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The following lists all amendments to the 616 NRDWSF Portion of the HF RCRA Permit and where these are located in Revision 3.

III.1.B.a. is now located on Page 2-6, line 7, and reads as follows:
"Compatible waste with incomplete paperwork also is staged in this area while discrepancies are resolved."

III.1.B.b. is no longer applicable per the revised Ecology Checklist.

III.1.B.c. has been removed from the text.

III.1.B.d. is now located in Chapter 3.0, Section 3.3, page 3-3, line 8.

III.1.B.e. is now located in Appendix 3A, Section 1.1, page 3, lines 41 through 42.

III.1.B.f. is now located in Appendix 3A, Section 1.2, page 4, lines 7 through 47, and page 5, lines 1 through 26.

III.1.B.g. is now located in Appendix 3A, Section 1.2, page 5, lines 32 through 34.

III.1.B.h. is now located in Appendix 3A, Section 1.2, page 5, lines 36 through 43.

III.1.B.i. is now located in Appendix 3A, Section 1.3, page 6, line 9.

III.1.B.j. is now located in Appendix 3A, Section 1.3, page 6, lines 10 through 11.

III.1.B.k. is now located in Appendix 3A, Section 1.3, page 6, line 16.

III.1.B.l. is now located in Appendix 3A, Section 1.3, page 6, lines 24 through 26.

III.1.B.m. is now located in Appendix 3A, Section 1.3, page 6, lines 26 through 27.

III.1.B.n. is now located in Appendix 3A, Section 1.4, page 6, lines 33 through 49.

III.1.B.o. is now located in Appendix 3A, Section 1.4, page 7, lines 11 through 16.

III.1.B.p. is now located in Appendix 3A, Section 1.4, page 7, lines 23 through 24.

III.1.B.q. is now located in Appendix 3A, Section 1.4, page 7, lines 27 through 28.

III.1.B.r. [Reserved]

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III.1.B.s. is now located in Chapter 4.0, Section 4.1.2, page 4-4, lines 38 through 42.

III.1.B.t. [Reserved]

III.1.B.u. is now located in Chapter 4.0, Section 4.1.2, page 4-5, lines 18 through 19.

III.1.B.v. has been removed from the text.

III.1.B.w. is now located in Chapter 4.0, Section 4.1.2, page 4-5, lines 33 through 35.

III.1.B.x. is now located in Chapter 6.0, Figure 6-1, page F6-1.1.

III.1.B.y. has been removed from the text.

III.1.B.z. is now located in Chapter 11.0, Section 11.1.1.2, page 11-2, lines 38 through 42.

III.1.B.aa. is now located in Chapter 11.0, Section 11.1.1.1, page 11-1, line 41.

III.1.B.bb. is now located in Chapter 11.0, Table 11-1, page T11-1.

III.1.B.cc. through ff. are now addressed in the Hanford Facility Dangerous Waste Permit Application, General Information Portion (DOE/RL-91-28), Chapter 12.0.

III.1.B.gg. is now located in Chapter 3.0, Section 3.1, page 3-1, lines 29 through 33.

III.1.B.hh. is now located in Appendix 11A.

III.1.B.ii. is now located in Chapter 7.0, page 7-1, lines 4 through 5.

III.1.B.jj. is now longer applicable per WAC 173-303.

III.1.B.kk. is now located in Chapter 2.0, Section 2.1.6, page 2-6, lines 36 through 39.

III.1.B.ll. is no longer applicable.

III.1.B.mm. is now located in Chapter 3.0, Section 3.3, page 3-4, line 19.

III.1.B.nn. is now located in Chapter 3.0, Section 3.1, page 3-1, lines 12 through 17.

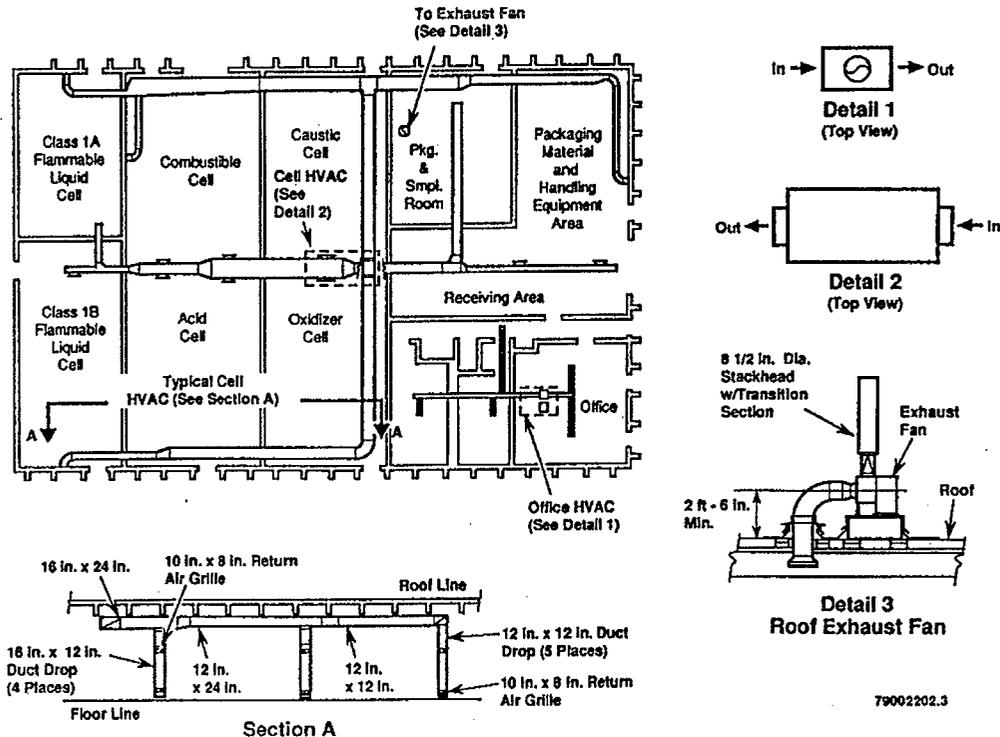
III.1.B.oo. is now located in Chapter 3.0, Section 3.1, page 3-1, lines 24 through 25.

III.1.B.pp. has been removed from Chapter 3.0.

III.1.B.qq. is now located in Chapter 3.0, Section 3.1, page 3-1, line 26.

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Figure 2-3. The 616 Nonradioactive Dangerous Waste Storage Facility Heating, Ventilation, and Air Conditioning Schematic.



Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

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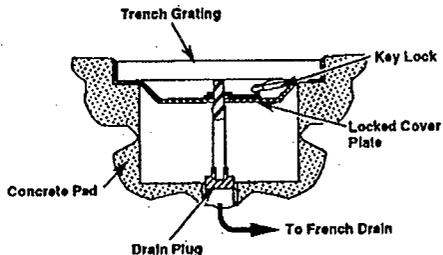
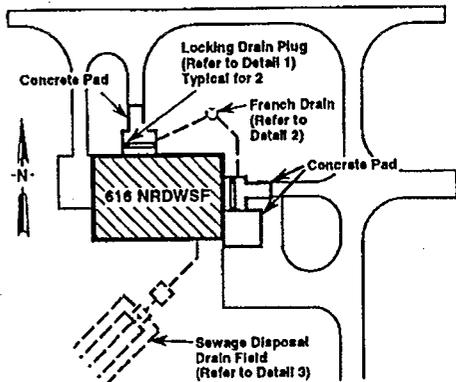
C16 BUILDING STORAGE COMPATIBILITY CELLS			
STORAGE AREA	PRIMARY STORAGE	SECONDARY STORAGE	PROHIBITED STORAGE
FLAMMABLE Class 1A $FP < 73^{\circ}F$ (UP $< 100^{\circ}F$)	Flammable Solids Flammable Liquids - 1A Flammable Gases Spontaneously Combustible Materials	Non-RCRA Waste Solids Non-RCRA Waste Liquids Combustible Liquids Flammable Liquids - 1B & 1C Non-Flammable Gases Flammable Gases Irritating Materials Class 9, Misc. Haz. Materials	Flammable Solids - DWV † Poison Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
FLAMMABLE Classes 1B & 1C $FP < 73^{\circ}F$ (MP $\geq 100^{\circ}F$) $73^{\circ}F \leq FP < 100^{\circ}F$	Flammable Solids Flammable Liquids - 1B & 1C Non-Flammable Gases Spontaneously Combustible Materials	Non-RCRA Waste Solids Non-RCRA Waste Liquids Combustible Liquids Irritating Materials Class 9, Misc. Haz. Materials	Flammable Solids - DWV † Flammable Liquids - 1A Poison Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
FLAMMABLE Class 1A - Cabinets Dangerous When Wet	Flammable Solids - DWV †	Flammable Solids Flammable Liquids - 1A Flammable Liquids - 1B & 1C	Non-RCRA Waste Liquids Poison Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
FLAMMABLE Class 1B & 1C - Cabinets Dangerous When Wet	Flammable Solids - DWV †	Flammable Solids Flammable Liquids - 1B & 1C	Non-RCRA Waste Liquids Poison Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
COMBUSTIBLE Class 2, Class 3HA & 3HB $100^{\circ}F \leq FP < 140^{\circ}F$ $140^{\circ}F \leq FP < 200^{\circ}F$ $FP \geq 200^{\circ}F$	Non-RCRA Waste Solids Non-RCRA Waste Liquids Combustible Liquids Poison Gases Poisonous Materials ‡ Irritating Materials Class 9, Misc. Haz. Materials	Flammable Solids Non-Flammable Gases	Flammable Solids - DWV † Flammable Liquids Flammable Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
OXIDIZER Promotes Combustion	Non-RCRA Waste Solids Non-RCRA Waste Liquids Oxidizers Organic Peroxides Irritating Materials Class 9, Misc. Haz. Materials	Combustible Liquids Non-Flammable Gases Poisonous Materials ‡	Flammable Solids - DWV † Flammable Solids Flammable Gases Poison Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)
ACIDIC $pH < 7$	Non-RCRA Waste Solids Poisonous Materials ‡ Corrosive Materials (Acidic) Irritating Materials Class 9, Misc. Haz. Materials	Combustible Liquids Non-RCRA Waste Liquids Non-Flammable Gases	Flammable Solids - DWV † Flammable Solids Flammable Liquids Flammable Gases Poison Gases Oxidizers Organic Peroxides Corrosive Materials (Caustic)
CAUSTIC $pH > 7$	Non-RCRA Waste Solids Corrosive Materials (Caustic)	Combustible Liquids Non-RCRA Waste Liquids Non-Flammable Gases Poisonous Materials ‡	Flammable Solids - DWV † Flammable Solids Flammable Liquids Flammable Gases Poison Gases Oxidizers Organic Peroxides Corrosive Materials (Acidic)
Packaging & Sampling Room		Non-RCRA Waste Solids Non-RCRA Waste Liquids Combustible Liquids Irritating Materials Class 9, Misc. Haz. Materials	Flammable Solids - DWV † Flammable Liquids Flammable Gases Corrosive Materials (Acidic) Corrosive Materials (Caustic)

* Use of the terms "FLAMMABLE" and "COMBUSTIBLE" in this table are as defined in the 1993 Edition of NFPA 30, net 49 CFR.
 † Class 4.3, Dangerous When Wet Material
 ‡ Poisonous Liquids, Packing Group I, Zone A, may be stored in the COMBUSTIBLE cell only.

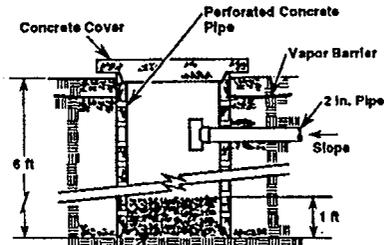
Figure 2-4. Waste Storage Compatibility by Hazard Class.

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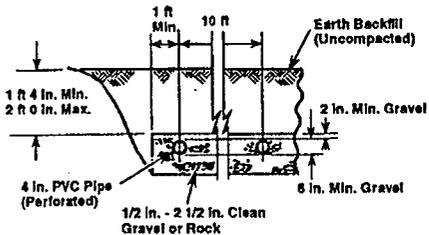
Figure 2-5. Diagram of French Drain.



Detail 1
Locking Drain Plug



Detail 2
French Drain



Detail 3
Sewage Disposal Drain Field

NRDWSF = Nonradioactive Dangerous Waste Storage Facility
 PVC = Polyvinyl Chloride
 Min. = Minimum
 Max. = Maximum

Note: To convert feet to meters, multiply by 0.3048.
 To convert inches to centimeters, multiply by 2.54.

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3.0 WASTE ANALYSIS [C]

This chapter provides information on the physical, chemical, and biological characteristics of the waste stored at the 616 NRDFS. A waste analysis plan is included that describes the methodology used for determining waste types.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS [C-1]

The 616 NRDFS stores nonradioactive dangerous waste that is received from generating units located on the contiguous Hanford Facility and from DOE-RL owned and operated generators located on noncontiguous areas near the Hanford Facility (e.g., Federal Building and the 712 Building in downtown Richland and the 3000 Area). This waste is stored in the 616 NRDFS until it is transported to an offsite TSD facility. Waste normally is received in U.S. Department of Transportation 18.9-, 113.6-, and 208-liter containers, but also can be received in other U.S. Department of Transportation-approved containers such as wooden or fiberboard boxes (Table 3-1). No waste is accepted at the 616 NRDFS in bulk loads (e.g., tank trucks, dump trucks, etc.).

The 616 NRDFS receives nonradioactive dangerous waste from DOE-RL owned and operated processing, testing, maintenance, and construction activities. The DOE-RL and Hanford Site contractors have implemented control procedures to ensure that proper waste identification, packaging, and Ecology designation are attained (Appendix 3A). Figure 3-1 illustrates the process for handling containerized nonradioactive dangerous waste. Chemical, biological, and physical analyses of the dangerous waste to be handled at 616 NRDFS pursuant to WAC 173-303-806(4)(a), entitled "616 Nonradioactive Dangerous Waste Facility Off-Site Shipping Lists," are found in Attachment 9 of the Hanford Facility RCRA Permit (Ecology 1994).

Most of the nonradioactive dangerous waste received at the 616 NRDFS consists of old (outdated) pure chemical products, spent dangerous waste sources, product mixtures in small laboratory quantities, and empty dangerous waste drums (WAC 173-303-160). Some waste regulated under the *Toxic Substances Control Act of 1976* (polychlorinated biphenyl) is received and stored at the 616 NRDFS in accordance with applicable regulations. Any waste listed in WAC 173-303-9903, or any dangerous waste mixture (WAC 173-303-084), or characteristic waste (WAC 173-303-090), could be generated on the Hanford Site. Waste normally can be characterized into 'U', 'P', 'F', 'D', 'WP', or 'WT' Ecology waste code designations by the use of manufacturers' product information, material safety data sheets, laboratory analysis, and such references as 40 CFR 302.4, *Dangerous Properties of Industrial Materials* (Sax 1984), *Registry of Toxic Effects of Chemical Substances* (NIOSH 1986), and *The Condensed Chemical Dictionary* (Sax and Lewis 1987). Waste also is characterized in accordance with the requirements of 40 CFR 261 and 40 CFR 761.

1 It is the responsibility of the generating units to completely and
2 correctly identify the dangerous constituents of their waste. Based on waste
3 identification information provided by the generating unit's waste
4 coordinator, the solid waste management staff designates the waste in
5 accordance with WAC 173-303-070. The solid waste management staff maintains
6 auditable copies of the following for each waste stored at the 616 NRDWSF, as
7 applicable:

- 8
- 9 • All records providing a description of the waste
- 10
- 11 • Documentation identifying the dangerous characteristics of the waste
- 12
- 13 • The basis for waste designation
- 14
- 15 • Laboratory reports with chemical, biological, and physical analysis of
- 16 samples
- 17
- 18 • Waste tracking forms/or Uniform Hazardous Waste Manifest.
- 19
- 20 • For wastes shipped to offsite TSD facilities, land disposal
- 21 restriction documentation (Chapter 12.0, Section 12.4.2.2.7).
- 22

23 The generating unit and the 616 NRDWSF operating organization maintain
24 copies of the waste tracking forms/or Uniform Hazardous Waste Manifest and
25 associated documents [i.e., hazardous waste disposal analysis record
26 (Appendix 3A)] identifying the waste characteristics and assigned waste
27 designations.

28

29 In general, each package is unique and new containers continuously are
30 being accepted for storage. In 1990, the 616 NRDWSF received 1,932 containers
31 in 94 shipments, an average shipment being 20 containers every 4 to 5 days.
32 The 616 NRDWSF accepts waste for storage with the waste codes identified in
33 Table 3-2, excluding explosive, shock-sensitive (Section 4.1.4.1), class IV
34 oxidizer (in waste volumes greater than 4.5 kilograms) and radioactive waste.
35 The 616 NRDWSF also can store containerized *Toxic Substances Control Act*
36 regulated waste.

37

38 Nonradioactive dangerous waste is shipped to an appropriate permitted
39 TSD facility. The waste is designated according to Ecology regulations for
40 waste designation outlined in WAC 173-303-070.

41

42

43 3.2 WASTE ANALYSIS PLAN [C-2]

44

45 The waste analysis plan is provided in Appendix 3A.

46

47

48 3.3 TRACKING SYSTEM [C-4]

49

50 Specific waste tracking forms for the transfer of waste to the 616 NRDWSF
51 are used. The waste tracking forms and other supporting documentation will be

1 maintained on the Hanford Facility for a minimum of 5 years following closure
2 of the 616 NRDFS.

3
4 The Hanford Facility uses an EPA Uniform Hazardous Waste Manifest for all
5 offsite shipments of dangerous waste. Onsite waste tracking forms are used
6 for transporting waste on the Hanford Facility.

7
8 The following provides requirements for receiving shipments, response to
9 manifesting discrepancies, and provisions for nonacceptance of shipments.

10
11 Before transfer of nonradioactive dangerous waste to the 616 NRDFS, the
12 following occurs (Appendix 3A).

- 13
- 14 • The generating unit secures the waste in a controlled, less-than-
15 90-day-storage area, satellite accumulation area, CERCLA cleanup site,
16 or expedited response action site.
- 17
- 18 • If the contents of the container cannot be verified, the waste
19 coordinator for the generating unit (Section 3.2) identifies the waste
20 from associated manufacturer's data, waste records, or sample
21 analysis.
- 22
- 23 • The waste coordinator for the generating unit submits a waste
24 storage/disposal request (Section 3.2) to solid waste management.
- 25
- 26 • A trained designator in solid waste management identifies the proper
27 waste designation.
- 28
- 29 • The completed waste designation is reviewed and signed by a peer
30 designator and a solid waste management manager.
- 31
- 32 • Solid waste management sends a hazardous waste disposal analysis
33 record (Section 3.2) to the generating unit's waste coordinator and to
34 616 NRDFS operating personnel.
- 35
- 36 • The generating unit's waste coordinator ensures that the dangerous
37 waste is packaged, marked, and labeled in accordance with the
38 hazardous waste disposal analysis record.
- 39
- 40 • The generating unit's waste coordinator prepares an onsite waste
41 tracking form or Uniform Hazardous Waste Manifest. The onsite waste
42 tracking form or Uniform Hazardous Waste Manifest identifies the
43 applicable contractor as the transporter and the 616 NRDFS as the
44 receiving storage unit.
- 45
- 46 • Transportation personnel inspect the containers for compliance with
47 U.S. Department of Transportation regulations and compliance with the
48 hazardous waste disposal analysis record.
- 49
- 50 • A transporter transports the dangerous waste from the generating unit
51 to the 616 NRDFS.
- 52

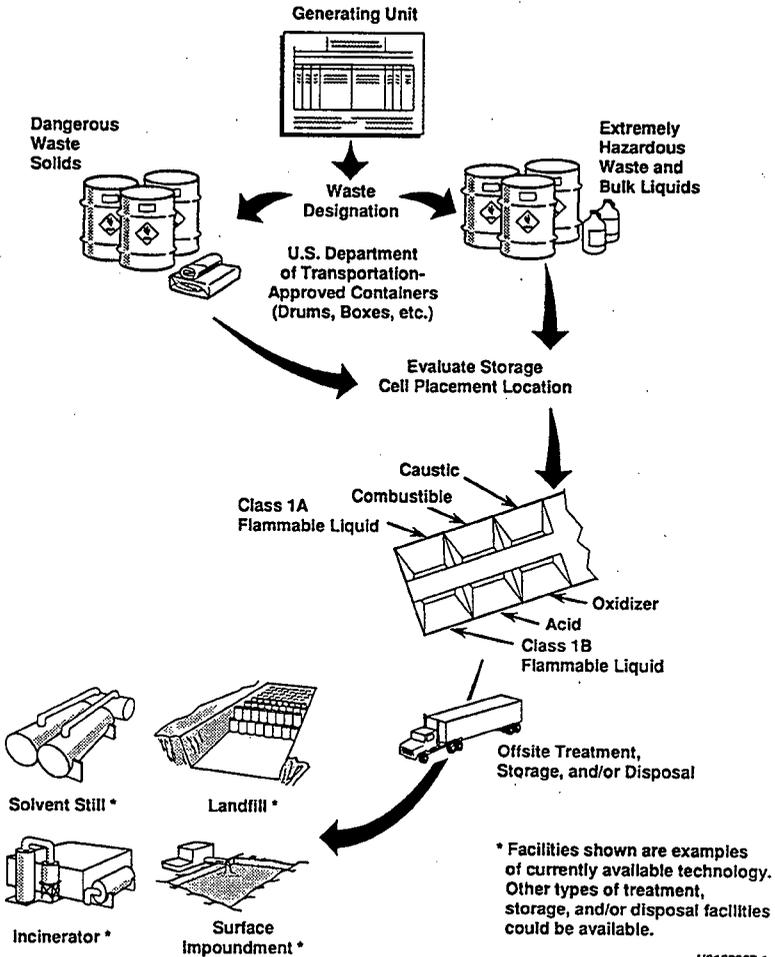
1 Before a transfer is accepted at the 616 NRWSF, each container is
2 reviewed against the onsite waste tracking form or the Uniform Hazardous Waste
3 Manifest, and the hazardous waste disposal analysis record. During the
4 review, the following items are checked:

- 5
- 6 • Proper shipping name
- 7
- 8 • Proper hazard class
- 9
- 10 • Proper marking and labeling
- 11
- 12 • Valid radiation release sticker in place (except for exempted
13 facilities)
- 14
- 15 • Proper packaging (e.g., correct container specification)
- 16
- 17 • Container condition.
- 18
- 19 • Evidence tape from field verified waste is untampered.
- 20

21 If the container passes these checks, the container is placed in the
22 appropriate storage cell (Chapter 4.0, Section 4.1.1.2 and Chapter 6.0,
23 Section 6.4.1). The acceptance procedure also ensures the following occurs.

- 24
- 25 • Significant discrepancies are noted on all copies of the waste
26 tracking form or Uniform Hazardous Waste Manifest.
- 27
- 28 • The transporter is given one signed copy of the waste tracking form
29 or Uniform Hazardous Waste Manifest.
- 30
- 31 • A copy of the waste tracking form or Uniform Hazardous Waste Manifest
32 is sent to the generating unit within 30 days of receipt.
- 33
- 34 • A copy of the waste tracking form or Uniform Hazardous Waste Manifest
35 is retained for at least 5 years by the 616 NRWSF and solid waste
36 management organization.
- 37

38 All dangerous waste stored at the 616 NRWSF is shipped offsite for
39 treatment, storage, and/or disposal. Before shipment offsite, all waste is
40 manifested to comply with U.S. Department of Transportation, EPA, WAC 173-303,
41 and other applicable regulations.
42
43



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Figure 3-1. Decision Process for Handling Dangerous Waste.

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1
2 Table 3-1. Common Containers Stored at the 616 Nonradioactive
Dangerous Waste Storage Facility.

3	DOT ^a Spec.	Container	Material	Ref. ^b (49 CFR 178)
4	12P/12U	CF ^c w/inner poly	Fiberboard/polyethylene	178.
5	(UN6HG2)	liner		522
6	12B (UN4G1)	CF	Fiberboard	178.516
7	17C (UN1A1)	DM ^d	Low carbon steel	178.504
8	17E (UN1A1)	DM	Low carbon steel	178.504
9	17H (UN1A2)	DM	Low carbon steel	178.504
10	34 (UN1A1)	DF ^e	Polyethylene	178.509
11	37A (UN1A1)	DM	Low carbon steel	178.504
12	37B (UN1A1)	DM	Low carbon steel	178.504

13 ^aU.S. Department of Transportation specifications.14 ^bReference section of regulations.15 ^cCF = fiberboard box.16 ^dDM = drum, metal.17 ^eDF = drum, fiberboard.

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Table 3-2. Waste Codes of Materials
Stored at the 616 Nonradioactive
Dangerous Waste Storage Facility.

Waste codes	Reference
U and P numbers	WAC-173-303-9903
F numbers	WAC-173-303-9904
W001	WAC-173-303-9904
D001	WAC-173-303-090(5)
D002	WAC-173-303-090(6)
D003	WAC-173-303-090(7)
D004 through D043	WAC-173-303-090(8)
WT01 and WT02	WAC-173-303-101/104
WP01, WP02 and WP03	WAC-173-303-102/104
WSC2	WAC-173-303-090(6)

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21		EXHIBIT IGNITABILITY OR REACTIVITY [D-1e]	4-6
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FIGURE

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14 4-4. Storage Cell Volume T4-4
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4.0 PROCESS INFORMATION [D]

This chapter discusses the processes used to store containers at the 616 NRDWSF.

4.1 CONTAINERS [D-1]

The following sections describe the type of containers stored at the 616 NRDWSF. The construction specification for this storage unit is provided in Appendix 4A.

4.1.1 Containers with Free Liquids

Containers with free liquid are discussed in the following sections.

4.1.1.1 Description of Containers [D-1a]. The 616 NRDWSF only accepts waste properly packaged in U.S. Department of Transportation-approved containers. These containers are chosen in accordance with pertinent regulations and are approved for that waste. Table 4-1 lists the most common types of containers [and applicable U.S. Department of Transportation specifications (49 CFR 178)] stored at the 616 NRDWSF.

All containers stored at the 616 NRDWSF are in an acceptable condition for each waste type (Appendix 3A). Because no containers are reconditioned on the Hanford Facility, there are no reconditioned containers at the 616 NRDWSF.

All waste containers received at the 616 NRDWSF are marked and labeled in accordance with the requirements specified under U.S. Department of Transportation regulations (49 CFR 172). Marking and labeling requirements are specified on the hazardous waste disposal analysis record (Appendix 3A). In addition to the U.S. Department of Transportation marking and labeling requirements, all waste containers are marked as follows:

- 'PERSISTENT' - If a WP01, WP02, or WP03 waste code is applicable
- 'TOXIC' - If a WT01 or WT02 waste code is applicable.

4.1.1.2 Container Management Practices [D-1b and c]. The 616 NRDWSF is designed with two different types of cells: regular storage and flammable liquid storage (Chapter 2.0, Figure 2-2). The details for each cell are provided in Table 4-2.

Before being accepted at the 616 NRDWSF for storage, each container is inspected for the following:

- Container condition
- Container seal
- Proper marking and labeling
- Valid radiological release, if applicable.

1 On being accepted for storage at the 616 NRDWSF, containers are unloaded
2 in accordance with the requirements of Chapter 6.0, Section 6.4.1, and moved
3 to the proper storage cell as described on the hazardous waste disposal
4 analysis record (Appendix 3A). The containers are moved on drum dollies, by a
5 pallet jack, or by a forklift if palletized (the forklift is prohibited from
6 operating in the Class 1-A flammable liquid cell). The containers are placed
7 in the assigned storage cell, with the containers being placed in one of the
8 storage locations painted on the cell floor (Chapter 6.0, Figure 6-2 provides
9 storage locations). The location of the container is logged on a locator
10 chart and input into the 616 NRDWSF waste tracking system. This system
11 identifies the location of each container stored in the 616 NRDWSF. Waste
12 packages can be stacked in any storage cell. Table 4-3 identifies the
13 stacking restrictions for each cell.
14

15 The containers can be stacked either by hand or machine (e.g., forklift).
16 Containers stacked by hand are placed next to the containers on which the
17 containers are to be stacked. The container is lifted and placed onto the
18 base container, taking care not to damage either container. The 616 NRDWSF
19 supervisor is responsible for ensuring that all lifts are done in accordance
20 with applicable safety requirements. No personnel are allowed to lift a waste
21 container in a manner that jeopardizes them or other personnel.
22

23 The lifting of containers having a gross weight that exceeds the weight
24 limit identified for an individual can be stacked by two employees or by
25 mechanical means. Containers having a gross weight exceeding 59.1 kilograms
26 must be stacked by mechanical means. Mechanically stacked containers must be
27 placed on a pallet or similar dunnage to properly distribute the load to base
28 containers.
29

30 Containers are closed during normal operations and are not handled or
31 stored in a manner that might damage the packaging. The containers are
32 inspected daily (when the storage unit is occupied) for degradation and
33 leakage. Activities restricted to the office area do not require a daily
34 inspection of the storage area, provided the ventilation system is fully
35 operational. A weekly inspection of the 616 NRDWSF and its waste inventory,
36 if present, (Chapter 6.0, Section 6.2.1.2) is performed.
37

38 In preparation for shipment of waste from the 616 NRDWSF to an offsite
39 TSD facility, containers are identified for shipment from the 616 NRDWSF
40 inventory tracking system. A completed offsite manifest and a list of waste
41 proposed for shipment are transmitted to transportation personnel and a
42 contracted offsite TSD facility for review. Review comments are dispositioned
43 to the satisfaction of all parties. The 616 NRDWSF personnel mark the
44 containers with the offsite manifest number. Solid waste management prepares
45 a letter that accompanies the waste shipment addressing the land disposal
46 restriction; documentation requirements are identified in Chapter 12.0.
47

1 Before shipment, each container is inspected and reviewed by
2 transportation representatives for proper designation, packaging, marking, and
3 labeling. An independent review of the shipping documentation (i.e., offsite
4 manifest, product information sheets) is performed. Solid waste management
5 and the 616 NRDWSF supervisor review each package before the package is loaded
6 on the truck for offsite shipment.
7

8 **4.1.1.3 Secondary Containment System Design and Operation [D-1d through**
9 **D-1d(1)(a)].** The design of the secondary containment system is shown in
10 Figure 4-1 and in Appendix 4B. Secondary containment consists of three main
11 components. First, each cell consists of a sealed concrete pad, which is
12 sloped to containment trenches. Second, there are three containment trenches
13 between adjacent cells, one for each cell and one in the walkway between the
14 cells. Third, each cell is surrounded by a curb for additional containment.
15 This curb varies from approximately 5.0 to 10.0 centimeters in height as the
16 level of the cell floor varies.
17

18 **4.1.1.4 Requirement for Base or Liner to Contain Liquids [D-1d(1)(b)].** The
19 floor and trenches in the storage and container handling areas are constructed
20 of reinforced concrete. Concrete was selected as a construction material
21 because concrete is essentially inert and inhibits downward permeation of
22 liquid caustic, oxidizing, combustible, and flammable materials.
23 Additionally, the concrete floor surface has been sealed with a polyamide
24 epoxy resin that, when cured, has properties similar to glass. The polyamide
25 epoxy resin base finish coatings were selected because of the capability of
26 the coatings to resist abrasion, extreme environmental conditions, and a wide
27 variety of chemical exposures (Appendix 4D).
28

29 The design of the floor in the storage and container handling areas
30 consists of concrete slabs (seamless) sloped to dedicated collection trenches
31 (Figure 4-1 and Appendix 4B). All interior trenches are self-contained
32 (without drains). Each storage cell is surrounded by a curb varying in height
33 from approximately 5.0 to 10.0 centimeters, which would provide additional
34 containment in the event of a large spill.
35

36 If a crack that compromises the integrity of the concrete containment
37 system of a storage cell is found, the crack is prepared, grouted, and sealed
38 in accordance with the construction specification (Appendix 4A) and the repair
39 material manufacturer's instructions. Significant cracks in the floor surface
40 of the containment cells are repaired within 14 days of detection.
41 Significant cracks in the storage cell containment trenches are repaired
42 within 5 working days of detection. If crack repairs cannot be completed
43 within the specified time periods, liquid waste storage in the affected areas
44 is suspended until repairs are completed.
45

46 After repair completion, the environmental compliance officer or designee
47 inspects the repair to ensure acceptability and indicates acceptance of the
48 repair in the 616 NRDWSF logbook. The logbook is maintained for the life of
49 the 616 NRDWSF.
50

1 4.1.1.5 Containment System Drainage [D-1d(1)(b)]. Each storage cell consists
2 of a concrete slab sloped to a self-contained containment trench
3 (Section 4.1.1.4).

4
5 4.1.1.6 Containment System Capacity [D-1d(1)(c)]. Each storage cell is
6 designed to contain over 10 percent of the total volume of containers that can
7 be stored there. Each cell is designed with a sloping floor that drains to a
8 containment trench (Figure 4-1 and Appendix 4B). Table 4-4 lists the total
9 containment volume and maximum container storage volume per cell.
10 Calculations performed to verify containment capacity are detailed in
11 Appendix 4C.

12
13 4.1.1.7 Control of Run-On/Run-Off [D-1d(1)(d)]. The only major run-on or
14 run-off foreseen would be a flood, fire sprinkler activation, or a break in
15 the water main. No floods are predicted to impact the 616 NRDWSF
16 (DOE/RL-91-28, Chapter 2.0).

17
18 In the event of a run-on or run-off from any source (e.g., fire sprinkler
19 activation, pipe break, etc.), containment systems in the 616 NRDWSF are
20 capable of holding between 2,445 liters and 3,510 liters of liquid for each
21 cell as cell width varies. Collected or contained liquid can be removed by
22 hand pumps for large quantities and by absorbents for smaller quantities. All
23 waste stored in the 616 NRDWSF is in sealed containers, which limits the
24 detrimental impact of a run-on or run-off situation.

25
26 In the event that contaminated water is released from the 616 NRDWSF
27 because of flooding of the containment system by fire sprinkler activation or
28 a pipe break (Section 4.1.2), the incident will be treated as a spill.

29
30 Actions to be taken in response to a spill or discharge are detailed in
31 the Building Emergency Plan - 616 Building provided in Appendix 7A.

32 33 34 4.1.2 Removal of Liquids from Containment System [D-1d(2)]

35
36 In the event of a spill or release at the 616 NRDWSF that results in
37 collection of liquid waste material in the containment system, the following
38 will be performed after determination by the Building Emergency Director (BED)
39 that implementation of the Contingency Plan pursuant to Appendix 7A is not
40 necessary or all necessary actions in accordance with the Contingency Plan
41 have been implemented. Either case must be recorded and signed in the TSD
42 unit-specific operating record by the BED.

- 43
44 • Containers in the cell(s) affected by the spill will be inspected for
45 signs of leakage. Leaking containers will be repackaged and
46 identified in the 616 NRDWSF operating and spill logbooks.
47
48 • Inspection reports and the 616 NRDWSF operating and spill logbooks
49 will be reviewed to identify any waste releases in the waste storage
50 areas for which remedial actions have not been completed.
51

- 1 • The waste will be removed from the containment system. The equipment
2 used for removal of large quantities of liquid normally would be a
3 hand-held pump or vacuum system. Adsorbents will be used for removal
4 of small amounts of liquid. The waste material will be placed in the
5 appropriate U.S. Department of Transportation-specified container.
6
7 • The containerized waste will be handled as follows.
8
9 - If the waste has been altered during stabilization and cleanup
10 actions (absorbed, mixed, diluted, etc.), the containerized waste
11 will be placed in storage and managed in accordance with the
12 provisions of the waste analysis plan (Appendix 3A).
13
14 - A waste storage/disposal request (Appendix 3A) will be submitted to
15 solid waste management for waste designation. In response, a waste
16 disposal analysis record describing the regulatory status and proper
17 packaging, labeling, and marking requirements for the waste
18 (Appendix 3A) will be issued. The 616 NRDWSF staff will ensure that
19 waste is properly packaged, labeled, marked, and stored.
20
21 - The 616 NRDWSF inventory will be altered to reflect the changes in
22 waste description, volume, and storage locations.
23
24 - If the waste was not altered during stabilization and cleanup
25 activities, the containerized waste will be placed in the
26 appropriate storage area and the 616 NRDWSF inventory altered to
27 reflect any changes.
28
29 • Wipe samples will be taken of the spill area in accordance with an
30 approved procedure (EPA 1987) using Whatman¹ No. 42 filter paper or
31 an equivalent. The filter paper used to collect the sample will be
32 moistened with an appropriate collection medium based on the
33 characteristics of the spilled material. All samples taken to verify
34 that the site of a release is clean will be obtained in accordance
35 with the applicable standards of Chapter 11.0, Section 11.1.4. et seq.
36 In the event that water would not be an appropriate collection medium
37 to dissolve the contamination of concern, the solvent used by the
38 laboratory for analysis will be used. The filter paper will be sent
39 to a laboratory where the filter paper will be prepared and analyzed
40 in accordance with the test methods identified in Appendix 3A, for
41 constituents known to have been involved in the spill to verify
42 cleanup adequacy.
43

44 An alternative sampling mechanism will be used for detection of waste
45 matrices for which wipe sampling protocols are ineffective. Volatile
46 organics will be detected using organic vapor air samplers. To detect
47 the presence of corrosive liquids, pH paper and pH monitors will be
48 used. The type of sampling technique used to determine the

49 ¹Whatman is a trademark of Whatman Incorporated.

1 cleanliness of the contaminant will be documented in the spill
2 logbook.

- 3
4 • When sampling techniques have verified cleanup, the 616 NRDWSF
5 supervisor will sign the spill logbook indicating that the waste was
6 removed from the containment system and cleanup activities were
7 completed. A solid waste management representative will sign the
8 spill logbook indicating approval of actions taken.

9
10 Specific actions to be taken in response to a spill or discharge are
11 detailed in the Building Emergency Plan - 616 Building provided in
12 Appendix 7A.

13
14 In the event of a fire sprinkler activation or a pipe break within the
15 616 NRDWSF that results in collection of water in the containment system, the
16 following will be performed.

- 17
18 • Water in the containment system visually will be inspected for signs
19 of contamination.
20
21 • Containers in the cell(s) affected by a sprinkler activation or a pipe
22 break will be inspected for signs of leakage.
23
24 • Inspection reports and the 616 NRDWSF operating and spill logbooks
25 will be reviewed to identify any waste releases in the waste storage
26 areas for which remedial actions were not completed.
27
28 • The 616 NRDWSF supervisor will sign the 616 NRDWSF logbook indicating
29 that the above steps were completed and that the storage building is
30 clean. Solid waste management will review the supervisors actions and
31 give concurrence.
32
33 • The water will be removed from the containment system. Water that
34 cannot be verified to be free of contamination will be containerized
35 and stored in an area equipped with secondary containment. The
36 containerized water will be handled in accordance with the provisions
37 of the waste analysis plan (Appendix 3A).
38
39 • The 616 NRDWSF supervisor will sign the logbook indicating that the
40 water was removed from the containment system.

41
42 Actions to be taken in response to a spill or discharge are detailed in
43 the Building Emergency Plan - 616 Building provided in Appendix 7A.

44
45
46 **4.2 CONTAINERS WITHOUT FREE LIQUIDS THAT DO NOT EXHIBIT IGNITABILITY OR**
47 **REACTIVITY [D-1e]**

48
49 Containers without free liquids are discussed in the following sections.
50

1 **4.2.1 Test for Free Liquids**
2

3 The 616 NRDWSF stores containers with free liquid and without free
4 liquid. Therefore, a test for free liquid is not required.
5
6

7 **4.2.2 Description of Containers**
8

9 Refer to Section 4.1.1.1, Description of Containers.
10
11

12 **4.2.3 Container Management Practices**
13

14 Refer to Section 4.1.1.2, Container Management Practices.
15
16

17 **4.2.4 Container Storage Area Drainage**
18

19 Each storage cell consists of a concrete slab sloped to a self-contained
20 containment trench (Section 4.1.1.4 and Chapter 2.0, Section 2.1).
21
22

23 **4.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES**
24 **IN CONTAINERS [D-1f]**
25

26 The following sections provide information on the management of
27 ignitable, reactive, and incompatible waste in containers. Additional
28 information can be found in Chapter 6.0, Section 6.5.
29
30

31 **4.3.1 Management of Reactive Waste in Containers [D-1f(1)]**
32

33 The 616 NRDWSF does not store waste exhibiting the characteristic
34 (reactivity) specified in WAC 173-303-090(7)(a)(vi), (vii), or (viii).
35
36

37 **4.3.2 Management of Ignitable and Reactive Waste in Containers [D-1f(2)]**
38

39 The nearest structure or TSD unit boundaries are in excess of 61 meters
40 from any of the ignitable waste sites as shown on Drawing H-13-000014 in
41 Appendix 2A. Sixty-one meters is in excess of the limits imposed by the
42 National Fire Protection Association (NFPA 1989).
43
44

45 **4.3.3 Management of Incompatible Wastes in Containers [D-1f(3)]**
46

47 The generating unit's waste coordinator and the solid waste management
48 staff are responsible for determining the regulatory status of each waste and
49 determining the incompatible compounds of the waste. Status information is
50 forwarded on a hazardous waste disposal analysis record (Appendix 3A) to the
51 generating unit, who packages the waste as instructed. Afterwards, solid
52 waste management personnel inspect the container for proper packaging,

1 labeling, marking, and onsite waste tracking forms before transport to the
2 616 NRDWSF. The container is inspected again at the 616 NRDWSF to determine
3 that the waste is properly packaged, marked, labeled, and manifested
4 (Appendix 3A).

5
6 Each storage cell in the 616 NRDWSF contains one compatibility group and
7 is segregated either by three self-contained trenches or concrete walls.

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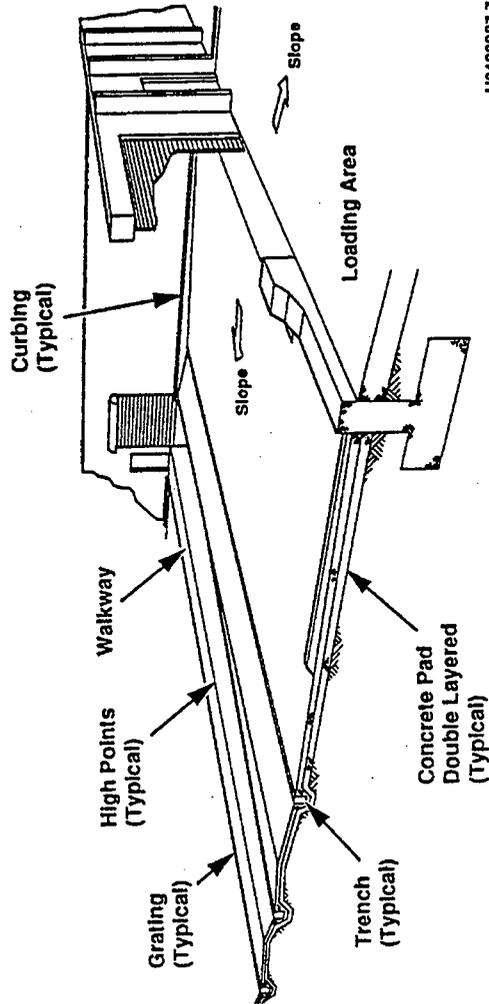


Figure 4-1. Design of the Secondary Containment System.

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1 Table 4-1. Common Containers Stored at the 616 Nonradioactive
2 Dangerous Waste Storage Facility.

3	DOT ^a Spec.	Container	Material	Ref. ^b (49 CFR 178)
4	12P/12U	CF ^c w/inner	Fiberboard/polyethylene	178.522
5	(UN6HG2)	poly liner		
6	12B (UN4G1)	CF	Fiberboard	178.516
7	17C (UN1A1)	DM ^d	Low carbon steel	178.504
8	17E (UN1A1)	DM	Low carbon steel	178.504
9	17H (UN1A2)	DM	Low carbon steel	178.504
10	34 (UN1A1)	DF ^e	Polyethylene	178.509
11	37A (UN1A1)	DM	Low carbon steel	178.504
12	37B (UN1A1)	DM	Low carbon steel	178.504

13 ^aU.S. Department of Transportation specifications.14 ^bReference section of regulations.15 ^cCF = fiberboard box.16 ^dDM = drum, metal.17 ^eDF = drum, fiberboard.18
19

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Table 4-2. Container Management Per Storage Cell.

Cell	Maximum containers per tier	
	Tier 1 (ground)	Tier 2
<u>Regular storage</u>		
Caustics	50 (208 liters)	40 (208 liters) 10 (113 liters) ^a
Oxidizers	50 (208 liters)	40 (208 liters) 10 (113 liters) ^a
Combustibles	58 (208 liters)	40 (208 liters) 18 (113 liters) ^b
Acids	60 (208 liters)	40 (208 liters) 20 (113 liters) ^b
<u>Flammable liquid storage</u>		
Class 1A	32 (208 liters) 1 flammable liquid storage cabinet (512 liters)	32 (75 liters) ^c
Class 1B*	40 (208 liters)	40 (113 liters) ^d

^aTier 2, row 1 \leq 30 113 liters (Chapter 6.0, Figure 6-4).

^bTier 2, rows 1 and 6 \leq 113 liters (Chapter 6.0, Figure 6-4).

^cTier 2 \leq 75 liters.

^dTier 2 \leq 113.6 liters.

*A flammable liquid storage cabinet(s) can be used in the Class 1B storage cell resulting in the following arrangement:

36 (208.2 liters) 36 (113.6 liters)^d

1 flammable liquid
storage cabinet
(512 liters)

or

34 (208.2 liters) 34 (113.6 liters)^d

2 flammable liquid
storage cabinet
(1,024 liters)

Because the total volume stored in this configuration (12,094.4 liters) is less than the other (12,870.4 liters), the volume is not listed in Table 4-2. Table 4-4 also is based on the maximum volume stored.

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1 Table 4-3. Storage Cell Stacking Restrictions.
2

Cell	Stacked container volume restrictions	
	Single row	Double row
3 Oxidizer	≤113 liters	≤208 liters
4 Caustic	≤113 liters	≤208 liters
5 Acid	≤113 liters	≤208 liters
6 Combustible	≤113 liters	≤208 liters
7 Class 1B flammable	≤113 liters	≤208 liters
8 Class 1A flammable	≤ 75 liters	≤ 75 liters

9 Note: Container stacking is limited to a base container and a
10 second tier.
11
12
13
14
15
16

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CONTENTS

1	
2	
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4	5.0 GROUNDWATER MONITORING [E] 5-1
5	

TRAINING PLAN

- Nonradioactive Dangerous Waste Storage Facility
- Low-Level Burial Grounds
- Radioactive Mixed Waste Land Disposal Facility
- TRU Retrieval program
- Solid Waste verification sampling
- WRAP 1 Shipping and receiving operator
- WRAP 1 Process glovebox operator
- WRAP 1 Restricted waste glovebox operator
- WRAP 1 Control room operator
- WRAP 1 Operations manager/operations team leaders.

5.4.3 Administration of JPMS/PDS for SWD Operations

Completion of JPMS/PDS is the final step in achieving job qualification for SWD operators. The JPMS/PDS are administered by qualified independent evaluators who are either operations team leaders or training personnel, but not the immediate team leader of the employee being evaluated. The examination consists of a minimum of two, and not more than 15, JPMS/PDS sufficient to evaluate an individual's knowledge, skills, and abilities in all important areas of job performance. Independent evaluators act as the final approval authority for the qualification process.

5.4.4 Examination Control

The training team leaders approve qualification examinations. Completed examinations are retained as part of completed qualification records. Examinations are controlled to prevent compromise of examination material. The examinations are stored in a locked storage container or in password protected computer files except as required for administering to a student, review by the oral examination board, for audit purposes, or update by examination author. Approved locations for storage of written examination material are designated by the training organization.

5.4.5 Oral Examinations

The final step of a qualification process for operations managers/team leaders is an oral examination. This evaluation assesses the candidate's knowledge of operations, systems, and interactions to determine the candidate's readiness for qualification and for assuming the responsibilities of a qualified SWD manager/team leader or Criticality Safety Representative.

5.4.5.1 Oral Examination Board. The Oral Examination Board consists of a minimum of four members. These members evaluate and score the candidate's responses. The board is chosen from the following (or their designees):

- Operations support manager (as applicable)
- Facility operations manager
- Operations engineering manager
- Nuclear, safety, and/or environmental manager
- Applicable SWD training team leader
- Radiological control manager
- Plant or deputy plant manager.

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The plant manager or deputy plant manager acts as the board's chairperson and performs the following:

- Ensures all prerequisites are met before commencing the oral board
- Provides a schedule for the candidate and board members with the time and location at least five working days before the board meeting
- Ensures the board is conducted in a professional manner and that the established rules and guidelines are followed
- Ensures the candidate is aware of the following:
 - The general conduct, scope, and length of the examination, and other pertinent information
 - The candidate's right to seek clarification of the examiner's questions when necessary
- Provides the candidate with the results of the board.

5.4.5.2 Oral Examination Categories. The oral examination consists of documented questions from (but not limited to) the following specific areas, if applicable to the facility or position:

- Design, control, operating, safety/safety analysis report limitations, and facility permit requirements
- Means by which facility design, operations, or procedures may be changed
- Radioactive and nonradioactive hazards within the facilities or plant
- Handling, controlling, and disposing of radioactive and nonradioactive hazardous materials and effluents
- Criticality safety requirements and procedures
- Industrial and fire safety, security, conduct of operations, and emergency systems, including reporting procedures
- Mechanical, electrical, and chemical theory
- Facility operating characteristics
- Job Control System (JCS).

5.4.5.3 Documentation and Evaluation of Oral Examinations. Each oral examination is documented on an oral examination form identified in the examination procedures and supplied to each examiner. The examiner documents only the comments that are relevant to determining a pass or fail conclusion.

The candidate and selected training personnel may see the comments. Each examiner evaluates the candidate's responses to every question that the examiner feels able to properly assess.

The following system is used for grading the examination.

- S--(SAT). Excellent to good knowledge and understanding of the subject. The candidate has demonstrated sufficient knowledge to safely carry out the responsibilities of the position.
- M--(Marginal). Fair working knowledge and understanding of the subject. The candidate may have difficulty answering questions in depth and relating the interaction between various systems.
- U--(UNSAT). Poor working knowledge and understanding of the subject. The candidate is unable to provide an answer, or the answers are incorrect or incomplete. The candidate shows obvious unfamiliarity with the subject, such as unusually hesitant answers or lack of understanding.

All grades are awarded on the basis of the candidate's verbal responses during the oral examination. The use of marginal evaluations should be minimized. Areas where the candidate's knowledge is marginal should be explored further in an attempt to determine if an "S" or "U" rating is warranted. If the marginal evaluation stands, supporting notes should be included, and the examiners objectively judge whether the candidate should pass or fail the examination. The candidate may be allowed to take additional training at a later date and retake an unsatisfactory or marginal portion of the Oral Board Examination, at the board's discretion.

The forms pertaining to the examination should be used only as an aid to the examiners in conducting the examination and as a means of documenting the basis for the examiner's pass/fail determination. The pass/fail determination is based on an audit of the candidate's level of knowledge, and (as such) all applicable areas should be explored in varying degrees of depth.

Each examiner must recommend approval or disapproval of the qualification based on the results of the entire examination. To successfully pass the oral examination, the candidate must receive a passing grade from each of the examiners.

5.4.6 Grading Standards--Written Examinations

For bargaining unit personnel, the satisfactory performance level for any objectively graded written examination is 70 percent. If the average grade is less than 70 percent, the entire examination must be retaken following remedial training, as specified in Section 5.11 and in accordance with the agreement between Westinghouse Hanford Company (WHC) and Hanford Atomic Metal Trades Council (HAMTC).

For exempt personnel, the satisfactory performance level for any objectively graded written examination is 80 percent. If the average grade is less than 80 percent, the entire examination must be retaken following remedial training, as specified in Section 5.11.

5.5 Qualification Card and Study Guide Administration for Operations

The qualification card contains the requirements for qualification. Requirements may include facility-specific training, classroom training, individualized instruction, OJT, comprehensive written exam, and operational exam. The qualification card documents qualification status and is an auditable record of an individual's participation in the performance based training program. The elements in the card are based on job analysis and supported by a task list.

Qualification cards are instruments for tracking and proving accomplishments and provide the employee with a list of requirements and a path of progression. The minimum required level of accomplishment shall be specified in the respective checklist for all requirements.

The study guide contains instructions and evaluation criteria. Knowledge requirements for the task to be performed are also found in the study guide. Qualification guides are developed and used to provide consistent OJT from trainer to trainer.

5.6 Provisional Qualification

Provisional qualification shall be established by the facility manager when the performance level required for full qualification cannot be satisfied. The provisional training program shall be approved by the training and operations managers and shall be established at the highest practical level consistent with work to be performed and existing constraints. Provisional qualification only covers tasks contained in the qualification card. Full qualification is necessary for unrestricted operation of a system or process. A provisional qualification is limited in scope and duration and will be in force only until full qualification can be achieved.

Provisional qualifications are valid for a maximum of one year.

5.7 OJT Qualification Guides for Maintenance Personnel

Maintenance OJT Instructors use OJT qualification guides to implement the OJT training process. A job-task analysis is used to determine which tasks are covered in the OJT qualification guides. The OJT qualification card documents the OJT process.

The OJT qualification card is an auditable record of an individual's participation in the performance-based training program. The OJT qualification card contains specific tasks identified by the job-task analysis for discussion, performance, and/or simulation. Upon completion of the training and evaluation process, the OJT instructor will sign off each task item.

The OJT qualification guide contains specific knowledge and skill requirements, specific technical material and references to enable the student to complete the identified task. The OJT qualification guide is a study reference document, training guidance instrument, and evaluation criteria for trainers; instructors, evaluators, and managers.

Section 1 of the OJT qualification guide identifies the specific task and the supporting skills and knowledge. Section 2 contains the technical material that addresses each knowledge factor. Section 3 contains the hands-on training where the student practices the specific skill factors. Section 4 contains the JPM and the qualification card.

OJT qualification guides should be reviewed by a subject matter expert who was not directly involved in their development and approved before use.

5.8 OJT

All OJT in SWD facilities is performance based. The method of conducting OJT, the required level of accomplishment, and performance test criteria are determined during the training material development process. The training and performance testing a trainee receives will qualify that individual to perform the task. Study guides and OJT qualification cards for individual qualification are developed to document training and to provide guidance for the instructor and the trainee.

The OJT instructors, subject matter experts, selected operators, maintenance crafts personnel, managers, and operations team leaders will be qualified to conduct OJT and performance tests in their areas of expertise. The primary method used to conduct OJT is the demonstration-performance method. When conditions warrant, alternate methods (such as discussion or simulation) may be used.

5.9 Proficiency Maintenance

It is necessary to maintain proficiency in facility operations and maintenance. This requires periodic hands-on experience to supplement the formal qualifications for facilities and/or watch stations. The following requirements will be met to ensure that proficiency is maintained:

1. An operator who fills one of the operator qualification positions must have completed a full shift in the same position within the last six months.
2. An operator who does not complete a full shift in a position in any six-month period has not maintained proficiency. This can be rectified by reviewing the facility/position status with the responsible manager and documenting satisfactory review in the individual's training file.
3. Operations managers, operations team leaders, and plant/facility managers will maintain proficiency through their normal duties.

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4. Proficiency of SWD maintenance personnel will be maintained by performance of assigned tasks or through equivalent training.

5.10 Failure Criteria

Failure to complete a component of a training program, failure to meet specified criteria during initial and continuing training, and/or a demonstrated deficiency requires initiating a remedial training program. An employee who has failed all or part of a training program must be assigned duties that do not require the failed training or be supervised by a trained individual. Remedial training is conducted in accordance with Section 5.11.

5.11 Remedial Training

Remedial training is an individually prepared program transmitted to the individual by internal memo from their immediate manager along with a remedial/retraining plan (the plan need not be more than one page in length). The program gives the individual experiencing difficulty written direction for actions to achieve required results. The remedial training program evaluates the effectiveness of the remedial training (i.e., for a classroom examination failure, a re-examination; for operational difficulties, an operational evaluation).

Remedial training programs are assigned as necessary, but must be assigned for the following:

- Failed classroom examinations
- Failed written qualification examinations
- Failed JPMs and PDs
- Failed oral board examinations
- Failed biennial written examinations.

The remedial training should be designed to ensure that the individual acquires additional knowledge. A two-week minimum waiting period is required before an employee may retake a failed written qualification examination. Remedial training may be recommended by the individual's immediate manager, instructors, or training evaluators.

Remedial training must be approved by the appropriate line manager. The completed copy of the remedial/retraining plan and its results will be filed with the individual's training field file.

5.12 Training Review Board

The employee's immediate manager or team leader determines and recommends to the Training Review Board the requirements for the following:

- Individual requalification for previously qualified personnel returning to work following extended absences (greater than six months for SWM and WRAP 1; and three months for T Plant) and/or corrective action

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- Individual requalification for previously qualified personnel demonstrating poor performance in the training program or facility operations.

The Training Review Board consists of the following:

- Individual's function manager
- Individual's facility/field operations manager or operations team leader
- WRAP 1, SWM, or T Plant training team leader or Operations Support team leader (when applicable)
- A bargaining unit member as applicable.

A copy of approved corrective actions and applicable milestones must be filed in the individual's field training file. Documentation of completion of corrective actions is submitted with completion of the associated training.

The Training Review Board approves a recommended course of action.

5.13 Continuing Training Program

Continuing training is designed to support and enhance the proficiency of operations personnel.

Continuing training provides qualification-oriented training and refresher training in selected areas.

The program, at the option of the training manager/team leader, may include:

- Attendance at selected continuing training lectures
- Completion of required reading
- Completion of selected OJT tasks
- Completion of all courses to maintain job qualifications
- Drills in the facility for response to abnormal or accident situations.

The training managers/team leaders document the completion of continuing lectures and OJT (beyond that required for qualification).

Continuing training lectures are scheduled and conducted as required.

If employees miss a lecture, their team leader/manager or another team leader/manager will cover the equivalent material and document the lectures in their training file.

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Training is specific to each operating facility. The SWD training team leaders, maintenance team leaders, and/or Operations Support team leaders compile the agenda for the lectures based on information received from operations, engineering, maintenance, and/or training needs. The lecture topics could include the following:

- Changes and upgrades to qualification packages
- Procedural changes
- Process/structural changes
- Industry events
- Unusual occurrences
- Lessons learned
- Demonstrated knowledge deficiencies
- Upgrading existing knowledge levels.

5.14 Required Reading

Important information relative to job assignments must be made available to appropriate personnel. The SWD uses required reading as a formal system to ensure that appropriate individuals receive important information. See Section 3.20 of this manual for further amplification.

5.15 Drill Program Description

Drills are conducted for operations personnel to develop and maintain proficiency in responding to abnormal or accident conditions. Teamwork skills are integrated into situations where technical knowledge and team skills are necessary. The objective is to establish, maintain, and enhance the performance of the individual and the team. Drill scenarios should identify and correct performance deficiencies related to abnormal and/or emergency situations.

5.16 Training Material Development

Training material is developed using a systematic approach (e.g., performance-based training) to ensure that all personnel are qualified to perform job requirements.

The affected group management, operations training, and facility management approve training materials. In addition, training material may be reviewed by other support organizations, as determined by SWD management.

5.17 Training Material Maintenance

Training material will be reviewed for accuracy as changes to state or federal regulations, plant or facility design or processes change, or changes in plant operating procedures take place. Training material will be reviewed and updated at intervals not to exceed two years.

5.18 Training Status Records

Training records are maintained by using the training records information (TRI) or TMX system and with the updates to employee training field file.

The following sections discuss exceptions and extensions.

5.19.1 Exceptions

Exceptions to initial and continuing training are considered on a case-by-case basis and are initiated by individual's immediate manager or team leader. The employee's name, the subject for which the exception is requested, and justification for the exception are sent to a plant/facility manager, or manager equal in authority for approval.

Under certain conditions, employees may be granted equivalency or be exempted or waived from specific qualification prerequisites or requirements.

Any deviation from the normal qualification requirements or qualification path must be documented on the individual's training field file. This documentation states what specific variation is requested and provides a short justification for the variation. No employee can be exempted from written or oral examination requirements associated with a qualification.

5.19.2 Extensions

Extensions of qualifications may be granted on a case-by-case basis by the plant/facility manager or manager equal in authority. Requests for extensions are prepared and processed by the applicable training team leader for approval by the applicable manager. An individual's manager or team leader will initiate the request for extension and should include, as a minimum, the following:

- The length of extension
- An explanation of the circumstances that prevented the person from completing the requirements
- A description of the operational schedule and/or commitment that necessitated the extension.

NOTE: Extensions of qualification for nuclear operators, operations team leaders, and managers usually will not be granted.

Anyone whose qualification has lapsed will be designated as a trainee in that area. Trainees will perform work as an extension of a qualified person only if the trainees are physically controllable by the qualified person.

5.20 Instructor Subject Matter Experts

The subject matter experts may be part-time instructors under the following conditions.

- The subject matter expert is qualified (or previously qualified) and/or experienced in a particular subject, topic, system or duty area.

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- The technical competence of the subject matter expert is verified by virtue of the individual's job assignment and overall command of the subject matter.
- An subject matter expert may be used to team-teach with the primary instructor.

5.21 Training Records

The SWD processes training records as follows.

- The original records are sent to and recorded on the TRI/TMX system.
- Field copies of records are maintained in the employee's training file. Contents of these files are listed in Section 5.3.
- A current training record is maintained by the individual's manager or team leader for the duration of employment in the facility, plus a three-year audit period. Personnel training records may accompany personnel transferred within the same company.
- The responsible team leader/manager reviews individual training records annually to ensure that tasks assigned and training received are appropriate for their employees.
- Letters or statements indicating the acceptance or denial of a request for exception to training and the basis for the justification are maintained in the employee's training field file.
- As required by Section 5.3, the employee profile system worksheet, recent health evaluation, position description, and statement of qualifications achieved also are maintained in the training field file as applicable.

The following forms can be obtained from applicable SWD training sections and are used to support and document the SWD training programs.

- The Individual Training Plan documents the training required for an employee. This record is maintained in the employee's training field file and reviewed and updated (as necessary) at least annually.
- The OJT qualification cards are used during the qualification process to record the completion of the required task items. The OJT qualification cards provide a permanent record of the qualification for each qualification package.
- The Oral Examination form records both the questions asked and key points from answers given during an Oral Board Examination. The Oral Examination form provides a permanent record to qualify the individual for qualification.

5.22 Qualified Personnel Status Report

The WRAP 1, SWM, and T Plant Training organizations issue a monthly report to WRAP 1, Solid Waste, and T Plant facility managers that provides the current training status for each of their employees. The managers are responsible for scheduling their employees for the applicable training.

NOTE: Managers are encouraged to use their training sections to assist them in scheduling and tracking training.

The PC&A manager compiles and issues a monthly report to the manager, SWD, identifying the qualification status of SWD personnel.

5.23 Facility Modifications, Procedure Changes, and Operating Experiences

Training on selected facility modifications, procedure changes, and operating experience is conducted during the continuing training program. When warranted by the significance of the information, the manager, team leader, or other appropriate personnel conduct a brief personnel lecture on the subject, incorporate the information into the support training schedule, or include the information in required reading.

5.24 Qualification Restrictions and Durations

Qualifications are granted only if the following conditions are met.

- All qualification requirements are completed (written and/or oral examinations, OJT requirements, and JPMS/PDs).
- Other specified requirements are completed (e.g., medical examinations).
- Immediate manager gives approval.
- For operations qualifications, an independent training evaluator verifies satisfactory completion of tasks that result in qualification.

5.25 Requalification Process

All employees will complete all training programs and/or courses in accordance with the established guidelines for the individual program/course. Requalification for specific job assignments is specified in Appendix A.

Written and/or oral examinations and proficiency demonstrations are used (to the extent possible) for requalification if the facility is not operated frequently enough to meet normal proficiency requirements.

If an employee has not received the job-specific training or retraining required for the work assignment within the required time, the employee will be relieved from the assignment until the required training or retraining is complete. The employee will, however, be allowed to work in the assignment under the direction of a qualified employee.

6.0 SOLID WASTE DISPOSAL TRAINING PROGRAMS

Training requirements for SWD personnel and visitors are defined in Appendix A.

7.0 DESIGNATED REVIEWING ORGANIZATIONS

This procedure does not require review outside of the SWD Division.

8.0 REFERENCES

WHC-IP-0867, *Operation Training Materials Development Guidelines*.

9.0 BIBLIOGRAPHY

DOE 1324.2A, "Records Disposition."

DOE 5480.1B, "Environment, Safety, and Health Program for DOE Operations."

WAC-173-303-330, "Personnel Training."

40 CFR 264.16, "Personnel Training."

WHC-CM-1-3, *Management Requirements and Procedures*.

WHC-CM-3-5, *Document Control and Records Management Manual*.

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APPENDIX A
TRAINING AND QUALIFICATION REQUIREMENTS

The training addressed in this appendix is presented in three tables. Table 1 identifies training requirements by job position and lists course requirements by categories. In most cases job position titles are generic. Managers are responsible for determining which job position category is applicable for employees and the subsequent required training. Categories A through E identify RCRA required training and is subject to review and/or audit by the Washington State Department of Ecology. Categories F through K identify non-RCRA required training and, in regard to an Ecology audit, is intended as information only.

Tables 2 and 3 list courses by category. In Table 2, the categories correspond to the position categories addressed in paragraph 5.1 of this training plan. Table 3 categories organize courses into general groupings. Managers must determine the specific course requirements for employees based on both general requirements and requirements unique to an employee's job assignment. Some courses are annotated with a qualifier such as "As required by job assignment" or "For Solid Waste only." In these cases where an employee's assignment does not warrant certain courses, or the employee works for a facility other than the target audience of a course, the course is not considered required training. A listing of additional training (classified as enhanced training) to improve on an employee's job skills, but not otherwise required, can be obtained from the facility training groups.

To determine required training for an employee, refer to Table 1 and find a corresponding job position. Adjacent to the job position is a series of X's and numbers. The X's indicate all training in that category is required unless otherwise noted (e.g., "As required by job assignment," "For Solid Waste only," etc.). The numbers in place of X's under the main categories indicate the requirement to receive training only in the identified sections of that category. As an example, under Category C, a trainer is required only to take courses under C-1. A nuclear process operator is required to take all courses in Category C indicated in Table 1. For employees falling into more than job one position or assignment, the requirements of both job position categories apply.

A dotted line separating courses distinguishes initial and retraining courses. For example, course number 02006A is retrained in 000001. The initial course is listed first, followed by a dotted line then the requalification course. A dashed line between courses are courses that are interrelated and normally have a required prerequisite course or courses.

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Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)						
	A	B	C	D	E	F	G	H	I	J	K	
SUPPORT PERSONNEL												
ACTIVITY ADMINISTRATOR/ENGINEER	X						3					
CLERK	X						3					
COMPUTER TECHNICIAN	X						3					
SECRETARY	X						3					
ENGINEERING WRITER	X						3				1	
RECORDS SPECIALIST	X						3					
PROJECT CONTROL ANALYST	X						3					
PLANNER/SCHEDULER	X						3					
STAFF ASSISTANT	X						3					
SYSTEMS ANALYST	X						3					
WORK CONTROL PERSONNEL												
JOB CONTROL ADMINISTRATOR	X						1+3			1	1	
JOB CONTROL CLERK	X						3			1	1	
PLANNER/SCHEDULER	X						1+3			1	1	
MATERIAL CONTROL SPECIALIST	X						3			1	1	
MATERIAL COORDINATOR	X						3			1	1	
TECHNICAL SUPPORT PERSONNEL												
ENGINEER/SCIENTIST (Facility)	X	1		2			1+6	1+3		1+6	1	1+12
ENGINEER/SCIENTIST (NON-Facility)	X			2			1+6	3				1
ENGINEER/SCIENTIST (Environmental)	X	X		2	1		1+6	3	2			
ENGINEER TECHNICIAN	X	X						3		1		
ENVIRONMENTAL COMPLIANCE OFFICER	X	X	2	2	1		1	3	2	1		1+4+7
ENVIRONMENTAL ENGINEER (T Plant)	X	X	2	2	1		1+6	1+3	2	1	1	1+12
HEALTH PHYSICIST	X	1					1	3				1
HAZARDOUS MATERIAL SPECIALIST	X	X		2			1+6	3	2			1
FIRE PROTECTION ENGINEER	X	1					1	3+9				3+6
INDUSTRIAL HYGIENIST	X	1					1	3+9				3
INDUSTRIAL SAFETY ENGINEER	X	1					1	1+3+9				3+6

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Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)					
	A	B	C	D	E	F	G	H	I	J	K
NUCLEAR SAFETY ENGINEER	X	1				1+6	3+9				3+6
PLANT ENGINEER (Facility)	X	1				1+6	1+3			1	1
PLANT ENGINEER (NON-Facility)	X						3				
PLANT ENGINEER (Environmental)	X	X		2	1	1+6	3	2			
QUALITY ASSURANCE ENGINEER	X	1				1	3				
RADIOLOGICAL CONTROL ANALYST (RCT)	X	1				1	3				1
RCT NUCLEAR ENGINEER	X	1				1	3				1
TRAINING INSTRUCTOR	X	1	1			1+6	1+3	2			1+2+8
TRAINING EVALUATOR	X	1	2	2+4	1	1+6	1+3+9	2	1+4		1+2+8+10
CRAFT PERSONNEL											
ELECTRICIAN	X	1				1+5	1+3+4+8+9			2+5 +11	1
INSTRUMENT TECHNICIAN	X	1				1+5	1+3+8+9			9 +11	1
INSULATOR	X	1				1+5	1+3+5+9				1
MILLWRIGHT	X	1				1+5	1+3+4+9			10 +11	1
NUCLEAR PROCESS OPERATOR	X	1	X			1+4	1+3+4+9	1	3+4+5+6	1+5	1+2
PAINTER	X	1				1+5	1+3+4+9			5	1
PIPEFITTER	X	1				1+5	1+3+4+9			5+6 +11	1
PROCESS CRANE OPERATOR	X	1				1+5	1+3+9			8	1
RADIOLOGICAL CONTROL TECHNICIAN	X	1				2+5	1+3+4+9				1
RIGGER	X	1				1+5	1+3+4+9		4	7	1
SIGN PAINTER	X	1				1+5	1+3+9			5	1
TOOL CRIB ATTENDANT	X						3+9				1
TRUCK DRIVER	X	1				1+5	1+3+9	1	3	4	1
WELDER	X	1				1+5	1+3+4+9				1
MANAGEMENT PERSONNEL											
DIVISION DIRECTOR	X			1			3				1
MANAGERS/DEPUTY MANAGERS											
ENGINEERING (Facility)	X	1		2		1+6	1+2+3		1+6	1	1+3+6+7 +12
ENVIRONMENTAL ENGINEERING	X	X	X	2	1	1+6	1+2+3+9	2	1+6	1	1+3+4+6+7

Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)					
	A	B	C	D	E	F	G	H	I	J	K
MAINTENANCE	X	1		2		1+6	1+2+3		1+6	1	1+3+6+10
OPERATIONAL READINESS REVIEW	X	1				1	1+2+3+9		1+2		1+3+6
OPERATIONS	X	1	X	2+3+4	1	1+6	1+2+3+9	2	1+2+4+6	1	1+2+3+6+7+10+12
OPERATIONS SUPPORT & WORK CONTROL	X	1		2			1+2+3		1+6	1	1+3+6+10
OTHER (NON-FACILITY MGRS)	X						3		1		
PLANT MGR/DEPUTY MGR	X	1		1		1+6	1+2+3		1+6		1+3+6+12
RADIOLOGICAL CONTROL	X	1		2		1+3+5	2+3+9		1+2+6		1+3
TRAINING	X	1	X	2		1	1+2+3		1+6		1+2+3
TEAM LEADERS											
GENERATOR & WASTE SERVICES	X	X				1+6	2+3	2	1		1
MAINTENANCE	X	1					1+2+3+6		1+6	1	1+3+6+10
OPERATIONS	X	1	X	2+3+4	1	1+6	1+2+3+9	2	1+2+4+6	1	1+2+3+6+10
OPERATIONS SUPPORT	X	1					1+2+3+6		1+6		1+3+6+10
RADIOLOGICAL CONTROL	X	1		2		1+3+5	2+3+9		1+2+6		1+3
TRAINING	X	1	X	2		1	1+2+3		1+6		1+2+3
WORK CONTROL	X	1					1+2+3+6		1+6	1	1+3+6
SPECIAL: GROUPS/MEMBERS/COMMITTEES/ASSIGNMENTS											
ASBESTOS ABATEMENT MANAGEMENT PLANNER	X	1					3				9
BUILDING WARDEN	X					1+6	1+3				5
CORRECTIVE ACTION EVALUATION GROUP	X						3				6+7
CRITICALITY SAFETY REPRESENTATIVE	X	1				1+6+7	3				
MANAGER-ON-CALL	X	1		2+3							10
OCCURRENCE REPORT WRITER/INVESTIGATOR	X	1				1	3				7+10+11
PERSON-IN-CHARGE (PIC)	X	1				1+6	1+3+6+8+9		6	1+3	
PLANT REVIEW COMMITTEE	X						3				12
PROCEDURE WRITER	X	X					3		1+6		
SHIPPER	X	1	2	2	X	1+6	3	2+3			
UNREVIEWED SAFETY QUESTION EVALUATOR	X										12
OTHER PERSONNEL											
SWD VISITOR/VENDER	REFER TO PAGE 17 OF THIS APPENDIX FOR REQUIRED TRAINING										

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Table 2. RCRA Required Training.

COURSE NUMBER	CATEGORY A GENERAL WORKER TRAINING	RETRAINING (months)
02006A	Hanford Site Orientation (HSO) <small>The following are part of HSO: (Required for new employee only.) 000087 Initial Security Briefing (DOE Order 5631.1B & DOE Order 5631.2C) *02006B Hazardous Communication and Waste Orientation (Washington Administrative Code (WAC) 173-303 & 29 Code of Federal Regulation (CFR) 1910.1200)</small>	12 - 000001
000001	Hanford General Employee Training (HGET) <small>The following are part of HGET: 000100 "Escort Training" *02006B "Hazard Communications Orientation" (WAC 173-303) 000165 "Asbestos General Employee Training" 020108 "Non-radioactive Worker Safety Orientation" 003000 "Lock & Tag-General" 020196 "Noise Control Requalification" 020005 "Criticality Safety - Nonfissile Material Handler" 120196 "Computer Security Awareness" 02006F "Fire Extinguisher Safety Orientation" 162236 "QA Program Overview"</small>	12 - 000001
* Denotes the RCRA portion of these courses.		
300700 SWM ONLY	Solid Waste Operations Facility Orientation	24 - 300700
301740 SWM ONLY	Solid Waste Management Hazard Communication <small>The following are part of 301740: Facility Emergency and Hazard Information Checklist - courses, 03E044 - LLBG, 03E045 - 616, 03E046 - 224T, & 03E047 - CWC; buildings not included in this list will use the "Emergency Response Information Board."</small>	12 - 301740
450700 T PLANT ONLY	Facility Orientation - T Plant	24 - 450700
03E048 T PLANT ONLY	Facility Emergency and Hazard Information Checklist - T Plant Complex <small>Buildings not included will use the "Emergency Response Information Board"</small>	12 - 03E048
306750 WRAP 1 ONLY	WRAP 1 Facility Orientation (including Haz. Comm. and BEP)	12 - 306750
CATEGORY B GENERAL WORKER TRAINING		
B-1		
031110	24-Hour RCRA TSD Hazardous Waste <small>The following are part of course 031110: 020032 "Scott SKAPAK-MSA PAPR Requalification" (29 CFR 1910.34)(As required by training needs analysis) 02006G "Hazardous Communication and Waste Management Awareness" (29 CFR 1910.1200, WAC 173-303)(ONE TIME ONLY) 020194 "Noise Control" (ONE TIME ONLY)</small>	12 - 032020
032020	Hazardous Waste Refresher Training <small>The following are part of course 032020: 020030 - SCBA Annual is given with this class if requested. (29 CFR 1910.134)(As required by training needs analysis) 020032 - Scott SKAPAK is given with this course if requested. (29 CFR 1910.134)(As required by training needs analysis)</small>	12 - 032020
031310	Hazardous Waste Operations Mgr/Supervisor - 8 hr <small>(For 24 hr or 40 hr Hazardous Waste Training - Operations managers/team leaders only)</small>	N/A
020041	Basic Respiratory Protection <small>(as required by training needs analysis.)</small>	12 - 020041
020044	Quantitative Mask Fit <small>(as required by training needs analysis.)</small>	12 - 020044
B-2		
301310	Solid Waste Facility Recordkeeping <small>(Required for SWITS data entry personnel only)(and as required by needs analysis.)</small>	N/A

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Table 2. RCRA Required Training.

CATEGORY B GENERAL WORKER TRAINING (continued)		
B-3		
301315	Solid Waste Acceptance Requirements <small>(As required by training needs analysis)</small>	N/A
CATEGORY C ADVANCED GENERAL WORKER TRAINING		RETRAINING (months)
C-1		
300010 300020 300025 300030 300040 300050 300080 SWM ONLY	SW TRU Waste Retrieval OQ Central Waste Complex OQ Mixed Waste Land Disposal Facility OQ TRUSAF - Operator Qualification Low-Level Burial Grounds Facility Non-Radioactive Dangerous Waste Storage Facility OQ Solid Waste Verification Sampling <small>*For operators only. Operators must qualify in the their assigned duties unless escorted by a qualified operator. Operators are not required to maintain all qualifications. SWO operations managers/team leaders will take course 300590, manager qualification. The training team leader, trainers, and training evaluator may take either applicable operator qualifications or course 300590.</small>	24 - 3000XX
450010 450020 450030 450040 T PLANT ONLY	T Plant Canyon Decontamination OQ T Plant Surveillance OQ 2706-T Decon OQ Waste Handler OQ <small>*Operators must qualify in the their assigned duties unless escorted by a qualified operator. Operators are not required to maintain all qualifications. T Plant operations managers/team leaders, training team leader, and trainers must take all operator qualifications.</small>	24 - 4500XX
306500 306515 306520 306525 WRAP 1 ONLY	WRAP 1 Restricted Waste Management Glovebox Qualification WRAP 1 Shipping and Receiving Qualification WRAP 1 Control Room Qualification WRAP 1 Process Glovebox Qualification <small>The above are for operators. Operations manager/operations team leaders/trainers take course 306510.</small>	24 - 3065XX
C-2		
035100	Core Waste Management Training - Initial <small>(For Operators, Operations Team leaders only)WAC 173-903, 40 CFR, & 49 CFR)</small>	12 - 035110
035110	Core Waste Management Training - Refresher	12 - 035110
450600 T PLANT ONLY	EP/APC - Operator <small>(Operators only - Managers/Team Leaders will take course 450660, Cat. D-4)</small>	12 - 450600
CATEGORY D GENERAL MANAGER TRAINING		
D-1		
035040	Environmental Regulations at Hanford	N/A
D-2		
035050	Environmental Compliance at Hanford <small>(As required by training needs analysis)(may take 035040 as equivalent training)</small>	N/A

Table 2. RCRA Required Training.

CATEGORY D GENERAL MANAGER TRAINING (continued)		
D-3		
02028B	Building Emergency Director Training <small>Required for Building Directors and operations managers/team leaders</small>	12 - 037510
037510	BED/BW Requalification Training	12 - 037510
D-4		
300060 <small>SWM ONLY</small>	Managers Oral Boards Qualification	N/A
306760 <small>WRAP 1 ONLY</small>	WRAP 1 Operations Manager/Team Lead Oral Boards	N/A
300590 <small>SWM ONLY</small>	SWO Managers Qualification	24 - 300590
306510 <small>WRAP 1 ONLY</small>	WRAP 1 Operations Manager/Operations Team Leader Qualification	24 - 306510
450660 <small>T PLANT ONLY</small>	EP/APC Manager	12 - 450660
***** <small>T PLANT ONLY</small>	T Plant Manager Oral Board	N/A
COURSE NUMBER	CATEGORY E GENERAL SHIPPER	RETRAINING (months)
NOTE: See Table 3, Category H for non-RCRA courses required for shipper certification. Personnel classified as General Workers, Advanced General Workers, or General Managers may also be required to take some or all of the following courses at the discretion of management.		
E-1		
035020	Facility Waste Sampling & Analysis <small>(As required by training needs analysis) (WAS-173-303, 40 CFR & 49 CFR)</small>	N/A
035010	Waste Designation Support <small>(WAC 173-303) (For information only, does not allow participant to sign manifest.)</small>	N/A
If course 035012 is taken, this requirement is met.		
E-2		
020159	Dept. of Transportation Hazardous Waste Shipment Certification <small>(Required for those who sign manifests) (Must have taken course 020064 first.) FOR HAZARDOUS WASTE SHIPPERS. (49 CFR 172)</small>	24 - 020159
035012	Waste Designation Certification Test <u>only</u> .	12 - 035012
035120	Waste Management Administrative - Initial <small>(For employees who sign manifest).</small>	12 - 035130
035130	Waste Management - Administrative - Refresher	12 - 035130

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Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY F RADIATION WORKER TRAINING	RETRAINING (months)
F-1		
10 CFR Part 835.902 Radiological Workers		
020001	Radiological Worker II Training - Initial (As required by training needs analysis)	24 - 020003
020003	Radiological Worker II Retraining Requalification	24 - 020003
020702	Rad Worker I/II Refresher	24 - 020702
This course is taken the off year of 020003		
020900	ALARA For Technical Support Personnel (For facility technical support staff only and as required by training needs analysis)	N/A
300745	Personal Self-Survey - Solid Waste (Completion of 034520 and 024530 satisfy requirement for 300745)(Required for all SWM operators and operations team leaders only)	24 - 300745
450850	Personal Self-Survey - T-Plant (Completion of 034520 and 024530 satisfy requirement for 450850)(Required for all T-Plant operators and operations team leaders only)	24 - 450850
F-2		
10 CFR Part 835.903 Radiological Control Technicians		
022004	RCT Academic Training Program	24 - 022002
022002	RCT Recertification Program	24 - 022002
022120	RCT Continuing Training Cycle #1	Continuous
022122	RCT Continuing Training Cycle #2	Continuous
022124	RCT Continuing Training Cycle #3	Continuous
022126	RCT Continuing Training Cycle #4	Continuous
This training is continuous; once the employee finishes this course, the employee repeats the cycle. NOTE: Technician-specific training is conducted in accordance with the applicable requirements, and ESQ/HSF monitors certification.		
023105 SWM ONLY	SWO Facility OJT - RCT	24 - 023105
451500 T PLANT ONLY	RCT OJT T-Plant	24 - 451500
306770 WRAP 1 ONLY	WRAP 1 Facility OJT - RCT	24 - 306770
F-3		
(RCT Level 4 managers & team leaders only)		
023001	1st Line Manager Oral Boards	N/A
024000	1st Line Manager Fundamentals	N/A
F-4		
DOE 5480.24		
020010	Criticality Safety Training - Fissionable Material Handlers	24 - 020110
020110	Criticality Safety - Fissionable Material Handlers Retraining	24 - 020110
020301	Criticality Safety Job Safety Orientation - Fissile (JSO)	24 - 020301

TRAINING PLAN

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY F RADIATION WORKER TRAINING (continued)	RETRAINING (months)
F-5		
020020 T PLANT ONLY	Criticality Safety Training - For Support Personnel	12 - 020020
F-6		
020012	Criticality Safety Training Managers & Engineers (As required by training needs analysis)	24 - 020013
020013	Criticality Safety Manager/Engineer Retraining	24 - 020013
020302	Criticality Safety Job Specific Orientation- Manager/Engineer (JSO)	24 - 020302
F-7		
*****	Board Certification - Criticality Safety Representative	24 - *****
CATEGORY G 29 CFR (OSHA) & WAC 296-65 (WISHA) TRAINING		
G-1		
003035 SWM AND WRAP 1 ONLY	Lock & Tag - Authorized Worker (As required by training needs analysis) (29 CFR 1910.147) (For WRAP 1 003035 or 450800 meet this requirement.)	12 - 003036
003036 SWM AND WRAP 1 ONLY	Lock & Tag Refresher (29 CFR 1910.147)	12 - 003036
450800 T PLANT ONLY	Lock and Tag T Plant (29 CFR 1910.147) (As required by training needs analysis)	12 - 450800
G-2		
004005	Managers' Safety Training	12 - 004005
G-3		
020107	Behavior Based Safety Training (Fed Reg Vol 54 No. 16)	N/A
G-4		
02006L	Asbestos Control (29 CFR 1910.1001) (As required by training needs analysis) (Qualifies support personnel to enter an Asbestos-Regulated Area for support purposes only. Not needed if the 170055 or 170060 course has been taken)	12 - 02006L
G-5		
170055	QTRC - Certified Asbestos Worker (WAC 296-65) (As required by training needs analysis)	12 - 170057
170057 INSULATOR ONLY	QTRC - Certified Asbestos Worker Requalification (WAC 296-65)	12 - 170057
G-6		
170060	Asbestos Supervisor - QTRC (Cert)	12 - 170062
170062	Asbestos Requal - QTRC (As required by training needs analysis)	12 - 170062
(Required for any manager, team leader, or PIC who supervises any support personnel who enter an Asbestos-Regulated Area) (WAC 296-65)		

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY G 29 CFR (OSHA) & WAC 296-65 (WISHA) TRAINING (continued)	RETRAINING (months)
G-7 (TRU Retrieval Program Only)		
031220	40-Hour Hazardous Waste Operations Training (For waste remediation sites; i.e. the TRU Retrieval program. Training is required according to job assignment).	12 - 032020 (See Cat. B)
031230	16-Hour Hazardous Waste Operations Upgrade Training (Upgrade from 24 hour to 40 hour training) (As required)	N/A
031410	1-Day Waste Site Field Experience (course taken addition to 24-hour RCRA TSD Hazardous Waste, course 031110, if working on a non-TSD project)	
031420	3-Day Waste Site Field Experience (For anyone who takes the 40-Hour training and who goes into an waste site area unescorted.)	N/A
G-8		
044480	Medium Risk Electrical Safety (For instrument specialists. Dependent on job assignment, may be required to take course 043870 instead.)	36 - 044480
043870	High Risk Electrical Safety (Required for electricians and electrical team leaders/managers.)	36 - 043875
G-9		
020130	Confined Space Entry (As required by training needs analysis)(29 CFR 1910.146)	24 - 020130
020140	Fall Protection & Retrieval Devices (For anyone who uses fall protection equipment and as required by training needs analysis. A HEHF medical clearance is required for entry to this course.)(29 CFR 1910.66)	N/A
170500	Medic First Aid (As required by training needs analysis)(29 CFR 1910.120)	24 - 170500
170648	Bloodborne Pathogens - SPT (29 CFR 1910.1030) (Required for RCTs only)	12 - 170651
170651	Bloodborne Pathogens Update (29 CFR 1910.1030)	12 - 170651
170656	QTRC - Hands on Fire Extinguisher Training (29 CFR 1910.157) (As required by training needs analysis.)	12 - 170656
CATEGORY H 49 CFR (DOT) TRAINING		
H-1		
020075	Hazardous Material General Awareness Training	24 - 020075
020076	Hazardous Material Driver's Training (Truck Drivers only)	24 - 020076
050410	Vehicle Inspection/Load Tie-Down Securement for Driver's Training (Truck Drivers only)	N/A
H-2:		
NOTE: (1) The following courses are the non-RCRA requirements for becoming a certified hazardous material shipper (also see Category E for RCRA requirements). Non-shipper personnel may be required to take some or all of the following courses as specified in their training needs analysis. (2) Retraining for the below listed course is not required if courses specified in H-3 are completed.		
020059	Basic RAM Shipment Awareness - Module 3 (Must have taken course 020064 first) FOR RADIOACTIVE OR MIXED WASTE SHIPPERS.	24 - 020059
020064	Basic Dept of Trans Haz Mat Regs Awareness - Module 1 (Prerequisite for 020059, 020069, & 020159)	24 - 020064
020068	Basic Hazardous Material Training - Module 2	24 - 020068

TRAINING PLAN

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY H 49 CFR (DOT) TRAINING (continued)	RETRAINING (months)
H-3		
020069	Radioactive material Shipment Certification - Advanced Module 3 (Required for those who sign RSRs)	24 - 020069
020159	Hazardous Waste Shipper Certification - Advanced Module 2 (Required for those who sign HMSRs)	24 - 020159
CATEGORY I OPERATIONS TRAINING		
I-1		
080820	Safe/Drug-Free Workplace (Managers only)	24 - 080820
080910	Equal Employment Opportunity (Managers only)	N/A
080969	New Manager Orientation/EEO 2000 (Managers only)	N/A
REQUIRED FOR NEW MANAGERS/TEAM LEADERS HIRED AFTER 07/93.		
***** SWM Only	Support Manager/Tech Staff Checklist (As required by training needs analysis.)(Not required for operations Managers/Team Leaders)	N/A
451420 T Plant only	Manager/Tech Staff Checklist	12 - 451420
306700 WRAP 1 only	WRAP 1 Technical Staff Training	12 - 306700
I-2		
081050	Managing People, The Art of Leadership	N/A
061950	Manager Fundamentals Training	N/A
I-3		
044470	Fork Truck Operator Training (As required by training needs analysis)	36 - 041890
041890	Fork Truck Operator Regualification	36 - 041890
I-4		
040784	Basic Crane & Rigging (As required by training needs analysis)	36 - 040788
040788	Basic Crane & Rigging Regualification	36 - 040788
I-5		
065911	NPO Mathematics	N/A
065912	NPO Chemistry	N/A
065914	NPO Electrical Theory	N/A
065915	NPO Instrumentation	N/A
065917	NPO Mechanical Fundamentals	N/A
I-6		
451410 T PLANT ONLY	T Plant Operational Safety Requirements	N/A

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY J MAINTENANCE TRAINING	RETRAINING (months)
J-1		
301730 SWM AND WRAP 1 ONLY	Solid Waste Job-Specific JCS (For WRAP 1, 301730 or 450500 satisfy this requirement). Required for Solid Waste employees working in operations, engineering, or work control areas directly in support of a facility. (May have taken course 010108 in place of this course)	N/A
450500 T PLANT ONLY	T Plant Work Control/JCS Required for T Plant employees working in operations, engineering, or work control areas directly in support of a facility. (May have taken course 010108 in place of this course)	N/A
J-2		
035065	PCB Awareness (Required for electricians only) (40 CFR 761)	N/A
459001	Maintenance Training System Overview (As required by training needs analysis)	N/A
452202	T Plant Circuit Breakers (As required by training needs analysis)	N/A
452210	T Plant Hoists and Cranes (Electrical) (As required by training needs analysis)	N/A
452217	Maintenance of 2706-T Ventilation and Exhaust Equipment (As required by training needs analysis)	N/A
452225	Maintenance of 271-T Air Supply Fan (As required by training needs analysis)	N/A
J-3		
300550	PIC Training--for Solid Waste employees	N/A
450550	PIC Training--for T Plant employees	N/A
306550	WRAP 1 PIC Training--for WRAP 1 employees	N/A
J-4		
020089	Defensive Driving Course	24 - 020089
042730	Flagging and Traffic Control	36 - 042730
043220	Load Securing for Transport	36 - 043220
J-5		
042720	Aerial Lifts (As required by training needs analysis)	36 - 043920
043920	Aerial Lifts Operator Requalification	36 - 043920
J-6		
042590	Pressure Relief Valves	24 - 042590
459001	Maintenance Training System Overview (As required by training needs analysis)	N/A
J-7		
042820	Wire Rope/Rigging Hardware Inspection	36 - 042822
J-8		
042830	Overhead Crane Mechanical	36 - 042830

TRAINING PLAN

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY J MAINTENANCE TRAINING (continued)	RETRAINING (months)
J-9		
459001	Maintenance Training System Overview - Instrument (As required by training needs analysis)	N/A
451800	Radiation Detection Fundamentals (As required by training needs analysis)	N/A
451801	Eberline Alpha Continuous Air Monitor (As required by training needs analysis)	N/A
451802	Eberline models AMS-3 and AMS-3A beta air monitor (As required by training needs analysis)	N/A
451803	Eberline PCM-1B portal monitors (As required by training needs analysis)	N/A
451804	Eberline PM-6A portal monitors (As required by training needs analysis)	N/A
451805	Eberline RMS-II Radiation Monitor (As required by training needs analysis)	N/A
451808	Honeywell UDC 5000 Differential Temperature Controller (As required by training needs analysis)	N/A
451810	Kurz Flow Controller (As required by training needs analysis)	N/A
451816	Chino Programmable Recorder (As required by training needs analysis)	N/A
451819	Kent 100 Programmable Recorder (As required by training needs analysis)	N/A
306535	EG&G Alpha/Beta Stack (As required by training needs analysis)	24 - 306535
042370	Eberline Beta Cam (As required by training needs analysis)	24 - 042370
042670	Eberline PCM-1B (As required by training needs analysis)	24 - 042670
J-10		
459001	Maintenance Training System Overview - Millwright (As required by training needs analysis)	N/A
452101	Pump Theory and Maintenance (As required by training needs analysis)	N/A
J-11		
306545	WRAP 1 Hydraulic Safety (As required by training needs analysis)	24 - 306545
COURSE NUMBER	CATEGORY K OTHER EMPLOYEE TRAINING	RETRAINING (months)
K-1		
000079	Comprehensive Security Briefing Required for badge levels 2 or 3	12 - 000080
000080	Security Refresher Briefing Required for badge levels 2 or 3	12 - 000080
305100	Solid Waste Disposal Operations Administration Conduct of Operations (Facility personnel only)	N/A

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY K OTHER EMPLOYEE TRAINING (continued)	RETRAINING (months)
K-2		
000390	On-the-Job Training Workshop (As required by training needs analysis)	N/A
000397	On-the-Job Evaluator Trainer (As required by training needs analysis)	N/A
K-3		
001000	Manager Conduct of Operations (DOE Order 5480.19) May have taken course number 001002 in place of this class	N/A
K-4		
02006J	EPCRA 312 REPORTING REQUIREMENTS (Previously called SARA) (40 CFR 370)	12 - 02006J
02006K	EPCRA 313 TOXIC CHEMICAL RELEASE REPORTING (Previously called SARA) (40 CFR 372)	12 - 02006K
K-5		
037500	Building Warden Training	12 - 037510
K-6		
170002	QTRC - Risk Evaluation	N/A
K-7		
170015	Root Cause Basics	N/A
170026*	Root Cause Techniques Workshop (As required by training needs analysis)(Required for employees who perform root cause analysis for PPG values \geq 25. Optional for Corrective Action Evaluation Group)	N/A
170027*	Root Cause Mini-Mort Workshop (As required by training needs analysis)	N/A
K-8		
170011	Train the Trainer (or equivalent level of training)	N/A
K-9		
170600	AHERA Management Planner	12 - 170600
170610	AHERA Building Inspector Required for engineers who manage asbestos within SWD facilities (40 CFR Part 61, WAC 296-62-077)	12 - 170610
K-10		
170640	Introduction to Occurrence Reporting (DOE Order 5000.3B)	N/A
K-11		
170642	Occurrence Report Writing (DOE Order 5000.3B)	N/A
K-12		
300970	SWD USQ Evaluator (DOE Order 5480.21) (As required by training needs analysis)	24 - 300970

SOLID WASTE DISPOSAL
OPERATIONS ADMINISTRATION

TRAINING PLAN

Manual
Section
Appendix
Page
Effective Date

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1.8
A, REV 5
A-15 of A-15
January 17, 1997

COURSE NUMBER	SWD VISITOR OR VENDOR	RETRAINING (months)
Print Name _____		Date _____
RADIATION TRAINING		
• 020001	Radiation Worker Training - Initial <small>In accordance with: 10 CFR Part 835.902</small>	24 - 020003
RCRA TRAINING		
000090	Visitor/vendor Training	N/A
• 031110	24-Hour RCRA TSD Hazardous Waste <small>In accordance with: 29 CFR 1910.120</small>	12 - 032020
FACILITY ORIENTATION		
300700 <small>SWM ONLY</small>	Solid Waste Operations Facility Orientation	24 - 300700
450700 <small>T PLANT ONLY</small>	Facility Orientation - T Plant	24 - 450700
306750 <small>WRAP 1 ONLY</small>	WRAP 1 Facility Orientation (including Haz. Comm. and BEP)	12 - 306750
• As required by job		
Job Description:		
<p>All hazardous waste and radiation worker training has been met or equivalent classes have been taken, if working in facility area containing radioactive or hazardous materials. Facility orientation will be taken unless escorted by an employee certified in this area.</p>		
<p><u>Visitor or Vender Signature</u></p>		
<p><u>NOTE: This data needs to be turned into Facility Operations Manager before initiating work.</u></p>		
<p><u>Operations Manager</u></p>		
<p><u>ECO (T Plant only)</u></p>		

NOTE: Craft-specific training is conducted in accordance with the applicable requirements of parent company. However, crane operators must be certified to the requirements of the Hanford Hoisting and Rigging Manual and have evidence of their certification.

EXHIBIT - 1

EXHIBIT - 2

EXHIBIT - 3

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APPENDIX 11A

RANDOM NUMBERS TABLE

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Table APP 11A-1. Random Numbers Table.* (sheet 1 of 2)

Location	X (1,13)	Y (1,11)
East loading pad	5	2
	4	8
	1	4
	3	5
	8	10
	5	6
	13	4
	7	3
	10	1
Location	X (1,9)	Y (1,13)
North loading pad	4	8
	2	12
	7	1
	1	11
	5	5
	3	5
	1	10
	8	7
	5	13

*Random numbers generated on Lotus 123. Lotus 123 is a Registered Trademark of the Lotus Development Corporation.

Table APP 11A-1. Random Numbers Table.* (sheet 2 of 2)

Location	X	Y
<u>Packaging, sampling, and receiving area sumps and trenches</u>		
Packaging materials handling equipment area sump	2	2
Packaging/sampling room sump	3	2
Receiving area trench	1	18
<u>Cell trenches</u>		
Caustic cell	1	2
Oxidizer cell	1	13
Combustible cell	1	16
Acid cell	1	3
Flammable 1A cell	1	14
Flammable 1B Cell	1	9
<u>Walkway trenches</u>		
Caustic/oxidizer	1	5
Combustible/acid	1	15
Flammable 1B/1A	1	9
<u>Loading pad trenches</u>		
East pad trench	1	25
North pad trench	1	16

*Random numbers generated on Lotus 123. Lotus 123 is a Registered Trademark of the Lotus Development Corporation.

APPENDIX 11B

DESCRIPTION OF PROCEDURES

1
2
3
4

APPENDIX 11B

Refer to Attachment 10 of Hanford Facility RCRA Permit (Ecology 1994).

The specific sections of Attachment 10 which are incorporated into the Permit are listed as follows by procedure. No part of Attachment 10 shall supersede any part of Attachment 8.

Number	Procedure	Pages	Sections
11B-1	Preparing Health and Safety Plan	1-4	1.0, 2.0, 3.0, 4.2, 5.0, 5.1, 5.2, 6.0, 6.1, 6.2
11B-2	Decontaminating Sampling Equipment	23-24	1.0, 2.0, 3.0, 5.2, 5.3, 6.1, 6.2, 6.3
11B-3	Evaluating Data	25-26, 28-29	1.0, 2.0, 3.0, 4.7, 5.0
11B-4	Packaging Samples	32-35	1.0, 4.0, 4.1, 5.0, 5.1, 5.2
11B-5	Soil and Sediment Sample Containers	6-11	1.0, 3.0, 4.2, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8
11B-6	Ensuring Quality Control of Records and Documentation	70-77	1.0, 3.0, 4.0, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.0, 6.2, 6.3, 6.4, 6.5, 6.6
11B-7	Maintaining a Field Logbook	44-48	1.0, 3.0, 5.0, 5.1, 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 6.0, 6.1, 6.2, 7.0
11B-8	Chain-of-Custody	39-43	1.0, 3.0, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, 5.0, 6.0, 6.1, 6.2, 6.3, 6.4, 6.5, 6.7
11B-9	Controlling Unknown Suspected Waste	49-59	1.0, 3.0, 4.1, 4.2, 4.3, 4.4, 4.5, 5.0, 5.1, 5.2, 6.0, 6.1, 6.2, 6.3, 6.4, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11
11B-10	Deviating from Procedures Used During Closure	60-64	1.0, 2.0, 4.0, 4.2, 5.0, 5.1, 5.2, 5.2.1, 5.2.2, 5.3

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616 NRDWSF Operating File

T4-04

1 On being accepted for storage at the 616 NRDWSF, containers are unloaded
2 in accordance with the requirements of Chapter 6.0, Section 6.4.1, and moved
3 to the proper storage cell as described on the hazardous waste disposal
4 analysis record (Appendix 3A). The containers are moved on drum dollies, by a
5 pallet jack, or by a forklift if palletized (the forklift is prohibited from
6 operating in the Class 1-A flammable liquid cell). The containers are placed
7 in the assigned storage cell, with the containers being placed in one of the
8 storage locations painted on the cell floor (Chapter 6.0, Figure 6-2 provides
9 storage locations). The location of the container is logged on a locator
10 chart and input into the 616 NRDWSF waste tracking system. This system
11 identifies the location of each container stored in the 616 NRDWSF. Waste
12 packages can be stacked in any storage cell. Table 4-3 identifies the
13 stacking restrictions for each cell.
14

15 The containers can be stacked either by hand or machine (e.g., forklift).
16 Containers stacked by hand are placed next to the containers on which the
17 containers are to be stacked. The container is lifted and placed onto the
18 base container, taking care not to damage either container. The 616 NRDWSF
19 supervisor is responsible for ensuring that all lifts are done in accordance
20 with applicable safety requirements. No personnel are allowed to lift a waste
21 container in a manner that jeopardizes them or other personnel.
22

23 The lifting of containers having a gross weight that exceeds the weight
24 limit identified for an individual can be stacked by two employees or by
25 mechanical means. Containers having a gross weight exceeding 59.1 kilograms
26 must be stacked by mechanical means. Mechanically stacked containers must be
27 placed on a pallet or similar dunnage to properly distribute the load to base
28 containers.
29

30 Containers are closed during normal operations and are not handled or
31 stored in a manner that might damage the packaging. The containers are
32 inspected daily (when the storage unit is occupied) for degradation and
33 leakage. Activities restricted to the office area do not require a daily
34 inspection of the storage area, provided the ventilation system is fully
35 operational. A weekly inspection of the 616 NRDWSF and its waste inventory,
36 if present, (Chapter 6.0, Section 6.2.1.2) is performed.
37

38 In preparation for shipment of waste from the 616 NRDWSF to an offsite
39 TSD facility, containers are identified for shipment from the 616 NRDWSF
40 inventory tracking system. A completed offsite manifest and a list of waste
41 proposed for shipment are transmitted to transportation personnel and a
42 contracted offsite TSD facility for review. Review comments are dispositioned
43 to the satisfaction of all parties. The 616 NRDWSF personnel mark the
44 containers with the offsite manifest number. Solid waste management prepares
45 a letter that accompanies the waste shipment addressing the land disposal
46 restriction; documentation requirements are identified in Chapter 12.0.
47

1 Before shipment, each container is inspected and reviewed by
2 transportation representatives for proper designation, packaging, marking, and
3 labeling. An independent review of the shipping documentation (i.e., offsite
4 manifest, product information sheets) is performed. Solid waste management
5 and the 616 NRDWSF supervisor review each package before the package is loaded
6 on the truck for offsite shipment.
7

8 **4.1.1.3 Secondary Containment System Design and Operation [D-1d through**
9 **D-1d(1)(a)].** The design of the secondary containment system is shown in
10 Figure 4-1 and in Appendix 4B. Secondary containment consists of three main
11 components. First, each cell consists of a sealed concrete pad, which is
12 sloped to containment trenches. Second, there are three containment trenches
13 between adjacent cells, one for each cell and one in the walkway between the
14 cells. Third, each cell is surrounded by a curb for additional containment.
15 This curb varies from approximately 5.0 to 10.0 centimeters in height as the
16 level of the cell floor varies.
17

18 **4.1.1.4 Requirement for Base or Liner to Contain Liquids [D-1d(1)(b)].** The
19 floor and trenches in the storage and container handling areas are constructed
20 of reinforced concrete. Concrete was selected as a construction material
21 because concrete is essentially inert and inhibits downward permeation of
22 liquid caustic, oxidizing, combustible, and flammable materials.
23 Additionally, the concrete floor surface has been sealed with a polyamide
24 epoxy resin that, when cured, has properties similar to glass. The polyamide
25 epoxy resin base finish coatings were selected because of the capability of
26 the coatings to resist abrasion, extreme environmental conditions, and a wide
27 variety of chemical exposures (Appendix 4D).
28

29 The design of the floor in the storage and container handling areas
30 consists of concrete slabs (seamless) sloped to dedicated collection trenches
31 (Figure 4-1 and Appendix 4B). All interior trenches are self-contained
32 (without drains). Each storage cell is surrounded by a curb varying in height
33 from approximately 5.0 to 10.0 centimeters, which would provide additional
34 containment in the event of a large spill.
35

36 If a crack that compromises the integrity of the concrete containment
37 system of a storage cell is found, the crack is prepared, grouted, and sealed
38 in accordance with the construction specification (Appendix 4A) and the repair
39 material manufacturer's instructions. Significant cracks in the floor surface
40 of the containment cells are repaired within 14 days of detection.
41 Significant cracks in the storage cell containment trenches are repaired
42 within 5 working days of detection. If crack repairs cannot be completed
43 within the specified time periods, liquid waste storage in the affected areas
44 is suspended until repairs are completed.
45

46 After repair completion, the environmental compliance officer or designee
47 inspects the repair to ensure acceptability and indicates acceptance of the
48 repair in the 616 NRDWSF logbook. The logbook is maintained for the life of
49 the 616 NRDWSF.
50

1 4.1.1.5 Containment System Drainage [D-1d(1)(b)]. Each storage cell consists
2 of a concrete slab sloped to a self-contained containment trench
3 (Section 4.1.1.4).

4
5 4.1.1.6 Containment System Capacity [D-1d(1)(c)]. Each storage cell is
6 designed to contain over 10 percent of the total volume of containers that can
7 be stored there. Each cell is designed with a sloping floor that drains to a
8 containment trench (Figure 4-1 and Appendix 4B). Table 4-4 lists the total
9 containment volume and maximum container storage volume per cell.
10 Calculations performed to verify containment capacity are detailed in
11 Appendix 4C.

12
13 4.1.1.7 Control of Run-On/Run-Off [D-1d(1)(d)]. The only major run-on or
14 run-off foreseen would be a flood, fire sprinkler activation, or a break in
15 the water main. No floods are predicted to impact the 616 NRDWSF
16 (DOE/RL-91-28, Chapter 2.0).

17
18 In the event of a run-on or run-off from any source (e.g., fire sprinkler
19 activation, pipe break, etc.), containment systems in the 616 NRDWSF are
20 capable of holding between 2,445 liters and 3,510 liters of liquid for each
21 cell as cell width varies. Collected or contained liquid can be removed by
22 hand pumps for large quantities and by absorbents for smaller quantities. All
23 waste stored in the 616 NRDWSF is in sealed containers, which limits the
24 detrimental impact of a run-on or run-off situation.

25
26 In the event that contaminated water is released from the 616 NRDWSF
27 because of flooding of the containment system by fire sprinkler activation or
28 a pipe break (Section 4.1.2), the incident will be treated as a spill.

29
30 Actions to be taken in response to a spill or discharge are detailed in
31 the Building Emergency Plan - 616 Building provided in Appendix 7A.

32 33 34 4.1.2 Removal of Liquids from Containment System [D-1d(2)]

35
36 In the event of a spill or release at the 616 NRDWSF that results in
37 collection of liquid waste material in the containment system, the following
38 will be performed after determination by the Building Emergency Director (BED)
39 that implementation of the Contingency Plan pursuant to Appendix 7A is not
40 necessary or all necessary actions in accordance with the Contingency Plan
41 have been implemented. Either case must be recorded and signed in the TSD
42 unit-specific operating record by the BED.

- 43
44
- 45 • Containers in the cell(s) affected by the spill will be inspected for
46 signs of leakage. Leaking containers will be repackaged and
47 identified in the 616 NRDWSF operating and spill logbooks.
 - 48 • Inspection reports and the 616 NRDWSF operating and spill logbooks
49 will be reviewed to identify any waste releases in the waste storage
50 areas for which remedial actions have not been completed.
- 51

- 1 • The waste will be removed from the containment system. The equipment
2 used for removal of large quantities of liquid normally would be a
3 hand-held pump or vacuum system. Adsorbents will be used for removal
4 of small amounts of liquid. The waste material will be placed in the
5 appropriate U.S. Department of Transportation-specified container.
6
7 • The containerized waste will be handled as follows.
8
9 - If the waste has been altered during stabilization and cleanup
10 actions (absorbed, mixed, diluted, etc.), the containerized waste
11 will be placed in storage and managed in accordance with the
12 provisions of the waste analysis plan (Appendix 3A).
13
14 - A waste storage/disposal request (Appendix 3A) will be submitted to
15 solid waste management for waste designation. In response, a waste
16 disposal analysis record describing the regulatory status and proper
17 packaging, labeling, and marking requirements for the waste
18 (Appendix 3A) will be issued. The 616 NRDWSF staff will ensure that
19 waste is properly packaged, labeled, marked, and stored.
20
21 - The 616 NRDWSF inventory will be altered to reflect the changes in
22 waste description, volume, and storage locations.
23
24 - If the waste was not altered during stabilization and cleanup
25 activities, the containerized waste will be placed in the
26 appropriate storage area and the 616 NRDWSF inventory altered to
27 reflect any changes.
28
29 • Wipe samples will be taken of the spill area in accordance with an
30 approved procedure (EPA 1987) using Whatman¹ No. 42 filter paper or
31 an equivalent. The filter paper used to collect the sample will be
32 moistened with an appropriate collection medium based on the
33 characteristics of the spilled material. All samples taken to verify
34 that the site of a release is clean will be obtained in accordance
35 with the applicable standards of Chapter 11.0, Section 11.1.4. et seq.
36 In the event that water would not be an appropriate collection medium
37 to dissolve the contamination of concern, the solvent used by the
38 laboratory for analysis will be used. The filter paper will be sent
39 to a laboratory where the filter paper will be prepared and analyzed
40 in accordance with the test methods identified in Appendix 3A, for
41 constituents known to have been involved in the spill to verify
42 cleanup adequacy.

43
44 An alternative sampling mechanism will be used for detection of waste
45 matrices for which wipe sampling protocols are ineffective. Volatile
46 organics will be detected using organic vapor air samplers. To detect
47 the presence of corrosive liquids, pH paper and pH monitors will be
48 used. The type of sampling technique used to determine the

49 ¹Whatman is a trademark of Whatman Incorporated.

1 cleanliness of the contaminant will be documented in the spill
2 logbook.

- 3
4 • When sampling techniques have verified cleanup, the 616 NRDWSF
5 supervisor will sign the spill logbook indicating that the waste was
6 removed from the containment system and cleanup activities were
7 completed. A solid waste management representative will sign the
8 spill logbook indicating approval of actions taken.

9
10 Specific actions to be taken in response to a spill or discharge are
11 detailed in the Building Emergency Plan - 616 Building provided in
12 Appendix 7A.

13
14 In the event of a fire sprinkler activation or a pipe break within the
15 616 NRDWSF that results in collection of water in the containment system, the
16 following will be performed.

- 17
18 • Water in the containment system visually will be inspected for signs
19 of contamination.
20
21 • Containers in the cell(s) affected by a sprinkler activation or a pipe
22 break will be inspected for signs of leakage.
23
24 • Inspection reports and the 616 NRDWSF operating and spill logbooks
25 will be reviewed to identify any waste releases in the waste storage
26 areas for which remedial actions were not completed.
27
28 • The 616 NRDWSF supervisor will sign the 616 NRDWSF logbook indicating
29 that the above steps were completed and that the storage building is
30 clean. Solid waste management will review the supervisors actions and
31 give concurrence.
32
33 • The water will be removed from the containment system. Water that
34 cannot be verified to be free of contamination will be containerized
35 and stored in an area equipped with secondary containment. The
36 containerized water will be handled in accordance with the provisions
37 of the waste analysis plan (Appendix 3A).
38
39 • The 616 NRDWSF supervisor will sign the logbook indicating that the
40 water was removed from the containment system.

41
42 Actions to be taken in response to a spill or discharge are detailed in
43 the Building Emergency Plan - 616 Building provided in Appendix 7A.

44
45
46 **4.2 CONTAINERS WITHOUT FREE LIQUIDS THAT DO NOT EXHIBIT IGNITABILITY OR**
47 **REACTIVITY [D-1e]**

48
49 Containers without free liquids are discussed in the following sections.
50

1 **4.2.1 Test for Free Liquids**
2

3 The 616 NRDWSF stores containers with free liquid and without free
4 liquid. Therefore, a test for free liquid is not required.
5
6

7 **4.2.2 Description of Containers**
8

9 Refer to Section 4.1.1.1, Description of Containers.
10
11

12 **4.2.3 Container Management Practices**
13

14 Refer to Section 4.1.1.2, Container Management Practices.
15
16

17 **4.2.4 Container Storage Area Drainage**
18

19 Each storage cell consists of a concrete slab sloped to a self-contained
20 containment trench (Section 4.1.1.4 and Chapter 2.0, Section 2.1).
21
22

23 **4.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES**
24 **IN CONTAINERS [D-1f]**
25

26 The following sections provide information on the management of
27 ignitable, reactive, and incompatible waste in containers. Additional
28 information can be found in Chapter 6.0, Section 6.5.
29
30

31 **4.3.1 Management of Reactive Waste in Containers [D-1f(1)]**
32

33 The 616 NRDWSF does not store waste exhibiting the characteristic
34 (reactivity) specified in WAC 173-303-090(7)(a)(vi), (vii), or (viii).
35
36

37 **4.3.2 Management of Ignitable and Reactive Waste in Containers [D-1f(2)]**
38

39 The nearest structure or TSD unit boundaries are in excess of 61 meters
40 from any of the ignitable waste sites as shown on Drawing H-13-000014 in
41 Appendix 2A. Sixty-one meters is in excess of the limits imposed by the
42 National Fire Protection Association (NFPA 1989).
43
44

45 **4.3.3 Management of Incompatible Wastes in Containers [D-1f(3)]**
46

47 The generating unit's waste coordinator and the solid waste management
48 staff are responsible for determining the regulatory status of each waste and
49 determining the incompatible compounds of the waste. Status information is
50 forwarded on a hazardous waste disposal analysis record (Appendix 3A) to the
51 generating unit, who packages the waste as instructed. Afterwards, solid
52 waste management personnel inspect the container for proper packaging,

1 labeling, marking, and onsite waste tracking forms before transport to the
2 616 NRDWSF. The container is inspected again at the 616 NRDWSF to determine
3 that the waste is properly packaged, marked, labeled, and manifested
4 (Appendix 3A).

5
6 Each storage cell in the 616 NRDWSF contains one compatibility group and
7 is segregated either by three self-contained trenches or concrete walls.

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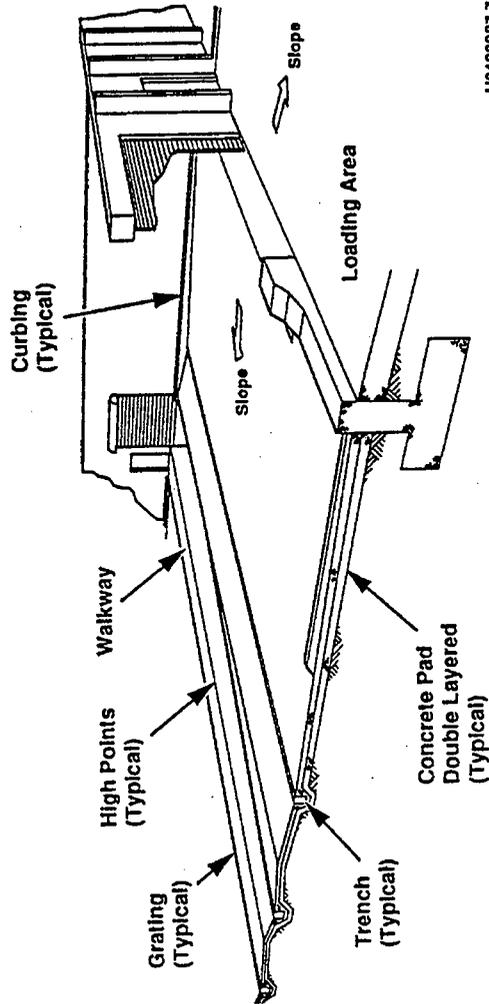


Figure 4-1. Design of the Secondary Containment System.

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1 Table 4-1. Common Containers Stored at the 616 Nonradioactive
2 Dangerous Waste Storage Facility.

3	DOT ^a Spec.	Container	Material	Ref. ^b (49 CFR 178)
4	12P/12U	CF ^c w/inner	Fiberboard/polyethylene	178.522
5	(UN6HG2)	poly liner		
6	12B (UN4G1)	CF	Fiberboard	178.516
7	17C (UN1A1)	DM ^d	Low carbon steel	178.504
8	17E (UN1A1)	DM	Low carbon steel	178.504
9	17H (UN1A2)	DM	Low carbon steel	178.504
10	34 (UN1A1)	DF ^e	Polyethylene	178.509
11	37A (UN1A1)	DM	Low carbon steel	178.504
12	37B (UN1A1)	DM	Low carbon steel	178.504

13 ^aU.S. Department of Transportation specifications.14 ^bReference section of regulations.15 ^cCF = fiberboard box.16 ^dDM = drum, metal.17 ^eDF = drum, fiberboard.18
19

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Table 4-2. Container Management Per Storage Cell.

Cell	Maximum containers per tier	
	Tier 1 (ground)	Tier 2
<u>Regular storage</u>		
Caustics	50 (208 liters)	40 (208 liters) 10 (113 liters) ^a
Oxidizers	50 (208 liters)	40 (208 liters) 10 (113 liters) ^a
Combustibles	58 (208 liters)	40 (208 liters) 18 (113 liters) ^b
Acids	60 (208 liters)	40 (208 liters) 20 (113 liters) ^b
<u>Flammable liquid storage</u>		
Class 1A	32 (208 liters) 1 flammable liquid storage cabinet (512 liters)	32 (75 liters) ^c
Class 1B*	40 (208 liters)	40 (113 liters) ^d

^aTier 2, row 1 \leq 30 113 liters (Chapter 6.0, Figure 6-4).

^bTier 2, rows 1 and 6 \leq 113 liters (Chapter 6.0, Figure 6-4).

^cTier 2 \leq 75 liters.

^dTier 2 \leq 113.6 liters.

*A flammable liquid storage cabinet(s) can be used in the Class 1B storage cell resulting in the following arrangement:

36 (208.2 liters) 36 (113.6 liters)^d

1 flammable liquid
storage cabinet
(512 liters)

or

34 (208.2 liters) 34 (113.6 liters)^d

2 flammable liquid
storage cabinet
(1,024 liters)

Because the total volume stored in this configuration (12,094.4 liters) is less than the other (12,870.4 liters), the volume is not listed in Table 4-2. Table 4-4 also is based on the maximum volume stored.

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1 Table 4-3. Storage Cell Stacking Restrictions.
2

Cell	Stacked container volume restrictions	
	Single row	Double row
3 Oxidizer	≤113 liters	≤208 liters
4 Caustic	≤113 liters	≤208 liters
5 Acid	≤113 liters	≤208 liters
6 Combustible	≤113 liters	≤208 liters
7 Class 1B flammable	≤113 liters	≤208 liters
8 Class 1A flammable	≤ 75 liters	≤ 75 liters

9 Note: Container stacking is limited to a base container and a
10 second tier.
11
12
13
14
15
16

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5.0 GROUNDWATER MONITORING [E]

1
2
3
4 The 616 NRDWSF is not operated as a dangerous waste surface
5 impoundment, waste pile, land treatment unit, or landfill as defined in
6 WAC 173-303-645(1)(a). Therefore, groundwater monitoring is not required.

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

The 616 NRDWSF is designed and operated to minimize exposure of the general public and operating personnel to dangerous waste.

6.1 SECURITY [F-1]

The following sections describe the security measures, equipment, and warning signs used to control entry into the 616 NRDWSF.

6.1.1 Security Procedures and Equipment [F-1a]

The following sections describe the 24-hour surveillance system, barrier, and warning signs used to provide security and control access to the 616 NRDWSF.

6.1.1.1 24-hour Surveillance System [F-1a(1)]. The entire Hanford Facility is a controlled access area. For surveillance information, refer to the General Information Portion (DOE/RL-91-28).

6.1.1.2 Barrier and Means to Control Entry [F-1a(2),(2a),(2b)]. Manned barricades are maintained around the clock at checkpoints on vehicular access roads leading to the 616 NRDWSF. The 616 NRDWSF could be occupied at any time. The 616 NRDWSF is locked when unoccupied.

6.1.1.3 Warning Signs [F-1a(3)]. Warning signs stating "DANGER--UNAUTHORIZED PERSONNEL KEEP OUT" are posted at each entrance to the active portion of the 616 NRDWSF. These signs are in English, legible from a distance of 7.6 meters and visible from all angles of approach.

6.1.2 Waiver [F-1b]

Waiver of the security procedures and equipment requirements for the 616 NRDWSF is not requested. Therefore, the requirements of WAC 173-303-310 are not applicable to the 616 NRDWSF.

6.2 INSPECTION PLAN [F-2]

This section describes the method and schedule for inspection of the 616 NRDWSF. The purpose of inspection procedures at the 616 NRDWSF is to identify leaking containers, improperly stored containers, and degradation of containment and safety equipment and/or systems. These inspections help ensure that situations do not exist that could cause or lead to the release of dangerous waste to the environment or pose a threat to human health. Abnormal conditions identified by an inspection must be corrected on a schedule that prevents hazards to workers, the public, and the environment.

1 6.2.1 General Inspection Requirements [F-2a, b, and c]
2

3 The content and frequency of inspections are described in this section.
4 The inspections are documented on inspection datasheets and logsheets. The
5 schedule and inspection records are kept at the 616 NRDWSF in the inspection
6 logbooks. Inspection records are retained for a minimum of 5 years.
7

8 6.2.1.1 Types of Problems. Each day the 616 NRDWSF is occupied for the
9 purpose of waste handling, a nuclear process operator performs a daily
10 inspection of areas subject to spills (e.g., loading and unloading areas and
11 waste handling areas).
12

13 Weekly inspections are performed to ensure operation and management of
14 the 616 NRDWSF is in accordance with WAC 173-303-630. If the 616 NRDWSF has
15 no containerized waste in storage, weekly inspections will not be conducted.
16 These items are listed in Section 6.2.1.2.
17

18 The fire systems at the 616 NRDWSF are inspected annually by
19 representatives of the Hanford Fire Department. Their inspection includes the
20 following:
21

- 22 • Fire protection system inspection and testing
23 - Fire alarm pull box inspection and test.
24 - Manual and automatic fire door inspection and test
25
- 26 • Wet-pipe sprinkler system inspection and testing
27 - System visual inspection
28 - System internal inspection
29 - Pressure of incoming water supply inspection
30 - Condition of gages by visual inspection
31 - Flow alarm device testing
32 - Zone indicated on fire alarm control panel by visual inspection
33
- 34 • Ignitable or reactive waste storage area inspection.
35

36 The 616 NRDWSF supervisor, or designee, conducts a monthly inspection and
37 test of the communication and alarm systems. This inspection and test
38 includes the following:
39

- 40 • Storage building evacuation alarms
41 • Storage building take cover alarms
42 • Public address system
43 • Portable radios and base station
44 • Crash alarm.
45

46 6.2.1.2 Frequency of Inspections. Each day the 616 NRDWSF is occupied for
47 the purpose of waste handling, a nuclear process operator performs an
48
49

1 inspection of the loading/unloading areas and waste handling areas. During
2 this inspection, the following items are addressed as required by
3 WAC 173-303-630:

- 4
- 5 • Curbing is in good condition
- 6 • Pads/loading areas are crack free
- 7 • Trenches/sumps are locked closed, empty, and crack free
- 8 • Spill kit seal is intact
- 9 • Overpack containers are present.

10
11 The inspection results are recorded in the logbook.

12
13 Weekly inspections are performed to ensure operation and management of
14 the 616 NRDWSF is in accordance with WAC 173-303-630. If the 616 NRDWSF has
15 no containerized waste in storage, weekly inspections will not be conducted.
16 A knowledgeable person cognizant of the 616 NRDWSF operations performs the
17 weekly inspection and completes the inspection form (Figure 6-1).
18 Discrepancies are noted in the comments section. Items inspected include the
19 following:

- 20
- 21 • Condition of concrete floor, walls, and curbing
- 22 • Storage building structural integrity
- 23 • Safety equipment operational and in place
- 24 • Fire extinguishers in place
- 25 • Lights and fixtures
- 26 • Appropriate safety and packaging equipment
- 27 • Container structural integrity
- 28 • Secondary containment systems integrity
- 29 • Containers closed
- 30 • Corrosion of containers
- 31 • Evidence of spills or leaks
- 32 • Container labels and markings in place
- 33 • Container storage locations
- 34 • Proper aisle space
- 35 • Materials wrapped in plastic for signs of deterioration.

36
37 As required by WAC 173-303-395, an annual inspection of the 616 NRDWSF
38 areas where ignitable or reactive waste is stored is performed by a
39 professional knowledgeable of the Uniform Fire Code. The following
40 information is entered into the 616 NRDWSF logbook as a result of this
41 inspection:

- 42
- 43 • The date and time of the inspection
- 44 • The name of the person who performed the inspection
- 45 • A notation of the observations made
- 46 • Any remedial actions that were taken as a result of this inspection.
- 47

48 At least annually, the emergency equipment cabinet will be opened and the
49 contents examined for degradation, respiratory protection equipment exceeding
50 certification date, and the contents restocked as needed.

1 **6.2.2 Specific Process Inspection Requirements [F-2d and (1)]**
2

3 As required by WAC 173-303-630, specific items and/or problems identified
4 during inspections are detailed in Section 6.2.1.2. The inspection records
5 are maintained at the 616 NRDWSF for 5 years.
6

7
8 **6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]**
9

10 The following sections document the preparedness and prevention measures
11 taken at the 616 NRDWSF.
12

13
14 **6.3.1 Equipment Requirements [F-3a]**
15

16 The following sections describe the internal and external communications
17 systems and the emergency equipment required.
18

19 **6.3.1.1 Internal Communications.** The 616 NRDWSF is equipped with an internal
20 communication system to provide immediate emergency instruction to personnel.
21 The onsite communication system at the 616 NRDWSF includes telephones, a
22 public address system, and alarm systems. The telephone system provides
23 internal and external communication. Telephones are available in the
24 operations office, Packaging Material and Handling Equipment Area, and on a
25 telephone pole 23 meters east of the 616 NRDWSF, between the 616 NRDWSF and
26 the primary staging area [the location of internal communication equipment and
27 the primary staging area is identified in the building emergency
28 plan (Appendix 7A)]. Alarm systems exist at the 616 NRDWSF to allow personnel
29 to appropriately respond to various emergencies, including the following
30 emergency situations: building evacuations, take cover events, and fire
31 and/or explosion (Appendix 7A).
32

33 Immediate emergency instruction to personnel is provided by a public
34 address system via speaker horns and ceiling-mounted speakers located
35 throughout the storage building, as well as speaker horns located on the
36 outside of the storage building.
37

38 **6.3.1.2 External Communications.** The 616 NRDWSF is equipped with devices for
39 summoning emergency assistance from the Hanford Fire Department, the Hazardous
40 Materials Response Team, and/or local emergency response teams, as necessary.
41 External communication is made via a telephone communication system, a two-way
42 radio base station, and two-way portable radios. Telephones are available in
43 the operations office, Packaging Material and Handling Equipment Area, and on a
44 telephone pole 23 meters east of the 616 NRDWSF, between the 616 NRDWSF and
45 the primary staging area [the location of external communication equipment and
46 the primary staging area is identified in the building emergency
47 plan (Appendix 7A)]. In addition, the following external communication
48 systems are available for notifying persons assigned to emergency response
49 organizations.
50

- 1 • Fire alarm pull boxes and fire sprinkler flow monitoring devices--
2 connected to a system monitored around the clock by the Hanford Fire
3 Department.
- 4
- 5 • Telephone number 911--contact point for the Hanford Facility; on
6 notification, the Hanford Patrol Operations Center notifies and/or
7 dispatches required emergency responders.
- 8
- 9 • Telephone number 373-3800--single point of contact for the emergency
10 duty officer; this number can be dialed from any Hanford Site
11 telephone.
- 12
- 13 • Crash alarm telephone system--consists of selected telephones that are
14 disassociated from the regular system and automatically are connected
15 to control stations.
- 16
- 17 • Two-way radio system--the system accesses the Hanford Site emergency
18 network and can summon the Hanford Fire Department, Hanford Patrol,
19 and/or any other assistance requested to handle emergencies.
- 20

21 **6.3.1.3 Emergency Equipment.** A detailed list of equipment is included in the
22 Building Emergency Plan (Appendix 7A).

23
24 **6.3.1.4 Water for Fire Control.** The 616 NRDWSF has a potable water main
25 installed for fire control. The available water pressure [measured at the
26 609-A Fire Station fire hydrant--across the street from the 616 NRDWSF
27 (Chapter 2.0, Figure 2-1)] has a static pressure of 545 kilopascals, with a
28 residual pressure of 269 kilopascals when flowing at 3,444.7 liters a minute.

29 30 31 **6.3.2 Aisle Space Requirement [F-3b]**

32
33 The container storage arrangement and aisle spacing for each storage cell
34 are shown in Figure 6-2. Aisle spacing is sufficient to allow the movement of
35 personnel and fire protection equipment in and around the containers.
36 A minimum 0.76 meter aisle space will be maintained between rows of containers
37 as required by WAC 173-303-630.

38 39 40 **6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [F-4]**

41
42 The following sections describe preventive procedures, structures, and
43 equipment.

44 45 46 **6.4.1 Unloading Operations**

47
48 The loading and unloading areas of the 616 NRDWSF are described in
49 Chapter 2.0, Section 2.1.6. All loading and unloading operations are
50 carried out on concrete pads that are equipped with containment trenches.
51 The nuclear process operators ensure the following before waste is unloaded at
52 the 616 NRDWSF.

- 1 • All trench and sump gratings are in place.
- 2
- 3 • All interior sumps and trenches are clean and dry.
- 4
- 5 • All exterior loading pad trenches have minimum residual water.
- 6
- 7 • Loading pad trench drain plugs are closed and locked.
- 8
- 9 • Necessary storage building access doors are open.
- 10
- 11 • Area from loading pad to appropriate storage cell is clear of
- 12 obstructions.
- 13
- 14 • If used, the scissor lift is operational and raised.
- 15
- 16 • The truck is placed so that container movement occurs over the loading
- 17 pad.
- 18

19 After a shipment has been accepted for storage (Chapter 3.0,
20 Section 3.3), the transporter is requested to unload the truck. Multiple
21 waste containers are placed on pallets for movement into the 616 NRDWSF using
22 pallet jacks or a forklift; the forklift is prohibited from operating in the
23 Class 1A flammable liquid storage cell. Single containers are hand carried or
24 moved on a dolly. The containers are placed in the storage cell as assigned
25 on the associated hazardous waste disposal analysis record (Appendix 3A).
26 When the storage of containers is completed, all storage building doors are
27 closed.

28 29 30 6.4.2 Run-Off

31
32 Chapter 4.0, Section 4.1.1.7, contains information on run-off and run-on
33 of liquid at the 616 NRDWSF.

34 35 6.4.3 Water Supplies

36
37 Water is supplied to the 616 NRDWSF from the Columbia River via the
38 Hanford Site potable water system. All hose connections to the potable water
39 line have a one-way check valve installed to prevent back flow. These check
40 valves prevent contamination from entering the water supply lines from within
41 the 616 NRDWSF.

42
43 The water supply system (potable and fire sprinkler supply) for the
44 616 NRDWSF has no backup. A backup is not necessary because of the proximity
45 of the 609-A Fire Station, which can provide a 2 minute response time
46 (Drawing H-13-000014 in Appendix 2A).
47
48
49

1 **6.4.4 Equipment and Power Failure**
2

3 The only powered equipment at the 616 NRDWSF is a forklift, if present,
4 scissor lift, and the ventilation system. If the forklift or scissor lift
5 fails, the 616 NRDWSF supervisor makes the necessary notifications for
6 repairs. Actions taken in response to a loss of ventilation are detailed in
7 the building emergency plan (Appendix 7A).
8

9 As described in Section 6.3.1.2, emergency communication equipment is
10 available to summon emergency assistance in the event of a power loss.
11

12 **6.4.5 Personnel Protection Equipment**
13

14 At the 616 NRDWSF, procedures, structures, and equipment are used to
15 prevent undue exposure of personnel to dangerous waste. The 616 NRDWSF
16 includes eyewash stations and safety showers in the combustible storage cell
17 and the packaging and sampling room. Protective clothing and equipment are
18 used by personnel handling dangerous waste. Protective clothing used at the
19 616 NRDWSF consists of foot, eye, and face protection.
20

21 The following protective clothing is worn when handling waste containers:
22

- 23 • Safety glasses
- 24 • Chemical-resistant gloves
- 25 • Chemical-resistant coveralls
- 26 • Approved safety shoes
- 27 • Face shield.
28

29 The following protective clothing is worn when handling empty new
30 containers:
31

- 32 • Safety glasses or goggles
- 33 • Leather gloves
- 34 • Approved safety shoes.
35

36 **6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND**
37 **INCOMPATIBLE WASTES [F-5]**
38

39 The following sections describe prevention of reaction of ignitable,
40 reactive, and incompatible waste.
41

42 **6.5.1 Precautions to Prevent Ignition or Reaction of Ignitable**
43 **or Reactive Waste [F-5a]**
44

45 All waste, including ignitable waste, is stored in sealed U.S. Department
46 of Transportation-approved containers. Ignitable waste is stored in the
47 Class 1A or Class 1B flammable liquid storage cells (Chapter 2.0, Figure 2-2).
48 The 1A cell is equipped with National Fire Protection Association 70 Class I/
49 Division I (NFPA 1989) electrical fixtures, intrinsically safe chemical
50
51
52

1 transfer pumps and receptacles, an explosion relief wall, 'blow out' pressure
2 relief ceiling panels, and grounding cables. Operation of the electric
3 forklift is prohibited in the Class IA flammable liquid storage cell.
4

5 The 616 NRDWSF does not store reactive waste as defined in
6 WAC 173-303-090(7)(a) (vi), (vii), or (viii).
7

8 Water-reactive waste is stored in U.S. Department of
9 Transportation-approved containers inside portable weatherproof storage
10 cabinets. These cabinets are standalone units that are placed in the
11 flammable liquid storage cells (Figure 6-2) on an as-needed basis. Other
12 reactive waste is stored throughout the storage building depending on waste
13 type and compatibility.
14

15 Smoking is prohibited in the storage building. Multiple "NO SMOKING"
16 signs are present to remind occupants.
17
18

19 **6.5.2 General Precautions for Handling Ignitable or Reactive** 20 **Waste and Mixing of Incompatible Waste [F-5b]** 21

22 Based on the dangerous characteristics identified by the generating unit,
23 specific packaging instructions are provided. General guidance is provided to
24 the generating unit in an internal document concerning waste packaging and
25 disposal requirements. A compatibility analysis is performed on the waste as
26 well. Incompatible waste is not packaged within the same container or placed
27 in the same storage cell.

Building 616 Weekly Inspection (sheet 1 of 3)

Inspection No. _____ Status: _____ Date: _____ Time: _____

	Yes	No	If no, specify
1.0 Office Area			
Emergency light operable			
Exit unobstructed			
Fire extinguisher charged			
Public address system operating			
Ventilation indicator lights operating			
Telephone operating			
Radio operating			
Evacuation alarm tested once monthly; date tested:			
2.0 Hallway			
Exit sign operating			
Fire extinguisher charged			
Exits unobstructed			
Protective equipment supply present per the emergency equipment list*			
Pressure differential gage working-reading:			
3.0 Receiving Material and Handling Equipment Area			
Absorbents present			
Emergency equipment present			
Emergency light operable			
Exit light operating			
Exit unobstructed			
Fire extinguisher charged			
Overpack drums present			
Public address system (audible)			
Telephone operating			
Radio operating			
4.0 Structure Exterior			
Curbing in good condition			
Exits unobstructed			
Pads/loading area crack free			
Trenches locked closed/empty			
No combustibles stored within 50 feet of structure			
Roads/fire lanes unobstructed			
Exterior telephone operating			

* This equipment shall be individually inspected and documented by type, and be in adequate condition, and in the quantities listed. The revised checklist shall be submitted for approval to the Department within 30 days of the effective date of this Permit.

Figure 6-1. Building 616 Weekly Inspection. (sheet 1 of 3)

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Building 616 Weekly Inspection. (sheet 2 of 3)

	Packaging and Sampling Room ^a	Oxidizer ^a	Caustic ^a	Acid ^a	Combustible ^a	Flammable 1B ^a	Flammable 1A ^a
5.0 Storage Areas							
A. Container Condition:							
Closed							
Corrosion							
Evidence of Leakage							
Required labels							
Structural defects							
B. Structures:							
Curbing							
Exits unobstructed							
Floor							
Roof/walls							
Signs							
C. Safety/Emergency Equipment							
[Amendment III.1.B.x.] Personal Protective Equipment ^a		NA	NA	NA	NA	NA	NA
Emergency light operable		NA		NA			NA
Exit light operating							
Fire extinguisher charged	NA	NA	NA	NA			NA
Public address system (audible)							
Safety shower/eye wash tested/flushed (weekly); date tested:		NA	NA	NA		NA	NA
D. Container Location^a							
Waste Tracking Form ID No./Location							
Waste Tracking Form ID No./Location							
Waste Tracking Form ID No./Location							

^aN/A - Not applicable.

X - No problems noted.

C - See comments for problem description or remedial action required.

^aThree container locations are verified against the storage building inventory. Record the waste tracking form ID No./location for each container checked above. Record discrepancies identified in the comments section.

* Located in sealed cabinet. Check for integrity of seal.

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Building 616 Weekly Inspection. (sheet 3 of 3)

6. Comments

Inspector

(print name)

(sign name)

7. Remedial Action Taken

8. Solid Waste Operations Manager Acknowledgment of Action

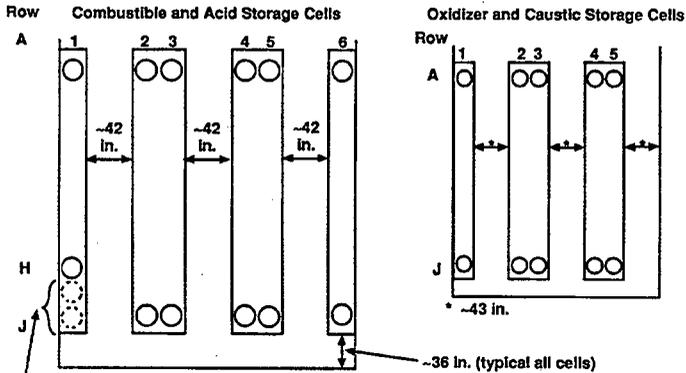
Completion Date: _____

Today's Date: _____

(print name)

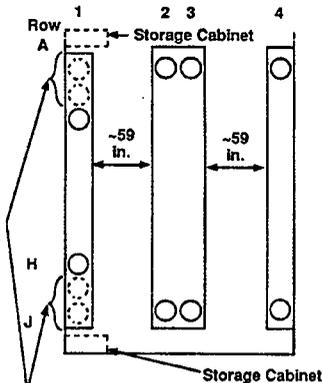
(sign name)

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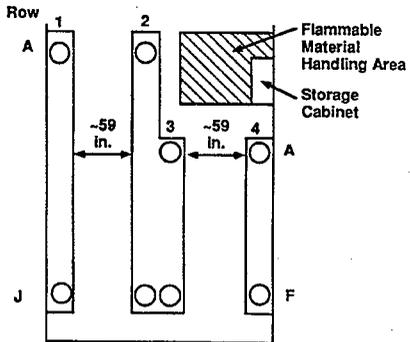
These two locations not present in the Combustible Cell to make room for the Safety Shower/Eyewash Station

Class 1B Flammable Liquid Storage Cell



These four locations not present when Storage Cabinets are used

Class 1A Flammable Liquid Storage Cell



Note: To convert inches to centimeters, multiply by 2.54.

(Not to Scale)

79005021.1

Figure 6-2. Current Container Storage Layout.

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7.0 CONTINGENCY PLAN [G]

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All instances where the emergency response number is cited as "811" shall be changed to "911." The WAC 173-303 requirements for contingency plans are satisfied in the following documents: the *Building Emergency Plan - 616 Building* (Appendix 7A) and the Hanford Facility Contingency Plan (DOE/RL-93-75).

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8.0 PERSONNEL TRAINING [H]

The training plan provided in Appendix 8A discusses training requirements pertaining to the 616 Nonradioactive Dangerous Waste Storage Facility.

The training program is designed to be compliant with all applicable federal, state, and DOE-RL training requirements. The training program complies with requirements contained within WAC 173-303-330 for the development of a written dangerous waste training program. The training program is designed to prepare personnel to manage and maintain TSD units in a safe, effective, efficient, and environmentally sound manner. In addition to preparing employees to manage and maintain TSD units under normal conditions, the training program ensures that employees are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur.

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9.0 EXPOSURE INFORMATION

The 616 NRDWSF does not store, treat, or dispose of hazardous waste in a surface impoundment or a landfill as defined in 40 CFR 270.10 and RCRA, Section 3019. Therefore, exposure information is not required.

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10.0 WASTE MINIMIZATION [D-9]

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To fulfill the requirements of 40 CFR 264.73(b)(9), a certification form that the 616 NRDWSF have a waste minimization/pollution prevention program in place will be entered, annually, into the 616 NRDWSF operating record.

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11.0 CLOSURE AND FINANCIAL ASSURANCE [I]

This chapter presents the closure plan for the 616 NRDWSF. The 616 NRDWSF is a clean, well-maintained dangerous waste container storage unit. Detailed records are maintained of materials stored at the 616 NRDWSF and spills and other unusual occurrences are handled promptly and are well documented. As a controlled container storage unit, the 616 NRDWSF is not anticipated to become extensively contaminated (the use of the word contaminated refers to contamination by dangerous chemicals regulated by Ecology); therefore, the closure approach will be clean closure. Consistent with the criteria that must be met to clean close a TSD unit, no postclosure activities will be necessary. Closure of the 616 NRDWSF will comply with WAC 173-303-610 regulations for the closure of TSD units. This chapter describes the performance standards that will be met, and closure activities that will be conducted to achieve clean closure.

11.1 CLOSURE PLAN [I-1]

The 616 NRDWSF became operational in 1986 and is designed for a 20-year operational life. The 616 NRDWSF Dangerous Waste Permit will be in effect for a maximum of 10 years. Before the end of the 10-year permit lifespan, the storage unit will be evaluated for operational fitness and repermitted. Any deficiencies (including deficiencies associated with the closure plan) will be corrected before continued use is considered.

Activities that are planned to achieve clean closure are presented in the following sections.

11.1.1 Closure Performance Standard [I-1a]

The following sections address closure performance standards and waste removal and decontamination standards.

11.1.1.1 Performance Standard. Closure of the 616 NRDWSF will be conducted in a manner that meets the closure performance standards of WAC 173-303-610(2)(a).

These standards will be achieved by removing, to below background levels or regulatory thresholds, dangerous waste from the 616 NRDWSF and decontaminating or removing all equipment, structures, soils, or other materials containing or contaminated with dangerous waste.

11.1.1.2 Removal or Decontamination Standard. Clean closure of the 616 NRDWSF will require removal and disposal of all dangerous waste, contaminated equipment, and rinsates to standards specified in WAC 173-303-610(2)(b). Sampling will ensure that all dangerous waste contamination is detected and removed as part of closure.

1 Contaminated equipment in the 616 NRDWSF will be decontaminated until
2 wipe sample analyses of the portions of the equipment, which would be in
3 contact with potentially contaminated materials or fluids, demonstrate that
4 the equipment is not a dangerous waste. The level of quantitation will be
5 used as the action level for wipe samples. Clean equipment will be reused.
6 Any equipment that cannot be decontaminated will be disposed of as dangerous
7 waste.

8
9 All concrete within the 616 NRDWSF boundary is susceptible to
10 contamination and there are no other pours of the same concrete outside of the
11 unit boundary. Because there is no other concrete available to establish a
12 background level, the approach detailed in Table 11-1 will be used for the
13 analysis of the concrete samples. All sampling and analyses necessary for
14 soils underneath a contaminated concrete layer will be performed before
15 removal of the overlying concrete.

16
17 The concrete floor of the 616 NRDWSF includes the trenches and sumps.
18 The trenches and sumps of the 616 NRDWSF are assumed to be the areas of the
19 floor subjected to the highest level of contamination. Consequently, the
20 disposition of the floor will be contingent on results of the core sampling of
21 the trenches and sumps. In addition to the trenches and sumps, the loading
22 areas of the 616 NRDWSF also will be core sampled. The floor, trenches, and
23 sumps of the storage and loading areas will be removed and disposed of as
24 dangerous waste if contamination is found in the designating sample. The
25 designating sample will be considered to be the sample indicating the highest
26 level of contamination. Action levels for the analysis of the core samples
27 will be established in accordance with Table 11-1.

28
29 The soil immediately surrounding the loading areas will be sampled for
30 verification that the environment has not been affected by the 616 NRDWSF
31 operations. Should contaminants be detected above background levels, the soil
32 will be excavated until the level of chemical constituents around the
33 616 NRDWSF is below or equal to that of soil background levels. Soil
34 background levels will be based on established and accepted Hanford Site soil
35 background information (WHC 1991) or established by soil sampling per SW-846
36 (EPA 1986).

37
38 All sampling and analyses necessary for soils underneath a contaminated
39 concrete layer will be performed before removal of the overlying concrete.
40 All soils that exceed the clean closure standards of WAC 173-303-610(2)(b)
41 will be managed in a manner analogous to that previously discussed (WHC 1991
42 and EPA 1986).

43
44 To achieve the above-mentioned standards within the tolerances specified,
45 distinct sampling strategies and methods have been determined for the floor of
46 the cells, loading areas, equipment, and soil. These strategies and methods
47 are discussed in Section 11.1.4.
48
49

1 11.1.2 Maximum Waste Inventory [I-1b(1) and 1c]
2

3 Of the 6 cells, the caustic cell and the oxidizer cell each can hold
4 19,873.4 liters, the combustible cell can hold 22,447.5 liters, and the acid
5 cell can hold 23,091 liters of waste. The remaining 2 cells, the Class 1A
6 flammable cell and the Class 1B flammable cell, can hold 9,596 liters and
7 12,870.4 liters, respectively. To achieve this capacity, the waste containers
8 would have to be double stacked as detailed in Chapter 4.0, Section 4.1.1.2.
9 In total, 108,395.3 liters of waste can be stored in the 616 NRDWSF.
10 Figure 11-1 shows the configuration and layout of a typical cell.
11

12
13 11.1.3 Inventory Removal, Disposal or Decontamination of Equipment,
14 Structures, and Soils [I-1b(2) and (3)]
15

16 Closure activities will entail sampling and decontamination or removal
17 and disposal of the structure, equipment, and soil. These activities will
18 consist of the following steps, as necessary, to determine what dangerous
19 waste, if any, has contaminated the building, the associated equipment, the
20 loading areas, and the surrounding soil.
21

- 22 1. Decontaminate the storage building floor and walls.
- 23
- 24 2. Decontaminate the associated storage building equipment.
- 25
- 26 3. Decontaminate the loading areas.
- 27
- 28 4. Perform verification sampling of the storage building trenches and
29 sumps, associated equipment, and loading areas to determine the
30 effectiveness of decontamination procedures.
- 31
- 32 5. Perform repeated decontamination and verification sampling until the
33 removal of all contaminants is verified or the component is properly
34 disposed of.
- 35
- 36 6. Excavate and dispose of any contaminated soil.
- 37
- 38 7. Perform repeated excavation and verification sampling until all
39 contaminated soil has been removed.
- 40
- 41 8. Decontaminate any equipment used in performing closure activities.
- 42
- 43 9. Dispose of all contaminated materials and rinsates generated during
44 the closure activities.
- 45
- 46 10. Restore the area after closure activities are complete.
- 47
- 48 11. Certify that closure activities were completed in accordance with
49 the approved plan.
50

51 A sampling flow path for the 616 NRDWSF components is shown in
52 Figure 11-2.

1 11.1.3.1 Inventory Removal. All waste inventory will be shipped offsite to a
2 permitted TSD facility within 90 days after receiving the last volume of
3 dangerous waste. Following the final shipment of waste, the 616 NRWSF floor,
4 walls, and loading areas will be washed down and decontaminated. An
5 appropriate decontamination method such as high-pressure, low-volume steam
6 cleaning coupled with detergent washes will be used. Such a combination is
7 nondangerous in itself and will be effective for both organic and inorganic
8 constituents. The decontamination rinsate will be containerized, sampled,
9 designated and, if regulated, shipped offsite to a permitted TSD facility.
10 All materials packaged for shipment to a permitted TSD facility will be in
11 U.S. Department of Transportation-approved containers that are compatible with
12 the waste contents. All containers will be labeled and shipped with an
13 accompanying offsite manifest. All dangerous waste rinsate generated from
14 decontamination of the 616 NRWSF will be handled in the same manner.
15

16 11.1.3.2 Decontamination of Building Equipment. Most of the equipment at the
17 616 NRWSF is used for drum handling. This equipment could become
18 contaminated in the event of a leaking or ruptured drum. Storage building
19 equipment includes the following:
20

- 21 • Barrel sling
- 22
- 23 • Drum dollies, hand trucks, pallet jacks, and/or electric forklift
- 24 truck
- 25
- 26 • Chemical transfer pumps
- 27
- 28 • Gantry crane
- 29
- 30 • Barrel tongs.
- 31

32 Any contaminated storage building equipment will be decontaminated with
33 an appropriate decontamination method, such as high-pressure, low-volume
34 steam cleaning coupled with detergent washes. The equipment decontamination
35 rinsate will be handled in the same manner as the storage building
36 decontamination rinsate. Equipment will be decontaminated until wipe sample
37 analysis shows no detectable contamination.
38

39 Other equipment within the storage building not associated with drum
40 handling includes cold and hot water lines servicing the basins and safety
41 showers. As shown in Drawing H-6-1559 in Appendix 4B, the cold water line
42 enters the receiving area at the change rooms and is routed to various
43 locations within the storage building. A counter top with two stainless steel
44 basins with their own independent hot water heater is provided in the
45 packaging and sampling room. Both basins have hot and cold running water.
46 The basins are provided for emergency use and do not have drains. The storage
47 building has two safety showers, one in the packaging and sampling room and
48 one in the combustible cell. The cold water line feeds these showers as well
49 as hose bibs in each cell. The hose bibs serve as a wash water source if
50 water is needed. To protect the water supply, each hose bib has a back flow
51 preventor.
52

1 The hot water heater in the packaging and sampling room is piped to the
2 hot water faucets at the basins as well as along the north wall to the
3 combustible cell where the piping is capped off. The water from the showers
4 drains to the floor and to the trenches (sampling and decontamination of the
5 trenches are discussed in Section 11.1.4). The showers in the storage portion
6 of the 616 NRDWSF are not expected to be contaminated with dangerous waste and
7 will not be sampled for dangerous waste contamination. The tile field will be
8 sampled for verification purposes (sampling of the tile field is discussed in
9 Section 11.1.4.4.4). The basins will be sampled and decontaminated if, based
10 on documentation, the basins have been used for handling of dangerous
11 constituents. The basins will be wipe sampled and the samples will be
12 analyzed for the documented constituents that were released to the basins.

13 14 15 **11.1.4 The 616 Nonradioactive Dangerous Waste Storage Facility** 16 **Sampling Plan [I-1b(4) and (a)]** 17

18 This section details the sampling plan that will be implemented following
19 the removal of the dangerous waste inventory and the initial building
20 decontamination.
21

22 The waste sampling and analysis plan has been prepared to evaluate
23 contamination, if any, at the 616 NRDWSF. A flowchart for sampling activities
24 is provided in Figure 11-2.
25

26 The walls of the storage cells are not expected to be contaminated with
27 dangerous waste and therefore will not be sampled. The walls are sealed, to a
28 height of 2.4 meters, with an epoxy sealant (Chapter 4.0, Section 4.1.1.4),
29 which prevents material from soaking into the concrete. The 616 NRDWSF uses
30 rigid documentation showing the time, location, and analysis to verify that
31 spills are cleaned up. Any material spilled in the 616 NRDWSF is removed and
32 verification samples are taken to ensure that no residue remains (Chapter 4.0,
33 Section 4.1.1.8). Therefore, it is not necessary to sample the walls of the
34 616 NRDWSF because the walls are known to be clean.
35

36 **11.1.4.1 Sampling Plan Objectives.** The objectives of the 616 NRDWSF sampling
37 plan are as follows:
38

- 39 • Obtain local background concentrations for soil, if required
40 (Section 11.1.1.2)
- 41
- 42 • Determine whether the concrete floor and loading pads contain
43 dangerous waste constituents as defined by WAC 173-303
44
- 45 • Identify and quantify the specific dangerous waste constituents
46 (if any) that are present using methods outlined in SW-846 (EPA 1986).
47 If any other methods are used, the methods will be referenced and
48 submitted to Ecology
49
- 50 • Evaluate sample analysis data to determine closure actions.
51

1 11.1.4.2 Site Safety. The following sections identify measures that will be
2 in place during implementation of the sampling plan to ensure personnel
3 safety.
4

5 11.1.4.2.1 Health and Safety Plan. A site-specific version of the
6 general RCRA/CERCLA investigation health and safety manual will be developed
7 to be used for sampling at the 616 NRDWSF. This plan will be completed and
8 added to the closure plan before initiation of sampling activities.
9

10 11.1.4.2.2 Standard Safety Procedures. The following safety procedures
11 will apply each time personnel make a site entry for sampling purposes.
12

- 13 • No personnel will be at the site without a designated 'buddy'.
- 14
- 15 • One of the people entering the site will be designated to be in
16 charge.
17
- 18 • Personal protective equipment will be worn as specified in the health
19 and safety plan. Approved deviations will be entered in the field
20 logbook and signed by the field team leader (cognizant engineer) and
21 the site safety officer.
22
- 23 • Field work will be planned before the site is entered.
24
- 25 • Equipment needed for work will be inventoried and inspected before the
26 site visit to ensure that all equipment is present and in operable
27 condition.
28

29 11.1.4.3 Analytical Parameters. All samples taken as part of the closure of
30 the 616 NRDWSF will be analyzed for the constituents identified in Appendix IX
31 of 40 CFR 264, unless specified otherwise in the text of this closure plan.
32 The 616 NRDWSF sampling plan was developed to determine the presence of
33 contamination that could have resulted from the storage of dangerous waste.
34

35 11.1.4.4 Sampling Activities. Sampling activities will be conducted in the
36 616 NRDWSF as follows:
37

- 38 • Collect local background soil samples
- 39 • Core the concrete floor and loading pads
- 40 • Collect samples of the soil immediately surrounding the loading pads
- 41 • Collect samples of the soil from the tile field and french drain.
42

43 Sampling procedures to be used for establishing local background
44 concentrations and for determining whether chemical waste has contaminated the
45 storage building and loading pads are described in this section. Sampling
46 procedures will be conducted in conformance with procedures described in
47 Appendix 11B.
48

49 11.1.4.4.1 Background Soil Samples. Background soil sampling will be
50 done at the time of closure, if required (Section 11.1.1.2). Five initial
51 samples will be taken at a distance from the 616 NRDWSF such that the soil
52 would not be impacted by the storage unit operations, but would still be in a

1 similar geologic strata. Standard statistical analyses will be performed to
2 approximate the background population distribution function. Metals are
3 expected to be found in a log normal distribution in the soil; therefore, the
4 natural logarithm of the analytical value will be calculated for use in
5 determining means and standard deviations and in comparing data from the soil
6 immediately surrounding the 616 NRDWSF. Other dangerous constituents are
7 expected to follow in a normal distribution in the soil, so actual analytical
8 values will be used for calculations and comparisons. If the variance is
9 large and, therefore, the computed background threshold value (based on at
10 least 90 percent confidence) is too large, further background sampling might
11 be necessary.

12
13 For those cases where comparisons with the background threshold value are
14 not applicable, samples will be compared to regulatory thresholds. Soil
15 samples will be considered contaminated if the constituent levels are above a
16 3-sigma tolerance limit on the background mean.

17
18 **11.1.4.4.2 Concrete Floor.** The floor of the 616 NRDWSF is poured
19 concrete. A penetrating sealant has been applied to seal concrete pores and
20 fill any cracks that might have developed while the concrete set up
21 (Chapter 4.0, Section 4.1.1.4). Any further cracks are filled as the cracks
22 are detected in the weekly inspection of the storage building or during
23 regular 616 NRDWSF operations. Resealing also occurs at regular intervals.
24 In accordance with existing operating procedures used at the storage building,
25 spills are contained (with absorbent material if liquid), the area of the
26 spill is contained and/or stabilized, and the area is cleaned up. The
27 recovered material is shipped offsite to a permitted TSD facility.

28
29 The trenches and sumps are assumed to be the areas of the floor subject
30 to the highest level of contamination. The disposition of the floor will be
31 determined by sampling and verification of the trenches and sumps. Waste
32 entering the trenches and sumps is in a liquid state and is assumed to be
33 relatively homogeneous. The sample locations have been placed based on this
34 assumption. Cell trenches have center sumps that are 0.3 meter by 0.3 meter
35 by 12.7 centimeters in size. Walkway trenches have no sumps, but the trenches
36 slope down to one end. Room sumps are flat bottomed. The trench and sump
37 configuration is shown in Figure 11-3. The areas to be sampled are shown in
38 Figure 11-4.

39
40 For verification purposes, each trench and sump will be core sampled.
41 Core samples will be taken to determine whether or not regulated constituents
42 have penetrated the concrete sealant. Two samples will be taken in each
43 trench, one random and one authoritative (in the deepest part of the trench).
44 One sample will be taken in the center of each sump. A coring device will cut
45 a core from each selected location.

46
47 The coring device employs a diamond bit that uses distilled water as a
48 cutting lubricant to minimize dust generation. No organic-based lubricant
49 will be used. An industrial-size shop vacuum will be used to remove excess
50 water from around the core to minimize surface contamination flowing into the
51 underlying material. The waste water from the shop vacuum will be emptied
52 into a new U.S. Department of Transportation-approved container and will be

1 stored at the 616 NRDSWF while awaiting disposal. A description of the
2 procedure to be used for decontaminating the coring device is located in
3 Appendix 11B. All decontamination fluids will be containerized with the waste
4 water.
5

6 Once the core is cut, the core will be withdrawn and protected from
7 cross-contamination. A laboratory will perform analyses on the core in
8 accordance with procedures defined in Table 11-1.
9

10 If the analyses of the concrete cores indicate that contamination is
11 present and has penetrated the sealant, the associated floor, trench, and sump
12 will be removed, placed in a containment module, and disposed of as dangerous
13 waste.
14

15 In the event that contaminants have penetrated the sealant, the core
16 holes will be advanced through the concrete to determine the extent of
17 contamination. Should the contamination go completely through the concrete,
18 the core holes will be advanced through the soil. Soil samples will be taken
19 at the surface, at a 0.3 meter depth, and at a 0.61 meter depth. It can be
20 shown that concentrations of inorganic constituents added to the soil by
21 sorption are greatest in the upper few inches (millimeters), and decreases
22 with increased thickness of the soil column. Because of the well known
23 process of sorption (Pendias and Pendias 1984; Routson et al. 1979;
24 Conway 1982; Freeze and Cherry 1979), any contamination remaining in the soil
25 would be the result of equilibrium reactions and/or irreversible sorption. In
26 either case, residual contamination would be concentrated mostly in the
27 uppermost part of the soil column, with rapidly decreasing concentrations
28 downward. Therefore, the uppermost part of the soil column is most likely to
29 contain contamination if contamination is present. Because the potential
30 contamination from the 616 NRDSWF would remain in the upper part of the soil
31 column, a maximum sampling depth of 0.61 meter is adequate.
32

33 A precleaned, hand-operated soil auger will be placed at each sampling
34 location, and soil/gravel will be removed to a total depth of 0.61 meter. If
35 access to the sampling location is restricted, a small shovel or trowel will
36 be used. Samples from the hole will be placed immediately in a
37 laboratory-prepared sample container to minimize loss of volatiles and will be
38 stored on ice in a cooler at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$. A description of the procedure to be
39 used for decontaminating the soil auger, as well as all sampling equipment, is
40 located in Appendix 11B. The equipment will be cleaned before use at each
41 sample location.
42

43 Excess soil that is removed from each hole will be containerized in a
44 U.S. Department of Transportation-approved container until results of the soil
45 analyses are received. The container will be stored at the 616 NRDSWF until
46 designated according to procedures. Each hole in the floor or pad will be
47 sealed with grout after sampling is completed.
48

49 The soil samples will be analyzed for the constituents identified in the
50 core samples. The analyses will follow the protocol outlined in SW-846
51 (EPA 1986). If contamination is detected, soil will be excavated to the
52 determined depth of contamination. This approach assumes a decreasing

1 concentration with depth, characteristic of a surface spill or leak such as
2 those from the trenches and sumps. A verification sample will be taken after
3 soil removal is complete. This sample will be taken at the surface. Further
4 removal will be performed at 0.3-meter increments until verification samples
5 demonstrate that contamination above background levels has been removed.
6

7 Metal gratings over the trenches and sumps will be steam cleaned with
8 low-volume, high-pressure steam in conjunction with a detergent wash. For
9 disposal purposes, the rinsate from the steam cleaning will be collected and
10 analyzed for the dangerous waste stored in the 616 NRDWSF. The metal grates
11 will be wipe sampled to verify that decontamination is adequate. Analyses
12 will proceed according to the protocol outlined in SW-846 (EPA 1986). As with
13 decontamination of other equipment, decontamination will continue until the
14 grate wipe sample analyses show no detectable levels of constituents.
15

16 **11.1.4.4.3 Loading Pads and Surrounding Soils.** Although the concrete
17 loading pad at the east end of the storage building is the primary pad used
18 for waste acceptance, both the north and east loading pads will be sampled.
19 Because the loading pads are similar in size and shape, the same sampling
20 scheme will be used for both. The concrete loading areas have been sealed,
21 but because of the potential for contamination, the loading areas will be core
22 sampled. The loading pads and soil immediately surrounding the pads will be
23 sampled at locations randomly selected on a 1-meter by 1-meter grid.
24 Six random samples will be taken on the north pad and six random samples will
25 be taken on the east pad. This represents a 5 percent coverage of the pads
26 and soil. Sample locations are noted in Figure 11-5.
27

28 Concrete cores will be taken as described for the concrete floor.
29 Once the concrete core is cut, the core will be withdrawn and protected from
30 cross-contamination. A laboratory will perform analyses on the core samples
31 in accordance with the procedures defined in Table 11-1. Core samples will be
32 taken to determine whether or not penetration of the sealant by regulated
33 constituents has occurred. The core samples will be analyzed for the
34 constituents historically received at the 616 NRDWSF. After sampling is
35 completed, the holes created by the core sampling will be filled with grout.
36

37 The trenches on the loading pads will be cored in the same manner as
38 those in the storage building. One random sample will be taken along with
39 another sample at the deepest part of the trench (Figure 11-4).
40

41 If dangerous constituents have penetrated the concrete (as determined by
42 core analyses), the pads and trenches will be removed, placed in a containment
43 module, and disposed of as dangerous waste, based on the results of the
44 designating sample(s). The soil underneath, if necessary, and along the side
45 of the loading pad will be sampled at the surface, at a 0.3-meter depth and at
46 a 0.6-meter depth in the same locations as the initial samples. Soil samples
47 will be placed in sample bottles appropriate for the type of analyses to be
48 performed. Soil samples will be analyzed for the contaminants identified in
49 the core samples. Samples will be analyzed in accordance with protocols
50 outlined in SW-846 (EPA 1986).
51

1 If the soil samples are determined to be contaminated, when compared to
2 the soil background levels (Section 11.1.1.2), the soil will be removed from
3 the loading area(s) to the depth of contamination noted in the soil samples.
4 Some soil removal might be necessary along the sides of the loading pads, even
5 if soil under the loading pads is found not to be contaminated. This approach
6 assumes a decreasing concentration of contaminants with depth-characteristic
7 of surface spills. Pending analyses, contaminated soils will be placed in new
8 open-head U.S. Department of Transportation-approved containers. Following
9 soil removal, surface soil sampling will be repeated at the random locations
10 for verification.
11

12 The samples will be analyzed for the contaminants reported in the
13 previous sample analyses. Further removal will take place at 0.3-meter
14 increments until verification samples demonstrate that contamination above
15 background levels has been removed. These analyses will provide verification
16 that contamination has been removed to the standards set forth in
17 Section 11.1.1. Analyses will be conducted according to protocols outlined in
18 SW-846 (EPA 1986). Soil containers will be disposed of based on the
19 analytical results of the designating sample(s).
20

21 **11.1.4.4 Tile Field and French Drain.** The tile field is used for the
22 disposal of sanitary waste generated at the 616 NRDSWF (Chapter 2.0,
23 Figure 2-4). Although dangerous waste is not handled in areas serviced by the
24 tile field, the tile field will be sampled to verify that no contaminants are
25 present. The tile field will be sampled by taking three equally spaced soil
26 samples across the center line of the tile field at the interface of the
27 native soil and the tile field gravel. Samples will be taken at 0.3-meter and
28 at 0.6-meter depths below the gravel and soil interface. The samples will be
29 analyzed in accordance with SW-846 (EPA 1986). Samples will be compared to
30 background constituent levels. Should any contamination be found, the tile
31 field will be excavated to the depth prescribed by the soil sampling.
32

33 The french drain receives effluent from the trenches on the loading pads.
34 The effluent is verified to be free of contamination (Chapter 2.0,
35 Section 2.5.1) before the effluent is released to the french drain. The
36 french drain will be sampled once in the center. As with the tile field, the
37 samples will be completed at the interface of native soil and french drain
38 gravel, at 0.3-meter and at 0.6-meter depths below the gravel and soil
39 interface. Analyses will be conducted in accordance with protocols outlined
40 in SW-846 (EPA 1986). Samples will be compared to background constituent
41 levels. Should any contamination be found, the french drain will be excavated
42 to the depth prescribed by the soil sampling.
43

44 **11.1.4.5 Sampling Locations.** Sampling locations have been selected randomly
45 except where authoritative sampling is warranted in areas of potential
46 contamination. Where appropriate, sections of the storage building have been
47 gridded to facilitate the selection and identification of random sample
48 locations. The use of a random-sampling strategy will ensure that data
49 obtained will be representative of the population from which the samples were
50 taken. Areas of potential contamination were selected for authoritative
51 sampling because of the higher potential for contamination. The number and
52 location of each type of sample is presented in Table 11-2. Random number

1 table is included in Appendix 11A for each area to be sampled. The following
2 sections discuss the sample locations.
3

4 **11.1.4.5.1 Concrete Floor.** The following describes the sampling
5 locations for the concrete cell floors.
6

7 **Packaging material and handling equipment area--**The sampling locations
8 for the packaging and handling equipment area sump are shown in Figure 11-4
9 (sheet 1). Two locations will be sampled.
10

11 **Packaging and sampling room--**The sampling locations for the packaging and
12 sampling room sump are shown in Figure 11-4 (sheet 1). Two locations will be
13 sampled.
14

15 **Caustic cell--**The sampling locations for the caustic cell trench are
16 shown in Figure 11-4 (sheet 2). Two locations will be sampled.
17

18 **Oxidizer cell--**The sampling locations for the oxidizer cell trench are
19 shown in Figure 11-4 (sheet 2). Two locations will be sampled.
20

21 **Acid cell--**The sampling locations for the acid cell trench are shown in
22 Figure 11-4 (sheet 2). Two locations will be sampled.
23

24 **Combustible cell--**The sampling locations for the combustible cell trench
25 are shown in Figure 11-4 (sheet 2). Two locations will be sampled.
26

27 **Flammable 1A cell--**The sampling locations for the flammable 1A cell
28 trench are shown in Figure 11-4 (sheet 2). Two locations will be sampled.
29

30 **Flammable 1B cell--**The sampling locations for the flammable 1B cell
31 trench are shown in Figure 11-4 (sheet 2). Two locations will be sampled.
32

33 **Receiving area--**The sampling locations for the receiving area trench are
34 shown in Figure 11-4 (sheet 3). Two locations will be sampled.
35

36 **Walkway between caustic and oxidizer cell--**The sampling locations for the
37 walkway trench between the caustic and oxidizer cell are shown in Figure 11-4
38 (sheet 3). Two locations will be sampled.
39

40 **Walkway between acid and combustible cell--**The sampling locations for the
41 walkway trench between the acid and combustible cell are shown in Figure 11-4
42 (sheet 3). Two locations will be sampled.
43

44 **Walkway between flammable 1A and 1B cells--**The sampling locations for the
45 walkway trench between the flammable 1A and 1B cell are shown in Figure 11-4
46 (sheet 3). Two locations will be sampled.
47

48 **11.1.4.5.2 Loading Pad Trenches.** Sampling locations for the loading pad
49 trenches are shown in Figure 11-4 (sheet 3). A total of four locations will
50 be sampled (two on the north pad and two on the east pad).
51

1 11.1.4.5.3 Loading Pads and Surrounding Soils. Sampling locations for
2 the loading pads and surrounding soil are shown on Figure 11-5. A total of
3 12 locations will be sampled (six on the north pad and six on the east pad).
4

5 11.1.4.5.4 Tile Field and French Drain. The sample locations for the
6 tile field and french drain are shown on Figure 11-6. Four locations will be
7 sampled (three at the tile field and one at the french drain).
8

9 11.1.4.6 Evaluation of Data. After receiving the analytical results, the
10 data will be judged for reliability, reviewed, and summarized to eliminate
11 constituents whose results are below detection limits (making the data more
12 manageable). The data will be statistically evaluated according to procedures
13 described in Appendix 11B. Data from the 616 NRDSWF sampling will be
14 evaluated and summarized by the following methodology:
15

- 16 • Evaluate the quality control of the sample handling and sample
17 analyses to assess the reliability of the data
18
- 19 • Examine the analytical data according to guidance provided in
20 *Statistical Analysis of Ground Water Monitoring Data at RCRA*
21 *Facilities, Interim Final Guidance (EPA 1989)*
22
- 23 • Prepare summary statistics for constituents
24
- 25 • Test the significance of the location effects of analytical results
26 using the analysis of variance procedure
27
- 28 • Have qualified personnel evaluate and interpret data
29
- 30 • Compare the sample results to the action levels.
31

32 11.1.4.7 Statistical Treatment of Data. All data collected will be analyzed
33 and tabulated for evaluation using the methods described in SW-846 (EPA 1986).
34 Other guidance documents and statistical references could be used where
35 applicable [e.g., Barth and Mason 1984, and *Statistical Analysis of Ground*
36 *Water Monitoring Data at RCRA Facilities, Interim Final Guidance (EPA 1989)*].
37 Laboratory data will be provided to Ecology on completion of sampling and
38 analyses. Data for individual constituents will be summarized and will
39 include the following information:
40

- 41 • Number of less than detection-limit values
- 42 • Total number of values
- 43 • Mean values
- 44 • Standard deviation
- 45 • Coefficient of variation
- 46 • Method detection limit values
- 47 • Quantitation limit values
- 48 • Representative method precision
- 49 • Minimum value
- 50 • Maximum value.
51

1 The data will be interpreted by qualified scientists and statisticians.
2 The technical bases for establishing the local background threshold
3 concentrations, the methods by which significant deviation from local
4 background will be determined, and the appropriate sample sizes (i.e.,
5 numbers) are discussed in the General Information Portion, DOE/RL-91-28,
6 Chapter 11.0. Specific approaches, and the criteria and assumptions implicit
7 in establishing concentration levels (levels that constitute significant
8 deviation from local background or other control levels), as well as the
9 numbers of samples, etc., will be related to Ecology when these factors have
10 been resolved. Data evaluation will be based on statistical criteria and
11 professional judgment as appropriate.
12

13 **11.1.4.8 Assessment of Data Reliability.** Data reliability will be assessed
14 by evaluating the sample handling and analysis quality control according to
15 procedures described in Appendix 11B. Sample handling quality control will be
16 evaluated by reviewing field documentation and results of quality assurance
17 samples to establish that sampling error was minimized. The review will be
18 conducted to verify that decontaminated equipment was used, that
19 cross-contamination was minimized, that samples were preserved properly, and
20 that sample chain of custody was not broken.
21

22 Analytical data received from any sampling performed at the 616 NRDWSF
23 will be scrutinized against the quality control report provided by the
24 contractor laboratory to assess the reliability of the results. Both organic
25 and inorganic chemical analytical results will be checked, as follows:
26

- 27 • Inorganic chemical analysis laboratory assessment
- 28 - Holding times are acceptable
- 29 - Contractor's detection limits are below those required by the EPA
- 30 - Laboratory blanks and replicates are within established quality
- 31 control limits
- 32 - Sample spike recoveries are within quality control limits.
- 33
- 34 • Organic chemical analysis laboratory assessment
- 35 - Holding times are acceptable
- 36 - Instrument detection limits, blank recoveries, surrogate recoveries,
- 37 and spike recoveries are within the EPA established quality
- 38 control limits.
- 39
- 40
- 41

42 **11.1.4.9 Reporting.** After completion of the sampling effort, verification
43 documents will be provided for actual sample locations, number of samples, and
44 specific methods used for collection, if different from those provided in this
45 waste sampling and analysis plan. Data received from the laboratory will be
46 reviewed, analyzed, and summarized statistically. The results will be used to
47 provide further closure evaluations.
48

49 **11.1.4.10 Sampling Equipment, Containers, and Preservation.** Sampling
50 equipment, containers, and preservation methods are discussed in the following
51 sections.
52

1 11.1.4.10.1 Sampling Equipment. Sampling equipment to be used will be
2 appropriate to the spectrum of media that might be encountered. The media to
3 be sampled will consist of concrete and soil. The following are examples of
4 the types of sampling equipment that could be used during the various sampling
5 phases:
6

- 7 • Concrete
- 8 - Coring device
- 9 - Saw for obtaining chip samples

- 10 • Soils and gravel
- 11 - Auger
- 12 - Split spoon
- 13 - Trowel
- 14 - Scoop
- 15 - Shovel.
- 16
- 17

18 If site conditions permit, an auger and split spoon will be used to
19 collect soil and gravel samples. Otherwise, a trowel, scoop, or shovel will
20 be used. The sampling equipment should be constructed of stainless steel or
21 should have liners constructed of inert materials.
22

23 Additional equipment and supplies will be procured as required to perform
24 the necessary sampling. Equipment could include, but not be limited to, the
25 following items:
26

- 27 • Bore or wire brushes
- 28 • Stainless-steel mixing bowls
- 29 • Sized, heavy-duty plastic bags
- 30 • Stainless-steel spatulas, scoops, and spoons
- 31 • Adhesive tape
- 32 • 30-meter steel tape, 3.7-meter steel tape
- 33 • Compass
- 34 • Indelible marking pens or pencils
- 35 • Hammer and/or sledgehammer
- 36 • Ice chests and ice
- 37 • Security tape, flagging
- 38 • Gloves (of material suitable for anticipated hazards)
- 39 • Field radio
- 40 • Rags
- 41 • Appropriate drawings and maps
- 42 • Tags
- 43 • Plastic sheeting
- 44 • Water containers
- 45 • Extra glass and plastic bottles (in case of breakage or contamination)
- 46 • Industrial-size shop vacuum
- 47 • Teflon* sheets.
- 48

49 * Teflon is a trademark of E.I. DuPont de Nemours & Company,
50 Incorporated.

1 11.1.4.10.2 **Sample Containers and Preservation.** Sample containers will
2 be chosen based on compatibility with the samples, resistance to leaking or
3 breakage, ability to seal tightly, and capacity to hold the required volume
4 for an optimum sample. Containers for collecting and sorting samples will be
5 made of high-density plastic or glass appropriate for the constituents to be
6 analyzed. The containers will have tight, screw-type lids with Teflon cap
7 liners for glass bottles.
8

9 All samples will be packaged according to the procedure described in
10 Appendix 11B, placed in an ice chest, and cooled to $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ immediately
11 after collection. A description of the soil and sediment sample containers to
12 be used is located in Appendix 11B. Samples will be transported to the
13 analytical laboratory within 24 hours of collection. All deviations from
14 SW-846 (EPA 1986) protocols, including sample size, will be documented with a
15 justification for the deviation.
16

17 11.1.4.11 **Sampling Quality Control.** The required quality control procedures
18 will be followed to the extent necessary to adequately control sampling
19 activities. The various quality control procedures are described in the
20 following sections.
21

22 11.1.4.11.1 **Data Quality.** To ensure quality data, all of the sampling
23 procedures will be conducted in conformance with procedures described in
24 Appendix 11B. All laboratory analyses will be performed in accordance with
25 standard EPA methods described in the most recent edition of SW-846. The
26 analytical laboratory will submit all analytical and quality assurance and
27 quality control procedures to the contractor for approval before samples are
28 analyzed. The EPA guidelines for reporting accuracy, precision, and practical
29 quantitation limit specified in the analytical methods will be met.
30

31 Quality control of sampling will be ensured through the use of field
32 duplicates, equipment blanks, and field blanks. Quality control of records
33 and documentation will be accomplished by following procedures described in
34 Appendix 11B.
35

36 Sampling records to be kept on file include field notes, daily memoranda,
37 records of meetings and activities concerning the sampling program, and
38 chain-of-custody records. In addition, quality control will be implemented
39 through the recording of field memoranda and field notes. Before sampling
40 begins, a quality assurance project plan for sampling and analysis at the
41 616 NRDWSF will be prepared.
42

43 11.1.4.11.2 **Field Quality Control.** Field quality control will be
44 accomplished through the use of various sampling duplicates and blanks, as
45 described in the following paragraphs.
46

47 Field duplicate samples will be taken for concrete and underlying soils.
48 Duplicate samples are two separate samples collected from the same sampling
49 point and placed into separate containers. The duplicates will be used as an
50 indication of the repeatability of the analytical data.
51

1 Equipment blanks will serve as a check on sampling device cleanliness.
2 An equipment blank will be composed of distilled water, which will be
3 transported to the site, opened in the field, poured over or through the
4 sample collection device, collected in a sample container, and returned to the
5 laboratory for analysis. These samples will be collected daily.
6

7 If appropriate, trip blanks will be used to identify any possible
8 contamination originating from container preparation methods. Trip blanks
9 will consist of pure deionized, distilled water in a clean sample container,
10 which will accompany each batch of containers shipped to the field. Trip
11 blanks will be returned unopened to the laboratory for analysis.
12

13 Field blanks will consist of pure deionized, distilled water that is
14 transferred to a sample container at the site and preserved with the reagent
15 specified for the analyses of interest. Field blanks will be used to check
16 for possible contamination originating with the reagent or the sampling
17 environment and will be collected daily.
18

19 11.1.4.11.3 Field Logbook. The personnel conducting sampling will
20 maintain an official logbook during sampling activities, as described in
21 Appendix 11B. The book will be bound and will have consecutively numbered
22 pages. All information pertinent to the sampling must be recorded in the
23 logbook in a legible fashion. If changes are necessary, changes will be
24 indicated by a single line drawn through the affected text. The individual
25 responsible for the change will initial and date the entry. Each day's
26 activities or separate sampling episodes must be signed. The logbook will be
27 protected, stored in a safe file or other repository, and retained as a
28 permanent record.
29

30 The following types of information will be included in the logbook:

- 31 • Site map, sketch, drawing, or other definitive site description
- 32 • Locations of all sampling points, including reference points and scale
- 33
- 34 • Sample method
- 35
- 36 • Date and time of collection
- 37
- 38 • Collector's name
- 39
- 40 • Number, type, and volume of samples taken
- 41
- 42 • Identification number for each sample
- 43
- 44 • Field observations (weather conditions, temperature, wind, wetness,
45 and appearance of sample, etc.)
- 46
- 47 • Laboratory of destination
- 48
- 49 • Signature of recording personnel.
- 50
- 51
- 52

1 The following items can be included:
2

- 3 • Name and address of field contact
- 4
- 5 • Type and/or purpose of sampling
- 6
- 7 • Sample transportation method
- 8
- 9 • Photographs of site for field conditions and site location
- 10 verification.
- 11

12 11.1.4.11.4 **Sample Labels.** Labels will be attached securely to each
13 sample to prevent misidentification. Labels will be in the form of adhesive
14 labels or tags and will be affixed to the proper sample containers before or
15 at the time of collection. All information will be completed at the time of
16 collection. Indelible pencil or ink must be used. Each label will contain at
17 least the following information:
18

- 19 • Site contractor
- 20 • Collector's name
- 21 • Date and time collected
- 22 • Sample number.
- 23

24 11.1.4.11.5 **Sample Seals.** Sample seals will be used to prevent and/or
25 detect tampering with samples between the time of collection and the beginning
26 of analysis. Seals will be applied to the sample containers before the
27 containers leave the sample location. The seals will be attached so the seal
28 must be broken to open the container.
29

30 11.1.4.11.6 **Chain-of-Custody Records.** To ensure the integrity of the
31 samples from collection through analysis to final disposition, documentation
32 will be used to trace sample possession and handling. This documentation will
33 provide a history of personnel having custody of the sample.
34

35 A chain-of-custody record will be completed and will accompany all
36 samples from collection to analysis. Multiple copies will be required, and at
37 least one copy will be maintained by the sampling supervisor. The following
38 information will be included:
39

- 40 • Contractor
- 41 • Sample numbers
- 42 • Date and time collected
- 43 • Sample type
- 44 • Number of containers
- 45 • Collector's signature
- 46 • Signature of person receiving possession
- 47 • Inclusive dates of possession
- 48 • Condition of samples on receipt.
- 49

50 A description of the chain-of-custody procedure to be used is located in
51 Appendix 11B.
52

1 11.1.4.11.7 Sample Analysis Request. The sample analysis request form
2 is designed to accompany the samples to the laboratory and to designate the
3 analyses to be performed on each sample. This form also provides a check to
4 ensure that all samples have been received and that correlation between sample
5 analysis and sample number is finalized and complete. The form includes the
6 following information:

- 7
- 8 • Contractor
- 9 • Company contact
- 10 • Collector
- 11 • Sample number
- 12 • Sample type
- 13 • Analysis requested
- 14 • Data and time collected
- 15 • Laboratory sample custodian.
- 16

17 A description of the soil and sediment sampling procedure and
18 chain-of-custody procedure to be used is located in Appendix 11B.

19

20 11.1.4.11.8 Laboratory Receipt and Logging of Sample. In the
21 laboratory, a sample custodian will be assigned to receive the samples. On
22 receipt of a sample, the custodian will inspect the condition of the sample
23 and the sample seal, verify the information on the sample label and seal
24 against that on the chain-of-custody record, assign a laboratory number, log
25 in the sample in the laboratory logbook, and store the sample in a secured
26 sample storage room or cabinet. Missing or damaged samples will be reported
27 immediately.

28

29 11.1.4.11.9 Laboratory Quality Control. The contractor laboratory will
30 ensure the integrity and validity of test results through implementation of an
31 internal quality control program. The program will meet the quality control
32 criteria of SW-846 (EPA 1986). A system of reviewing and analyzing the
33 results of these samples will be maintained to detect problems caused by
34 contamination, inadequate calibrations, miscalculations, improper procedures,
35 or other factors. Standard methods will be used and alternative methods that
36 are developed or adapted will be tested and completely documented. All
37 methods and method changes will be approved by a contractor contracts
38 representative.

39

40 The quality control procedures for hazardous chemical analyses will
41 include [as appropriate to each analysis and as specified in Section 1.2 of
42 SW-846 (EPA 1986)] evaluation of blanks, random matrix spikes (for 10 percent
43 of the samples), internal standards, surrogates, and standard calibration
44 curves. Spikes will be added in amounts comparable to the amount of analyte
45 present in the sample. The quality control procedures specific to individual
46 methods will be detailed in the laboratory's documented analytical procedures
47 and will be included with each batch of samples analyzed.

48

49 11.1.4.11.10 Sample Disposition. At the completion of all analyses, the
50 samples will be returned to the collector. In no case will the samples be
51 retained longer than 3 years unless specifically designated by the cognizant
52 engineer.

1 11.1.4.11.11 **Equipment Decontamination.** Extreme care is necessary in
2 field sampling to ensure that there is no cross-contamination of samples by
3 sampling equipment. To prevent this source of contamination, freshly cleaned
4 or disposable sampling tools will be used. When equipment must be reused in
5 the field, it will be cleaned as thoroughly as practical as described in
6 Appendix 11B.
7

8 11.1.4.11.12 **Sampling Container Decontamination Procedures.** Containers
9 will be purchased precleaned from the factory and maintained under strict
10 chain of custody to preserve the integrity of the samples from collection
11 through disposal. After analysis, sample containers will be disposed of.
12

13 11.1.4.12 **Analytical Procedures.** Analyses of all constituents will be
14 performed by the laboratory in accordance with procedures identified in
15 SW-846 (EPA 1986).
16

17 11.1.4.13 **Contamination Control.** Excess sample material will be
18 containerized in a preconditioned 17-H open-headed 208-liter container. Rinse
19 water also will be containerized. In accordance with WAC 173-303-200(2) and
20 the procedure described in Appendix 11B, the 208-liter containers will be
21 stored in a designated area at the dangerous waste site until each container
22 is full. When the container is full, the contents will be tested for
23 dangerous waste. If the contents are found to be dangerous, arrangements will
24 be made for proper disposal of the material. The disposal will take place
25 within a 90-day period after a container is full. If dangerous contamination
26 is not found, materials will be laundered or disposed of according to onsite
27 procedures that meet all applicable federal, state, and U.S. Department of
28 Energy regulations. Containers for storage will be properly marked.
29

30 11.1.4.14 **Decontamination of Equipment Used for Closure.** The equipment used
31 during the closure activities will be cleaned three times with a steam
32 cleaner. The rinsate from steam cleaning will be collected, pumped into new
33 bung-type 208-liter containers, and sampled. The pump will be flushed three
34 times with water, which will be managed as rinsate. Rinsate will be managed
35 in accordance with Section 11.1.3.1.
36

37 11.1.4.15 **Removal of Contaminated Material and Waste Residues.** Waste
38 remaining in the storage building and in the outside storage areas at the
39 commencement of closure activities will be removed. General housekeeping
40 cleanup procedures will be followed to remove any remaining waste residues.
41

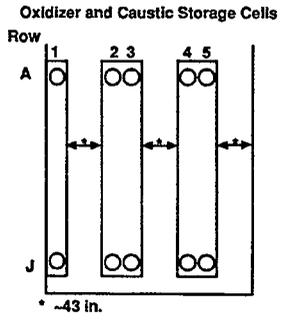
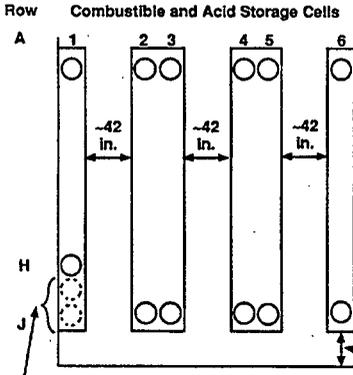
42 11.1.4.16 **Restoration.** On removal of waste residues and contaminated
43 structures or soil, the site might require some degree of reclamation.
44 Reclamation would be justified to control dust, erosion, and surface water
45 run-off, and to promote postclosure usage. Site restoration will include
46 backfilling disturbed soil areas with noncontaminated native soil, compaction,
47 grading, and revegetation.
48

49 11.1.4.17 **Modifications to the Waste Sampling and Analysis Plan.**
50 Modification of the sampling plan could be necessary because of unanticipated
51 or changing conditions. Factors adversely influencing sampling efforts can
52 include equipment malfunction or breakdown, improper equipment, and physical

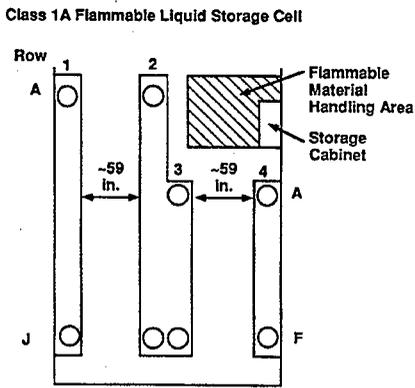
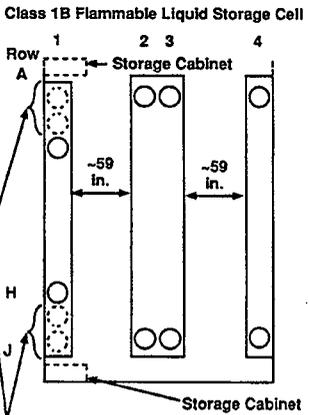
1 barriers to coring equipment. When changes to the planned activity are
2 necessary, the changes will be recorded in the field logbook along with
3 circumstances requiring the action. The field logbook will be reviewed and
4 signed daily by the project manager, as described in Appendix 11B. This
5 procedure will provide an accurate record of changes and will allow sampling
6 to proceed safely while maintaining efficient manpower and equipment use. Any
7 deviation from procedures used during closure will be handled in accordance
8 with the procedure described in Appendix 11B. In addition, any changes to the
9 closure plan will be in accordance with the protocol established in the
10 *Hanford Facility Dangerous Waste Permit Application* (DOE-RL 1991).
11
12

13 11.2 SCHEDULE FOR CLOSURE [I-1f] 14

15 A schedule of the closure activities is presented in Figure 11-7.
16 Closure will be completed 180 days after the last shipment of waste is
17 received at the 616 NRDWSF [WAC 173-303-610(4)(b)]. The activities
18 representing the greatest portion of time will be the sampling and
19 decontamination iteration of the floor and the loading areas. At this time,
20 an estimate of 90 days is given for these tasks. This estimate assumes a
21 rapid turnaround time of 10 working days or less for laboratory analyses.
22 However, it is unknown how many iterations of decontamination will be required
23 or if any will be required at all.
24



These two locations not present in the Combustible Cell to make room for the Safety Shower/Eyewash Station



These four locations not present when Storage Cabinets are used

Note: To convert inches to centimeters, multiply by 2.54.

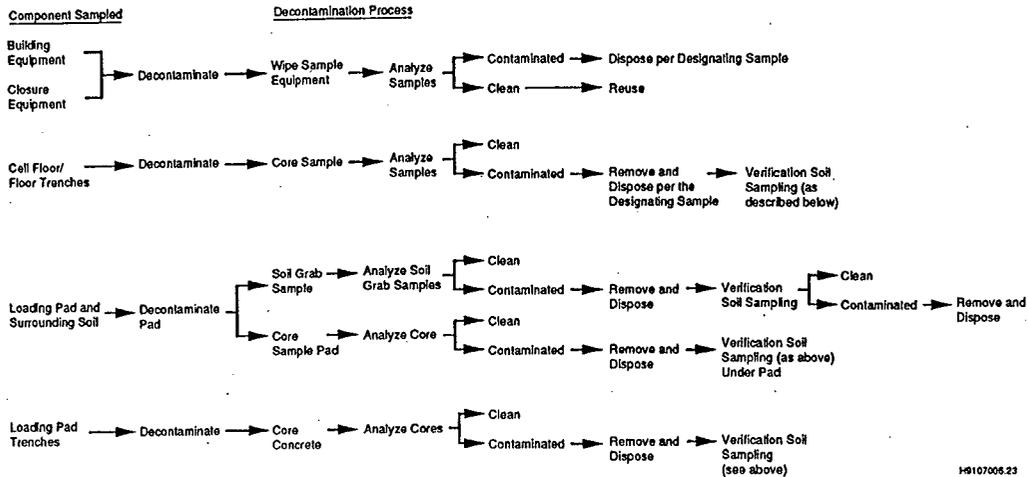
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Figure 11-1. Configuration and Layout of a Typical Cell.

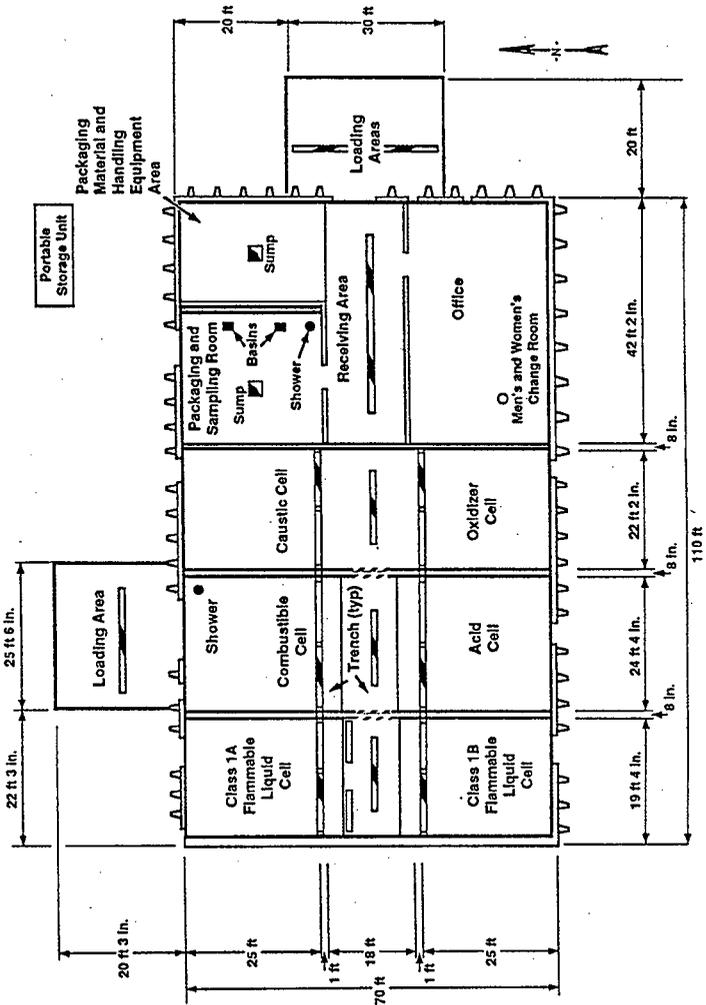
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Figure 11-2. Sampling Flow Path.



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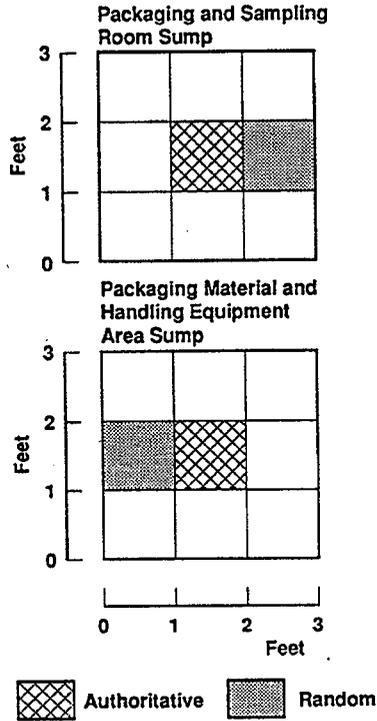


HS108007.3

Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

Figure 11-3. Floor Plan of the 616 Nonradioactive Dangerous Waste Storage Facility Showing Locations of the Trenches, Sumps, Water Lines, Basins, and Safety Showers.

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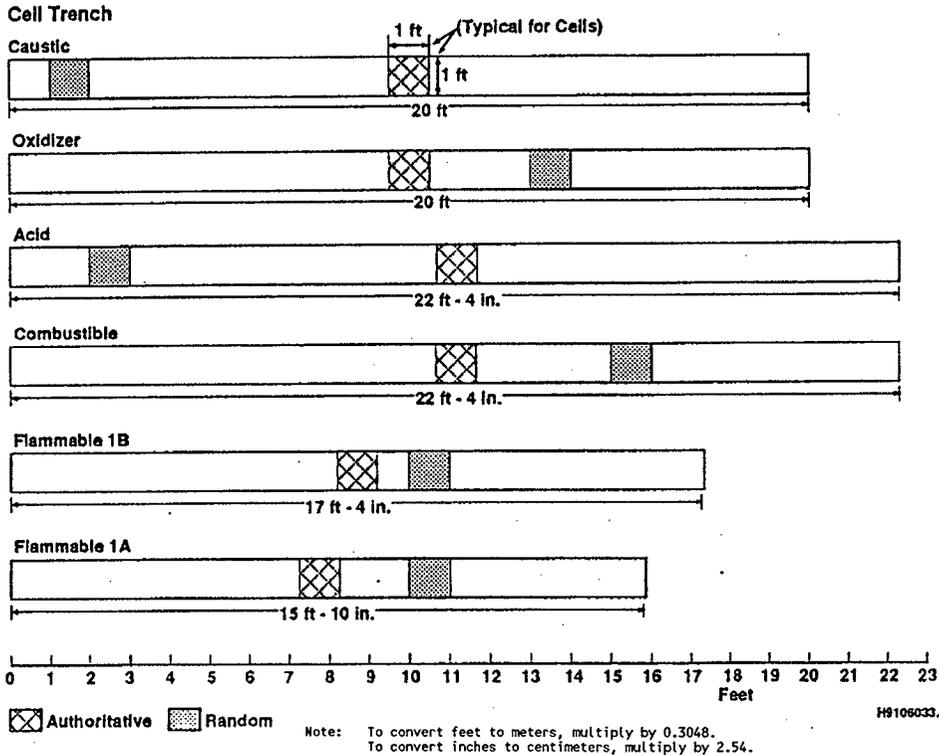
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Note: To convert feet to meters, multiply by 0.3048.

Figure 11-4. Trench and Sump Sample Locations. (sheet 1 of 3)

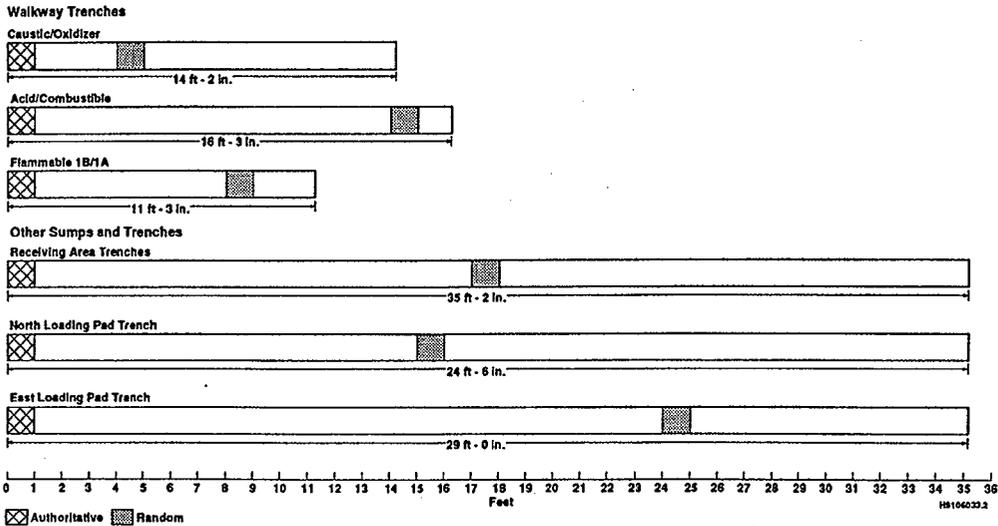
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Figure 11-4. Trench and Sump Sample Locations. (Sheet 2 of 3)



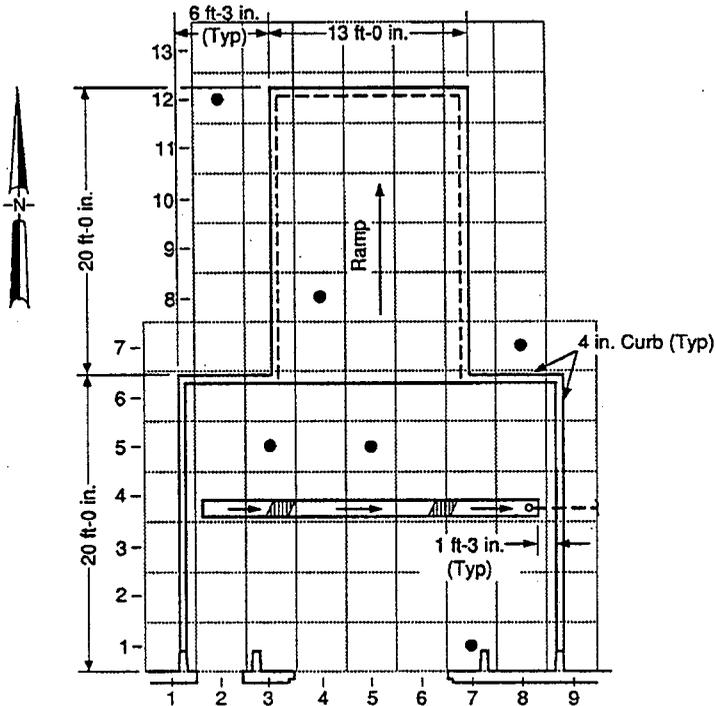
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Figure 11-4. Trench and Sump Sample Locations. (Sheet 3 of 3)



Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

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North Loading Pad Sample Points

● Sample Location

Scale: 1 inch (2.5 centimeters) = 9.41 feet (2.86 meters)

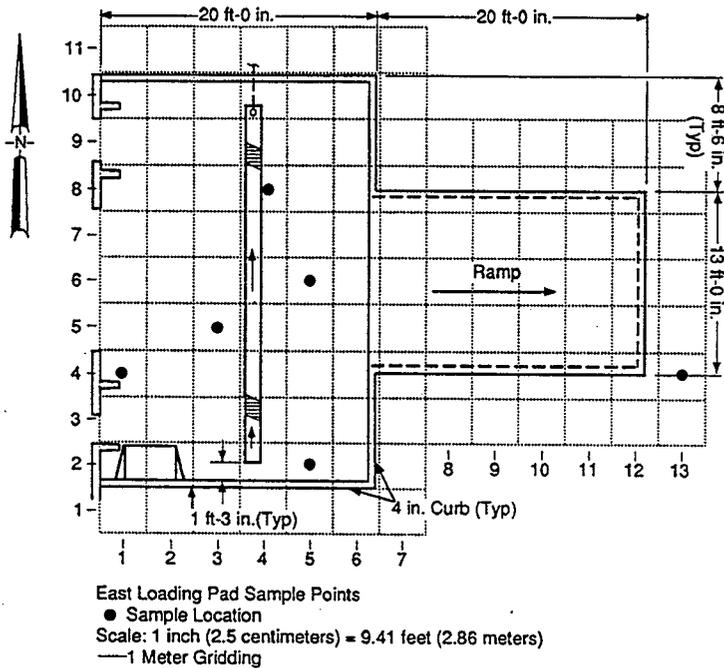
— 1 Meter Gridding

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Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

Figure 11-5. Loading Pad Sample Locations. (sheet 1 of 2)

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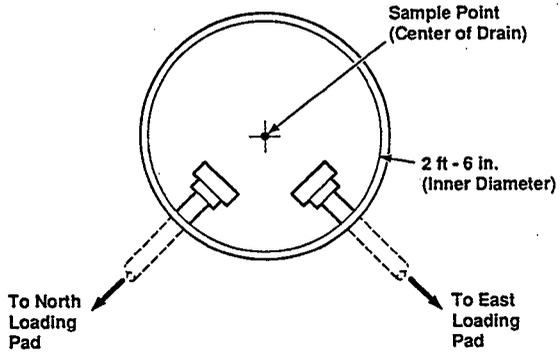
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Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

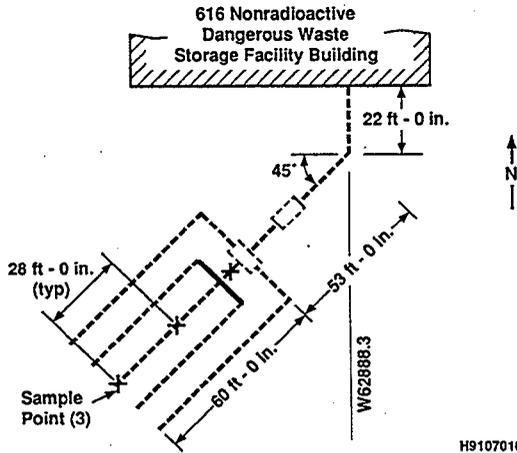
Figure 11-5. Loading Pad Sample Locations. (sheet 2 of 2)

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A. French Drain Sample Location



B. Tile Field Sample Location



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Note: To convert feet to meters, multiply by 0.3048.
To convert inches to centimeters, multiply by 2.54.

Figure 11-6. Tile Field and French Drain Sample Location.

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Table 11-1. Concrete Analysis.

Possible contaminant	Preparation method	Extract method	Analysis method	Initial action level	Second action level
Inorganic	None	TCLP ^a (3050)	SW 846 6010 AA	Level of quantitation	HB ^b
Organic		Thermal desorption	Gas chromatograph	Level of quantitation	HB ^b

^aTCLP = toxicity characteristics leaching procedure.

^bHB = health based.

In addition to the analyses in Table 11-1, the concrete samples also will be analyzed for all dangerous waste constituents documented to have been spilled at the 616 NRDWSF during its operating life. These analyses will be performed in accordance with WAC 173-303-110 including the quality assurance and quality control requirements delineated in SW-846. Action levels will be based on the level of quantitation for each analyte. Final decisions based on health based standards will be subject to approval or rejection by Ecology.

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Table 11-2. 616 Nonradioactive Dangerous Waste
Storage Facility Sample Location Summary.

Location	Number of sampling locations
Local background samples	
Soil samples	
Random	5
Sump samples	
Authoritative	2
Random	2
Cell trench samples	
Authoritative	6
Random	6
Walkway trench samples	
Authoritative	3
Random	3
Other trench samples	
Receiving walkway trench	
Authoritative	1
Random	1
North loading pad trench	
Authoritative	1
Random	1
East loading pad trench	
Authoritative	1
Random	1
Tile field	
Authoritative	3
French drain	
Authoritative	1
North loading pad	
Random	6
East loading pad	
Random	6

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12.0 REPORTING AND RECORDKEEPING

Reporting and recordkeeping requirements that could be applicable to the Hanford Facility are described in Chapter 12.0 of the General Information Portion (DOE/RL-91-28). Not all of these requirements and associated reports and records identified in Chapter 12.0 of the General Information Portion are applicable to the 616 NRWSF. Those reporting and recordkeeping requirements determined to be applicable to the 616 NRWSF are summarized as follows:

- Hanford Facility Contingency Plan and incident records (as identified in the General Information Portion):
 - Immediate reporting
 - Written reporting
 - Shipping paper discrepancy reports.
- Unit-specific Part B permit application documentation and associated plans
- Personnel training records
- Inspection records (unit)
- Onsite transportation documentation
- Land disposal restriction records
- Waste minimization and pollution prevention.

In addition, the following reports prepared for the Hanford Facility will contain input, when appropriate, from the 616 NRWSF:

- Quarterly Hanford Facility RCRA Permit modification report
- Anticipated noncompliance
- Required annual reports.

Annual reports updating projections of anticipated costs for closure and postclosure will be submitted when the 616 NRWSF closure plan is submitted for Ecology approval (Chapter 11.0).

The 616 NRWSF Operating Record 'records contact' is kept on file in the General Information file of the Hanford Facility Operating Record (refer to Chapter 12.0, DOE/RL-91-28).

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13.0 OTHER FEDERAL AND STATE LAWS [J]

Other federal and state laws and local requirements applicable to the 616 NRDSWF (*Toxic Substances Control Act of 1976, State Environmental Policy Act of 1971, Federal Facilities Compliance Act of 1992, and the Federal Insecticide, Fungicide, and Rodenticide Act of 1975*) are discussed in Chapter 13.0 of the General Information Portion (DOE/RL-91-28).

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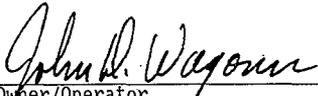
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14.0 PART B CERTIFICATION [K]

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4 I certify under penalty of law that this document and all attachments
5 were prepared under my direction or supervision in accordance with a system
6 designed to assure that qualified personnel properly gather and evaluate the
7 information submitted. Based on my inquiry of the person or persons who
8 manage the system, or those persons directly responsible for gathering the
9 information, the information submitted is, to the best of my knowledge and
10 belief, true, accurate, and complete. I am aware that there are significant
11 penalties for submitting false information, including the possibility of fine
12 and imprisonment for knowing violations.
13
14
15
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18 
19

20 _____
21 Owner/Operator
22 John D. Wagoner, Manager
23 U.S. Department of Energy
24 Richland Operations Office
25

4/14/97

Date

26
27 
28

29 _____
30 Co-operator
31 H. J. Hatch,
32 President and Chief Executive Officer
33 Fluor Daniel Hanford, Inc.
34
35

4/10/97

Date

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APPENDICES

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- 2A TOPOGRAPHIC MAP
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- 4A CONSTRUCTION SPECIFICATION
- 4B DESIGN DRAWINGS
- 4C CONTAINMENT CALCULATIONS
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APPENDIX 2A

TOPOGRAPHIC MAP

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APPENDIX 2A

TOPOGRAPHIC MAP

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H-13-000014 616 NRDWSF Topographic Map

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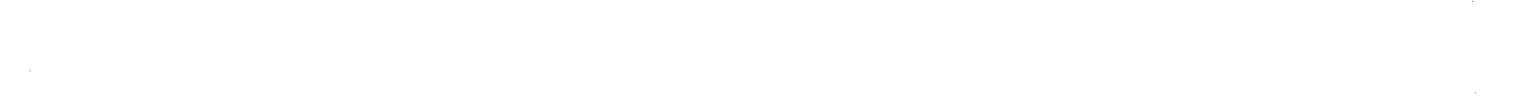
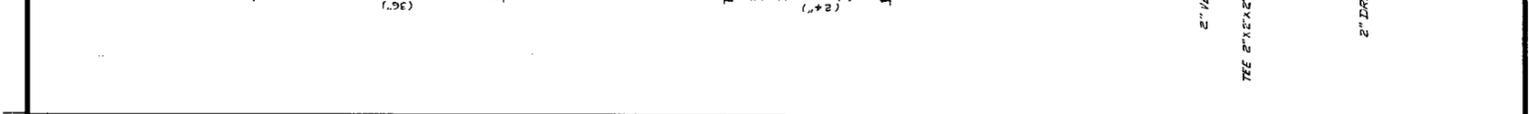
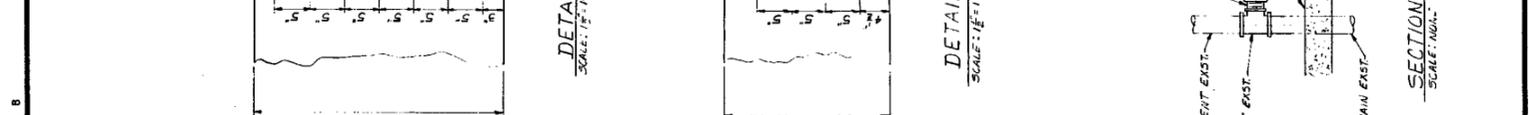
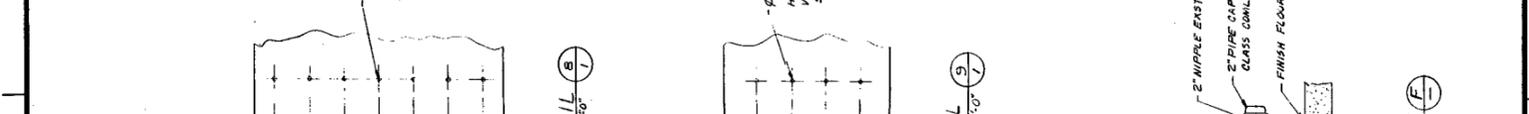
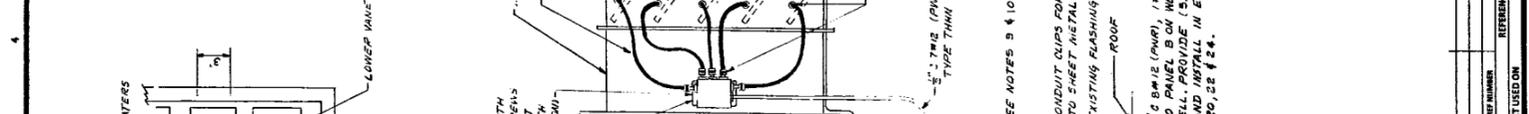
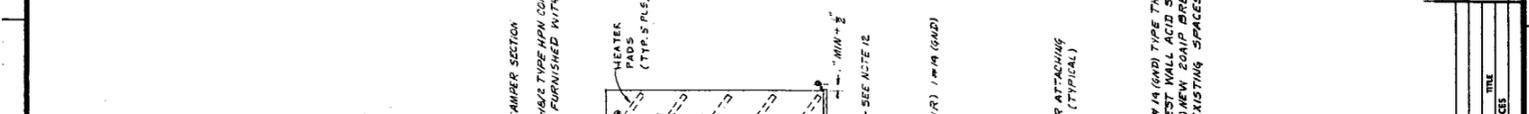
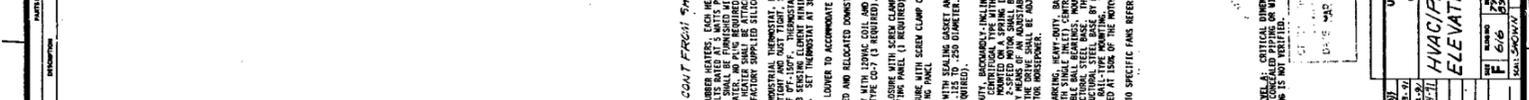
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NOTES: (CONT FROM 57-1)

1. EVILS) WITH SILICONE RUBBER HEATER. EACH HEATER SHALL BE...

2. FROM TEMPERATURE CONTROL INDUSTRIAL THERMOSTAT, MODEL A1800-1...

3. DRILL HOLE THROUGH SIDE OF LOUVER TO ACCOMMODATE HEATER COIL.

4. RIGID SCREEN SHALL BE REMOVED AND RELOCATED DOWNSTREAM OF LOUVER.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS...

6. 1/2" C-2 TYPE THIN CONDUIT SHALL BE USED FOR ALL NEW CONDUIT...

7. 1/2" C-2 TYPE THIN CONDUIT SHALL BE USED FOR ALL NEW CONDUIT...

8. SUPPLY AIR SHALL BE HEAVY DUTY, BACKWARD-TILTING, 100%...

9. MOTOR SHALL BE MOUNTED ON THE STRUCTURAL STEEL BASE BY MEANS OF AN...

10. FOR INFORMATION PERTAINING TO SPECIFIC FANS REFER TO CITY DIRECTORY.

11. ATTACH BOXES WITH SHEET METAL SCREWS (SCREWS MUST NOT INTERFERE WITH DIMMER OPERATION).

12. KEEP CLEAR FOR PRE-CAST CONCRETE ROOF PANEL.

13. CONDUIT CLIPS FOR ATTACHING TO SHEET METAL (TYPICAL).

14. 1/2" C-2 TYPE THIN CONDUIT SHALL BE USED FOR ALL NEW CONDUIT...

15. EAST RIGID INSULATION PRECAST CONCRETE ROOF SLAB.

16. 1/2" C-2 TYPE THIN CONDUIT SHALL BE USED FOR ALL NEW CONDUIT...

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APPENDIX 3A

WASTE ANALYSIS PLAN
FOR 616 NONRADIOACTIVE DANGEROUS WASTE STORAGE FACILITY

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APPENDIX 3A

WASTE ANALYSIS PLAN
FOR 616 NONRADIOACTIVE DANGEROUS WASTE STORAGE FACILITY

1.0 INTRODUCTION

Each onsite generating unit (or group of generating units) has an individual (called the waste coordinator) in charge of waste handling. The waste coordinator is trained in the following areas:

- Waste management
- Sampling practices
- Waste identification
- Waste segregation
- Packaging, labeling, and marking
- Waste tracking form requirements
- Transport
- Waste minimization.

The waste coordinator is responsible for correctly and completely identifying the dangerous constituents of the generating unit's waste and packaging the waste in accordance with 49 CFR 173. The waste coordinator is responsible for the proper management of the waste from the generating unit. The solid waste management staff oversees the activities of waste coordinators.

Before transfer of nonradioactive dangerous waste from a generating unit to the 616 NRDWSF, the waste coordinator secures the waste in a controlled, less than 90-day storage area, satellite accumulation area, CERCLA cleanup site, or expedited response action site. The waste coordinator identifies the waste from accumulation records and/or product label information. The waste coordinator assembles the waste information, which consists of associated sample analysis records and/or manufacturer's data (material safety data sheets) (Sections 1.2 and 1.3). Material recovered from a nonpermitted leak or spill is characterized by identifying the source. If the source cannot be found or additional unknown waste is suspected, the material is completely analyzed using a methodology presented in Section 1.2. Actions to be taken in response to a spill or discharge are detailed in Appendix 7A.

The waste coordinator prepares a waste storage/disposal request and attaches all necessary information in preparation for waste designation (in accordance with WAC 173-303-070). The waste storage/disposal request is sent to solid waste management where trained designators perform a waste designation.

Figure 1 describes the control procedures established by solid waste management for ensuring that waste is designated properly. Based on waste

1 identification information provided by the waste coordinator, the solid
2 waste management staff designates the waste in accordance with
3 WAC 173-303-070. The designation process also includes determining if the
4 waste is subject to a land disposal restriction as required by 40 CFR 268.
5 Figure 2 presents a worksheet used by the solid waste management staff to
6 perform the waste designation. If the information supplied by the
7 generating unit's waste coordinator is insufficient or the designator
8 suspects the information is incorrect, the waste coordinator is requested to
9 supply additional information. This information can include sample analysis
10 reports (Section 1.3) or additional information from the manufacturer.
11

12 After the designation is complete, a peer review is conducted. In the
13 peer review, another trained designator reviews and verifies the
14 designation. Solid waste management performs the final review and approves
15 the designation. If a waste is suspected of being improperly identified,
16 verification sampling of the responsible generating unit's waste will be
17 required as detailed in Section 1.3.
18

19 The solid waste management staff makes a final evaluation of waste
20 disposition only after waste characterization is complete and the proper
21 waste designation is made. On completion of the above evaluation, a
22 hazardous waste disposal analysis record is prepared by the solid waste
23 management staff. This letter identifies which materials are regulated and
24 which materials are not regulated. The hazardous waste disposal analysis
25 record provides the following information:
26

- 27 • The appropriate waste designation per WAC 173-303-070
- 28 • Land ban disposal restrictions per 40 CFR 268
- 29 • Packaging, marking, and labeling instructions
- 30 • Waste tracking requirements
- 31 • Compatibility groups (Figure 3)
- 32 • Transport contact
- 33 • Treatment, storage, and/or disposal unit contact
- 34 • Identification of a proper storage cell at the 616 NRDWSF.
35

36 The hazardous waste disposal analysis record is sent by the solid waste
37 management staff to the generating unit, the 616 NRDWSF and transportation
38 personnel. The waste coordinator packages the nonradioactive waste and
39 applies appropriate markings and labels in accordance with the hazardous
40 waste disposal analysis record.
41

42 The waste coordinator prepares the waste and associated documentation
43 (e.g., waste tracking forms) according to the hazardous waste disposal
44 analysis record. Before transport, a transportation representative reviews
45 the waste tracking forms and each waste package against the hazardous waste
46 disposal analysis record to ensure U.S. Department of Transportation
47 requirements are met. The representative also checks the condition,
48 marking, and labeling of the packages. If discrepancies or deficiencies are
49 found, these are corrected by the waste coordinator before receiving
50 approval for shipment to the 616 NRDWSF. The transportation representative
51 initials the waste tracking form indicating the load is acceptable for
52 transportation to the 616 NRDWSF.

1 All wastes received at the 616 NRDWSF must be free from any
2 radionuclides generated as the result of DOE-RL operations. The generating
3 unit is required to submit a certification that the waste contains no
4 radionuclides before transferring the waste to the 616 NRDWSF. The
5 616 NRDWSF personnel do not accept waste without the proper radiation
6 release documentation.
7

8 The transporter ensures the waste packages are marked and labeled as
9 indicated by the hazardous waste disposal analysis record and the waste
10 tracking form/Uniform Hazardous Waste Manifest is complete. The transporter
11 verifies that a transportation representative has initialed the waste
12 tracking form/Uniform Hazardous Waste Manifest, checks the condition of the
13 package, and verifies that each container bears a valid radiological
14 release, if applicable (or that one release covers a set of containers).
15 The transporter loads the vehicle, the waste coordinator signs for the
16 generating unit, and the transporter signs the waste tracking form/Uniform
17 Hazardous Waste Manifest. Transporters transport the nonradioactive
18 dangerous waste from the generating unit to the 616 NRDWSF.
19

20 At the 616 NRDWSF, nuclear process operators check the waste tracking
21 form/Uniform Hazardous Waste Manifest against the hazardous waste disposal
22 analysis record to verify that the waste tracking form/Uniform Hazardous
23 Waste Manifest is correct, that the transportation representative's initials
24 and the waste coordinator's and the transporter's signatures are present.
25 Nuclear process operators check the condition of the marking, labeling, and
26 the presence of a valid radiological release, if applicable, on each waste
27 package. If the load is accepted, the packages are removed from the vehicle
28 and the packages are stored in the 616 NRDWSF, as indicated on the hazardous
29 waste disposal analysis record. If a discrepancy or deficiency is found, it
30 is handled as detailed in Section 1.3. After the load is accepted, the
31 616 NRDWSF supervisor (or a delegate) signs the waste tracking form/Uniform
32 Hazardous Waste Manifest as the storage unit operator.
33

34 All dangerous waste shipped offsite from the 616 NRDWSF is subject to
35 the verification sampling program of the receiving TSD facility as required
36 by WAC 173-303-300(3).
37
38

39 1.1 PARAMETERS AND RATIONALE 40

41 The minimum parameters needed for waste designation and the rationale
42 for their selection are presented in Section 1.2 through 1.4 and 3.0. The
43 goal of obtaining this information is to ensure that a proper and complete
44 waste designation is made per WAC 173-303-080 through 103 and 40 CFR 264.13
45 before acceptance of waste at the 616 NRDWSF. The information also ensures
46 that all hazards of the waste have been identified for the purposes of safe
47 handling and proper waste disposition (including radiological screening).
48 When possible, information on a material is taken from manufacturer
49 information (e.g., material safety data sheets). If this information is not
50 sufficient, analytical testing will be performed. Dangerous waste toxic
51 mixtures (WT01 and WT02) of known chemical content will be designated
52 according to toxicity calculations defined in WAC 173-303-100, which uses

1 the National Institute for Occupational Safety and Health registry
2 (NIOSH 1986).
3
4

5 1.2 TEST METHODS 6

7 Before acceptance of waste at 616 NRDWSF, confirmation of designation
8 might be required by solid waste management (Section 1.4). The waste that
9 will undergo confirmation of designation is identified in Section 1.4 and
10 can be divided into two groups; those that easily yield a representative
11 sample (Category I), and those that do not (Category II). The steps for
12 each type are outlined in the following along with a description of which
13 waste falls into each category:
14

- 15 • Category I. If a waste that easily yields a representative sample
16 is received, a representative sample will be taken of the waste. If
17 more than one phase is present, each phase must be tested
18 individually. The following field tests will be performed:
19
 - 20 - Reactivity - HAZCAT¹ oxidizer, cyanide, and sulfide tests. These
21 tests will not be performed on materials known to be organic
22 peroxides, ethers, and/or water reactive compounds.
23
 - 24 - Flashpoint/explosivity - by HAZCAT flammability procedure,
25 explosive atmosphere meter², or a closed cup flashpoint
26 measurement instrument².
27
 - 28 - pH - by pH meter² or pH paper (SW-846-9041).³ This test will not
29 be performed on non-aqueous materials.
30
 - 31 - Halogenated organic compounds - by Clor-D-Tect⁴ kits.
32
 - 33 - Volatile organic compounds - by photo or flame ionization tester²,
34 by gas chromatography with or without mass spectrometry, or by
35 melting point and/or boiling point determination.
36

37 If the waste meets the parameters specified in its documentation,
38 within a 10% tolerance, confirmation of designation is complete. If
39 it does not meet these parameters, sample and analyze the materials
40 in accordance with WAC 173-303-110. Refer to Table 1 for a list of

41 ¹ HAZCAT is a tradename of HazTech Systems, Inc., San Francisco, CA.

42 ² These instruments are field calibrated or checked for accuracy daily
43 when in use.

44 ³ The pH paper must have a distinct color change every 0.5 pH unit and
45 each batch of paper must be calibrated against certified pH buffers or by
46 comparison with a pH meter calibrated with certified pH buffers.

47 ⁴ Clor-D-Tect is a tradename of Dexsil Corporation, Hamden, CT.

1 analytical methodologies and Table 2 for sampling methodologies.
2 This is considered a significant error under Section 1.4. Re-assess
3 and redesignate the waste. Repackage and label as necessary or
4 return to the generating unit.
5

6 When mathematically possible, confirmation on an equal number of
7 Category I and Category II containers will be performed.
8

- 9 • Category II. If a representative sample is not easily obtained (for
10 example, discarded machinery or shop rags) or if the waste is a
11 labpack or discarded laboratory reagent container, the following
12 steps will be performed:
13
14 - Visually verify the waste. Labpacks and combination packages must
15 be removed from the outer container. If the waste meets the
16 parameters specified in its documentation, confirmation of
17 designation is complete. If it does not meet these parameters,
18 proceed to the next step. This is considered a significant error
19 under Section 1.4.
20
21 - If possible and necessary, segregate/repackage the waste for
22 shipment in a compliant manner. If the waste is not packaged in
23 compliance with shipping requirements, proceed to the next step.
24
25 - The waste must be redesignated using designation methods
26 identified in WAC 173-303-070 through 173-303-100.
27

28 In all instances, test methods must conform to those referenced in the
29 *Chemical Testing Methods* (Ecology March 1982, revised July 1983), the
30 American Society for Testing Materials (ASTM 1982), or the *Test Methods for*
31 *the Evaluation of Solid Waste, Physical/Chemical Methods (SW-846)*. All test
32 methods must conform to those referenced in WAC 173-303-110. Petitions to
33 use an alternate test method will be submitted in accordance with
34 WAC 173-303-910.
35

36 All analytical tests performed to fulfill the requirements of
37 Sections 1.4 and Chapter 4.0, Section 4.1.1.8 (Frequency of Analysis and
38 Removal of Liquids from Containment System, respectively) will be performed
39 in accordance with WAC 173-303-110. New test methods will be used within
40 90 days of the effective date of the State regulations or laws that mandate
41 the use of the test method. To ensure analytical quality control, all
42 analyses must fulfill, at a minimum, the quality procedures specified in
43 SW-846 Volume II.
44

45 1.3 SAMPLING METHODS

46 Representative sampling can be requested by solid waste management to
47 ensure proper waste identification, and the sampling will be performed under
48 the direction of a waste coordinator at the point of generation.
49
50
51

1 The specific sampling methods and equipment vary with the chemical and
2 physical nature of the waste material and the sampling circumstances. All
3 sampling methods must conform to those referenced in WAC 173-303-110.
4

5 Sampling methods and equipment used for sampling different materials
6 are presented in Table 5. For liquid waste in tanks or containers, a
7 composite liquid waste sampler (COLIWASA) device, suction pump, or tubing is
8 used to obtain a vertical core section. The length of the liquid sampler
9 device must be adequate to reach the bottom of the vessel, thus providing a
10 representative sample of all phases of the waste. Sample analysis must be
11 performed on each phase of the waste. For solid waste, either tubing or a
12 scoop can be used, depending on the nature of the waste. For bulk solids,
13 such as contaminated soil, representative samples are obtained with a trier
14 or an auger. For contaminated containment structures, such as concrete or
15 steel, samples are obtained using the EPA wipe sampling procedure
16 (EPA 1987). Composite sampling is performed by obtaining representative
17 samples in random locations. Should a maximum chemical contamination level
18 be required, the location of the highest likely chemical contamination is
19 chosen for sampling purposes.
20

21 All sampling equipment and sample containers are handled so that cross-
22 contamination is minimized. For example, most sampling equipment consists
23 of disposable units to prevent cross-contamination. Plastic materials
24 (other than Teflon) is not used for organic waste sampling. To ensure
25 sample quality control, all sampling efforts must, at a minimum, be in
26 accordance with the procedures specified in WAC 173-303-110. Appropriate
27 packaging and preservation techniques and chain-of-custody requirements
28 specified in SW-846 are used.
29
30

31 1.4 FREQUENCY OF ANALYSIS 32

33 At least 5 percent of the waste containers stored at 616 NRDWSF during
34 a Federal fiscal year (October 1 through September 30) will undergo
35 confirmation of designation pursuant to Sections 1.2 and 1.3 (Test Methods
36 and Sampling Methods, respectively). The number of containers to meet the
37 5 percent requirement is the average of containers for the previous three
38 months. For example, if 200 containers are received in January, 180 in
39 February, and 220 in March, 10 containers of inbound waste must undergo
40 confirmation of designation in April. All generating units that ship more
41 than 20 containers through 616 NRDWSF in a fiscal year will have at least
42 1 container sampled and analyzed. Containers for which there is
43 insufficient process knowledge or analytical information to designate
44 without sampling and analysis might not be counted as part of the 5 percent
45 requirement unless there is additional confirmation of designation
46 independent of the generator designation. The generating unit's staff shall
47 not select the waste containers to be sampled and analyzed other than
48 identifying containers for which insufficient information is available to
49 designate.
50

51 Currently, there are no generating units that generate a continuous,
52 nonradioactive dangerous waste stream for which the chemical constituents

1 and their concentrations are not readily known from knowledge of the raw
2 materials. Each request for waste disposition is considered unique and is
3 normally a one-time-only situation. The need for sampling and analysis of a
4 particular waste is identified at the time the waste is generated or at the
5 time a disposal request is received by the solid waste management staff.
6 Should a continuous, nonradioactive dangerous waste stream be identified, an
7 initial laboratory analysis is made (if necessary) with periodic analysis
8 repeated at least annually and whenever the process used or raw materials
9 usage changes.

10
11 For waste without known process knowledge, samples of nonradioactive
12 waste streams must be documented to have been sent to a laboratory for waste
13 analysis when newly identified or whenever the process used or raw materials
14 usage changes, and at least annually thereafter, to ensure that the waste
15 designation assigned by the solid waste management staff (Section 3.2) is
16 accurate and in compliance with land ban restrictions. This verification
17 analysis does not eliminate the need for the offsite TSD facility to perform
18 verification sampling as required by WAC 173-303-300(3).

19
20 If a waste is determined to be improperly designated because of a
21 significant error in information provided by the waste coordinator,
22 verification sampling of the responsible generating unit's waste stream(s)
23 will be required. For the next six shipments or 2 months, whichever is
24 longer, to 616 NRDWSF following the discovery of an incorrect designation,
25 the responsible waste coordinator will be required to submit laboratory
26 verification results for each waste stream that is addressed in a waste
27 storage/disposal request. The laboratory verification results shall be
28 obtained in accordance with WAC 173-303-110.

31 2.0 ADDITIONAL REQUIREMENTS FOR WASTES GENERATED OFFSITE

32
33
34 All waste received at the 616 NRDWSF, as described in Section 3.1, is
35 subject to the confirmation of designation sampling requirements. Each
36 shipment of waste received at the 616 NRDWSF must be accompanied by accurate
37 and complete waste tracking forms for waste received from onsite sources and
38 uniform hazardous waste manifests for waste received from offsite sources.

39 3.0 ADDITIONAL REQUIREMENTS FOR IGNITABLE, REACTIVE, 40 OR INCOMPATIBLE WASTES

41
42
43
44
45 Based on the hazard characteristics identified by the waste
46 coordinator, specific packaging instructions are provided by the solid waste
47 management staff. Instructions taken into consideration are the
48 ignitability, reactivity, and potential incompatibilities of the waste
49 stream.

50
51 Instructions are in compliance with U.S. Department of Transportation
52 regulations at all times. If multiple waste types are to be placed in a

1 single container (e.g., labpacks), compatibility analyses are performed and
2 potentially incompatible waste is packaged in separate containers. In no
3 case is waste of differing hazard classes packaged together. Dangerous
4 waste is packaged in a compatible labpack and stored at the 616 NRDWSF
5 before transport to an offsite TSD facility. Dangerous waste is not placed
6 in an unwashed container that previously held an incompatible waste or
7 material. A mixture of extremely hazardous waste and dangerous waste always
8 will be designated as extremely hazardous waste. Various references are
9 used to determine potential incompatibilities. Figure 3 presents a
10 compatibility chart used, in conjunction with their associated tests, for
11 this purpose.
12

13 Infrequently, the solid waste management staff is alerted to the
14 existence of shock-sensitive or peroxide-forming chemicals that could
15 present a serious explosive hazard. Examples are laboratory quantities of
16 unstable 'dry' picric acid or outdated ethyl ether. These chemicals are not
17 allowed at the 616 NRDWSF. The location of the chemical is noted and the
18 risk to personnel and structures determined.
19

20 21 **3.1 RESPONSE TO SIGNIFICANT DISCREPANCIES**

22
23 The primary concern during acceptance of containers for storage is
24 improper packaging or waste tracking form/Uniform Hazardous Waste Manifest
25 discrepancies. Depending on the nature of the condition, such discrepancies
26 can be resolved through the use of one or more of the following
27 alternatives.
28

- 29 • Incorrect or incomplete entries on waste tracking forms can be
30 corrected or completed with concurrence of the generating unit's
31 waste coordinator and the solid waste management staff. Corrections
32 are made by drawing a single line through the incorrect entry.
33 Corrected entries are initialed and dated by the individual making
34 the correction.
35
- 36 • The waste packages can be held and the generating unit's waste
37 coordinator requested to provide written instructions for use in
38 correcting conditions before the waste is accepted.
39
- 40 • The generating unit's waste coordinator can be requested to correct
41 the condition before the waste is accepted.
42

43 Waste tracking form and/or Uniform Hazardous Waste Manifest
44 discrepancies are considered resolved when all parties are satisfied with
45 the designation and packaging. To prevent any problems that could occur
46 during transportation back to generating units, all waste tracking form
47 and/or Uniform Hazardous Waste Manifest discrepancies are resolved at the
48 616 NRDWSF.
49
50

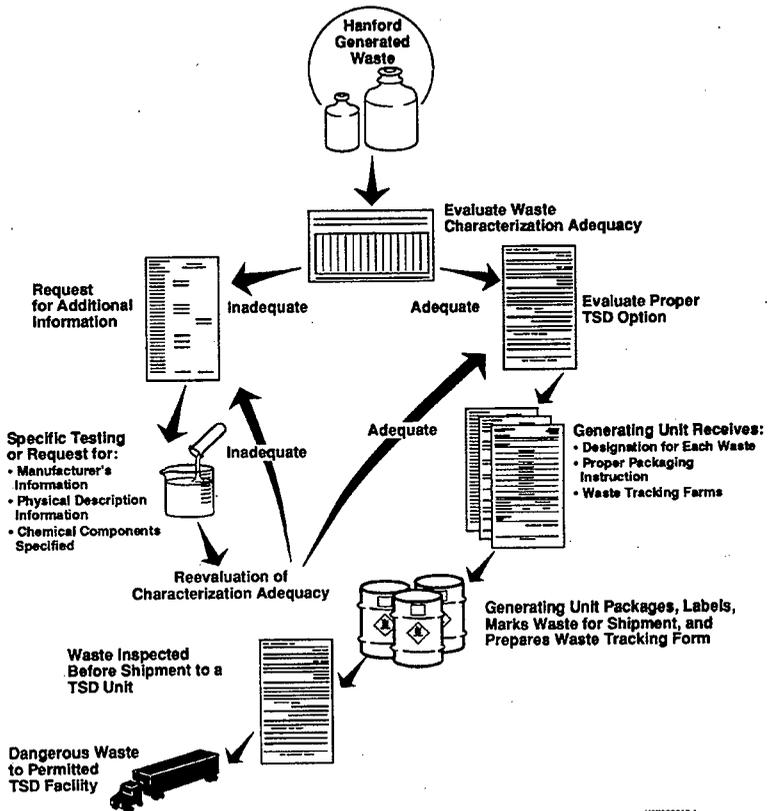
1 3.2 PROVISIONS FOR NONACCEPTANCE OF SHIPMENT
2

3 Shipments of materials that the 616 NRDWSF is not designed to store
4 [explosives, class IV oxidizers greater than 4.5 kilograms, and waste
5 without proper radiation releases, if applicable] are rejected. All other
6 types of discrepancies are resolved at the 616 NRDWSF before further
7 transportation.
8

9 If a shipment arrives in a condition as to present a hazard to public
10 health or the environment in the process of further transportation, the
11 contingency plan is implemented. The contingency plan is described in the
12 Building Emergency Plan - 616 Building provided in Appendix 7A.
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Figure 1. Waste Control Procedure Description.

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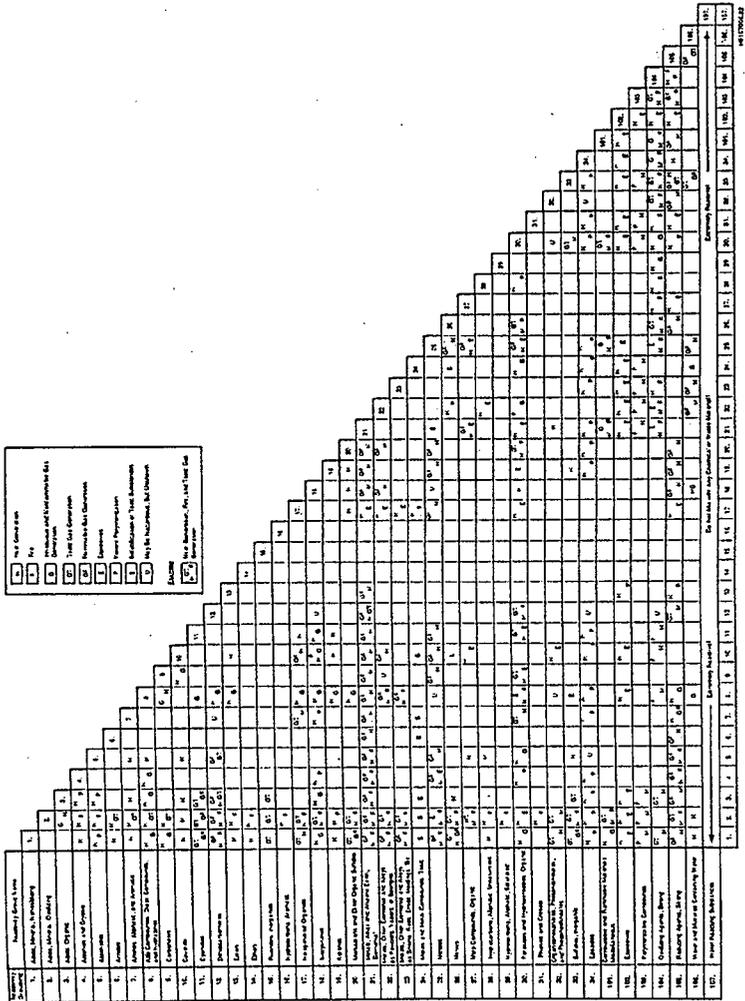


Figure 3. Compatibility Chart.

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1 Table 1. Parameters and Rationale for Waste Designation. (sheet 1 of 2)

2	Analytical Parameter	Rationale for Selection
3	1. Radioactive	All waste suspected of being radioactively contaminated or located within a radioactive zone is screened for radioactivity before being released to nonradioactive areas for the purpose of safe handling and proper management of the hazard characteristic.
4	screen	
5	2. pH	To indicate the degree of corrosivity of the waste for safe handling and to establish a relatively simple indicator parameter for the purpose of verification.
6	3. Flash point	To determine conditions for ignitability of waste content for safe handling. Organic waste that is determined to be ignitable will be directed to incineration or to reuse or recycle options if possible. This test also will determine if waste is an Ecology-and/or U.S. Department of Transportation-regulated ignitable, flammable, or combustible substance.
7	4. Water	To determine whether the waste has a potential to violently react with water to form gases or generate heat for the purpose of safe handling and proper disposition. The need for waste treatment may be determined, should waste be considered water reactive.
8	reactivity	
9	5. Reactive	To determine if waste produces hydrogen cyanide or hydrogen sulfide on acidification below pH 2. A positive cyanide or sulfide screen would direct the waste to a treatment or incineration facility. This waste would not be landfilled. This information would not be required for waste with pH less than 6.
10	cyanide/	
11	reactive	
12	sulfide	
13	content	
14	6. Chemical	An analysis of dangerous reaction potential with other waste types will be performed for the purpose of segregating waste types in the 616 NRDFWSF.
15	compatibility	
16	7. Physical	To determine the general physical characteristics of the waste (e.g., viscosity, color, texture, odor-free liquids) for comparison between generating unit-supplied information and verification by the Solid Waste Engineering staff.
17	description	
18	8. Specific	To establish a measurement for a parameter that effectively compares liquid waste characteristics against generating unit-supplied information.
19	gravity	
20	9. PCB screen	To determine PCB content in oil-bearing waste for the purpose of managing this waste in accordance with regulations prescribed in the <i>Toxic Substance Control Act of 1976</i> .

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1 Table 1. Parameters and Rationale for Waste Designation. (sheet 2 of 2)

2	Analytical Parameter	Rationale for Selection
3	10. TCLP	A method used to determine whether a waste is a regulated toxic waste due to its toxicity characteristics.
4	11. Toxicity	To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its toxic constituents as determined by the NIOSH Registry of Toxic Effects.
5	12. Halogenated hydrocarbons	To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its halogenated hydrocarbon content.
7	13. Polycyclic aromatic hydrocarbons	To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its polycyclic aromatic hydrocarbon content.
8	14. Carcinogenicity	To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its carcinogenic chemical constituents as determined by the International Agency for Research on Cancer.
9		To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its toxic constituents as determined by tests on biological systems.
11	15. Biological testing	To determine whether a waste is Ecology-regulated dangerous waste or extremely hazardous waste because of its toxic constituents as determined by tests on biological systems.

13 Ecology = Washington State Department of Ecology
 14 NIOSH = National Institute for Occupational Safety and Health
 15 PCB = polychlorinated biphenyl
 16 TCLP = toxicity characteristics leaching procedure

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Table 2. Analytical Methodologies.

Parameter	Methods*
Ignitability	<i>Chemical Testing Methods</i> , March 1982, revised July 1983
Corrosivity	<i>Chemical Testing Methods</i> , March 1982, revised July 1983, including the addendum <i>Test Method for Determining pH of Solutions in Contact with Solids</i> , March 1984
Reactivity	<i>Chemical Testing Methods</i> , March 1982, revised July 1983
Toxicity characteristics leaching procedure	<i>EPA Final Rule</i> , Federal Register, Volume 55, pages 11799 through 11877, March 1990
Halogenated hydrocarbons	<i>Chemical Testing Methods</i> , March 1982, revised July 1983
Polycyclic aromatic hydrocarbons	<i>Chemical Testing Methods</i> , March 1982, revised July 1983 and March 1984
Static acute fish toxicity test	<i>Biological Testing Methods</i> , July 1980
Acute oral rat toxicity test	<i>Biological Testing Methods</i> , July 1980
Free liquids (absence or presence)	<i>Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846</i> (most recent edition and all updates), Including "Method 9095" (Paint Filter Liquids Test)
Chlorinated dibenzo-p-dioxins and dibenzofurans	40 CFR 261, Appendix X
Polychlorinated biphenyls in transformer fluids and waste oils	EPA-600/4-81-045
Polychlorinated biphenyls in mineral insulating oils by gas chromatography	ASTM Standard D 4059-86

*WAC 173-303-110 - unless otherwise noted.

EPA = U.S. Environmental Protection Agency.

ASTM = American Society for Testing and Materials.

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APPENDIX 4A

CONSTRUCTION SPECIFICATION

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MARKED-UP SPECIFICATION

EE Upson 8-1-86
Prepared by Date

MO Bellows 8-6-86
Concurrence Date

8-526-C1

DFC's affecting Specification

- #5
- #7
- #8
- #10

CONSTRUCTION SPECIFICATION FOR
NONRADIOACTIVE HAZARDOUS CHEMICAL
WASTE FACILITY

DT's affecting Specification

- #8
- #18C
- #18D
- #22
- #24.A
- #33.A.1
- #33.A.2
- #39
- #103.2
- #105
- #106
- #108
- #109
- #113.B
- #117

Work Order X52602

Prepared By:

KAISER ENGINEERS HANFORD COMPANY
Richland, Washington

For the US Department of Energy

Contract DE-AC06-82RL10367

KEH Job R688A2

SC's affecting Specification

JAJ-1791 SC-12
JAJ-1791 ADD-1

<u><i>F. J. K. Hamrick</i></u> Lead Lead Engineer	<u>6-24-85</u> Date	<u><i>Samuel E. Zaranowski</i></u> Specifications Department	<u>6-24-85</u> Date
<u><i>D. J. Minister</i></u> Safety	<u>6-24-85</u> Date	<u><i>Samuel E. Zaranowski</i></u> Chief Design Engineer	<u>6-24-85</u> Date
<u><i>Wm. H. Engman</i></u> Quality Assurance	<u>6-24-85</u> Date	<u><i>F. J. K. Hamrick</i></u> Project Engineer	<u>7-25-85</u> Date

ROCKWELL HANFORD OPERATIONS

J. J. Noble
J. J. Noble
Cognizant Engineer

7/25/85
Date

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SECTION 01060

REFERENCED STANDARDS AND SPECIFICATIONS

REFERENCED STANDARDS AND SPECIFICATIONS

The following standards and specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this Specification to the extent indicated by subsequent references in this Specification.

A. American Concrete Institute (ACI)

301-84 Specifications for Structural
Concrete for Buildings

318-83 Building Code Requirements for
Reinforced Concrete

B. American Institute of Steel Construction, Inc (AISC)

November, 1978 Specification for the Design,
Fabrication and Erection of
Structural Steel for Buildings

1980 Edition Manual of Steel Construction
Eighth Edition

August, 1980 Specification for Structural
Joints Using ASTM A 325 or A 490
Bolts

C. American Iron and Steel Institute (AISI)

1980 Edition Manual of Steel Construction

D. American National Standards Institute (ANSI)

05.1 Specification and Dimensions
for Wood Poles

A13.1-81 Identification of Piping
Systems

B16.3-1977 Malleable-Iron Threaded Fit-
tings, Class 150 and 300

B31.1-1983 Edition, Standard Code for Pressure
w/Addenda thru Summer 1984 Piping-Power Piping

- C2-1984 National Electrical Safety Code
- C57.12.00 General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
- C57.12.20 Requirements for Overhead-Type Distribution Transformers 500 kVA and Smaller: High-Voltage, 67,000 Volts and Below; Low Voltage, 15,000 Volts and Below
- C80.1-83 Standard for Rigid Steel-Conduit Zinc-Coated
- C82.1 Specification for Fluorescent Lamp Ballasts
- C97.1-72 (R1978) Standard for Low-Voltage Cartridge Fuses 600 Volts or Less
- Z53.1 Safety Color Code for Marking Physical Hazards
- E. American Society of Mechanical Engineers (ASME)
- Section IX Welding and Brazing Qualifications
- F. American Society for Testing and Materials (ASTM)
- A 36-81a Structural Steel
- A 53-83 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
- A 74-82 Standard Specification for Cast Iron Soil Pipe and Fittings
- A 82-79 Cold-Drawn Steel Wire for Concrete Reinforcement
- A 108-81 Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality
- A 120-76 Pipe, Steel Black and Hot-Dipped, Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses

A 123-78	Standard Specification for Zinc-Coating on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 153-82	Zinc Coating on Iron and Steel Hardware
A 185-79	Welded Steel Wire Fabric for Concrete Reinforcement
A 307-83a	Carbon Steel Externally Threaded Standard Fasteners
A 325-83c	High Strength Bolts for Structural Steel Joints
A 416-80	Uncoated Seven-Wire Stress-Relieved Strand for Prestressed Concrete
A 490-83a	Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
A 527-80	Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality
A 563-83a	Standard Specification for Carbon and Alloy Steel Nuts
A 615-82	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
B 32-83	Solder Material
C 33-84	Concrete Aggregates
C 90-75 (1981)	Hollow Load-Bearing Concrete Masonry Units
C 94-83	Ready Mix Concrete
C 150-84	Portland Cement

C 260-77	Air-Entrained Admixtures for Concrete
C 270-84	Mortar for Unit Masonry
C 476-83	Grout for Masonry
C 494-82	Chemical Admixtures for Concrete
C 636-76	Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
D 653-83	Standard Terms and Symbols Relating to Soil and Rock
D 1785-83	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120
D 2464-76	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2466-78	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D 2564-80	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
D 2729-83	Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D 2855-83	Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings
D 3034-83	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
E 84	Surface Burning Characteristics of Building Materials
F 436-83b	Hardened Steel Washers
G. Air-Conditioning and Refrigeration Institute (ARI)	
240-81	Standard for Air-Source Unitary Heat Pump Equipment

H. Architectural Woodwork Institute (AWI)

1984 Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program

I. American Welding Society (AWS)

D1.1-84 Structural Welding Code

D1.3-81 Structural Welding Code-Sheet Steel

D1.4-79 Structural Welding Code-Reinforcing Steel

D9.1-84 Specification for Welding of Sheet Metal

J. American Wood-Preservers' Association (AWPA)

C7 Western Red Cedar, Northern White Cedar, and Alaska Yellow Cedar Poles -- Preservative Treatment of Incised Pole Butts by the Thermal Process

P1 Coal Tar Creosote for Land and Fresh Water Use

K. American Water Works Association (AWWA)

C104-80 Standard for Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water

C110-82 Standard for Gray-Iron and Ductile-Iron Fittings, 3 Inch through 48 Inch, for Water and Other Liquids

C111-80 Standard for Rubber Gasket Joints for Gray-Iron and Ductile-Iron Pressure Pipe Fittings

C151-81	Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids
C500-80	AWWA Standard for Gate Valves, 3 Through 48 In. NPS, for Water and Sewage Systems
C502-80	AWWA Standard for Dry-Barrel Fire Hydrants
C600-82	AWWA Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances
C601-81	AWWA Standard for Disinfecting Water Mains
L. Cast Iron Soil Pipe Institute (CISPI)	
301-82	Specification Data for Hubless Cast Iron Sanitary System with No-Hub Pipe and Fittings
M. Factory Mutual System (FM)	
1985 Edition	Approval Guide
Loss Prevention Data Sheets 1-28	Insulated Steel Deck
N. Federal Specification (FS)	
RR-G-661E	Grating, Metal, Bar Type
TT-E-489G	Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces)
TT-P-645A	Primer, Paint, Zinc Chromate, Alkyd Type
TT-S-00230C Including AMD 2	Sealing Compound, Elastomeric Type, Single Component
W-C-1094A	Conduit and Conduit Fittings, Plastic, Rigid
W-F-406C	Fittings for Cable, Power, Electrical And Conduit, Metal, Flexible

- | | |
|------------------------------------|--|
| W-P-115B | Panel, Power Distribution |
| W-S-896E/Gen
Including AMD 2 | Switches, Toggle, Flush Mounted |
| WW-C-00540C
Including INT AMD 1 | Conduit, Metal, Rigid: And
Coupling, Elbow, and Nipple,
Electrical Conduit: Aluminum |
| WW-C-566C | Conduit, Metal, Flexible |
| WW-U-531E | Unions, Pipe, Steel or Malleable
Iron; Threaded Connection,
150 Lb. and 250 Lb. |
- O. Federal Standards (Fed Std)
- | | |
|--|--|
| 141b | Paint, Varnish, Laquer, and
Related Materials: Method for
Sampling and Testing |
| 595A, including
Chgs Nos 1, 2, 3, 4, 5, and 6 | Colors Vol 1 |
- P. International Association of Plumbing and Mechanical Officials (IAPMO)
- | | |
|--------------|---------------------------------------|
| IS-6-75 | Hubless Cast Iron Sanitary
Systems |
| 1982 Edition | Uniform Plumbing Code |
- Q. International Conference of Building Officials (ICBO)
- | | |
|----------|-----------------------|
| UBC 1982 | Uniform Building Code |
|----------|-----------------------|
- R. Institute of Electrical and Electronics Engineers (IEEE)
- | | |
|--------|--|
| Std 28 | Surge Arresters for Alternating-
Current Power Circuits |
|--------|--|
- S. National Electrical Manufacturers Association (NEMA)
- | | |
|---------------------------|---|
| FB 1-77 w/Rev thru Dec 80 | Fittings and Supports for
Conduit and Cable Assemblies |
| ICS-2-78 | Industrial Controls and
Systems |

ICS-6-78	Enclosures for Industrial Controls and Systems
KS1	Enclosed Switches
RN 1-74	Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing
ST20	Dry-Type Transformer for General Applications
WD-1	General-Purpose Wiring Devices
T. National Fire Protection Association (NFPA)	
NFPA 13 - 1985	Standard for Installation of Sprinkler Systems
NFPA 24 - 1984	Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 70 - 1984	National Electrical Code (NEC)
NFPA 72B-1979	Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service
NFPA 80-1983	Standard for Fire Doors and Windows
NFPA 1221 - 1984	Standard for the Installation, Maintenance and Use of Public Fire Service Communications
1963	Standard for Screw Threads and Gaskets for Fire Hose Connections, 1985 Edition
U. Prestressed Concrete Institute (PCI)	
MNL-116-77	Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products

- V. Sheet Metal and Air Conditioning Contractors National Association, Inc (SMACNA)
- 1974 Testing, Balancing, and Adjusting of Environmental Systems
- 1976, 5th Edition Low Pressure Duct Construction Standards
- W. Steel Deck Institute (SDI)
- 1981-82 Steel Deck Institute Design Manual for Floor Decks and Roof Decks
- X. Steel Door Institute
- 100-83 Standard Specifications for Steel Doors and Frames
- Y. Underwriters Laboratories, Inc (UL)
- January 1985 Fire Protection Equipment Directory
- 1984, Including Nov 1984 Supplement Electrical Appliance and Utilization Equipment Directory
- 1984, Including Nov 1984 Supplement Electrical Construction Materials Directory
- UL 38-1981 w/Rev thru Sep 1981 Manually Actuated Signaling Boxes for Use with Fire Protection Signaling Systems
- UL 555-1979 Standard for Safety, Fire Dampers and Ceiling Dampers
- UL 797-1977 Standard for Electrical Metallic Tubing
- UL 1242-1977 Standard for Safety, Conduit, Intermediate, Metal
- January 1985 Building Materials Directory

Z. Washington State Department of Transportation (WSDOT)

M 41-10-84

Standard Specification for Road,
Bridge, and Municipal Construc-
tion

END OF SECTION

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SECTION 01300

SUBMITTALS

1.1 DESCRIPTION

1.1.1 This section summarizes the requirements for the submittal of documents which are defined in Part 1 of each Section of this Specification and describes procedures for "Supplemental" submittals.

1.2 SUBMITTALS

1.2.1 Submittals listed in Part 1 of each of the sections of this Specification requires either review and approval or review for record.

1.2.1.1 Submittals requiring review and approval shall have been approved and returned to the Contractor before proceeding with procurement, fabrication, or construction.

a. Approved submittals are identified by a submittal stamp with the "Approved" or "Approved with Exception" box checked. "Approved" signifies general concurrence to achieve conformance with the design concept of the project and compliance with the requirements of the contract documents. "Approved with Exception" signifies general concurrence with noteworthy comments or clarifications. Approval of Contractor submittals does not relieve the Contractor of responsibility for errors which may be contained therein.

b. A submittal which is Not Approved is identified on the submittal stamp as "Not Approved, Revise and Resubmit." Said submittal is considered, by the Architect-Engineer (A-E), to be technically deficient or incomplete and therefore, unacceptable. Resubmittal is required, hence fabrication, procurement, or performance of procedures shall not proceed.

1.2.1.2 Review For Record indicates that the Contractor may proceed with procurement, fabrication, or construction; however, said acceptance is contingent upon strict compliance with the Drawings and Specification. Incomplete or inaccurate submittal data will be returned to the Contractor with appropriate comments and items procured or work performed shall be corrected.

1.2.2 Supplemental Submittals: Submittals initiated by the Contractor for consideration of "equal substitute" products or corrective procedures shall contain sufficient data for review and approval. "Equal Substitute" product submittals must contain outline dimensions, operating clearances, and sufficient engineering data to indicate substantial compliance with the Drawings and Specification. Identify each submittal by the Specification number, section, and paragraph number; or a referenced drawing number and detail. Improperly identified submittals will be returned without consideration.

1.3 SUBMITTAL PROCEDURES

1.3.1 Submittals are itemized in Article 1.4, Schedule of Submittals, and are identified by Submittal Number and Title. Identify each submittal by the Specification Number and Submittal Number noted in the Schedule.

1.3.2 The Contractor shall review all submittals before forwarding such data to the A-E. The Contractor shall sign Data Transmittal form indicating that the submittal has been reviewed for compliance with the contract documents. The Contractor's signature represents that he has verified all materials and field measurements, and has checked and coordinated the information contained within such submittals with the requirements of the contract documents. Only signed submittals shall be forwarded to the A-E. Any submittal which is not signed will be returned by the A-E without review.

1.4 SCHEDULE OF SUBMITTALS

Submittal Number	Submittal Title	Review and Approval	Review For Record
PIPED UTILITIES			
02650/1.1.1	Leak/Pressure Test Procedures	Before testing	
02650/1.1.2	Method for Disposal of Flushing Water		Before flushing
FIRE WATER SYSTEMS			
02668/1.1.1	Approval Data	Before delivery	
02668/1.1.2	Certified Vendor Information (CVI)		Before installation
02668/1.1.3	NFPA Test Certificate		Within 10 days after completion
CAST-IN-PLACE CONCRETE			
03300/1.1.1	Form Coating Materials	Before use	
03300/1.1.2	Reinforcing Steel Drawings	Before delivery	
03300/1.1.3	Block Diagram	Before installation of forms	

Submittal Number	Submittal Title	Review and Approval	Review For Record
03300/1.1.4	Concrete Materials, Mix Design, and Mix Proportions	Before mixing	
03300/1.1.5	Curing Procedure	Before mixing	
PRECAST PRESTRESSED CONCRETE SECTIONS			
03419/1.1.1	Fabrication Drawings	Before delivery	
03419/1.1.2	Concrete Materials and Mix Design	Before mixing	
03419/1.1.3	Record of Tests	Before mixing	
CONCRETE UNIT MASONRY			
04220/1.1.1	Method to Heat Masonry Units	Before erection	
STRUCTURAL STEEL			
05120/1.1.1	Fabrication and Erection Drawings	Before fabrication	
METAL DECKING			
05300/1.1.1	Installation Drawings	Before installation	
05300/1.1.2	Metal Deck Certificate of Compliance	Before installation	
PREFORMED METAL SIDING			
07411/1.1.1	Fabrication Drawings	Before fabrication	
07411/1.1.2	Performance Test Conformation	With delivery	
EXPLOSION RELIEF VENT			
07700/1.1.1	Fabrication Drawings	Before fabrication	
METAL DOORS AND FRAMES			
08100/1.1.1	Fabrication Drawings	Before delivery	

Submittal Number	Submittal Title	Review and Approval	Review For Record
BLAST-RESISTANT DOORS			
08315/1.1.1	Fabrication Drawings	Before delivery	
08315/1.1.2	Calculations	Before delivery	
OVERHEAD COILING DOORS			
08332/1.1.1	Fabrication Drawings	Before delivery	
08332/1.1.2	Certified Vendor Information (CVI)		Before installation
FINISH HARDWARE			
08710/1.1.1	Hardware List	Concurrent with doors and frames	
FIRE PROTECTION			
15300/1.1.1	Approval Data	Before delivery	
15300/1.1.2	Certified Vendor Information (CVI)		Before installation
15300/1.1.3	Design/Fabrication Drawings	Before fabrication	
15300/1.1.4	Calculation Data Sheets	Before fabrication	
15300/1.1.5	As-Built Drawings		Within 10 days after completion
15300/1.1.6	NFPA Test Certificate		Within 10 days after completion
PLUMBING			
15400/1.1.1	Approval Data	Before delivery	
15400/1.1.2	Certified Vendor Information (CVI)		Before installation
15400/1.1.3	Method for Disposal of Flushing Water		Before flushing

Submittal Number	Submittal Title	Review and Approval	Review For Record
HEATING, VENTILATING, AND AIR CONDITIONING			
15500/1.1.1	Certified Vendor Information (CVI)		Before installation
15500/1.1.2	Test and Balance Procedure	Before testing	
15500/1.1.3	Test and Balance Data		Within 10 days after test completion
HIGH VOLTAGE DISTRIBUTION (ABOVE 600-VOLT)			
16300/1.1.1	Approval Data	Before delivery	
16300/1.1.2	Certified Vendor Information (CVI)		Before installation
SERVICE AND DISTRIBUTION (600-VOLT AND BELOW)			
16400/1.1.1	Approval Data	Before delivery	
16400/1.1.2	Certified Vendor Information (CVI)		Before installation
ALARM AND DETECTION SYSTEMS			
16720/1.1.1	Approval Data	Before delivery	
16720/1.1.2	Certified Vendor Information (CVI)		Before installation

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SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

2.1.1 **General:** Obtain select soils from the excavation or from other designated locations. Obtain on-site approval for soils.

2.1.2 **Structural Fill or Backfill:** Well-graded soil mixtures which may contain cobbles up to 3 inches in greatest dimension provided same are uniformly distributed and do not constitute more than 20% of the volume of the fill.

2.1.3 **Common Fill or Backfill:** Well-graded soil mixtures containing cobbles up to 8 inches in greatest dimension provided same are uniformly distributed and do not constitute more than 40% of the volume of the fill.

2.1.4 **Cushion for Underground Pipe:** Sand, as defined in ASTM D 653, or excavated sandy material having a maximum dimension of 1/2 inch.

2.1.5 **Stabilization Material:** Gravel as defined in ASTM D 653. Maximum size of particles 3/4 inch for parking area and 2 inch minus for other areas.

2.2 PLASTIC SHEET MARKER

2.2.1 **Plastic Sheet Marker for Buried Piping and Conduit:** 6-inch-wide, yellow nondetectable tape similar to "Terra Tape" as manufactured by Griffolyn Co, Inc. Tape shall be imprinted with a warning such as "Caution Buried Installation Below" at intervals of not more than 4 feet.

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 **Before performing any excavation, obtain an excavation permit for the area to be excavated. Excavation permits will be furnished by the Government's Representative upon advance notice of the scheduled activity.**

3.1.2 **Shore excavations which are more than 4 feet deep and which have sides sloped steeper than 1-1/2 horizontal to one vertical. Install shoring as excavation progresses and remove as backfilling is accomplished.**

3.1.3 **Do not store excavated or other material closer than 2 feet from the edge of the excavation unless a barrier is erected to retain the**

excavated materials. Store and maintain materials in such a manner that they are prevented from falling or sliding into the excavation.

3.1.4 Wherever the slopes of excavations will intersect existing underground piping, electrical ducts, or direct buried electrical lines; install shoring or other means of support to prevent overstressing underground lines or to prevent interrupting service to existing buildings.

3.1.5 Footings and Foundations

3.1.5.1 Make excavations for footings to the depth shown on the drawings or to such further depth as is necessary to provide an undisturbed surface to receive the footing. Make excavations to the proper width with allowances made for forms and bracing. Make bottom of excavations compact, level, true, and free of loose material.

3.1.5.2 If over-excavation occurs where footings are designed to be placed on undisturbed earth, correct at the time of placing concrete by extending the concrete down to undisturbed earth, or by placement of backfill, compacted in accordance with Subparagraph 3.2.2.2(a).

3.1.6 Trenches for Underground Piping or Conduit

3.1.6.1 Make excavations for piping or conduit to the line and grade shown on the Drawings and wide enough to make the connections. Excavate with near vertical sides from bottom of trench up to 1 foot above the pipe or conduit. Excavate the trench deep enough to permit the placement of a compacted sand cushion (4 inches minimum thickness) beneath the pipe or conduit except where excavation is in undisturbed sand which will serve as a cushion or where lines are to be encased in concrete. Pare holes in trench bottoms for pipe couplings so that the pipe will bear full length of the barrel or section.

3.1.6.2 Install shoring (if required) to hold all materials and the surcharge pressure for the full depth of the trench.

3.1.6.3 Keep trenches free from standing water when pipe or conduit laying is in progress.

3.1.6.4 If over-excavation occurs, correct by placement of structural backfill.

3.2 FILLING AND BACKFILLING

3.2.1 General

3.2.1.1 Backfill Permit: Obtain all signatures required on a backfill permit for the area to be backfilled. Forms will be furnished by the Government's Representative. Work not started within five calendar days from the time the permit is approved shall not be started until a new permit has been approved. A continuing job that has not had backfill installed within the past five calendar days will require a new backfill permit.

3.2.1.2 The terms "fill" and "backfill" refer to the placement and compaction of soil excavated and stockpiled at the site or obtained from other locations.

3.2.1.3 Remove all debris and organic matter from the area to be filled or backfilled.

3.2.1.4 Use only select materials for fill or backfill. Keep materials free from frozen particles, lumps, organic matter, and trash.

3.2.1.5 Do not place fill or backfill on frozen ground.

3.2.1.6 Filling or backfilling by sluicing or flooding with water will not be permitted.

3.2.1.7 Bring fill or backfill up evenly on the sides of walls, structures, and pipes to avoid unbalanced loading.

3.2.1.8 Do not place fill or backfill against any concrete structure or foundation wall less than 14 days after completion of the structure or wall unless written permission is obtained. Provide wall support, where noted on the Drawings, before filling or backfilling.

3.2.1.9 Where stabilization is required, finish the subgrade 3 inches below the elevations shown on the Drawings.

3.2.2 Structural Fill or Backfill

3.2.2.1 Before placement of structural fill or backfill, demonstrate, to the Government's Representative, by physical test at the site, that the procedure proposed for the installation and compaction of the soils will provide the degree of compaction specified. Prepare a "Soil Compaction Procedure" Form KEH-382 (sample appended) in accordance with the printed instructions. Forms will be furnished by the Government's Representative.

3.2.2.2 Place structural backfill in accordance with WSDOT M41-10, Paragraph 2-03.3(14)C and the approved procedure as follows:

- a. Use Method C under foundations, slabs, and pipelines.
- b. Use Method B under pavements and roads, and within 5 feet of structures or poles supporting electric lines or pipes.

3.2.2.3 Compaction control tests will be in accordance with WSDOT M41-10, Paragraph 2-03.3(14)D.

3.2.3 Common Fill or Backfill

3.2.3.1 Place common fill or backfill in layers not more than 12 inches thick, loose measurement.

3.2.3.2 Compact each layer, full width, by at least one pass of a vibratory or rammer-type compactor, pneumatic-tired roller, loaded scraper wheel, grader wheel, or power roller.

3.2.3.3 Mound over top layer of backfill to a depth of 1 inch for each 12 inches of trench depth to a maximum mound height of 6 inches.

3.2.4 Filling or Backfilling for Underground Piping or Conduit

3.2.4.1 The sand cushion placed beneath pipe or conduit in trenches shall be material meeting the requirements of Paragraph 2.1.4.

3.2.4.2 Place and compact the sand cushion in trench prepared according to Subparagraph 3.1.6.1 before laying pipe or conduit. Compact sand cushion as specified for structural backfill.

3.2.4.3 Place backfill over joints in underground pipes only after pressure testing of the line has been completed.

3.2.4.4 Backfill under conduit and the haunches of the pipe, around the sides, and up to 1 foot above the top of the pipe or conduit with sand cushion material. Place and compact the material the same as specified for structural backfill. Compact with care, to avoid misalignment of the pipe and to provide uniform bearing along the barrel of the pipe.

3.2.4.5 Backfill pipe or conduit trenches from an elevation 1 foot above the top as follows:

a. For locations specified in Paragraph 3.2.2, use structural backfill.

b. Use common backfill in accordance with Paragraph 3.2.3 for all other locations.

3.2.4.6 Do not allow heavy construction equipment to pass over buried lines until at least 2 feet of backfill has been placed over the line or until bridging has been placed across trenching and has been approved by the Government's Representative.

3.3 INSTALLATION OF PLASTIC SHEET MARKER

3.3.1 Place plastic sheet marker continuous over all buried piping or conduit. Place marker tape directly over the line and 1 foot below finish grade. Place a marker over each of the outside pipes of multiple lines. Place intermediate markers at a maximum of 4 feet apart.

3.4 FINISH GRADING AND STABILIZATION

3.4.1 Rake the area disturbed by the work, remove surface stones larger than 6 inches and dispose of excess material and debris at an area designated by the Government's Representative.

3.4.2 Stabilize the area around the perimeter of the building (approximately 4 feet), with a 3 inch course of gravel meeting the requirements of Paragraph 2.1.5. Finish the stabilization course to the elevations shown on the Drawings.

3.5 TESTING

3.5.1 All sampling and testing of compacted fill and backfill will be performed by the Government's Representative.

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SOIL COMPACTION PROCEDURE

Project No.		Project Title				Date																																																																																									
Contract No.		Procedure No.		Location of Demonstration																																																																																											
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	Government Representative					Date																																																																																									

INSTRUCTIONS

This Soil Compaction Procedure form, when approved by the Government Representative, constitutes an approved compaction procedure.

Section A is the responsibility of the Construction Contractor. It is to be completed at the time of backfill compaction demonstration and presented to the Government Representative.

Section B is completed by the Government Representative. Data entered is obtained from the agency that performs the laboratory testing.

Section C is completed by the Government Representative as the demonstration is performed. Using the applicable formula, the percent compaction achieved is determined and entered. Acceptance is based on the results as compared with the compaction percent required in Section A.

Section D is signed and dated by the Construction Contractor Representative acknowledging responsibility for this procedure and compliance thereto for applicable backfill operations. Section D is signed and dated by the Government Representative to signify approval.

END OF SECTION

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SECTION 02650
PIPED UTILITIES

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
 - 1.1.1 **Leak/Pressure Test Procedures:** Submit procedures outlining proposed methods of testing joints in piping systems.
 - 1.1.2 **Method for Disposal of Flushing Water:** Prepare a method for disposal of flushing water.

PART 2 - PRODUCTS

- 2.1 **PIPE AND FITTINGS**
 - 2.1.1 Piping and fittings for sanitary water shall be PVC meeting the requirements of ASTM D 2464 and ASTM D 2466, and the details on the drawing.
 - 2.1.2 Pipe joint sealant shall meet the requirements of ASTM D 2564 and ASTM D 2855.
 - 2.1.3 Piping for 6-inch sanitary sewer shall be PVC meeting the requirements of ASTM D 3034-SDR 35.
 - 2.1.4 Perforated piping for 4-inch and smaller sanitary sewer shall be PVC meeting the requirements of ASTM D 2729.

PART 3 - EXECUTION

- 3.1 **GENERAL**
 - 3.1.1 Keep piping systems clean during all phases of the work. Once fabrication has started on any length of pipe, plug or cap the open ends of the piping when erection is not in progress to prevent the entry of dirt and other foreign material.
 - 3.1.2 Where piping is laid in a trench, the trench shall be free from frost or frozen earth and standing water.
- 3.2 **POLYVINYL CHLORIDE (PVC) PIPE**
 - 3.2.1 Install piping and piping accessories in conformance with the manufacturer's written installation procedure, the Drawing, and this Specification.
 - 3.2.2 For sanitary water pipe installation, provide thrust restraint at all tees, plugs, caps, and bends in accordance with NFPA 24, Article 8-6. For thrust block for pipe sizes less than 6 inches in diameter use thrust block for 4 inches in diameter pipe.

3.3 FLUSHING

3.3.1 After installation and immediately before pressure testing a completed system, and before connecting a completed system into any existing system; flush all piping with water for one minute, minimum, or until the effluent is clean and contains no visible particulate matter, but in no case for less than one minute.

3.3.2 Raw water may be used for flushing the sanitary sewer, use sanitary water for flushing sanitary waterlines.

3.3.3 Use a flushing velocity of at least 5 feet per second with the pipe full.

3.3.4 Provide documented evidence that flushing has been accomplished in accordance with this Specification. Deliver to the Government's Representative before leak/pressure testing.

3.4 HYDROSTATIC TESTING

3.4.1 Furnish all instruments, facilities, and labor required to conduct the tests.

3.4.2 Document leak/pressure testing of each piping system on "Leak/Pressure Test Certification" Form RL-F-6410.2 (sample appended) by preparing Section A of the form and signed by the Contractor Representative. Forms will be furnished by the Government's Representative.

3.4.3 Perform all leak tests as designated in the applicable pipe codes in the presence and to the satisfaction of the Government's Representative.

3.4.4 Perform tests before backfilling or application of exterior protective coating.

3.4.5 Before applying test pressure to piping, install any necessary restraining devices to prevent distortion or displacement of the piping.

3.4.6 Install one temporary relief valve during pressure testing of piping systems. The relief valve shall have a discharge capacity of not less than 125% of the capacity of the pressurizing device and shall be set to operate at not more than 110% of the test pressure. Demonstrate the proper operation of the relief valve to the Government's Representative at the following times: Before each series of leak tests before the relief valve is attached to the system; whenever the Government's Representative has cause to question the operating accuracy of the relief valve.

3.4.7 Coat all joints and connections of threaded lines with a mixture of powdered blue chalk and water or isopropyl alcohol, and allow to dry before filling piping with water and inspecting for leaks.

3.4.8 Test all other new piping for at least 30 minutes with no visible leaks or loss of test water. Examine all piping joints, fittings, and other potential leak sources carefully during testing. Repair all detectable leaks; re-examine by the same test method originally prescribed and retest.

3.4.9 If lines are subject to freezing, remove all water from lines immediately upon completion of the hydrostatic test.

3.4.10 Use the test pressures shown on the Pipe Codes Sheet.

3.5 DISINFECTION OF SANITARY WATERLINES

3.5.1 Disinfect sanitary waterlines in accordance with AWWA C601.

PIPE CODE A

Service:	Max Operating Pressure:	Test Pressure:	Max Operating Temp:
Sanitary Water	120 psig	180 psi	100 F

Sizes : 4" and smaller

Pipe : PVC 1120 per ASTM D 1785

Fittings : PVC, Schedule 80 per ASTM D 2464, or Schedule 40 per ASTM D 2466

PIPE CODE B

Service:	Max Operating Pressure:	Test Pressure:	Max Operating Temp:
Sanitary Sewer	-	Per Uniform Plumbing Code	100 F

Sizes : 4" and Smaller

Pipe : PVC, ASTM D 2729

PIPE CODE C

Service	Max Operating Pressure:	Test Pressure:	Max Oper Temp:
Sanitary Sewer	---	Per Uniform Plumbing Code	100 F

Sizes : 6"

Pipe : PVC, ASTM D 3034-SDR 35

LEAK/PRESSURE TEST CERTIFICATION

Project No. _____		Work Order No./Shop Order No. _____		Report No. _____		Code or Standard _____	
Class _____	Year _____	Addenda _____	Stamp <input type="checkbox"/> Yes <input type="checkbox"/> No	Const. Spec. _____	Rev. _____	Test Procedure Title & No. _____	
Description of Component(s) _____							

CONTRACTOR PRE-TEST CHECK LIST	Customer Representative Notified			Safety Representative Notified		
	Date _____	Time _____		Date _____	Time _____	
	Item	Acceptance	Exception	Item	Acceptance	Exception
	Flushing of component to be tested completed.			All lines not required for test: disconnected or isolated.		
	Vents, openings, and relief valve discharge checked.			All test equipment checked for tightness.		
	Test medium per requirements. Medium _____			Test medium temp. equalized. Temp. _____ (ASME Section III, VIII only)		
	Test set up in accordance with above referenced procedure. If exception, explain:					
	Test gauge correct range and currently calibrated.					
	Serial No. _____ Range _____ Calib. Due Date _____					
	Pressure relief valve properly set and currently calibrated.					
	Serial No. _____ PSI Setting _____ Calib. Date _____					
	Areas to be inspected chalked prior to pressurization. If exception, explain:					
	Soap solution applied to all areas examined while component was pressurized.					
	No Leakage Found _____ Leaks Found and Repaired _____					
	Specified test pressure obtained.					
	Pressure Specified _____	Hold Time Specified _____	Test Press. Obtained _____	A.M. _____	P.M. _____	
	CONTRACTOR REPRESENTATIVE ➤					Date _____

INSPECTION VERIFICATION	Actual test pressure during inspection _____		All joints and welded attachments to pressure retaining components chalked/soaped as applicable. <input type="checkbox"/> Yes <input type="checkbox"/> No*		Pressure test:	
	Specified hold time verified at _____ A.M. _____ P.M.		All joints and welded attachments to pressure retaining components visually inspected for leakage. <input type="checkbox"/> Yes <input type="checkbox"/> No*		<input type="checkbox"/> Accepted	<input type="checkbox"/> Rejected*
	* Basis of Rejection and/or Comment:					
	CUSTOMER REPRESENTATIVE ➤					Date _____
	WITNESS - ASME AUTHORIZED INSPECTOR ➤					Date _____

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INSTRUCTIONS

1. THE FABRICATION OR CONSTRUCTION CONTRACTOR IS RESPONSIBLE TO FILL IN THE UPPER PORTION OF THE LEAK/PRESSURE TEST CERTIFICATION, INCLUDING THE CONTRACTOR PRE-TEST CHECK LIST SECTION. PORTIONS OR BLOCKS NOT APPLICABLE SHALL BE NA'd.
2. THE CONTRACTOR SHALL PRESENT THE LEAK/PRESSURE TEST CERTIFICATION TO THE CUSTOMER'S REPRESENTATIVE AT THE TIME OF TESTING.
3. THE CUSTOMER'S REPRESENTATIVE SHALL COMPLETE THE INSPECTION VERIFICATION SECTION OF THE LEAK/PRESSURE TEST CERTIFICATION AT THE TIME OF TESTING, AND THE RESULTS OF THE TEST WILL BE SO INDICATED. (THE ASME AUTHORIZED INSPECTOR SIGNATURE BLOCK WILL BE NA'd AS APPROPRIATE BY THE CUSTOMER'S REPRESENTATIVE.)
4. THE CUSTOMER'S REPRESENTATIVE WILL PROVIDE A COPY OF THE LEAK/PRESSURE TEST CERTIFICATION TO THE CONTRACTOR UPON COMPLETION OF THE TEST. THE ORIGINAL WILL BE RETAINED BY THE CUSTOMER FOR PERMANENT RECORD.

END OF SECTION

SECTION 02668

FIRE WATER SYSTEMS

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.1.1 Approval Data: Submit the information requested in Column 5 of the Vendor Data List in this section.
- 1.1.2 Certified Vendor Information (CVI): Submit the information listed in Column 6 of the Vendor Data List in this section.
- 1.1.3 NFPA Test Certificate: Submit a completed Contractor's Material and Test Certificate in accordance with NFPA 13, Section 1-12.

PART 2 - PRODUCTS

2.1 GENERAL

2.1.1 All components of the new underground fire protection system, if not designated in this Specification and the Drawings by a manufacturer's name and model or figure number, shall be current products of the manufacturer and shall be FM approved or UL listed for the intended use.

2.1.2 The system is designed for a maximum operating pressure of 125 psig.

2.2 PIPING

2.2.1 Pipe, pipe joints, and fittings shall meet the requirements of NFPA 24, the Drawings, and this Specification.

2.2.2 Pipe shall be cement-lined, meeting the requirements of AWWA C104 and be ductile iron, Class 50 (minimum) meeting the requirements of AWWA C151. Pipe shall have rubber-gasketed, mechanical joints or push-on joints meeting the requirements of AWWA C111.

2.2.3 Fittings shall be cement-lined, meeting the requirements of AWWA C104, with joints and pressure class ratings compatible with the pipe used and shall meet the requirements of AWWA C110.

2.3 POST INDICATOR VALVE (PIV)

2.3.1 The gate valve shall be a nonrising stem valve with an indicator post flange. The valve shall open in counterclockwise direction.

2.3.2 The indicator post shall be of the adjustable, telescoping barrel type with locking handle and shall have clearly visible, position indicator sign plates, protected by nonbreakable plastic windows. The indicator post shall be matched for assembly to the gate valve.

2.3.3 The valve position supervisory limit switch for installation on the post indicator valve shall be tamperproof. The switch shall be operated during the first two revolutions of the handle in the closing direction:

2.4 POST INDICATOR VALVE (PIV) WITH TAPPING SLEEVE

2.4.1 The tapping sleeve and post indicator gate valve shall be provided as a unit.

2.4.2 The gate valve shall be a nonrising stem valve with an indicator post flange. The valve shall open in the counterclockwise direction.

2.4.3 The indicator post shall be of the adjustable, telescoping barrel type with locking handle and shall have clearly visible, position indicator sign plates, protected by nonbreakable plastic windows. The indicator post shall be matched for assembly to the gate valve.

2.4.4 The valve position supervisory limit switch for installation on the post indicator valve shall be tamperproof. The switch shall be operated during the first two revolutions of the handle in the closing direction.

2.5 FIRE HYDRANTS

2.5.1 Fire hydrants shall meet the requirements of AWWA C502 and be dry barrel type with compression type main valve which opens against pressure. Inlets shall be 6 inches with a minimum 5 inch valve opening. The hydrants shall have one 4-1/2 inch pumper nozzle and two 2-1/2 inch hose nozzles, including caps and chains. Nozzle threads shall be National Standard Fire Hose Coupling Threads in accordance with NFPA 1963. The hydrant operating nut and cap nuts shall be National Standard Pentagon in accordance with AWWA C502 and shall open in the counterclockwise direction. Stem seals shall be the O ring type.

2.6 HYDRANT CONNECTION VALVE: Hydrant connection valve shall be a 6 inch gate valve meeting the requirements of AWWA C500 and be provided with an adjustable cast iron valve box.

2.7 REFLECTIVE SHEETING: 6 inch wide reflective sheeting for placement around the fire hydrant body shall be Scotchlite No. 3270 silver "Wide-Angle Flat Top", adhesive coated.

2.8 DRAINAGE MATERIAL FOR FIRE HYDRANT BASE: 3/8 inch to 1 inch clean crushed rock or gravel.

2.9 BITUMASTIC: Koppers No. 550 or Superservice black.

2.10 PAINTING MATERIALS

2.10.1 Primer: FS TT-P-645, (alkyd type zinc chromate) National Lead No. 200-41.

2.10.2 Paint: FS TT-E-489, Class A, Composition G.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Install piping and piping accessories in accordance with NFPA 24, AWWA C600, the Drawings, and this Specification.

3.1.2 Protect pipe and fittings from impact shocks and dropping. Immediately before laying, inspect the pipe and discard damaged components. Remove the damaged components from the job site.

3.1.3 Keep piping systems clean during all phases of the work. Once fabrication has started on any length of pipe, plug or cap the open ends of the piping when erection is not in progress to prevent the entry of dirt and other foreign material. Inner surfaces of all pipe, valves, and fittings shall be smooth, clean, and free from sand, debris, and dirt when installed.

3.1.4 Where piping is laid in a trench, the trench shall be free from frost or frozen earth and standing water.

3.1.5 Install restraints on pipe and piping components in accordance with NFPA 24, Articles 8-6 and A-8-6.2. Restraining mechanical joints as listed in the UL Fire Protection Equipment Directory may be substituted for conventional anchoring. Where thrust blocks are used, make the bearing area equal to the area shown in Table 8-6.2.9, multiplied by a factor of 1.33.

3.1.6 Coat all carbon steel accessories which will be buried, such as tie-rods and clamps, with bitumastic. Allow time for bitumastic to dry before backfilling.

3.1.7 Install fire hydrants and hydrant sectionalizing valves in accordance with AWWA C600 and NFPA 24.

3.1.8 Install post barricades around fire hydrants and post indicator valves in accordance with the Drawings.

3.1.9 Excavation, backfill, and grading work shall meet the requirements of Section 02200 of this Specification as it applies.

3.1.10 Place drainage material at the base of the fire hydrant in accordance with AWWA C600, Section 3.7. The interface between the drainage material and compacted earth fill shall be separated by a layer of 30 pound roofing paper.

3.1.11 The fire hydrant base pad shall bear on undisturbed or compacted earth and shall be a minimum 16 inch diameter or square by 4 inch thick precast concrete.

3.1.12 The centerline of the fire hydrant pumper nozzle shall be between 18 and 22 inches above the adjacent finished grade. Orient the pumper toward the roadway or street.

3.1.13 Paint the entire fire hydrant with one coat of primer meeting the requirements of FS TT-P-645, and two coats of safety yellow enamel meeting the requirements of FS TT-E-489. Colors shall be as defined in ANSI Z53.1. Place a reflective sheeting band around the body of the fire hydrant immediately below the pumper nozzle.

3.2 FLUSHING AND TESTING

3.2.1 General

3.2.1.1 Furnish all equipment and instruments required to perform the flushing and testing.

3.2.1.2 Perform all flushing and testing while being witnessed by the Government's Representative.

3.2.1.3 Remove and replace or repair apparatus, material, or work which fails in flushing or testing operations and repeat the operation.

3.2.1.4 Repair any damage resulting from flushing or testing.

3.2.2 Flushing

3.2.2.1 Flush all new piping in accordance with NFPA 24, Article 8-8.

3.2.2.2 Prepare the method for disposal of flushing water. Deliver to the Government's Representative for approval before flushing.

3.2.2.3 Provide documented evidence that flushing has been accomplished in accordance with this Specification. Deliver to the Government's Representative before testing.

3.2.3 Hydrostatic Testing

3.2.3.1 Perform testing in accordance with NFPA 24, Article 8-9. A relief valve will be required.

3.2.3.2 Perform testing after piping has been flushed and before backfill is placed over pipe joints.

3.2.3.3 Verify that all air has been expelled from piping before applying the hydrostatic pressure.

3.2.3.4 Examine all piping joints, fittings, and other potential leak sources carefully during the test. Leaks in the piping system are not acceptable. Repair all leaks and retest.

3.2.3.5 If the piping system is subject to freezing, remove all water from the lines immediately upon completion of the tests.

3.3 DISINFECTING

3.3.1 Arrange for bacteriological testing of water samples with the Government's Representative before performing disinfection procedures. The

bacterial analysis is four days in length from the time samples are received in the laboratory. The analysis provides "presumptive" results in two days with "confirmation" at the end of the test.

3.3.2 Disinfect sanitary waterlines in accordance with AWWA C601.

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Form Coating Materials: Submit proposed form coating materials in accordance with ACI 301, Section 4.4.

1.1.2 Reinforcing Steel Drawings: Submit complete reinforcing fabrication and placing drawings based on the block diagram in accordance with ACI 301, Section 5.1, including splices not shown on contract drawings.

~~1.1.3 Block Diagram: Submit a block diagram of scheduled concrete pours. Identify all pours.~~

DT #8

1.1.4 Concrete Materials, Mix Design, and Mix Proportions: Submit the concrete materials, mix design, and mix proportions in accordance with ACI 301, Sections 3.8 and 16.7.3. Define each of the materials to be used in the concrete and state the amount, by weight, to be utilized per cubic yard of plastic mix.

1.1.5 Curing Procedure: Submit description of materials and methods of curing in accordance with ACI 301, Section 12.2.

PART 2 - PRODUCTS

2.1 CONCRETE

2.1.1 Cement: ASTM C 150, Type II (Low Alkali).

2.1.2 Aggregates: ASTM C 33, maximum size 1-1/2 inch.

2.1.3 Air-Entraining Admixture, Meeting the Requirements of ASTM C 260: Sika Chemical Company "SIKA AER", Chem-Masters Corp "Adz-Air" or Prote Industries "Protex".

2.1.4 Properties

2.1.4.1 Minimum allowable compressive strength: 3000 psi at 28 days.

2.1.4.2 Slump: 4 inch maximum in accordance with ACI 301, Section 3.5.

2.1.4.3 Air content: In accordance with ACI 301, Table 3.4.1.

2.1.4.4 Proportions: In accordance with ACI 301, Section 3.8, Method 2 or 3.

2.1.5 Mixing: In accordance with ASTM C 94.

2.1.6 Delivery: In accordance with ASTM C 94.

2.2 REINFORCING STEEL

2.2.1 Steel Bars: ASTM A 615, deformed, Grade 60.

2.2.2 Welded Wire Fabric: ASTM A 185.

2.2.3 Tie Wire: Black annealed steel, 16 gauge minimum.

2.3 JOINT MATERIALS

2.3.1 Expansion Joint Filler: See Section 07920.

2.3.2 Sealant: ~~See Type II, Section 07920~~, See Building Sealant,
Section 07920

2.4 NONSHRINK GROUT

2.4.1 Nonmetallic Type: "Five Star Grout" by US Grout Corp; "Por-Rok" Anchoring Cement by Hallemite; or "Masterflow 713" by Master Builders.

2.5 FORMS: Wood, steel, plywood, or Masonite Corporation "Concrete Form Presdwood", as required for the various specified finishes.

PART 3 - EXECUTION

3.1 FORM CONSTRUCTION AND REMOVAL

3.1.1 Install formwork in accordance with ACI 301, Section 4.2. The interior shape and rigidity shall be such that the finished concrete will meet the requirements of the Drawings within the tolerances specified in ACI 301, Table 4.3.1.

3.1.2 Prepare form surfaces in accordance with ACI 301, Section 4.4.

3.2 REINFORCING STEEL

3.2.1 Fabricate reinforcing bars accurately to the dimensions shown on the Drawings, within the tolerances shown in ACI 301, Section 5.4.

3.2.2 Place reinforcing steel as shown on the approved submittals within the tolerances specified in ACI 301, Sections 5.4 and 5.5.

3.2.3 Tie all bars securely to prevent displacement during placement of concrete.

3.2.4 Do not force reinforcing bars into concrete after initial set has started.

3.2.5 Place reinforcing with the dimension of concrete protection equal to the minimum given in ACI 301, Section 5.5, except where shown otherwise on the Drawings.

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3.2.6 Place welded wire fabric on chairs and lap two mesh at splices. Tie splices with wire.

3.3 CONCRETE

3.3.1 Before ordering concrete, obtain approval of required submittals.

3.3.2 Before concrete is batched, obtain approval of formwork and reinforcement by the Government's Representative.

3.3.3 Before Placing Concrete

3.3.3.1 Obtain approval of the "Pour Slip" by the Government's Representative. "Pour Slip" shall include the appropriate reference to the specific portion of the structure to be placed, the maximum size of coarse aggregate, the design strength, the admixture, and the slump. "Pour Slip" forms can be obtained from the Government's Representative.

3.3.3.2 For each truck load of concrete, deliver "Trip Ticket" to the Government's Representative. The "Trip Ticket" shall contain the information listed in ASTM C 94, Subparagraphs 16.1.1 through 16.1.10, and shall include water/cement ratio.

3.3.4 Place concrete in accordance with ACI 301, Sections 8.1, 8.2, and 8.3. Do not drop (free fall) more than 5 feet. Insert the vibrator (vertically if possible) into the concrete and reach a small distance into the concrete in the next lower layer. Do not insert vibrators into lower courses that have reached initial set. Take care to avoid allowing the head of vibrator to come in contact with forms or embedded items.

3.3.5 Temper concrete only as permitted in ACI 301, Section 7.5.

3.3.6 Place nonshrink grout where shown on the Drawings and in accordance with the manufacturer's written instructions.

3.3.7 Weather Conditions: Protect concrete during placement in accordance with ACI 301, Section 8.4.

3.3.8 Construction Joints: Make construction joints in accordance with ACI 301, Section 6.1, and as detailed on the Drawings.

3.3.9 Embedded Items: Install embedded items in accordance with ACI 301, Sections 6.4 and 6.5.

3.3.10 Expansion Joints: Locate expansion joints as shown on the Drawings and construct with premolded expansion joint filler and sealant.

3.3.11 Placing Concrete Against Earth: Place concrete only upon or against firm, damp surfaces free from frost, ice, and free water. Do not place concrete until the required compaction has been obtained. Dampen earth surfaces to receive fresh concrete.

3.3.12 Consolidation: Consolidate concrete slabs in accordance with ACI 301, Section 11.6.

3.4 REPAIRING CONCRETE

3.4.1 Cracks or defects in the concrete surfaces which may compromise the ability of the surfaces to retain liquids shall be repaired.

3.4.1.1 Place concrete repair mortar within one hour after mixing. Do not retemper the mortar.

3.4.1.2 Immediately after removal of forms, cut back all form ties and inspect concrete surfaces for defects. Repair only after permission for patching is given by the Government's Representative.

3.4.2 Repair of Surface Defects: Repair surface defects in concrete in accordance with ACI 301, Sections 9.1, 9.2, and 9.3. Cure concrete repairs the same as new concrete.

3.5 CONCRETE FINISHES AND TOLERANCES

3.5.1 Formed Surfaces

3.5.1.1 Start the finishing of concrete immediately following concrete repair and complete said finishing within 96 hours after the forms have been removed. Finish formed surfaces in accordance with the sections of ACI 301 noted below:

- | | |
|--|----------------|
| a. Formed surfaces exposed to earth backfill | Section 10.2.1 |
| b. Formed interior surfaces | Section 10.2.2 |
| c. Formed exterior surfaces exposed to weather | Section 10.2.2 |
| d. Related unformed surfaces | Section 10.5 |
| e. Tolerances for formed surfaces | Section 4.3.1 |

3.5.2 Unformed Surfaces

3.5.2.1 Finish unformed surfaces in accordance with the sections of ACI 301 noted below:

- | | |
|---|----------------|
| a. Surfaces of interior floors | Section 11.7.3 |
| b. Surfaces of exterior equipment slabs | Section 11.7.3 |
| c. Exterior slabs subject to foot traffic | Section 11.7.4 |

3.6 CURING AND PROTECTION

3.6.1 Cure concrete in accordance with ACI 301, Section 12.2. Clear curing compounds shall be tinted or applied surfaces marked to delineate extent of spraying.

3.6.2 Do not use curing compound on concrete surfaces which are to receive flooring or special protective coating.

3.6.3 Protect concrete during extreme weather conditions in accordance with ACI 301, Section 12.3.

3.6.4 Protect concrete from mechanical injury in accordance with ACI 301, Section 12.4.

3.7 CONCRETE TESTING

3.7.1 Sampling and testing of concrete will be the responsibility of the Government's Representative. The concrete will be tested in accordance with ACI 301, Sections 16.3.4, 16.3.5, 16.3.6, and 16.3.8.

END OF SECTION

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SECTION 03419

PRECAST PRESTRESSED CONCRETE SECTIONS

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Fabrication Drawings: Prepare and submit complete drawings and calculations for the prestressing and erection methods, materials, and equipment. Drawings shall indicate the plan, elevations, and sections of all units, and shall show the methods and sequence of stressing, including specifications and details of prestressing steel and anchoring devices, anchoring stresses, type of enclosure, arrangement of prestressing steel, erection procedures, location of pick-up points for handling, and details of pick-up devices.

1.1.2 Concrete Materials and Mix Design: Define each of the materials to be used in the concrete and state the amount, by weight, to be utilized per cubic yard of plastic mix.

1.1.3 Record of Tests: Maintain and submit the records of all tests performed to determine the properties of the materials to be used in the concrete.

1.2 PRODUCT DESIGN CRITERIA

1.2.1 Structural Loads

1.2.1.1 Roof live loads: 20 psf.

1.2.1.2 HVAC unit loads on the roof in accordance with the Drawings.

1.2.1.3 Wind load: 25 psf.

1.2.1.4 Seismic: UBC Zone 2.

1.2.1.5 Internal building pressure: The north side of Class 1A flammable liquids cell area is to be designed for 200 psf internal pressure.

1.2.1.6 Walls: Wall panels shall be insulated as shown on the Drawings. Insulation shall be R-13 or greater.

1.3 PRODUCT DELIVERY AND HANDLING

1.3.1 Precast concrete members shall be lifted and supported during manufacturing, stockpiling, transporting, and erecting operations only at the lifting or supporting points, or both, as shown on the Fabricator Drawings, and with approved lifting devices. All lifting devices shall have a minimum safety factor of 4.

PART 2 - PRODUCTS

2.1 GENERAL

2.1.1 Each of the aggregates, cement, water, and admixtures shall be supplied by a single source capable of producing a consistent quality within the quantity of materials required for the project. Aggregates, cement, and admixtures shall each have been produced by the same manufacturer and shall, when the quantity required is less than one batch or mix, be from the same batch or mix. The type, brand, and source of supply of the ingredients of the concrete will not be changed without prior written approval of the Government's Representative.

2.1.2 Design precast prestressed concrete sections in accordance with ACI 318.

2.2 MATERIALS

2.2.1 Portland Cement: ASTM C 150, Type I or III..

2.2.2 Admixtures

2.2.2.1 Air-entraining admixtures: ASTM C 260.

2.2.2.2 Water reducing, retarding, accelerating admixtures: ASTM C 494.

2.2.3 Aggregates: ASTM C 33.

2.2.4 Water: Potable or free from foreign materials in amounts harmful to concrete and embedded steel.

2.2.5 Reinforcing Steel

2.2.5.1 Bars: Deformed billet steel, ASTM A 615.

2.2.5.2 Wire Fabric: Welded steel, ASTM A 185.

2.2.6 Strand: Uncoated, 7-wire, stress-relieved strand; ASTM A 416, Grade 250K or 270K.

2.2.7 Anchors and Inserts

2.2.7.1 Materials: Structural steel, ASTM A 36.

2.2.8 Grout

2.2.8.1 Cement grout: Portland cement, sand and water sufficient for placement and hydration. Minimum strength of 3000 psi at 28 days.

2.2.8.2 Nonshrink grout: Nonmetallic type; "Five Star Grout" by US Grout Corp, "Por-Rok" Anchoring Cement by Hallemite, or "Masterflow 713" by Master Builders.

2.2.9 Welded Studs: In accordance with AWS D1.1.

2.3 CONCRETE MIXES

2.3.1 28 Day Compressive Strength: 5000 psi, minimum.

2.3.2 Release Strength: 4000 psi, minimum.

2.3.3 Use of calcium chloride, chloride ions, or other salts is not permitted.

2.4 MANUFACTURE

2.4.1 Manufacturing procedures shall be in accordance with PCI MNL-116. The manufacturer shall be a registered PCI Plant, certified by the plant certification program prior to start of production.

2.4.2 Manufacturing tolerances shall meet the requirements of PCI MNL-116.

2.4.3 Finishes

2.4.3.1 Standard underside: Resulting from casting against approved forms using good industry practice in cleaning of forms, design of concrete mix, placing and curing. Small surface holes, caused by air bubbles, normal color variations, normal form joint marks, and minor chips and spalls will be tolerated, but no major or unsightly imperfections, honeycomb, or other defects will be permitted.

2.4.3.2 Standard top: Result of vibrating screed and additional hand finishing at projections. Normal color variations, minor indentations, minor chips and spalls will be permitted. No major imperfections, honeycomb, or defects will be permitted.

2.4.3.3 Exposed vertical ends: Strands shall be recessed and the ends of the member shall receive sacked finish.

2.4.4 Openings: The manufacturer shall provide openings as shown on the Drawings.

2.4.5 Patching: Patching will be acceptable, providing the structural adequacy of the product and the appearance are not impaired.

2.4.6 Fasteners: The manufacturer shall cast in structural inserts, bolts, and plates as detailed or required by the Drawings.

PART 3 - EXECUTION

3.1 ERECTION

3.1.1 Installation: Installation of precast prestressed concrete shall be in strict accordance with approved Fabrication Drawings and shall be performed by the manufacturer or an erector with 5 years of similar installation experience. Members shall be lifted by means of suitable lifting devices at points provided by the manufacturer. Temporary shoring and bracing, if necessary, shall be in accordance with the manufacturer's written instructions.

3.1.2 Alignment: Members shall be properly aligned and leveled as required by the approved Fabricator Drawings. Variations between adjacent members shall be reasonably leveled out by jacking, loading, or any other feasible method in accordance with the manufacturer's written instructions and acceptable to the Government's Representative.

3.1.3 Grouting: Grout joints between wall panel edges (interior surfaces only).

3.1.4 Caulking: Caulk joints between wall panel edges (exterior surfaces only) using backer rod per Section 07920, Sealants and Caulkings. The caulking material shall be Sonoplastic NP1 or Sonoplastic NP2 manufactured by Sonneborn. Standard manufacturer color shall closely match with the precast concrete panels.

3.2 FIELD WELDING

3.2.1 Field welding shall be done by qualified welders using equipment and materials compatible to the base material. Weld structural steel in accordance with AWS D1.1 and reinforcing steel in accordance with AWS D1.4. *Personnel and procedures for welding structural steel shall have been qualified in accordance with AWS D1.1 before welding. Qualification in accordance with ASME Section IX may be substituted for this requirement. Personnel and procedures for welding reinforcing steel shall have been qualified in accordance with AWS D1.4 before welding. Visual weld examination and acceptance criteria for structural steel welds and reinforcing steel welds shall meet the requirements of AWS D1.1 and AWS D1.4, respectively.

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END OF SECTION

SECTION 04220

CONCRETE UNIT MASONRY

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.1.1 Method to Heat Masonry Units: Submit a written description of the methods proposed to heat masonry materials and protect masonry from freezing.

PART 2 - PRODUCTS

2.1 HOLLOW CONCRETE MASONRY UNITS

- 2.1.1 Provide units meeting the requirements of ASTM C 90, Grade N, Type I, with half pumice aggregate and half sand aggregate.
- 2.1.2 Use nominal 8 by 8 by 16 inch or 12 by 8 by 16 inch size as required with standard smooth face and natural gray color. Furnish all special shapes shown on the Drawings; including closures, jambs, headers, lintels, and bond beam units, as required to complete the work.

2.2 MORTAR: ASTM C 270, Type M.

2.3 GROUT: ASTM C 476, Type PL.

2.4 REINFORCEMENT

- 2.4.1 Horizontal Mortar Joints: Fabricated from steel wire meeting the requirements of ASTM A 82; deformed 3/16 inch side rods and 9 gauge cross wires in truss pattern sized for nominal 8-inch and 12-inch walls; manufactured by Durowal Products "Durowal", Southern Wire Mesh Co "Bet-R-wal", or AA Wire Products Co "Blok-Lok" with zinc coating in accordance with Paragraph 2.7.1.
- 2.4.2 Steel Bars: ASTM A 615, deformed, Grade 60.
- 2.5 ANCHOR BOLTS: ASTM A 307.
- 2.7 ANCHORS, TIES, AND CENTERING DEVICES
- 2.7.1 Wire Devices: Factory fabricated from steel wire meeting the requirements of ASTM A 82.
- 2.7.2 Centering clips shall be formed from not lighter than 9 gauge wire. Clips shall be of a design that will prevent displacement of the reinforcing bars during the course of construction.
- 2.7.3 Wire anchors for use with embedded slots or wire inserts shall be formed from not lighter than 9 gauge wire, looped and closed.

2.7.4 Dovetail anchors, where noted on the Drawings, shall be not lighter than 16 gauge steel at least 1 inch wide, crimped, corrugated, or bent at the end to provide anchorage, and shall be hot-dip zinc coated in accordance with ASTM A 153, Class B-2.

PART 3 - EXECUTION

3.1 HANDLING AND STORAGE

3.1.1 Deliver masonry units to the job site in air-dry condition. Handle, store, and protect masonry units to avoid chipping, breakage, contact with soil or contaminating material, and exposure to the elements. Anchors, ties, and joint reinforcement shall be free of loose scale and rust.

3.2 MORTAR: Mix Type M mortar in accordance with ASTM C 270.

3.3 COARSE GROUT: Mix 2000 psi (minimum) compressive strength grout in accordance with ASTM C 476.

3.4 ERECTION

3.4.1 Lay only clean and surface dry units. Do not use frozen or saturated units. Lay masonry plumb, true to line, with level courses accurately spaced. Keep bond pattern, corners and reveals plumb and true throughout. Vertical joints shall be shoved tight. Adjust each unit to final position while mortar is still plastic. Remove all units that are disturbed after mortar has stiffened and re-lay with fresh mortar. Units used in exposed surfaces or in walls and partitions to be painted shall be free from chipped edges or other imperfections detracting from the appearance of the finished work.

3.4.2 Hot Weather Installation

3.4.2.1 Protect masonry, erected when the ambient temperature is more than 99 F or when winds are in excess of 10 miles per hour from these elements during erection and for 48 hours following.

3.4.2.2 During hot, windy, or dry weather moisten the masonry units to prevent excessive absorption of water in the mortar.

3.4.3 Cold Weather Installation

3.4.3.1 Do not erect masonry if the temperature is below 40 F until the proposed methods to heat masonry materials and to protect masonry from freezing have been approved by the Government's Representative.

3.4.3.2 Maintain masonry unit temperature of 30 F, minimum, when laid. Maintain mortar and grout temperature between 70 F and 110 F. Temperature of mixing water or of water and sand introduced to cement shall not exceed 160 F. Maintain air temperature on both sides of the masonry above 40 F for at least 48 hours. When temperatures are below 20 F, do not lay masonry.

3.4.4 Wherever possible, use full units of the proper size instead of cut units. Cutting and fitting, including that required to accommodate the work of others shall be done by masons using power masonry saws. Concrete masonry units may be either wet or dry cut. Dry wet cut units, before being placed in the work, to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true, and sharp. Make openings carefully so that wall plates, cover plates, or escutcheons required by the installation will completely conceal the openings and have bottoms aligned with the masonry joints. Use of broken units is prohibited.

3.4.5 Set masonry units in full bed of mortar under both face shells and webs at starting courses on foundation walls and where cells are filled with grout or concrete. Lay all other blocks in shell mortar bedding.

3.4.6 Strike off all mortar joints flush. Compact all joints exposed to view or scheduled for painting with a shallow, oval-faced, grooving tool, after the mortar has taken an initial set.

3.4.7 Reinforce horizontal joints in masonry walls at every other course. Lap reinforcement side rods 6 inches at all splices. Use prefabricated reinforcement at corners or hook and side lap the side rods.

3.4.8 Reinforce vertical cores where shown on the Drawings. Install vertical reinforcing steel full height of the masonry wall. Make splices bar-to-bar and bar-to-dowel lapping at least 30 diameters and tie with wire.

3.4.9 Install structural steel framed openings and doorways as masonry walls are erected. Shore all openings which are more than three feet wide.

3.4.10 Fill spaces around metal door frames and other built-in items solid with mortar. Fill cells receiving anchor bolts; and cells of first masonry course below bearing plates solid with grout.

3.4.11 Where the Drawings call for cores to be filled or reinforced:

3.4.11.1 Vertical cores shall have vertical alignment sufficient to maintain a clear, unobstructed continuous opening not less than 3 inches by 3 inches.

3.4.11.2 Fill cores with coarse grout.

3.4.11.3 Rod the grout in solid to eliminate honeycomb.

3.4.11.4 Fill the cores in lifts no greater than 6 courses high.

3.4.11.5 When the grouting is stopped for one hour or longer, form horizontal construction joints by stopping the pour of grout not less than 1/2 inch below the top of the uppermost unit grouted.

3.4.11.6 Fully embed horizontal steel by grout in an uninterrupted pour.

3.4.12 Make bond beams with loadbearing units filled with coarse grout and continuous reinforcement. Lap reinforcement 30 bar diameters or 12 inches, whichever is greater where splices are required for continuity. Maintain a minimum clearance of 1/2 inch between reinforcement and interior faces of units.

3.4.13 Unless shown otherwise on Drawings, intersecting walls shall be tied together with a metal tiebar 1/4 inch thick, 1-1/4 inches wide, and 28 inches long, with 2 inch right angle bends on each end. Tiebars shall be placed in alternate courses in the wall with the bends at the ends of the tiebars embedded in cores filled with grout.

3.4.14 Clean masonry walls after mortar has set. Remove excess mortar and mortar stains by scrubbing with a stiff fiber brush and clean water.

3.5 PROTECTION

3.5.1 Cover masonry to protect it from frost, ice, and snow and to prevent collection of moisture in the core of the wall. Protect all corners subject to damage.

END OF SECTION

SECTION 05120
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.

1.1.1 **Fabrication and Erection Drawings:** Submit fabrication drawings, erection diagrams, and bills of material for all structural steel framing.

1.2 **QUALIFICATION OF WELDING PERSONNEL AND PROCEDURES**

1.2.1 Personnel and procedures for welding structural steel shall have been qualified in accordance with AWS D1.1 before welding. Qualification in accordance with ASME Section IX may be substituted for this requirement.

1.2.2 Maintain a file of welding procedure specifications, procedure qualification records, and welder performance qualification test results at the job site for review at any time by the Government's Representative.

1.3 **PRODUCT HANDLING AND STORAGE**

1.3.1 Deliver anchor bolts and other anchorage devices which are to be embedded in concrete or masonry construction to the project site in time to be installed before the start of concrete operations or masonry work.

1.3.2 Provide setting drawings, templates, and directions for the installation of the anchor bolts and other devices which are to be embedded.

1.3.3 Store structural steel members at the project site above ground on platforms, skids, or other supports.

1.3.4 Protect steel from corrosion.

1.3.5 Store materials in a weathertight and dry place, until ready for use in the work.

1.3.6 Store packaged materials in their original unbroken package or container.

PART 2 - PRODUCTS

2.1 **MATERIALS**

2.1.1 **Rolled Steel Shapes and Plates:** ASTM A 36.

2.1.2 **Steel Bars and Rods:** ASTM A 108, minimum yield 36,000 psi, maximum carbon content 0.35%.

2.1.3 **Steel Pipe:** ASTM A 53, Type E or S, Grade B.

2.1.4 Fasteners

2.1.4.1 Bolts:

a. For general application: ASTM A 307, Grade A or B, except that the requirement for bolt head marking is waived.

b. For all permanent structural steel column and beam connections: ASTM A 325, Type 1 or 2, galvanized; or ASTM A 490, Type 1 or 2.

2.1.4.2 Nuts:

a. For ASTM A 307 bolts: ASTM A 563, Grade A, heavy hex.

b. For ASTM A 325 bolts: ASTM A 563, Grade C, plain, heavy hex.

c. For ASTM A 325 galvanized bolts: ASTM A 563, Grade DH, galvanized, heavy hex.

d. For ASTM A 490 bolts: ASTM A 563, Grade DH, heavy hex.

2.1.4.3 Washers for ASTM A 325 or ASTM A 490 Bolts: ASTM F 436, circular washers.

2.1.4.4 Expansion Anchors: Hilti Kwik-Bolt or HDI drop-in anchors.

2.1.4.5 Weld Studs: Nelson Stud Welding Company, Type H4L.

2.1.5 Nonshrink Grout: Nonmetallic type, "Five Star Grout" by US Grout Corp; "Por-Rok" Anchoring Cement by Hallemite; or "Masterflow 713" by Master Builders.

2.1.6 Paint: See Section 09900.

PART 3 - EXECUTION

3.1 GENERAL

3.1.1 Fabricate and erect structural steel in accordance with the AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", except that welding shall be in accordance with this Specification.

3.1.2 Perform welding in accordance with AWS D1.1.

3.1.3 Visual weld examination and acceptance criteria shall meet the requirements of AWS D1.1, paragraph 6.5.5.

3.2 FABRICATION

3.2.1 Fabricate structural steel for close fit, with erection holes aligned within the tolerances given in the AISC Specification noted in Paragraph 3.1.1 above.

3.2.2 Fabricate beam-to-column and beam-to-beam connections in accordance with the AISC "Manual of Steel Construction", Part 4 (Connections) and Table I, or Table I in combination with Table III. Connections shall be high-strength-bolted or welded unless otherwise noted on the Drawings.

3.2.3 One-sided or other type of eccentric connections will not be permitted except where shown on the Drawings.

3.2.4 Fabricate welded connections in accordance with Table IV, Part 4, of the AISC "Manual of Steel Construction".

3.2.5 Mill the ends of columns square at splices and base plates.

3.2.6 Install weld studs in accordance with the manufacturer's written instructions.

3.2.7 Use E70XX electrodes for welding.

3.3 SHOP PAINTING

3.3.1 Prepare and prime coat steel in accordance with Section 09900.

3.3.2 Do not apply primer to surfaces within 3 inches of welds before welding.

3.3.3 Do not apply primer to contact surfaces within friction-type joints.

3.4 ERECTION

3.4.1 Do not use oxy-fuel cutting for correcting fabrication errors on any major member in the structural framing. Holes shall not be made or enlarged by oxy-fuel cutting. Oxy-fuel cutting will be permitted only on minor members and only after permission of the Government's Representative is obtained.

3.4.2 Contact surfaces within friction-type joints shall be free from oil, paint, and other foreign materials.

3.4.3 Do not make holes in framing members for supporting equipment, unless shown on the Drawings, without specific approval from the Government's Representative.

3.4.4 Drift pins may be used in connections to bring together the several parts, but not in a manner which will enlarge bolt holes or distort or damage the framing.

3.4.5 Connections using high-strength bolt fasteners shall meet the requirements of AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts", except any ASTM A 490 bolt or nut turned by the job inspecting torque shall require replacement of both bolt and nut. ASTM A 490 bolts shall not be substituted for ASTM A 325 bolts.

3.4.6 Use high-strength bolts for connections in structural framing. Tighten nuts by use of torque wrenches or by the "turn-of-the-nut" method in accordance with the AISC Specifications.

3.4.7 Install expansion anchors in accordance with the manufacturer's written instructions.

3.5 GROUTING BASE PLATES

3.5.1 Grout-in column base plates, where shown on the Drawings, with nonshrink grout mixed in accordance with the manufacturer's written instructions.

3.5.1.1 Before grouting, clean concrete (and masonry) bearing surfaces and roughen to improve bond. Clean the bottom surfaces of the base plates.

3.5.1.2 Pack grout solidly between bearing surfaces and base plates to ensure that no voids remain. Bevel the exposed surfaces.

3.6 TOUCH-UP

3.6.1 After erected steel has been approved, clean and paint all connections with primer. Touch-up the shop prime coat wherever it has been damaged. Prime and touch-up with the same primer as used for shop coat.

END OF SECTION

SECTION 05300

METAL DECKING

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Installation Drawings: Submit erection drawings including a specification of the materials, quantities of materials, layout, and erection details.

1.1.2 Metal Deck Certificate of Compliance, ~~Submit a standard SDI Certificate of Compliance,~~ signed by the metal deck supplier, stating that the metal decking furnished ~~meets the requirements of the Drawings and this Specification,~~ conforms to the standards of the SDI.

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1.2 QUALIFICATION OF WELDING PERSONNEL AND PROCEDURES

1.2.1 Personnel and procedures for welding sheet steel in structures shall have been qualified in accordance with AWS D1.3 before welding any material or components which will become a part of the work covered by this Specification. Qualifications in accordance with ASME Section IX may be substituted for this requirement.

1.2.2 Maintain a file of welding procedure specifications, procedure qualification records, and welder performance qualification test results at the job site for review at any time by the Government's Representative.

1.3 SHIPPING, STORAGE, AND HANDLING

1.3.1 Deliver materials to the site in a dry, undamaged condition. Store off the ground under weathertight cover.

PART 2 - PRODUCTS

2.1 METAL DECKING UNITS

2.1.1 Standard Wide Rib Deck, meeting the requirements of SDI Publication No. 24 and manufactured from zinc-coated steel sheets. Decking shall be as manufactured by Inryco Inc.

2.1.1.1 Roof: Inryco, Type B Deck, 1-1/2 inches deep, 20 gauge.

2.1.2 Furnish decking in lengths which shall cover a minimum of two spans of support framing wherever possible, allowing for a minimum of 2 inches of bearing on end supports.

2.1.3 Ship decking to the job site in standard widths and cut to proper lengths. Prefabricate all penetration openings which are larger than 16 square feet.

2.2 METAL DECK ACCESSORIES

2.2.1 Furnish accessories such as spacer plates, bridging, and other sheet metal items that are to be attached directly to the deck to provide a finished surface for the application of roof insulation.

2.2.2 Furnish welding washers 16 gauge or heavier, or other approved method, for plug-welding.

2.2.4 Sheet metal or neoprene closers shall be the standard product of the decking manufacturer.

2.3 ZINC-RICH COMPOUND

2.3.1 Galvicon as manufactured by the Galvicon Corp, or ZRC as manufactured by the Sealube Co.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Erection of Decking

3.1.1.1 Place decking in accordance with the approved Erection Drawings and the SDI Specifications. Handle decking units in a manner to avoid damage to the units. Limit temporary loads on roof decking to avoid overloading.

3.1.1.2 Place units on supporting steel framework, and adjust to final position before being permanently fastened. Bring each unit to proper bearing on supporting members.

3.1.1.3 Cut penetrating openings which are smaller than 16 square feet, and reinforce as shown on the Drawings.

3.1.2 Span and Lap of Panels

3.1.2.1 Lay decking panels across the support framing and span a minimum of two support members for each length of deck panel wherever possible. Lap ends of panels only over support framing.

3.1.2.2 Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work.

3.1.3 Welding of Decking

3.1.3.1 Plug weld decking to steel framing in accordance with approved Erection Drawings and AWS D1.3. Use welding washers or other approved methods for welding to steel framing.

3.1.3.2 Fasten units to steel framework at ends of units and at intermediate supports by welds at least 3/4 inch in diameter, spaced not more than

12 inches across width of the deck unit. Where two units abut, each unit shall be fastened to the steel framing. Welds shall be free of sharp points or edges.

3.1.3.3 Fasten side laps of adjacent units between supports at intervals not exceeding 3 feet between supporting members.

3.1.3.4 Visual weld examination and acceptance criteria shall meet the requirements of AWS D1.3.

3.1.4 Accessories

SC-1:

3.1.4.1 Cant Strips: Weld cant strips to top surface of roof decking at 12 inches on centers. Lap end joints at least 3 inches.

3.1.4.2 Closure Strips: Install metal closure strips at all open uncovered ends and edges of decks, and in voids between decking and other construction where shown on the Drawings. Weld into position to provide complete decking installation.

3.2 CLEANING AND TOUCH-UP

3.2.1 Thoroughly clean decking to be left unpainted and exposed to view by wire brushing or other effective means. Remove weld flux, spatter, slag, rust, oil, and other deleterious matter to provide clean, bright metal surfaces.

3.2.2 Touch-up zinc coated units with zinc-rich compound as specified. Apply in accordance with compound manufacturer's printed instructions.

3.2.3 Touch-up shop painted surfaces with the same paint used in shop, and apply in accordance with the manufacturer's written instructions.

END OF SECTION

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SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.2 QUALIFICATION OF WELDING PERSONNEL AND PROCEDURES
 - 1.2.1 See Section 05120 for welding of structural steel.

PART 2 - PRODUCTS

2.1 MATERIALS

- 2.1.1 Rolled Steel Shapes and Steel Plate: ASTM A 36.
- 2.1.2 Steel Bars and Rods: ASTM A 108, minimum yield 36,000 psi, carbon content not to exceed 0.35%.
- 2.1.3 Fasteners
 - 2.1.3.1 Expansion Anchors: Hilti Kwik-Bolt or HDI drop-in anchors.
 - 2.1.3.2 Weld Studs: Nelson Stud Welding Company, Type H4L.

2.1.4 Steel Grating: Meeting the requirements of FS RR-G-661, Type I, ~~pressure locked~~ (riveted grating not acceptable), with end banding bars, and hot-dip galvanized. Steel grating to be Irving welded rectangular design, Type GW-2 as manufactured by IKG Industries. Main bearing bars to be spaced 1-3/16 inches center to center. Crossbars to be resistance welded at right angles to the bearing bars and spaced 2 inches center to center. No notching or cutting of bearing or crossbars before welding is permissible. Maximum panel length at low end of trenches is to be 5 feet.

ADD-1

- 2.1.5 Paint: See Section 09900.
- 2.1.6 Supports: Unistrut P-1000.
- 2.1.7 Support Clamps: Unistrut P-1111 and P-1112.

2.2 MISCELLANEOUS METAL FABRICATIONS

2.2.1 Ladders: Fabricate in accordance with the Drawings. Rungs shall be solid-section rods, fitted into punched or drilled holes in rails, and welded. All splices and connections shall have a smooth transition with original members without projections that are sharp or more extensive than required for joint strength. Rails shall be fitted with brackets at the spacing shown for anchorage to structure.

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SECTION 07411
PREFORMED METAL SIDING

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.1.1 Fabrication Drawings: Submit fabricator erection drawings. Include a description of the sheet materials, fastening devices, and sealants to be supplied, the quantity of each type of material, and the layout of each area to be covered with the wall system.
- 1.1.2 Performance Test Confirmation: Performance test information shall be submitted confirming the ability of the controlled wall system to function within a ± 10% variation under release-out conditions.

PART 2 - PRODUCTS

- 2.1 Controlled release wall system and standard wall system as designed and manufactured by ~~H. H. Robertson Co.~~ North Star Industries. DT 1E
- 2.1.1 Prefinished steel siding panels shall be 22 gauge "box rib" exterior siding.
- 2.1.2 Prefinished steel liner panels shall be 20 gauge, "L2" interior liners, with 1-1/2 inches of fiberglass insulation.
- 2.1.3 Finish shall be standard off-white color Versacor coating system.
- 2.1.4 The wall insulation system, consisting of insulated steel liner panels and fiberglass blankets, shall have an insulating value of R-13. Insulation containing asbestos will not be acceptable.
- 2.1.5 Sub-girts to be the standard product of the manufacturer, shall be cold formed sections designed to receive attachment of face and liner panel fasteners.
- 2.1.6 Closures and Sealants
- 2.1.6.1 Closures shall be of contoured material designed to meet the configuration of the siding panels.
- 2.1.6.2 Metal closure strips, top, base, head, sill and jamb or corner trims shall be the same material, gauge, and finish as the siding.
- 2.1.6.3 Sealant shall be the manufacturer's standard and shall be provided in accordance with the manufacturer's written recommendations and as shown on the Drawings.

2.1.7 Fasteners

Fabco Top Seal Fasteners and Weath-R-Seal Washers.

2.1.7.1 Fasteners shall be ~~400 Series, stainless steel, self tapping screws, painted to match siding and shall be manufacturer's standard product.~~

2.1.7.2 Explosion release fasteners shall be designed to fail at 30 lbs/ft² and be tested and approved by FM.

2.1.7.3 Concealed fasteners shall be the manufacturer's standard product, designed to interlock with the siding for attachment without panel perforation.

PART 3 - EXECUTION

3.1 METAL SIDING AND LINER PANELS

3.1.1 Store all materials at the project site in a dry place away from excess moisture, uncured concrete, cement, lime, or any strong chemicals.

3.1.2 Plastic protection film shall be applied to prefinished surfaces and must be removed before the panels are installed or immediately after installation.

3.1.3 Field assemble and install panel systems in accordance with Erection Drawings and in accordance with the manufacturer's written instructions.

3.1.4 Protect exposed surfaces of prefinished panels used on the project during their installation. Shop or field applied painting will not be acceptable except for minor touch-up.

3.1.5 See Drawing for location of controlled release wall system and the standard wall system.

END OF SECTION

SECTION 07510

BUILT-UP BITUMINOUS ROOFING
ON CONCRETE & METAL DECK

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 MANUFACTURER

2.1.1 Products specified herein are manufactured by ~~Marville Building Materials Corporation~~ ^{Gilsonite Inc.} unless noted otherwise. DT #10

2.2 ROOF INSULATION

2.2.1 Insulation shall be Fes-core, with a thermal resistance rating of R-20, and listed as acceptable for Class 1 construction by FM for application on a steel deck, in accordance with FM Loss Prevention Data Sheet 1-28.

2.3 VAPOR RETARDER

2.3.1 Vapor barrier shall be GlasPly and listed by FM as acceptable for Class 1 construction.

2.3.2 The vapor barrier adhesive shall be a fire-retardant material approved by FM as acceptable in Class 1 construction. The vapor retarder and the adhesive used shall be products of the same manufacturer, or the adhesive shall be a product recommended by the vapor retarder manufacturer's written instructions.

2.4 ROOFING SYSTEMS

2.4.1 Four-ply, smooth-surface, GlasPly felt, Specification No. 4GIS, Type III asphalt, with a final finish coating of fibrated aluminum roof coating over Topgard Type-8 fibrated.

2.5 LUMBER FOR NAILING STRIPS AND CURBS

2.5.1 Lumber for nailing strips and curbs shall be of treated wood using the pressure process with a water-borne salt. Oil based preservatives are not allowed.

2.5.2 Nailing strips shall be the same thickness as the insulation used and shall be lapped a minimum of 2 feet at joints.

2.6 WALKWAY SYSTEM

2.6.1 Walkway material shall be a mineral-granule-surfaced asphalt cap sheet, 90 lb weight. Color shall be white or off-white.

2.7 METAL FLASHING AND GRAVEL STOPS

2.7.1 For metal flashing and gravel stops, see the Drawings and Section 07600 for product and execution.

2.8 CANT STRIPS AND CRICKETS

2.8.1 Cant strips and crickets shall be the standard product of the roof insulation manufacturer.

PART 3 - EXECUTION

3.1 STORAGE, HANDLING, AND PREPARATION OF MATERIALS

3.1.1 Keep all materials clean, dry, and protected from weather during storage and application. Insulation which has become damp or wet shall not be used.

3.1.2 Store rolls of felt in upright position and protect from damage during storage and application.

3.1.3 Deliver all roofing and insulating materials to the job site in their original sealed packages or containers with the manufacturer's label intact, showing name and grade of material. Roofing materials for application of insulation shall be of the same manufacturer as used for the roofing application.

3.1.4 Use extreme care to control the temperature of the asphalt during heating. Any evidence that a batch has been overheated shall be cause for rejection of that batch.

3.1.5 Asphalt shall not be heated above 500 F for Type III asphalt. Temperature of asphalt when applied shall be at least 350 F.

3.1.6 Asphalt shall not be adulterated in any way.

3.1.7 Leaky containers shall not be used for handling vapor barrier adhesive, asphalt, or roofing cement. If such materials are spilled or scattered on permanently exposed surfaces of structures, completely remove the material from the surface of the structure.

3.1.8 Equip material handling dollies and other wheeled equipment with low-pressure pneumatic tires when used on roof.

3.1.9 Materials and equipment shall not be used on, stored on, or transported over the new roofs unless protection is provided to prevent damaging or overloading the roof deck, built-up roofing components, or the structural system. The Contractor shall verify roof loading conditions with the Government's Representative.

3.2 SURFACE PREPARATION

3.2.1 All surfaces to receive vapor retarder, insulation, and roofing materials shall be completely dry and free from dirt, dust, loose materials, and frost, or effects of freezing. Sweep surfaces clean before applying materials. Materials shall not be applied when the ambient temperature or the temperature of the roof deck is 40 F or lower, or where there is frost or dampness visible on the deck.

3.2.2 Roofing materials shall not be applied to the deck until the deck surface preparation is complete. The Government's Representative will verify the condition of the roof deck prior to application of roofing materials.

3.2.3 Install cant strips, at least 3 inches high, at the intersection of all vertical surfaces with the roof deck. Install crickets where shown on the Drawings. Cricketts shall be constructed with the peak a minimum of 4 inches high.

3.3 APPLICATION OF VAPOR RETARDER

3.3.1 Apply vapor retarder in accordance with the roof insulation specifications and written instructions.

3.3.2 A cut-back asphalt concrete primer shall be applied to the concrete roof surface prior to application of the vapor retarder.

3.3.3 Apply only that amount of vapor retarder which can be covered with insulation and roofing on the same day.

3.3.4 Patch all holes and damaged areas in vapor retarder with a layer of vapor retarder material set in a continuous coating of adhesive. Extend patch a minimum of 2 inches beyond edges of damaged area.

3.4 APPLICATION OF ROOF INSULATION

3.4.1 The roof insulation shall be installed in accordance with Manville Specification No. 501, for concrete deck roof areas and Manville Specification No. 503 for steel deck roof areas. Edges of insulation shall bear on or across flutes in steel decking. Edges parallel to flutes shall not extend over the voids in decking. Tape insulation joints with Owen-Corning "Fiberglas" roof tape welded to the insulation joints with hot steep asphalt.

3.4.2 All insulation applied to the deck shall be completely covered and sealed with built-up roofing on the same day the insulation is applied. Where additional insulation is to be laid on succeeding shifts, seal the exposed edges of the insulation to the vapor retarder with 12 inch wide strips of vapor retarder material and cement to prevent the entry of water into or under the insulation. Remove vapor retarder at edge of insulation prior to starting new work.

3.4.3 Insulation shall be adhered to the vapor barrier over 100% of the area, and all end flaps, protective felt strips, and strips for sealing edges of insulation between shifts shall be adhered over 100% of their area.

3.5 APPLICATION OF BUILT-UP ROOFING

3.5.1 Application of the built-up roofing system shall be as shown on the Drawings, this Specification, Manville Specification No. 4GIS and Manville Application Procedures.

3.5.2 Prior to application of roofing plies, a sealing envelope at the edge of the built-up roofing shall be provided as follows: Lay two roofing plies, a minimum of 12 inches wide, in a coating of roofing cement 4 inches wide and nailed through tin discs on 12 inch centers to the wood nailer along edges of roof decks and roof penetrations before laying built-up plies. This will provide a 6-inch flap for sealing ends and edges of plies after roofing has been applied. After all roofing plies are in place, turn the flaps back over and mop to the top of the roofing membrane.

3.6 FLASHING SYSTEMS

3.6.1 Application of roof flashing systems shall be as shown on the Drawings and by Manville Specification number listed below:

Gravel stops: FE-4 Modified, Dynakap to be used in lieu of GlasPly
Concrete parapet and concrete masonry unit walls: FE-1 (LB)
Modified, Dynakap to be used in lieu of GlasPly
Equipment curbs and relief vent curbs: FE-8 Modified, Dynakap to be used in lieu of GlasPly

3.7 INSTALLATION OF WALKWAY SYSTEM

3.7.1 Install walkway system where shown on the Drawings. Set each cap sheet in a solid mopping of asphalt. Top surface shall not receive asphalt.

3.8 INSTALLATION OF METAL FLASHING AND GRAVEL STOPS

3.8.1 Install metal roof flashing and gravel stops as shown on the Drawings after all built-up roofing plies are in place. See Section 07600 for execution.

3.8.2 Lap joints in counterflashing over base flashing and in gravel stops and edging 4 inches. Seal laps in gravel stops and roof edging over the entire roof flange and bead area with roofing cement. Carefully and completely remove all excess roofing cement from permanently exposed metal surfaces.

3.9 CERTIFICATION

3.9.1 Provide a typewritten information card, under glass, in a weathertight frame, for each roof. This card shall contain the information listed on the Roofing and Sheet Metal Work Form (sample appended). Install the card near the point of access to the roof, as directed. Deliver a duplicate card to the Government's Representative.

ROOFING AND SHEET METAL WORK

1. Contract Number _____

2. Date Work Completed _____

3. Type of Deck _____

4. Slope of Deck _____

5. Insulation
a. Type _____
b. Thickness _____
c. Manufacturer's Name _____

6. Felt Application
a. Type _____
b. Weight _____
c. Method (hand or machine nailing) _____
d. Manufacturer's Name _____

7. Bitumen
a. Type _____
b. Quantity per square _____
c. Manufacturer's Name _____

8. Flashing
a. Type _____
b. Weight or Gauge _____
c. Manufacturer's Name _____

9. Statement of Compliance or Exceptions

Contractor's Signature _____

Date Signed _____

Inspector's Signature _____

Date Signed _____

SAMPLE COPY
(The Contractor shall provide a similar card, typewritten and framed under glass with a weather-tight frame. Install near the point of roof access as directed.)

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SECTION 07600
FLASHING AND SHEET METAL

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.2 DELIVERY AND STORAGE: Store all sheet metal off the ground and protected from damage.

PART 2 - PRODUCTS

- 2.1 SHEET METAL: Galvanized sheet steel, coating Class G90, meeting the requirements of ASTM A 527.
- 2.2 SOLDER: 50% tin, 50% lead meeting the requirements of ASTM B 32.
- 2.3 REGLET FLASHING: Fry Reglet Corporation galvanized steel, Type MA.
- 2.4 MATERIAL GAUGES
 - 2.4.1 Gravels stops: 24 gauge.
 - 2.4.2 Copings: 24 gauge.
 - 2.4.3 Gutters: 24 gauge.
 - 2.4.4 Downspouts: 26 gauge.
 - 2.4.5 Counterflashing/cleats: 26 gauge.
 - 2.4.6 Reglet: 24 gauge.
 - 2.4.7 Downspout/gutter hangers: 10 gauge.

PART 3 - EXECUTION

- 3.1 FABRICATION
 - 3.1.1 General
 - 3.1.1.1 Form sheet metal accurately to the profiles shown on the Drawings, free from buckles and waves.
 - 3.1.1.2 Hem all exposed edges 1/2 inch.
 - 3.1.1.3 Make provision in all fabrication for expansion and contraction.
 - 3.1.1.4 Clean and flux metals before soldering. Sweat solder completely through seam width.

3.1.1.5 Neutralize excess flux, as work progresses, with 5% to 10% washing soda solution, and rinse thoroughly.

3.1.2 Gravel Stops

3.1.2.1 Fabricate with lap joints spaced 10 feet apart, maximum.

3.1.2.2 Pre-form and solder corners.

3.1.2.3 Provide continuous cleat to lock-in gravel stop. Provide 6 inch wide cleat, 2 feet on center, at gutter.

3.1.3 Copings

3.1.3.1 Fabricate with lap joints spaced 8 feet apart, maximum.

3.1.3.2 Pre-form corners with mitered and soldered joints.

3.1.3.3 Fabricate coping to lock over continuous cleats on the outside edge and 8 inch long cleats at the joints on the inside edge.

3.1.4 Gutters and Downspouts

3.1.4.1 Solder one inch high end caps at gutter ends.

3.1.4.2 Provide expansion joints in gutters, midway between downspouts, and provide end caps spaced 1/2 inch apart. Close the top of expansion joints with loose-lock covers. Extend the cover over the outer face of the gutter and under the gravel stop.

3.1.4.3 Provide a 2 inch long thimble at each downspout location. Make the thimble 1/8 inch smaller than the downspout and solder the flange of the thimble to the gutter.

3.1.4.4 Solder lap joints 1 inch minimum.

3.1.4.5 Provide concealed removable basket type strainers at each downspout.

3.1.4.6 Downspout upper sections shall telescope into lower sections a minimum of 2 inches.

3.2 INSTALLATION

3.2.1 Verify that surfaces to receive sheet metal are clean and smooth and that blocking has been installed.

3.2.2 Install sheet metal watertight, without waves, warps, buckles, fastening stresses, or distortion.

3.2.3 Set the lap joints of copings in cold application cement and install over cleats.

3.2.4 Set the flanges of gravel stops in cold application cement. Lap 4 inches at the joints and apply cement in the joints. Nail the flange at 3 inches on center into wood nailers. Stagger the nails.

3.2.5 Seal expansion joint covers of gutters with cold application cement.

3.2.6 Attach downspouts with hangers at tops and bottoms, at joints, and spaced at 8 feet maximum.

3.2.7 Brace gutter with metal hangers at 4 feet maximum.

3.2.8 Nails for attaching metal flashing shall be 1-1/2 inches long, 10 gauge, hot dipped galvanized, with minimum 3/8 inch head.

END OF SECTION

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SECTION 07700
EXPLOSION RELIEF VENT

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.1.1 Fabrication Drawings: Submit Fabrication and Erection Drawings of the explosion relief vents.
- 1.2 DELIVERY, STORAGE, AND PROTECTION: Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCT

- 2.1 EXPLOSION RELIEF ROOF VENT
- 2.1.1 Vent shall comply with current National Fire Test Standards for automatic shrink out vents and release automatically at an outward pressure of 30 lbs/ft². Model XRV-P, Catalog No. 40, as manufactured by APC Corporation.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- 3.1.1 Assemble and install explosion relief roof vent in strict accordance with the manufacturer's written instructions and recommendations.
- 3.2 PROTECTION
- 3.2.1 Protect all finish until completion of this project.
- 3.2.2 Replace or repair any damaged or defaced items.

END OF SECTION

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SECTION 07920
SEALANTS AND CAULKINGS

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.2 DELIVERY AND STORAGE OF MATERIALS

1.2.1 Deliver materials to the job site in manufacturer's original containers, unopened and labels intact. Handle and store all materials to prevent inclusion of foreign materials or exposure to temperatures exceeding 90 F.

PART 2 - PRODUCTS

- 2.1 GENERAL: Container labels shall show name of material, date of manufacture, mixing instructions, shelf life, and curing time. Color to closely match adjacent surfaces.
- 2.2 BUILDING SEALANT: One-part, low modulus, silicone sealant, Gesil N 2600, General Electric Company.
- 2.3 FIRE BARRIER SEALANT: 3M brand fire barrier caulk CP 25.
- 2.4 PRIMER: Nonstaining type, in accordance with the sealant or caulking compound manufacturer's written instructions.
- 2.5 BACKER ROD: Closed-cell polyethylene foam rod; Haskon Inc. "Minicel", approximately 25% larger than the width of the joint in which it is to be installed.
- 2.6 EXPANSION JOINT FILLER: WR Grace Co. Standard Cork Code 4323.
- 2.7 BOND BREAKER: Polyethylene tape with pressure-sensitive adhesive.

PART 3 - EXECUTION

3.1 PREPARATION OF JOINTS

3.1.1 Follow the written instructions of the manufacturer of the sealant or caulking materials for each condition of application. Unless the written instructions of the manufacturer state otherwise, make depth of sealant joints 1/2 of the joint width.

3.2 BACK-UP

3.2.1 Install backer rod in all joints where sealant is to be applied. Install with the proper tool, in accordance with the manufacturer's written instructions and to the correct depth for the sealant shape specified.

Where the depth of joint is not sufficient for installation of backer rod, use bond-breaker tape to prevent three-point adhesion.

3.3 INSTALLATION OF SEALANT

3.3.1 Perform all sealant work using experienced workers, specified materials, and proper tools in accordance with the manufacturer's written instructions for the conditions of each application. Tool the sealant after installation as required to properly fill the joint and produce a smooth surface. Take all necessary precautions to prevent contact of sealants with adjacent surfaces.

END OF SECTION

SECTION 08100
METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.

1.1.1 **Fabrication Drawings:** Submit drawings indicating the size, elevations, and location of each door and frame. Include location and details of hardware reinforcement and frame anchors.

1.2 **DELIVERY AND STORAGE**

1.2.1 Deliver to the site in undamaged condition and store above ground and under cover. Storage of doors and frames shall be in accordance with SDI-100.

PART 2 - PRODUCTS

2.1 **HOLLOW METAL DOORS:** Hollow metal doors and frames shall be fabricated in accordance with SDI-100 and this Specification.

2.1.1 Grade II, Model 2, full flush, hollow steel construction. Doors scheduled for fire rating shall bear appropriate UL or FM rating label.

2.1.2 Jop shall have flush end closure and bottom shall have recessed channel end closure.

2.1.3 See details and Door Schedule on Drawings for types and sizes.

2.1.4 Internal construction shall be polystyrene foam board core meeting the requirements of SDI-100-2.3.3.3.

2.1.5 Frames installed for glazed openings (vision lite) where scheduled. Glazing system shall be minimum 20 gauge steel.

2.2 **HOLLOW METAL FRAMES (DOORS AND WINDOWS)**

2.2.1 See details and Door Schedule on Drawings for profile and dimensions. Frames scheduled for fire rating shall bear appropriate UL or FM rating label.

2.2.2 Frames shall be welded construction.

2.2.3 Provide two weld studs, 3/8 inch diameter, at each side of framing.

2.2.4 Provide four wall anchors per side in openings in precast concrete walls.

2.2.5 Plaster guards installed at hardware cut-outs.

2.3 SHOP FINISH

2.3.1 Primer containing lead will not be acceptable and shall not be yellow color.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Frames shall be installed in accordance with SDI-100 and this Specification.

3.1.2 Leave temporary spreaders in place until the frames are securely attached to wall framing.

3.1.3 Align anchors with hinges and the strike at door frames.

3.1.4 Install doors in conjunction with application of hardware, and with uniform clearance at head and jams. Leave in smooth operating condition.

3.1.5 Installation of window frames will be executed by the precast concrete wall panel manufacturer. Glass panes shall be installed after wall panels have been erected.

END OF SECTION

SECTION 08315
BLAST-RESISTANT DOORS

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.1.1 Fabrication Drawings: Submit Drawings showing all features of construction and installation details.
- 1.1.2 Calculations: Submit certification that door assembly is in compliance with design requirements.
- 1.2 STORAGE: Store door and frame units off ground and under cover.

PART 2 - PRODUCTS

2.1 LOW RANGE BLAST DOOR

2.1.1 Low range blast door and frame shall be as manufactured by ~~Overly Manufacturing Company~~ Krieger Steel Products Co. DT #22

2.1.2 Door and frame shall bear UL label.

2.1.3 Door assembly, including door, frame, hardware, and seals, shall be designed to withstand a pressure of 200 pounds per square foot. Rebound pressure shall be 100% of design pressure.

2.1.4 The door shall be sized to accommodate a concrete masonry opening of 6 feet 8 inches wide by 7 feet 4-inches high.

2.1.5 The door shall be equipped with the following hardware:

- Closer - Norton 7700
- Lockset - Corbin 863 x 455
- Keyway - per Hardware Schedule (Section 08710)

PART 3 - EXECUTION

- 3.1 Install door and frame in accordance with the Drawings, approved submittals, and manufacturer's written instructions.
- 3.2 Install plumb and square. Adjust doors as required and leave in smooth operating condition.

END OF SECTION

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SECTION 08332
OVERHEAD COILING DOORS

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.1.1 **Fabrication Drawings:** Submit Drawings showing each door type and location. Describe all features of construction and show installation details.
- 1.1.2 **Certified Vendor Information (CVI):** Submit the information specified in Column 6 of the vendor data list in this Section.
- 1.2 **DELIVERY AND STORAGE:** Deliver to the job site in undamaged condition. Store above ground and under cover.

PART 2 - PRODUCTS

- 2.1 **OVERHEAD COILING DOORS:** As manufactured by ^{Overhead} ~~As~~ Door Corporation. See Drawings for Door Schedule for type and location. DT #24A
- 2.1.1 **Exterior doors:** Insulated thermal series-standard.
- 2.1.2 **Interior doors:** Rolling fire door and rolling service door. Fire door assemblies shall be UL listed or FM approved.
- 2.1.3 **Doors manually operated by means of a chain hoist using gear reduction and galvanized hand chain.**
- 2.1.4 **Hood and slat construction to be galvanized steel.**
- 2.1.5 **Guides to be structural steel angles. Provide windlock bar at exterior doors.**
- 2.1.6 **Galvanized slats and hood to be shop primed with baked-on finish. Other surfaces, except bearings, to be shop primed.**
- 2.1.7 **Equip doors with locking devices, suitable for padlocking.**

PART 3 - EXECUTION

3.1 INSTALLATION

- 3.1.1 **Install all doors in accordance with the Drawings and the approved submittals. Fire rated assemblies shall be installed in accordance with NFPA 80.**
- 3.1.2 **At completion, adjust as required for the door to operate freely.**

SECTION 08710
FINISH HARDWARE

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.1.1 **Hardware List:** Submit complete hardware list. List the hardware for each door separately under the door number and hardware requirement.

PART 2 - PRODUCTS

- 2.1 **SPECIFIC REQUIREMENTS:** See the Hardware Schedule at the end of this Section for specific requirements.
- 2.2 Refer to Section 08315 for hardware supplied and installed by the blast resistant door manufacturer.

PART 3 - EXECUTION

- 3.1 **PACKING AND MARKING:** Pack each item of hardware separately, with all necessary fasteners and instructions. Mark each item with the hardware number shown on the Hardware Schedule.
- 3.2 **FASTENERS:** Install all necessary screws, bolts, or other fasteners of suitable size and type to anchor the hardware in its intended position. Match hardware finish. Supply with expansion shields, toggle bolts, or other appropriate anchors.
- 3.3 **PROTECTION:** Protect hardware from damage at all times during construction, both prior to and after installation.
- 3.4 **INSTALLATION AND FIT:** Verify the installation and be responsible for the fit of hardware in the location specified. Install each hardware item in accordance with the manufacturer's written instructions.
- 3.5 **KEYWAY:** Furnish 6 pin-tumbler cylinders compatible with 67 Keyway system.
- 3.6 **COMPLETION:** Remove protective coverings and clean all hardware before completion of this project. Leave all hardware in smooth operating condition. Deliver all keys to the Government's Representative.

HARDWARE SCHEDULE

GROUP NO.	ITEM	QUANTITY	TYPE	FINISH/MFR
1	Hinges	3 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Lockset	1	#836 x 1410	US26D/CORBIN
	Closer	2	#7700HFL-3	AL/NORTON
	Flush Bolts	1 Pair	#458	826D/IVES
	Coordinator	1	#469 x 478	826D/IVES
	Astragal	1-(7'-0")	#357A	PEMCO
	Kick Plate	1 Pair	#48-8" x 36"	GRAY/QUALITY
NOTE: Lockset and Astragal shall be installed on the active leaf.				
2	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Lockset	1	#836 x 1410	US26D/CORBIN
	Closer	1	#7700-3	AL/NORTON
3	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Lockset	1	#836 x 1410	US26D/CORBIN
	Closer	1	#7700HFL-3	AL/NORTON
4	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Closer	1	#7500-3	AL/NORTON
	Push Plate	1	#40-6 x 16	AL/QUALITY
	Pull Plate	1	#1546A	AL/QUALITY
	Kick Plate	1	#48-8" x 34"	QUALITY
	Door Stop	1	#306TB	SS/QUALITY

GROUP NO.	ITEM	QUANTITY	TYPE	FINISH/MFR
5	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Exit Device	1	#29 x 2K	SBL/CORBIN
	Closer	1	#7500-5	AL/NORTON
	Threshold	1	#272A	PEMKO
	Weatherstripping	1 Set	#297AV	PEMKO
	Door Bottom	1	#345AV	PEMKO
	Door Stop	1	#138	AL/QUALITY
6	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Exit Device	1	#29 x Exit Only	SBL/CORBIN
	Closer	1	#7500-3	AL/NORTON
	Threshold	1	#157A	PEMKO
	Weatherstripping	1 Set	#297AV	PEMKO
	Door Bottom	1	#345AV	PEMKO
	Door Stop	1	#138	AL/QUALITY
7	Hinges	1-1/2 Pairs	4-1/2 x 4-1/2 Butts FBB179	US26D/STANLEY
	Exit Device	1	#LA 29 x 2K	SBL/CORBIN
	Closer	1	#7700-3	AL/NORTON
	Door Stop	1	#W302-S	SS/QUALITY

END OF SECTION

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SECTION 08800
GLASS AND GLAZING

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.2 Deliver glass to the job with labels, designating manufacturer, type, thickness, and quality of glass.

PART 2 - PRODUCTS

2.1 GLASS

- 2.1.1 Wire Glass: Clear, 1/4" nominal thickness polished plate reinforced with standard Misco polished wire. Mississippi wire glass as manufactured by Hordis Brothers, Inc.
- 2.1.2 Insulating Glass: Bronze tint with inboard clear lite, minimum 1/4 inch air space.

PART 3 - EXECUTION

3.1 INSTALLATION

- 3.1.1 Install glass in conformance with the manufacturer's written instructions.
- 3.2 CLEANING: At the completion of the work, remove all excessive glazing compound from window assembly, remove all labels and paint from the glass, clean and polish.

END OF SECTION

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3.4 APPLICATION OF GYPSUM BOARD (GENERAL)

3.4.1 Inspect all framing scheduled to receive gypsum board. Deficiencies shall be corrected prior to gypsum board application.

3.4.2 Apply gypsum board first to ceilings and then to walls. Use boards of maximum practical lengths in order to minimize joints. Bring boards into contact, but do not force into place. Fit boards neatly where ends or edges abut.

3.4.3 Install fasteners at least 3/8 inch from edges.

3.4.4 Apply corner bead to all external angles, in accordance with the manufacturer's written instructions. Casing bead shall be installed at all locations where gypsum board abuts a dissimilar material.

3.4.5 Ceiling Installation

3.4.5.1 Single Ply: Apply gypsum board with long dimension at right angles to the furring members.

3.4.6 Wall Installation

3.4.6.1 Single-Ply Application: Apply with long dimension of panels horizontally according to the manufacturer's written instructions. Make joints over framing or furring members. When installing board horizontally attach upper board first. Stagger end joints on different framing members, and on opposite sides of the wall.

3.4.6.2 Control Joints: Make control joints with casing bead installed back-to-back and attached to separate framing or furring members. Install at a maximum of 30 feet on center in continuous runs.

3.5 APPLICATION TO STEEL FURRING OR FRAMING

3.5.1 Fasten gypsum board to furring and framing with screws. Drive screws with clutch-controlled, power screwdrivers. Drive slightly below the surface.

3.5.2 Space screws at 12 inches on center into each bearing for ceilings and at 16 inches on center into each bearing for walls.

3.6 TAPING AND FINISHING

3.6.1 Apply compound over joints in a thin uniform layer, spread at least 3 inches wide, center reinforcing tape on the joint and embed in the compound. When dry, apply second coat of compound in a thin uniform coat, a minimum of 6 inches wide. Sand to eliminate ridges and high points.

3.6.2 Apply a third coat of compound after second coat is dry and has been sanded. Feather out to a minimum width of 12 inches. After compound has dried, sand as necessary to obtain a uniformly smooth surface.

3.6.3 Finish over fasteners to be similar to finishing over joint tape.

3.6.4 Treat internal corners in the manner specified for joints except fold reinforcing tape lengthwise through the middle and fit neatly into the corner.

3.6.5 Fit corner bead neatly over external corner and fasten with screws at approximately 6 inches on center and driven into framing members. Treat with joint compound and reinforcing in the manner specified for joints. Feather out joint compound from 8 to 10 inches on each side of the corner.

3.6.6 Apply medium "orange peel" texture to exposed finished surfaces, USG Texture II finish system.

END OF SECTION

SECTION 09500
ACOUSTICAL SYSTEM

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.2 **DELIVERY, STORAGE, AND PROTECTION:** Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

2.1 ACOUSTICAL UNITS

2.1.1 **Acoustical Lay-In Panels:** Armstrong Cork Company "Minaboard", Cortega design, Class 25 or less flame spread.

2.1.1.1 **NRC (Noise Reduction Coefficient) Range:** .50 - .60 mechanically supported.

2.1.1.2 **Finish:** Factory applied washable white paint with light reflectance of over 75%.

2.1.1.3 **Size:** 24 x 48 x 5/8 inch and 12 x 48 x 5/8 inch.

2.2 **SUSPENSION SYSTEM:** Exposed two way tee grid system for lay-in acoustical panels. "DX System" as manufactured by Donn Corporation.

2.2.1 **Exposed Finish:** Low sheen white satin baked enamel.

2.2.2 **Wall Moldings:** Angle shape.

2.2.3 **Hanger Wire:** Galvanized steel wire, not less than 12 gauge.

PART 3 - EXECUTION

3.1 GENERAL

3.1.1 Do not start acoustical work until work on adjacent surfaces has been completed, the area in which the work is to be performed is clean and the building has been closed in and heated to at least 50 F.

3.1.2 Install acoustical units in straight, perfectly level, and true lines.

3.2 LAY-IN PANELS ON T-BAR SUSPENSION SYSTEM

3.2.1 Support main runners with hanger wires spaced at not more than 48 inches on center.

3.2.2 Where above-ceiling equipment prevents installation of hanger wire from structure to ceiling, support ceiling on 1-1/2 inch cold-rolled runner channels hung from structure.

3.2.3 Install an intermediate hanger wire at all cross runners spanning more than 48 inches.

3.2.4 Install hanger wires supporting T-bars at each corner of each lighting fixture.

3.2.5 Fasten wall moldings to walls at not more than 32 inches on center.

3.2.6 Install in conformance with ASTM C 636.

END OF SECTION

SECTION 09650
RESILIENT FLOORING

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.2 **DELIVERY, STORAGE, AND PROTECTION:** Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

- 2.1 **TILE FLOORING:** 12 x 12 x 1/8 inch vinyl composition tile, supreme vinyl Corion, color No. 55507 beige. Manufacturer: Armstrong.
- 2.2 **RUBBER BASE:** 4 inches high, 1/8 inch thick cove base. Color No. 23 dark brown. Manufacturer: Flexco.
- 2.3 **EDGE STRIPS:** Homogeneous vinyl, 1 inch wide, with tapered edge. Color No. 200 Brown. Manufacturer: Flexco.
- 2.4 **PRIMER:** Cut-back type in accordance with the tile manufacturer's written instructions.
- 2.5 **ADHESIVES:** In accordance with the manufacturer's written instructions for the type of flooring or base being installed, and the condition and type of underlayment or subfloor receiving the floor covering.

PART 3 - EXECUTION

- 3.1 **INSPECTION:** Inspect all surfaces which are to receive resilient flooring. Report in writing to the Government's Representative all surface defects that need corrective work. Proceed with installation only after all corrective work has been performed and the surfaces are acceptable.
- 3.2 **PREPARATORY WORK:** Clean all subfloors before installation. Sweep the subfloor clean, scrape off all spatters, remove with solvent all materials which may affect the adhesion of resilient flooring. Patch all cracks, holes, joints, and score marks with a latex type underlayment in accordance with the tile manufacturer's written instructions. Vacuum the subfloor immediately before installation.
- 3.3 **MOISTURE TESTS**
- 3.3.1 **Moisture test for concrete floors in contact with the ground.** Spread patches of cut-back primer in several locations in each room and

allow to dry overnight. If the dry primer can be peeled easily from the floor surface, the floor is not sufficiently dry. Repeat test until the primer adheres properly.

3.4 INSTALLATION

3.4.1 General

3.4.1.1 Start installation only after the work of all other trades, including painting, has been completed.

3.4.1.2 Maintain a temperature of at least 70 F for 48 hours before installation, during installation, and 48 hours after installation. Maintain a temperature of at least 55 F thereafter.

3.4.1.3 Install in accordance with the written instructions of the manufacturer of the product being installed.

3.4.2 Tile Flooring

3.4.2.1 Lay tile in straight pattern starting at the center of room working toward walls. Do not install perimeter tile with less than one half tile width except where unavoidable. Butt all joints and make all lines of joints straight and parallel to the walls.

3.4.2.2 Install tiles flat and smooth. Replace tiles with bumps and uneven surfaces with new tiles.

3.4.2.3 Where tiles adjoin different floor surfaces, terminate with reducer strips firmly cemented in place.

3.4.3 Rubber Base

3.4.3.1 Install using the longest lengths practicable. Butt joints of rubber base tightly.

3.4.3.2 Install preformed corners at external corners; accurately cut, miter, and fit internal corners.

3.5 CLEAN-UP: Leave the floor broom-clean and remove all excess adhesive from surface of floor and other exposed surfaces. Remove all adhesive containers, tools, and other implements used in installation from the job site.

3.6 PROTECTION: Avoid rolling loads for 48 hours after installation. Cover tile exposed to traffic with heavy-duty kraft paper. Leave paper in place until final acceptance.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2 HANDLING AND STORAGE OF MATERIALS

1.2.1 Deliver all materials to the job site in the manufacturer's unopened containers with labels intact. Do not open containers or remove labels until after inspection and acceptance by the Government's Representative.

1.2.2 Store materials in accordance with the manufacturer's written instructions and in a well ventilated place not exposed to excessive heat, smoke, sparks, flame, or direct rays of the sun.

PART 2 - PRODUCTS

2.1 The terms used herein are as defined in Pittsburgh Paint (PPG) Architectural Finishing System and PPG Rez Stain Systems unless noted otherwise.

2.2 MATERIAL USE

2.2.1 Materials for use shall be of the same manufacturer; materials of different manufacturers shall not be used over one another, except for applications for prime coats on materials or assemblies shop primed.

2.2.2 Primer, sealers, or surface conditioners shall be the product of the manufacturer of the top coats; shall be fully compatible and of the type necessary or required by the manufacturer for the type of system listed or scheduled to produce the suitability of the system for a given surface or problem, and shall be furnished and applied whether listed or not.

2.3 PRIMER

2.3.1 Interior

2.3.1.1 Gypsum wallboard: Latex, Speedhide Quick Drying Latex Primer-Sealer, 6-2.

2.3.1.2 Ferrous Metal: Acrylic latex, Speedhide Water Base Inhibitive Metal Primer, 6-712, white.

2.3.1.3 Concrete and Concrete Masonry Units: Latex, Speedhide Masonry Block Filler, 6-7. Aquapon Polyamide Epoxy Coating - thinned with PPG Epoxy Thinner 97-725 for specific conditions.

2.3.2 Exterior

2.3.2.1 Ferrous Metal: Acrylic latex, Speedhide Water Base Inhibitive Metal Primer, 6-712, white.

2.3.2.2 Galvanized Metal: Acrylic latex, pretreatment with acid wash, Speedhide Water Base Inhibitive Metal Primer, 6-712, white.

2.4 PAINT

2.4.1 Interior

2.4.1.1 Gypsum Wallboard: Acrylic latex, Speedhide Semi-Gloss Latex Enamel, 6-510; acrylic epoxy, Pitt-Glaze Acrylic-Epoxy Semi-Gloss Water Base Coating, 16-line.

2.4.1.2 Ferrous Metal: Acrylic latex, Speedhide Semi-Gloss Latex Enamel, 6-510.

2.4.1.3 Concrete and Concrete Masonry Units: Acrylic latex, Speedhide Semi-Gloss Latex Enamel, 6-510; Acrylic Epoxy, Pitt-Glaze Acrylic-Epoxy Semi-Gloss Water Base Coating, 16-line.

2.4.2 Exterior

2.4.2.1 Ferrous Metal: Acrylic latex, sun-proof, Semi-Gloss Latex House and Trim Paint, 78-300.

2.4.2.2 Galvanized Metal: Acrylic latex, sun-proof, Semi-Gloss Latex House and Trim Paint, 78-300.

2.5 STAIN

2.5.1 Wood: Stain, Semi-transparent Alkyd-Oil Interior Stain, 77-302.

2.5.2 Wood: Finish, Polyurethane Satin Clear Plastic Interior Coating, 77-9.

2.6 SEALER

2.6.1 Concrete: Clear sealer, Horn Clear Seal 150, A. C. Horn, Inc.

2.6.2 Concrete Masonry Units: Clear sealer, Thompson Water Seal, Thompson.

PART 3 - EXECUTION

3.1 SURFACES TO BE COATED: Coat all surfaces except those which have been finished by the manufacturer. Coat factory-primed materials in conformance with this Specification except for the prime coat.

3.2 SAFETY: Furnish and maintain closed metal containers for the disposal of waste materials at the job site. Place materials that have become spotted or soaked with paint, oil, or solvents in these containers. Remove such containers from the job site each day.

3.3 ENVIRONMENT FOR COATING

3.3.1 Coat interior surfaces after all doors and windows have been installed and glazed, the heating equipment has been installed and is in operation, and the building has been maintained above 50 F for at least 72 hours. Do not apply coating materials when the temperature of the surface exceeds 90 F.

3.3.2 Immediately before the application of coating materials, the space or area to receive such coating shall be swept and thoroughly dusted in such a manner as to preclude the precipitation of deleterious materials on the coated surfaces or their entrainment in the coating materials.

3.3.3 Provide and install drop cloths, masking tape, and any other protective devices required to protect material adjacent to the areas being coated. Spatter, smears, droppings, and over-run of coating materials shall be removed as coating progresses.

3.4 SURFACE PREPARATION

3.4.1 Surfaces to be coated shall be in proper condition to accept and assure the proper adhesion of the coating system.

3.4.2 In addition to preparatory sanding, each coat, except the last, shall be lightly sanded as required to remove surface blemishes. Use sandpaper appropriate to the finish required.

3.5 MIXING MATERIALS

3.5.1 Agitate ready-mixed material, in original containers, in a vibratory-type paint mixer for a period of from three to ten minutes, then stir thoroughly and "box" for uniformity.

3.6 COATING

3.6.1 Apply coating materials to a uniform film thickness, showing no runs, sags, crawls, brush marks, overspray, or other defects.

3.6.2 Succeeding coats shall not be applied until preceding coat is thoroughly dry. Follow coating manufacturer's written instructions regarding time required for curing of materials between coats.

3.7 CLEAN-UP

3.7.1 At the completion of each day, remove all painting materials, containers, rags, cloths, brushes, or other equipment from the building.

3.7.2 After painting has been completed, make a detailed inspection of paint finish and carefully remove spatter from adjoining work, particularly from glass, plumbing fixtures, tiles, and trim.

3.8 PAINTING SYSTEMS

		<u>Minimum Dry Film</u>
3.8.1	Interior	
3.8.1.1	Gypsum drywall, acrylic latex	
	Primer - one coat latex	1.0 mils/coat
	Finish - two coats acrylic latex	1.4 mils/coat
3.8.1.2	Gypsum drywall, acrylic epoxy	
	Primer - one coat latex	1.0 mils/coat
	Finish - two coats acrylic epoxy	2.7 mils/coat
3.8.1.3	Ferrous metal, acrylic latex	
	Primer - one coat acrylic latex (touch-up primer for shop primed surfaces)	2.0 mils/coat
	Finish - two coats acrylic latex	1.4 mils/coat
3.8.1.4	Concrete and CMU, acrylic latex	
	Primer - one coat latex	5.5 mils/coat
	Finish - two coats acrylic latex	1.4 mils/coat
3.8.1.5	Concrete and CMU, acrylic epoxy	
	Primer - one coat latex	1.0 mils/coat
	Finish - two coats acrylic epoxy	2.7 mils/coat
3.8.1.6	Wood - stain and finish	
	Finish - one coat stain	1.2 mils/coat
	Finish - two coats polyurethane finish	1.1 mils/coat
3.8.1.7	Safety Shower Area - acrylic latex	
	Primer - one coat latex	2.0 mils/coat
	Finish - two coats acrylic latex	1.4 mils/coat
3.8.1.8	Concrete floors, clear sealer	
	Finish - one coat at rate of 200 square feet per gallon	
3.8.2	Exterior	
3.8.2.1	Ferrous metal, acrylic latex	
	Primer - one coat acrylic latex	2.0 mils/coat
	Finish - two coats acrylic latex	1.3 mils/coat
3.8.2.2	Galvanized metal, acrylic latex	
	Primer - pretreatment and one coat acrylic latex	2.0 mils/coat
	Finish - two coats acrylic latex	1.3 mils/coat
3.8.2.3	Concrete masonry units	
	Sealer finish - 2 coats at the rate of 100 sq ft per gallon	

3.9 COLOR SCHEDULE: Colors selected from PPG Design-a-Color System.

3.9.1 Interior

3.9.1.1 Storage Cells, Packaging, and Sampling Area, Packaging/Material Handling Area: Walls and structural steel, No. 2541 Abbey; doors and frames, including door Nos. 8 and 22, No. 2751 Chromium Gray.

3.9.1.2 Corridor, Restroom/Locker Rooms, Office: Walls and ceiling, No. 2517 Abbey white; doors and frames, No. 3606 Cork.

3.9.1.3 Safety Shower Areas: Provide 4 inch wide diagonal stripes, alternating colors of safety green and porcelain white, at locations as follows:

Floor: 3 foot wide square directly below shower head and adjacent to walls.

Walls: 3 foot wide by 7 foot high directly behind and adjacent to the painted floor area.

3.9.1.4 Class I, Division I Area: Provide 4 inch wide diagonal stripes, alternating colors of safety green and porcelain white at floor location shown on Drawing H-6-1561.

3.9.1.5 Wood Cabinets: Stain, Butternut.

3.9.2 Exterior

3.9.2.1 Doors and Frames: No. 2751, Chromium Gray.

3.9.2.2 Gutters, Downspouts, Fascia, Miscellaneous Metals: No. 2751, Chromium Gray.

END OF SECTION

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SECTION 10160

METAL TOILET COMPARTMENTS

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.2 **DELIVERY, STORAGE, AND PROTECTION:** Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

2.1 **TOILET PARTITIONS:**

2.1.1 **Overhead-braced type,** with baked enamel finish on galvanized-bonderized steel for partitions, pilasters, and doors. Color: ~~66-Appleton~~ 823-~~Buff~~ DT #108
Manufactured by ~~Sanymetal Products Co.~~ U. S. Gypsum Co.

2.1.2 **Doors and Partitions:** 1 inch thick, with honeycomb cores bonded to face panels.

2.1.3 **Pilasters:** 1-1/4 inch thick, assembled over a honeycomb core, equipped with integral adjustable floor anchors and leveling devices, covered with vandal-proof stainless steel shoes.

2.1.4 **Hardware and Trim:** Stainless steel or chromium-plated brass in accordance with the manufacturer's written instructions. Tamperproof screws. One combination coat hook and bumper on the inside of each door.

2.2 **URINAL SCREENS:** Flush wall-hung type, 30 inch x 42 inch x 1 inch thick, with porcelain enamel finish. Provide with manufacturer's standard fastening devices. Color: ~~66-Appleton~~ 823-~~Buff~~ Manufactured by ~~Sanymetal Products Co.~~ U. S. Gypsum Co.

2.3 **SHOWER:** Showermaster shower stall, solid phenolic core, baked acrylic finish. Size 36 inches x 36 inches x 82 inches with precast terrazo receptor and curtain. Color: To match toilet partitions. Manufactured by Sanymetal Products Co.

PART 3 - EXECUTION

3.1 **PREPARATION:** Install blocking in cavity walls for attachment of partitions and screens.

3.2 **INSTALLATION**

3.2.1 Install partitions straight, level, and plumb as shown on the Drawings.

SECTION 10440

SIGNS

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

PART 2 - PRODUCTS

2.1 SIGNAGE

2.1.1 Signage shall be as manufactured by Inland Pacific Architectural Signage Systems.

2.1.2 Lettered plaques shall be minimum .080 mil finish aluminum. Letters shall be pre-spaced, applied vinyl die-cut, adhered to front surface. Letter style shall be Helvetica Medium. Copy margins shall be 1 inch top and sides.

2.1.3 Graphic symbols shall be Type A6 and A7 (men and women symbols). Graphic process shall be Type A.

2.2 Provide the following signage at locations as follows:

2.2.1 Caution Explosion Relief Area: 6 inch high letters, mount at height of 6 feet above grade and centered on the controlled release wall system, one required.

2.2.2 Caution Explosion Relief Area: 3 inch high letters, center mount on door No. 13, two feet from top, one required. Copy to be multiple line arrangement.

2.2.3 2140: 3 inch high letters, mount at height 6 feet above grade and adjacent to door No. 8, one required.

2.2.4 A 6 inch by 6 inch graphic symbol shall be provided for the men's and women's restroom entry door.

2.2.5 Dispensing Area: 4 inch high letters, mount at height of 6 feet above floor on the inside surface of the controlled release wall system, centered in the Class I, Division 1 Area.

PART 3 - EXECUTION

3.1 Signage shall be surface mounted with appropriate fasteners as required for the specific conditions of use. Exterior fasteners shall provide weathertight condition.

END OF SECTION

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SECTION 10500

LOCKERS

PART 1 - GENERAL

- 1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.
- 1.2 DELIVERY, STORAGE, AND PROTECTION: Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

2.1 METAL LOCKERS

- Manufactured by the Interior Steel Equipment Co. DT #10
- 2.1.1 ~~As manufactured by Lyon Metal Products.~~
- 2.1.2 Single-tier locker 15 inches wide by 15 inches deep by 72 inches high.
- 2.1.3 Lockers to be furnished with continuous sloping tops.
- 2.1.4 Color to be No. 7 Matte, #53 Tan.

2.2 BENCHES

- 2.2.1 As manufactured by Lyon Metal Products.
- 2.2.2 Hardwood seat, 9-1/2 inches wide by 46 inches long by 1-1/4 inches thick, with manufacturer's standard clear finish.
- 2.2.3 Tubular steel pedestals, flanged for bolt attachment to the floor, finish to match lockers.

PART 3 - EXECUTION

3.1. INSTALLATION

- 3.1.1 Assemble and install all metal lockers and benches in accordance with the manufacturer's written instructions. Install lockers accurately aligned, flush, level, and plumb. Make all joints and fastenings tight.
- 3.1.2 Anchor lockers and benches securely to the floor, base, and wall.
- 3.1.3 Protect all finish until the completion of this project.

END OF SECTION

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SECTION 10670
STORAGE SHELVING

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.2 **DELIVERY, STORAGE, AND PROTECTION:** Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

2.1 **OPEN SHELVING:** Modular open wire shelving, Postmaster series, as manufactured by Hodges, size 18 inches by 48 inches by 84 inches. All stainless steel construction with four shelves per unit. See Drawing for locations. Include side ledges, Part No. SPE 300-3 and back ledges, Part No. SPD 048-3 to the open shelving.

DFC #

2.2 **STORAGE CABINET AND CLOSED SHELVING:** Clip style steel shelving, ~~0000 Series as manufactured by Lyon Metal Products, Inc.~~ See Drawing for locations. Penco Products.

DT #106

- 2.2.1 Six shelf unit, capacity per shelf of 600 lbs minimum, with one-piece back and sides for each unit.
- 2.2.2 Finish to be manufacturer's standard grey color.
- 2.2.3 Storage cabinets: Size 18 inches deep by 36 inches wide by 84 inches high with swing doors, base strip, and built-in keylock.
- 2.2.4 Closed shelving: Size 12 inches deep by 36 inches wide by 84 inches high.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Assemble and install all storage shelving in strict accordance with the manufacturer's written instructions. Install accurately aligned, flush, level, and plumb. Make all joints and fastenings tight.

3.2 PROTECTION

3.2.1 Protect all finish until completion of this project.

END OF SECTION

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SECTION 10800
TOILET ROOM ACCESSORIES

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.2 **DELIVERY, STORAGE, AND PROTECTION:** Deliver materials in their original sealed packages. Store and handle materials in a manner which will protect them from damage. Store above ground and protect against moisture and physical damage.

PART 2 - PRODUCTS

- 2.1 **COMBINATION PAPER TOWEL DISPENSER AND WASTE RECEPTACLE:** Parker No. 695-2, semi-recessed unit with 2 inch skirt. DT #10
- 2.2 **TOILET PAPER HOLDER:** ~~Parker No. 964 single holder.~~ Bobrick No. B-264 single roll toilet tissue holder.
- 2.3 **MIRROR:** ~~Parker No. 54020.~~ Bobrick No. B-294. #B-295 Tilted mirror with shelf, Mirror size 16" x 30" x 24".
- 2.4 **SOAP DISPENSER:** ~~Parker No. 30 L SS, horizontal dispenser for liquid soap.~~ Bobrick B-12, liquid soap dispenser.
- 2.5 **SANITARY NAPKIN DISPENSER:** ~~Parker No. 6935.~~ Bobrick No. B-2802. Mechanism set for no coin operation. Surface mounted.
- 2.6 **SANITARY NAPKIN RECEPTACLE:** ~~Parker No. 6065,~~ Bobrick No. B-271 surface mounted with shelf.
- 2.7 **MOP AND BROOM HOLDER:** ~~Parker No. 60824,~~ Bobrick No. B-223, with 3 holders.
- 2.8 **GRAB BAR**
- a. ~~Parker No. 624-10-X2-36"~~ Bobrick No. B-490 exposed Type J imbedded plate.
- b. ~~Parker No. 624-24-X2-52"~~ Bobrick No. B-4937 exposed partition mounting.
- 2.9 **FASTENERS**
- 2.9.1 All exposed fasteners to match finish of accessories.
- 2.9.2 Provide back-up plates for attachment of accessories to cavity walls.

PART 3 - EXECUTION

- 3.1 Install back-up plates for toilet accessories in all stud and furred walls.
- 3.2 Install all accessories securely with fasteners extending into the surrounding construction, back-up plates, or anchors.

- 3.3 Install accessories as shown on the Drawings and in accordance with the manufacturer's written instructions.
- 3.4 Install accessories in the following locations except where shown otherwise on the Drawings:
 - 3.4.1 Combination Paper Towel Dispenser and Waste Receptacle: 1 in each toilet room.
 - 3.4.2 Toilet Paper Holder: 1 in each water closet.
 - 3.4.3 Mirror: 1 in each toilet room.
 - 3.4.4 Soap Dispenser: 1 for each lavatory
 - 3.4.5 Sanitary Napkin Dispenser: 1 in women's toilet room.
 - 3.4.6 Sanitary Napkin Receptacle: 1 in women's toilet room.
 - 3.4.7 Mop and Broom Holder: 1 in janitor's area.
- 3.5 Mount grab bars at 33 inches to center line.

END OF SECTION

SECTION 15300

FIRE PROTECTION

PART 1 - GENERAL

1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.

1.1.1 **Approval Data:** Submit the information listed in Column 5 of the Vendor Data List in this Section.

1.1.2 **Certified Vendor Information (CVI):** Submit information listed in Column 6 of the Vendor Data List in this Section.

1.1.3 **Design/Fabrication Drawings:** Submit Design, Fabrication, and Installation Drawings of the wet pipe sprinkler system. All hydraulic data points shall be shown on the Drawings. The complete fire sprinkler system design package, at the time of submittal for approval, shall be stamped by a professional fire protection engineer.

1.1.4 **Calculation Data Sheets:** Submit hydraulic calculations for each design area in an easy to read tabular format, meeting the requirements and recommendations of NFPA 13, including Appendix A.

1.1.5 **As-Built Drawings:** Submit As-built Drawings of the wet pipe sprinkler system.

1.1.6 **NFPA Test Certificate:** Complete a Contractor's Material and Test Certificate, in accordance with NFPA 13, Section 1-12.

1.2 **WELDING DOCUMENTATION:** The fabricator shall ensure that welders in his employ are properly qualified in accordance with AWS and/or ANSI requirements before performing shop or field welding on structural steel components which are a part of this section. Welder qualification test results shall be made available to the Government's Representative upon request. AWS and/or ANSI welding procedures proposed for the work of this Section shall be subject to review by the Government's Representative.

PART 2 - PRODUCTS

2.1 **GENERAL**

2.1.1 All components of the new wet pipe sprinkler system, if not designated in this Specification and the Contract Drawings by a manufacturer's name and model/figure number, shall be current products of the manufacturer and shall be UL listed or FM approved for the use intended.

2.1.2 The sprinkler system shall include a minimum 6 inch alarm check valve supplied with standard trim including a retard chamber, a fire department connection, flow alarm pressure switch, a system main drain valve, and water motor alarm gong.

2.2 PIPING

2.2.1 Pipe and fittings shall meet the requirements of NFPA 13. Piping shall be steel with threaded or grooved type (rubber gasketed) fittings. Rubber gasketed fittings for use with plain end pipe shall not be used.

2.2.2 Flexible Couplings: Bolted sleeve type for use with grooved-end pipe, with rubber rings for sealing.

2.3 FIRE DEPARTMENT CONNECTION: The Fire Department connection shall be brass finish and furnished with self-closing double clappers, plugs and chains, automatic ball-drip valve, and escutcheon plate. The connection shall be a 4 inch IP x 2-1/2 inch HT x 2-1/2 inch HT. Hose threads shall be National Standard Fire Hose threads, 7-1/2 TPI.

2.4 WATER MOTOR ALARM GONG: Weatherproof mechanical gong with hood, complete with drain and interconnecting piping.

2.5 SWITCHES

2.5.1 The flow alarm pressure switch for installation on the sprinkler system retard chamber shall have pressure-actuated, normally-open contacts.

2.6 AUTOMATIC SPRINKLERS

2.6.1 Automatic sprinklers shall have nominal 1/2 inch diameter orifices and be rated for ordinary temperature classification, unless other temperature ratings are required by the sprinkler code.

2.7 SPRINKLER HEAD GUARDS: Formed wire or forged steel, suitable for use with upright or pendent sprinklers, and which can be attached or removed without disturbing the sprinkler head.

2.8 IDENTIFICATION LABELS AND SIGNS

2.8.1 Labels: Fire protection piping identification shall consist of a label approximately 2-1/4 inches by 14 inches bearing the words "FIRE PROTECTION WATER" and a direction arrow approximately 2-1/4 inches by 7 inches. Labels shall have adhesive backing.

2.8.2 Signs: Permanent type identification signs shall be installed at all control, drain, test, and alarm valves. The legend shall include the warning of Fire Department response to the operation of the valve.

2.9 SEALANT: Elastomeric sealant for pipe penetrations shall be a light-colored, polysulfide-base compound, meeting the requirements of FS TT-S-00230, Type II.

2.10 PAINTING MATERIALS: See Section 09900 of this Specification.

2.11 SPRINKLER CABINET: Provide a sprinkler cabinet with the required number of sprinkler heads of all ratings and types installed and a sprinkler wrench for each system and locate adjacent to the riser.

PART 3 - EXECUTION

3.1 INSTALLATION OF PROTECTION SYSTEMS

3.1.1 General

3.1.1.1 The detailed design of the fire sprinkler system shall be prepared under the supervision of a licensed professional fire protection engineer.

3.1.1.2 The personnel area will be designed for ordinary hazard, Group I requirements. Density shall be .14 gpm per square foot.

3.1.1.3 The packaging/sampling area and the loading area will be designed for ordinary hazard, Group 3 requirements. Density shall be .19 gpm per square foot.

3.1.1.4 The storage cells will be designed for extra hazard, Group 1 requirements. Density shall be .25 gpm per square foot except the flammable liquid storage areas shall be .30 gpm per square foot.

3.1.1.5 Outside hose requirements shall be as defined in NFPA 13, Table 2-2.1(B). Available water supply at the 609A Building fire hydrant is static of 79 psi, residual of 39 psi, and with 910 gpm flowing.

3.1.1.6 Install the wet pipe sprinkler system in accordance with NFPA 13 for the specified area classifications. Design areas for sprinkler operation shall be as defined by the 2-hour and 4-hour fire walls.

3.1.1.7 Supply the new sprinkler system from the new 8 inch underground main shown on Drawing No. H-6-1556.

3.1.1.8 Coordinate requirements for interruption of existing services and for Fire Department stand-by with the Government's Representative.

3.1.1.9 Protect new sprinkler system piping from damage by earthquake, by use of proper clearance around penetration holes, flexible couplings, and sway bracing, in accordance with NFPA 13, Sections 3-10.3 and A-3-10.3.

3.1.1.10 Pack all sprinkler pipe penetrations through concrete and partition walls with fiberglass or mineral wool packing and seal on both sides with ~~polyurethane sealant~~. Install escutcheons on sides exposed to view.

*a minimum of 1" of 3M brand fire barrier caulk CP 25.

3.1.1.11 Repair all damaged surfaces. Refinish repaired or defaced surfaces to match adjacent undisturbed areas.

3.1.1.12 Terminate exterior discharge, inspectors test, and auxiliary drain lines with 45° elbows, turned down.

3.1.1.13 Provide suitable concrete splash-pads, at exterior discharge locations, on other than paved surfaces.

3.1.1.14 Paint all new wet pipe sprinkler system piping exposed to view, with one coat of zinc chromate primer and one coat of semigloss enamel. Finish color shall be red (No. 21105) as shown in FED STD 595. Surface preparation, including cleaning and primer, shall be in accordance with the requirements specified in Section 09900.

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3.1.2 Welding.

3.1.2.1 Welding shall be limited to the fabrication of supports or braces, if necessary. No other welding on site will be allowed, except as specified in this Specification or the Design Drawings.

3.1.2.2 Perform all welding of piping and attachments to pressure retaining components in accordance with ANSI/ASME B31.1 and NFPA 13.

3.1.2.3 Perform all welding of steel structural elements in accordance with AWS D1.1.

3.1.2.4 Do not perform welding or flame cutting on or within the building without prior written approval of the Government's Representative.

3.1.2.5 Perform visual weld examination in accordance with the requirements of AWS D1.1, Paragraph 6.5.5, or ANSI/ASME B31.1, Paragraph 136.4.2 as applicable.

3.1.2.6 Perform Dye Penetrant weld examination on tie-in welds, which will not be hydrostatically tested, in accordance with ANSI/ASME B31.1, Paragraph 136.4.4.

3.1.2.7 & 3.1.2.8 SEE PAGE 15300 - 4a

3.1.3 Identification

3.1.3.1 Identify piping in accordance with the following:

a. Install labels after painting is completed.

b. Locate labels on the pipe where they can be read easily. Place labels on the bottom quadrant of overhead pipe and the top quadrant of pipe lower than eye level.

c. Identify only feed mains, cross mains, and risers 3 inch nominal diameter and larger.

d. Locate line identification at intervals of approximately 40 feet on unobstructed runs, and on each side of partitions and floors.

3.2 FLUSHING AND TESTING

3.2.1 Furnish all equipment and instruments required to perform the flushing and testing operations described below:

3.2.1.1 Conduct the flushing and testing operations while witnessed by the Government's Representative.

3.2.1.2 Remove and replace all pieces of apparatus, material, or work which fails in flushing or testing operations and retest.

3.2.1.3 Repair damage resulting from flushing or testing to the satisfaction of the Government's Representative.

3.1.2.7 Liquid penetrant examinations shall be performed in accordance with a procedure as required by Article 6, Section V, of the ASME Boiler and Pressure Code. The procedure shall be available at the job site for review at any time by the Government's Representative.

3.1.2.8 Personnel performing liquid penetrant examinations shall have been certified in accordance with the Contractor's written practice which shall meet the requirements of ASNI No. SNT-TC-1A.

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3.2.2 Flushing: Flush the new sprinkler system piping as described below:

3.2.2.1 Flush sprinkler piping by feeding water into the system through the alarm valve to provide velocity of not less than 7 feet per second in the piping being flushed.

3.2.2.2 Discharge flushing water from the end of the cross mains.

3.2.2.3 Discharge flushing water to a point designated by the Government's Representative. Flushing shall continue until the effluent runs clear and free of foreign matter.

3.2.2.4 Provide documented evidence that flushing has been accomplished in accordance with this Specification. Deliver to the Government's Representative before testing.

3.2.3 Hydrostatic Test

3.2.3.1 Hydrostatically test the new sprinkler system in accordance with NFPA 13, Section 1-11.2.

3.2.3.2 Use a hydrostatic test pressure of 200 psi.

3.2.3.3 Leaks in piping will not be acceptable.

SECTION 15400

PLUMBING

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Approval Data: Submit the information requested in Column 5 of the Vendor Data List in this Section.

1.1.2 Certified Vendor Information (CVI): Submit the information specified in Column 6 of the Vendor Data List in this Section.

1.1.3 Method for Disposal of Flushing Water: Prepare a method for disposal of flushing water used for testing.

1.2 QUALIFICATION OF WELDING PERSONNEL AND PROCEDURES

1.2.1 See Section 05120 for welding of structural steel.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

2.1.1 The equipment to be furnished under this Specification shall be new and the standard product of the manufacturer. Where two or more units of the same class of equipment are required, these units shall be products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer unless otherwise specified. Size and capacity of the equipment and materials shall be as shown on the Contract Drawings, or as specified.

2.1.2 Equipment ratings and sizes are intended to establish minimum requirements for the equipment.

2.1.3 All fixtures shall be provided with isolation valves in addition to those provided as part of the fixture trim.

2.2 PLUMBING FIXTURES

2.2.1 Water Closets: Wall mounted vitreous china siphon jet elongated bowl, Kohler Co, "Kingston Water Guard" No. K-4430-ET, with No. K-4670-C white seat, Sloan 110-3 flush valve, and floor mounted adjustable supporting chair carrier.

2.2.2 Lavatories: Kohler Co, 20 inches by 18 inches "Greenwich" No. K-2032, drilled for concealed arm carrier. Furnish with K-7401 faucet, K-7606 angle supplies with stops, K-9000 "P" trap, and floor mounted fixture support with concealed arms.

Smith fig. 417-D-Y

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2.2.3 Urinal: Kohler Co, "Bardon Water-Guard" K-4980-T with Sloan 186 flush valve and wall hangers.

2.2.4 Service Sink: Kohler Co, "Sudbury" K-6650 with wall hangers, K-8905 faucet, K-8934 stainless steel rim guards, and K-6673 3 inch trap with strainer.

2.2.5 Electric Water Cooler: Wall mounted, air cooled, self contained refrigerated type with one piece basin and back-splash. Capacity shall be 8 gph of 50 F water from 80 F entering water and an ambient of 90 F. Unit wiring shall be suitable for 120 volt, single phase electric power. Unit shall be Elkay Manuf. Co., Model No. EHFS-8 for handicapped application. Color shall be grey beige.

2.2.6 Kitchen Sink: Kohler Co, "Mayfield" 24 inches x 21 inches No. K-5960 with K-11925 faucet, K-8801 strainer, K-9000 "P" trap, and K-6699 metal frame trim.

2.2.7 Lab Sink and Basin: See Drawing H-6-1554 for lab sink and basin. Equip lab sink with Duralab combination deck mount mixing faucet, 9 inch swing spout, aerator outlet, integral mounting shank, and crumb cup sink outlet basket strainer, 1-1/2 inch size.

2.2.8 Water Heater: A. O. Smith, Model KEN-52, 50 gallon capacity, 18.95 gph recovery with 4.5 kW at 100 F rise, 230 volt, single phase.

2.2.9 Water Heater: A. O. Smith, Model ELS-10, 10 gallon capacity, 6.15 gph recovery with 1.5 kW at 100 F rise, 120 volt, single phase.

2.2.10 Floor Drains: Zurn Model Z-455 with integral trap, floor level cleanout, and adjustable nickel bronze strainer, size 2 inch with 5 inch strainer.

2.2.11 Shock Absorbers: Zurn Model Z-1700, size 400. See Drawings for locations.

2.2.12 Backflow Preventer: Hersey Products Inc., "AERGAP" Model FRP-II, with air gap drain funnel. See Drawing for size and location.

2.2.13 Wall Hydrant: Nonfreeze type, Zurn Z-1315, 3/4 inch with loose key, 3/4 inch hose threads, with Watts Model No. 8A vacuum breaker.

2.2.14 Hose Bibb: McMaster-Carr, Model 4800K12, 3/4 inch male pipe thread inlet, 3/4 inch hose thread outlet with Watts Model No. 8A vacuum breaker.

2.2.15 Safety Shower/Eyewash: Bradley Model S1931 with self-closing shower and eyewash valves.

2.2.16 Shower: Shower stalls shall be equipped with brass drain, mixing valve, pressure balancing line valve, and shower head. See Section 10160 for shower stalls.

2.2.17 Air Gap: Zurn Model Z-1025, with female thread inlet and outlet. See Drawings for location and size.

2.3 PIPE AND FITTINGS: As specified in the Pipe Codes and detailed on the Drawings.

2.4 PIPE JOINING MATERIALS: Sealants for threaded piping joints shall be Teflon type tape, Scotch Brand Pipe Sealant Tape No. 547; Chemtrol Dri-Seal No. 5; or Crane Packing Co "Thread-Tape".

2.5 HANGERS AND SUPPORTS

2.5.1 Hilti HDI drop-in anchors, 3/8 inch bolt size.

2.5.2 Unistrut channels and clamps.

2.6 PIPE PENETRATION MATERIALS

2.6.1 Sealer for Floor Penetrations: WR Grace "Hornflex", Dap "Flexiseal", or PRC 5000, or GE Penetration RTV 7403.

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2.6.2 Floor and Ceiling Plates: Chrome-plated, spring-loaded type.

2.7 PIPE INSULATION

2.7.1 Interior Sanitary Hot and Cold Water Piping: Johns-Manville Flame-Safe fiberglass insulation with average thermal conductivity not to exceed 0.22 BTU-In/Hr-F²-F at a mean temperature of 75 F. Accessories, such as adhesives, mastics, cements, tapes, and cloth for fittings shall have the same component ratings as given above. Insulation thickness shall be 1/2 inch.

2.7.2 Jacketing: A laminate of white kraft and foil reinforced with glass and applied to the insulation at the factory. Jackets shall have a minimum 1-1/2 inch longitudinal sealing lap. Butt joints shall be sealed with a 3 inch wide strip of jacket material. Longitudinal jacket laps and butt strips shall be secured with an adhesive in accordance with the insulation manufacturer's written instructions.

2.7.3 Insulation for Fittings and Valves: Same type as used for pipe. Open-weave fiberglass tape or cloth shall be used where necessary to hold insulation in place and to fair-in fittings and valves.

PART 3 - EXECUTION

3.1 FABRICATION AND INSTALLATION OF PIPING

3.1.1 Fabricate and install piping in accordance with the UPC, the attached Pipe Codes, the Drawings, and this Specification.

3.1.2 Promptly report all conflicts in design locations of piping with ductwork, lighting fixtures, etc., to the Government's Representative.

3.1.3 Keep piping systems clean during all phases of work. Once fabrication has started on any length of pipe, keep the open ends of piping plugged or capped when installation is not in progress to prevent the entry of dirt and other foreign materials.

3.1.4 Remove burrs from mating threads in threaded piping before assembly. Ream pipe to the nominal inside diameter after cutting.

3.1.5 Seal floor and wall penetrations airtight and watertight with the sealing compound specified in this Section.

3.1.6 Install floor and ceiling plates at piping penetrations in building floors and at all piping penetrations in building walls, partitions, and ceilings.

3.2 CAST IRON SOIL PIPE

3.2.1 Lay cast iron soil pipe in accordance with the following:

3.2.1.1 Protect pipe against impact shocks and dropping. Immediately before laying, inspect the pipe and discard all damaged sections.

3.2.1.2 Start laying pipe in finished trenches at the lowest point of the run and progress upgrade with spigot ends pointed in the direction of flow. Support the full length of the pipe.

3.2.1.3 Carefully center all pipe joints so when the pipe is laid, a pipeline with a uniform invert is formed.

3.2.1.4 Firmly set pipe to resist deformation, according to line and grade, preparatory to making pipe joints.

3.2.2 Hubless soil pipe installation shall meet the requirements of IAPMO IS 6.

3.3 INSTALLATION OF PIPE HANGERS AND SUPPORTS

3.3.1 Except where shown otherwise on the Drawings, pipe supports and hangers shall be as follows:

3.3.1.1 Support vertical piping at least once each 12 feet of run.

3.3.1.2 Location of supports shall be the suggested maximum spacing in the UPC, with additional supports close to all concentrated loads such as valves and specialties.

3.3.1.3 Installation of drop-in anchors shall be in accordance with the manufacturer's written instructions. (Cutting of embedded steel is unacceptable.)

3.4 CLEANING

3.4.1 Flush piping with water, immediately before leak testing, until the effluent is clear and contains no visible particulate matter, but in no case for less than one minute.

3.4.2 Raw water may be used for flushing sanitary waste, vent, and drain lines. Use cold sanitary water for flushing hot and cold waterlines. Flush sanitary waterlines before disinfecting.

3.4.3 The flow for flushing shall be sufficient to produce a velocity of at least 5 feet per second with the pipe full.

3.4.4 Remove all water from lines immediately after flushing is completed.

3.4.5 Prepare the method for disposal of flushing water. Deliver to the Government's Representative for approval before flushing.

3.4.6 Provide documented evidence that flushing has been accomplished in accordance with this Specification. Deliver to the Government's Representative before leak/pressure testing.

3.5 HYDROSTATIC TESTING

3.5.1 Perform hydrostatic tests as designated in the applicable Pipe Codes (attached).

3.5.1.1 Furnish all instruments, facilities, and labor required to conduct the tests.

3.5.1.2 Perform testing in the presence of and to the satisfaction of the Government's Representative.

3.5.1.3 Complete testing before pipe insulation is applied to above ground lines and before backfilling is completed over lines to be buried or encased.

3.5.1.4 Verify that all air has been expelled from piping before applying the hydrostatic pressure.

3.5.1.5 Slowly raise pressure in section of piping undergoing test to the specified test pressure.

3.5.1.6 Carefully examine all piping, fittings, and joints during testing and check manual valves for proper operation. All leaks shall be repaired and the leaking section of piping retested.

3.5.1.7 Duration of leak tests shall be at least ten minutes with no leaks or drop in test pressure, and for such additional time as may be necessary to conduct the examination for leakage.

3.5.1.8 Install one temporary relief valve during leak testing of piping systems. The relief valve shall have a discharge capacity of at least 125% of the capacity of the pressurizing device and be set to operate at not more than 110% of the test pressure. Tag each relief valve used to show serial number, calibration date, and pressure setting.

3.5.1.9 Test hot and cold sanitary waterlines in accordance with the UPC.

3.5.1.10 Test soil and vent lines in accordance with the UPC.

3.5.1.11 Document leak/pressure testing of each piping system on "Leak/Pressure Test Certification" Form RL-F-6410.2 (sample appended) in accordance with the printed instructions. Forms will be furnished by the Government's Representative. Use one or more forms to describe and record each of the piping systems. Under "Description of Components" describe each piping system in enough detail to be readily correlated to Contract Drawings. For systems tested segmentally, indicate continuity in the "Description" to assure that the entire system has been tested.

3.5.1.12 Remove all water from lines immediately after testing is completed.

3.6 PIPE INSULATION

3.6.1 Method of application and finish shall be as specified unless modifications are approved by the Government's Representative.

3.6.2 Insulate sanitary hot and cold water piping. Unless specified otherwise, it shall include bends, fittings, flanges, and valves forming part of such piping, installed to the thickness for the piping in which they occur.

3.6.3 Insulation shall not be applied on piping until the systems have been leak tested and approved by the Government's Representative.

3.6.4 Insulation shall be of uniform thickness for each pipe size and piece of equipment and shall fit to the surface to which it is applied.

3.6.5 Apply molded pipe covering with end joints butted together. Remove all insulation that does not fit properly and replace.

3.6.6 All insulation shall be free of moisture at time of application.

3.6.7 Surfaces shall be clean and dry and free from moisture, oil, dirt, scale, loose rust, or other foreign material, before any layer of insulating material is applied.

3.6.8 Groove and score insulation where necessary to fit the contours of equipment.

3.6.9 Where pipe hangers are attached directly to the pipe by clamps, cover the clamps, removing part of the inside surface of the insulation, when necessary, to maintain the continuous unbroken outer surface of the pipe covering. Seal the insulation around the hanger clamp with finish cement.

3.6.10 Install insulation in a neat, uniform manner. Seal ends of insulation with insulation cement or with specially-prepared ends supplied with the insulation.

3.6.11 Insulation shall be continuous through wall and other openings and through pipe sleeves.

3.7 DISINFECTING

3.7.1 Following flushing and hydrostatic testing, disinfect all sanitary waterlines in accordance with AWWA C601.

3.7.2 Remove equipment parts subject to damage by the disinfecting solution before the operation, and disinfect before reinstallation.

3.8 PIPE IDENTIFICATION

3.8.1 Identify all piping as to service and direction of flow, in accordance with ANSI A13.1.

PIPE CODE P-1

Service:	Max Operating Pressure:	Max Operating Temperature:	Test Pressure:
Cold Sanitary Water (CSW)	60 psig	80 F	90 psig
Hot Sanitary Water (HSW)	60 psig	160 F	90 psig

Sizes	1/2" thru 2-1/2"
Pipe	Galvanized steel, seamless or welded, ASTM A 120
Wall Thickness	Standard weight
Fittings	Class 150 malleable iron, galvanized, threaded, in accordance with ANSI B16.3
Unions	Galvanized malleable iron, threaded, FS WW-U-531, Type B, Class 2
Valves	
Ball:	NIBCO T-590-W
Gate:	NIBCO T-124
Check:	NIBCO T-413-B
Cleaning	Flush with water in accordance with this Specification
Test	Hydrostatic in accordance with this Specification
Disinfect	Disinfect all sanitary waterlines in accordance with this Specification

PIPE CODE P-2

Service:	Max Operating Pressure:	Max Operating Temperature:	Test Pressure:
Sanitary Sewer (SNS)	Atmospheric	160 F	Per UPC
Sanitary Sewer Vent (V)	Atmospheric	160 F	

Size	Above Ground: - 2" and Larger	Underground: All sizes
Pipe	Hubless cast iron sanitary system in accordance with CISPI 301	Service weight cast iron soil pipe in accordance with ASTM A 74
Joints	Sealing sleeve with shield and clamp assembly in accordance with CISPI 301	Hubless cast iron in accordance with the UPC, Section 802.
Fittings	Hubless cast iron in accordance with CISPI 301	Service weight cast iron soil fittings in accordance with ASTM A 74
Cleaning	Flush with water in accordance with this Specification.	
Test	In accordance with the UPC, Section 318, Par: 2, Water Test	

LEAK/PRESSURE TEST CERTIFICATION

Project No.		Work Order No./Shop Order No.		Report No.		Code or Standard	
Class	Year	Addenda	Stamp <input type="checkbox"/> Yes <input type="checkbox"/> No	Const. Spec.	Rev.	Test Procedure Title & No.	Rev.

Description of Component(s)

Customer Representative Notified			Safety Representative Notified		
Date _____	Time _____		Date _____	Time _____	
Item	Acceptance	Exception	Item	Acceptance	Exception
Flushing of component to be tested completed.			All lines not required for test disconnected or isolated.		
Vents, openings, and relief valve discharge checked.			All test equipment checked for tightness.		
Test medium per requirements. Medium _____			Test medium temp. equalized. Temp. _____ (ASME Section III, VIII only)		
Test set up in accordance with above referenced procedure. If exception, explain:					
Test gauge correct range and currently calibrated.					
Serial No. _____ Range _____ Calib. Due Date _____					
Pressure relief valve properly set and currently calibrated.					
Serial No. _____ PSI Setting _____ Calib. Date _____					
Areas to be inspected chalked prior to pressurization. If exception, explain:					
Soap solution applied to all areas examined while component was pressurized.					
No Leakage Found _____ Leaks Found and Repaired _____					
Specified test pressure obtained.					
Pressure Specified _____		Hold Time Specified _____		Test Press. Obtained _____ A.M. P.M.	
CONTRACTOR REPRESENTATIVE ➤					Date

CONTRACTOR PRE-TEST CHECK LIST

INSPECTION VERIFICATION	Actual test pressure during inspection _____	All joints and welded attachments to pressure retaining components chalked/soaped as applicable. <input type="checkbox"/> Yes <input type="checkbox"/> No*	Pressure test: <input type="checkbox"/> Accepted <input type="checkbox"/> Reject**
	Specified hold time verified at _____ A.M. P.M.	All joints and welded attachments to pressure retaining components visually inspected for leakage. <input type="checkbox"/> Yes <input type="checkbox"/> No*	
	* Basis of Rejection and/or Comment:		
CUSTOMER REPRESENTATIVE ➤			Date
WITNESS - ASME AUTHORIZED INSPECTOR ➤			Date

INSTRUCTIONS

1. THE FABRICATION OR CONSTRUCTION CONTRACTOR IS RESPONSIBLE TO FILL IN THE UPPER PORTION OF THE LEAK/PRESSURE TEST CERTIFICATION, INCLUDING THE CONTRACTOR PRE-TEST CHECK LIST SECTION. PORTIONS OR BLOCKS NOT APPLICABLE SHALL BE NA'd.
2. THE CONTRACTOR SHALL PRESENT THE LEAK/PRESSURE TEST CERTIFICATION TO THE CUSTOMER'S REPRESENTATIVE AT THE TIME OF TESTING.
3. THE CUSTOMER'S REPRESENTATIVE SHALL COMPLETE THE INSPECTION VERIFICATION SECTION OF THE LEAK/PRESSURE TEST CERTIFICATION AT THE TIME OF TESTING, AND THE RESULTS OF THE TEST WILL BE SO INDICATED. (THE ASME AUTHORIZED INSPECTOR SIGNATURE BLOCK WILL BE NA'd AS APPROPRIATE BY THE CUSTOMER'S REPRESENTATIVE.)
4. THE CUSTOMER'S REPRESENTATIVE WILL PROVIDE A COPY OF THE LEAK/PRESSURE TEST CERTIFICATION TO THE CONTRACTOR UPON COMPLETION OF THE TEST. THE ORIGINAL WILL BE RETAINED BY THE CUSTOMER FOR PERMANENT RECORD.

END OF SECTION

SECTION 15500

HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.

1.1.1 **Certified Vendor Information (CVI):** Submit the information specified in Column 6 of the Vendor Data List in this Section.

1.1.2 **Test and Balance Procedure:** Submit the forms and a procedure for testing and balancing the air distribution system.

1.1.3 **Test and Balance Data:** Submit documentation of test and balance data, dated and signed by the Contractor executing said test.

1.2 **QUALIFICATION OF WELDING PERSONNEL AND PROCEDURES**

1.2.1 See Section 05120 for welding of structural steel.

1.2.2 Personnel and procedures for welding sheet metal shall have been qualified in accordance with AWS D9.1 before welding. Qualification in accordance with ASME Section IX may be substituted for this requirement.

PART 2 - PRODUCTS

2.1 **GENERAL REQUIREMENTS**

2.1.1 **Standard Products:** Equipment shall be new and essentially the standard product of the manufacturer. Where two or more units of the same class of equipment are required, these units shall be products of a single manufacturer. The component parts of the system, however, need not be the product of the same manufacturer unless otherwise specified.

2.2 **HEAT PUMP SYSTEMS**

2.2.1 The heat pump shall be furnished with demand activated electric heat package, emergency heat control, compressor short cycle control, economizer, and indoor thermostat package. The heat pump wiring shall be compatible with a 208 volt, single phase, power supply. Electric heat package wiring shall be compatible with a 208 volt, 3 phase, power supply. Color shall match building trim.

2.2.2 The heat pump shall be Carrier Corp. Model 50YQ030, with Stiles Corp. Model DPPC-5054YQ curb, PPM-5036YQ plenum and platform, and 5-504-8Q economizer with pkg No. 3WR controls (all components including the transformer shall be mounted in the unit). Cooling capacity shall be 28,600 BTUH at ARI 240 Standard conditions. Heat pump shall be supplied with 7.5 kW supplemental heat.

2.2.3 Provide low voltage adjustable thermostat to provide night and weekend setback, automatic or manual changeover from cooling to heating, controls first stage of electric resistance heating, and allows for continuous or cycling indoor fan operation.

2.3 HEAT RECOVERY/EVAPORATIVE COOLING UNIT: The packaged unit shall be completely factory assembled, wired, tested, and shipped in one piece. Unit shall be suitable for outdoor operation with weatherproof construction.

2.3.1 Design and Construction Features

2.3.1.1 Structural and Frame - the base shall be constructed from a minimum 12-gauge, 8-inch deep, formed steel channel having welded construction. The frame shall have welded cross-members to support all major components, prevent bending or deforming, maintain weathertight integrity, and ensure proper equipment alignment. Prior to having the final paint coating applied, the welded steel frame shall be completely coated with chromate-oxide primer. Lugs, for lifting the unit, shall be an integral part of the structural frame.

2.3.1.2 Floor to be continuously welded 14-gauge aluminized steel. Coated steel or materials other than specified will not be accepted. There shall be no penetrations through the floor except for air duct openings and utility openings, which shall have 2-inch high continuously welded collars around entire peripheries. The floor shall be welded to the base frame. The manufacturer shall leak-test the floor at the factory and certify that it will be watertight and leakproof for a period of 5 years from the date of shipment. Thermal insulation having a thickness of 2 inches shall be firmly affixed under the entire floor in a manner such that no floor panels will be visible from below. Insulation will be held in place by adhesives and welded and capped stud pins.

2.3.1.3 The cabinet's outer casing shall be constructed for outdoor use with watertight, 16-gauge galvanized steel throughout to house all components. Cabinets shall be coated with 100% acrylic latex, corrosion and weather-resistant paint meeting FED STD 141b and ASTM E 84 as minimum. Color shall match building trim. The entire cabinet shall be thermally insulated with a minimum of 1 inch thick, 1-1/2 pound density insulation. The thermal insulation shall be fastened to the outer casing by adhesives. All roof and side wall seams shall be positively sealed and capped to prevent water and air leakage. All screws and fasteners penetrating the outer casing shall be gasketed and sealed to prevent leakage. All access doors shall be full double-wall construction, thermally insulated and gasketed to prevent water and air leakage. Access doors shall be swing-out type hinged for ease of access and with positive sealing latches. All openings and access doors shall have rain gutter or full weather hoods with bird screen.

2.3.2 Indirect Cooler Section shall be the air-to-air heat exchanger having a minimum of 500 square feet of surface area per 1000 cfm of supply air. The heat exchanger shall be made of .006 inch thick 1100 alloy aluminum with the surface exposed to water being fully epoxy coated to

protect against corrosion. The heat exchanger shall not be constructed from plastics or treated paper.

2.3.2.1 The indirect cooler shall be furnished with water distribution headers, solenoid valves, drain, overflow, and other components necessary for operation as specified.

2.3.3 Supply fan shall be heavy duty backwardly inclined DWDI centrifugal type with pillow block regreaseable ball bearings, mounted on a spring isolated welded structural steel base. The 2-speed motor shall be mounted on the structural base by means of an adjustable cast steel motor rail-type mounting. The drive shall be adjustable pitch and rated at 150% of the motor horsepower.

2.3.4 Exhaust fan shall be non-sparking, heavy-duty, backwardly-inclined, SMSI centrifugal type with pillow block regreaseable ball bearings, mounted on a spring isolated welded structural steel base. The 2-speed motor shall be mounted on the structural steel base by means of an adjustable cast steel motor rail-type mounting. The drive shall be adjustable pitch and rated at 150% of the motor horsepower.

2.3.5 Connections between the blowers and any stationary member shall be by means of flexible duct connectors.

2.3.6 Standard filters shall be 2 inch thick FARR 30/30 throwaway.

2.3.7 Traversing defrost plate shall be a motor driven plate on a drive screw which is approximately 8 inches wide. The plate blocks the supply air from leaving the core, thereby allowing the hot exhaust air to keep its side of the core free from frost. This control will allow maximum heat recovery during the winter cycle.

2.3.8 Face and by-pass dampers shall be of opposed blade design with a factory mounted modulating damper motor.

2.3.9 Electric heating coils shall be of the open resistive type with all factory mounted controls including, but not limited to: airflow switch, auto reset thermal cutouts, manual reset thermal cutouts, circuit fuses, control transformer, step controller, unit mounted thermostat, and disconnect. Provide a minimum of three stages of electric heat.

2.3.10 Roof curb shall be galvanized, reinforced, heavy gauge, section with 2-inch insulation and wood nailing strip for securing flashing. Curb shall be 12 inches high and provide uniform and level support.

2.3.11 Service outlet shall be supplied by the manufacturer to allow 120 volt service.

2.3.12 Electrical equipment panel shall be a NEMA 12 control panel provided as an integral part of the unit and be provided with hinged access door, an integral NEMA 4 lockable fused-disconnect switch, 2-speed motor starters, and 200 volt-amp, 480/120 volt control transformer.

2.3.13 Controls shall be factory mounted, wired, and tested. Controls shall consist of but not be limited to: heating, discharge modulating thermostat, cooling modulating thermostat, traversing defrost plate thermostat, traversing defrost plate drive motor, indirect evaporative cooling water solenoid valves, summer/winter auto change over thermostat. Provide a remote panel with on/off switch for both exhaust fan and supply fan and manual override on motor speeds.

2.3.14 The packaged heat recovery/evaporative cooling unit shall be Des ~~Champs Laboratories, Inc. Model PK5-8~~. Unit wiring shall be compatible with DT #33.1 a 480 volt, 3 phase, power supply. Control wiring shall be 120 volt, single phase, power supply.

*York-Shipley, Inc. Model HRC-80.

PERFORMANCE SCHEDULE

<u>Heat Recovery/Evaporative Cooling Unit</u>	<u>Winter Data</u>	<u>Summer Data</u>
CFM	6500	8000
Aux Heat	75 kW	--
Btuh Recovered	258,000	203,000
Btuh Required	500,000	200,000
HP Supply Fan*	5	5
E.S.P. Available	1.5"	1.5"
Wheel Size	20" BI-DWDI	20" BI-DWDI
HP Exhaust Fan*	5	5
E.S.P. Available	1.5"	1.5"
Wheel Size	27" BI-SWSI	27" BI-SWSI
GPH Water	--	60
OA Temperature	9 F db	99 F db
IA Temperature	65 F db	75 F db

*2-speed motor, 1800/1200 rpm

2.4 RESTROOM EXHAUST FANS: Restroom exhaust fans shall be Nutone Model QT-110 with 885 weather louver wall cap. Unit wiring shall be 120 volt, 1 phase.

2.5 EXHAUST FAN

2.5.1 Exhaust fan shall be Kewaunee No. 5-3301-82, 510 cfm at 3/4 inches S.P. Equipment fan with weather cover, vibration isolators, fan inlet adapter No. 5-3424-00, and vertical exhaust duct stackhead and transition section No. 5-3400-00.

2.6 DUCT

2.6.1 HVAC Duct

2.6.1.1 Galvanized steel sheet meeting the requirements of ASTM A 527, G90 coating.

2.6.2 HVAC Duct Reinforcement

2.6.2.1 Carbon steel shapes meeting the requirements of ASTM A 36 galvanized in accordance with ASTM A 123.

2.6.3 HVAC Duct Supports and Hangers

2.6.3.1 Unistrut channels and clamps.

2.6.3.2 Carbon steel shapes meeting the requirements of ASTM A 36.

2.6.3.3 Carbon steel rods meeting the requirements of ASTM A 108 with ASTM A 563 nuts and plain washers.

2.6.3.4 Hilti HD1 drop-in anchors, 3/8 inch bolt size.

2.6.4 Fasteners: ASTM A 307, Grade A or B bolts, with heavy hex nuts meeting the requirements of ASTM A 563, UNC threads, bolt head marking not required. Finish to be cadmium plating or electro-galvanizing.

2.6.5 Rivets: Marsen "Klik-Fast" blind pop rivets.

2.6.6 Fabric: Ventfabrics Inc. "Ventglas", 30 ounces per square yard, (finished weight), glass cloth double-coated with neoprene.

2.7 DUCT ACCESSORIES

2.7.1 General Requirements: Duct accessories that are the standard products of a manufacturer may be acceptable, subject to the approval of the Government's Representative. Duct accessories shall be of the same material as the duct.

2.7.2 Turning vanes are required in all rectangular section square elbows. Vanes shall be double thickness, tubular blades tapered to a fine edge. Blades shall be assembled with, and equally spaced on, side runners for installation in elbows with bolts or rivets.

2.7.3 Zinc-Rich Coating: Galvicon MZP metallic zinc paint or ZRC zinc rich coating.

2.8 DUCT INSULATION

2.8.1 Duct insulation and ^{adhesive} ~~sealant~~ shall be listed in UL Building Materials Directory and shall carry the UL mark. Insulation and adhesive shall have a UL fire hazard classification for flame spread of not more than 25 and for smoke developed of not more than 50.

2.8.2 Thermal insulation for the exterior surfaces of concealed supply and return duct shall be 1/2 inch thick, ~~Johns-Manville Flexible 800 Series~~ spin-glass fiberglass insulation, 1.6 pcf density, with FSK facing. DT #33.2

*Owens-Corning Faced Duct Wrap Series ED-75,

2.8.3 Thermal insulation for the exterior surfaces of exposed supply duct shall be 1-inch thick, Johns-Manville Rigid 800 Series, spin-glass fiberglass, 6.0 pcf density, with FSKL facing.

2.8.4 Adhesive ~~sealant~~ for the insulation shall be in accordance with the written instructions of the insulation manufacturer.

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2.9 SUPPLY DIFFUSERS

2.9.1 Office/Restroom Area: Tuttle and Bailey Type DA, with modular panels for installation in suspended (office only) and opposed blade dampers, WI finish. See Drawing for sizes.

2.9.2 Packaging and Sampling Area: Tuttle and Bailey Type M, with opposed blade dampers, WI finish. See Drawing for sizes.

2.10 SUPPLY GRILLES: Tuttle and Bailey Series T55 with integral opposed blade dampers, WE finish. See Drawing for sizes.

2.11 RETURN AIR GRILLES: Tuttle and Bailey Series NT-CT, White No. 8-377 finish. See Drawing for sizes.

2.12 RETURN AIR REGISTERS: Tuttle and Bailey Series CR500 with opposed blade dampers, RL finish. See Drawing for sizes.

2.13 FIRE DAMPERS

2.13.1 Ruskin Model IBD23, Style A, UL listed, 3 hour rating, with 165 F fusible link. See Drawing for size and location.

2.13.2 Ruskin Model IBD2, Style A, UL listed, 1-1/2 hour rating, with 165 F fusible link. See Drawing for size and location.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

3.1.1 Install equipment where shown on the Drawings in accordance with the manufacturer's written instructions.

3.1.2 Install fire dampers in accordance with the Drawings and UL 555. Provide access panels adjacent to fire dampers, fusible link side, for inspection.

3.2 DUCT FABRICATION

3.2.1 Fabricate heating and cooling duct in accordance with SMACNA Low Pressure Duct Construction Standards.

3.2.2 Provide companion angle flanges at duct-to-equipment joints unless otherwise noted. Gasket material shall be neoprene.

3.2.3 Install turning vanes, meeting the requirements of Paragraph 2.7.2, in rectangular section square elbows.

3.2.4 Air Test Connections: Install permanent connections for pitot tube traverse and static pressure readings where necessary to perform the testing and balancing specified in SMACNA Testing, Balancing, and Adjusting Publication, Chapter 17. Pitot tube connections shall consist of a 1 inch drilled hole in the duct, capped with a 1 inch plugged coupling brazed in place. Where it is not possible to read static pressure with a pitot tube, static pressure connections shall be installed and shall consist of a 1/16 inch drilled hole in the duct, capped with a 1/8 inch plugged coupling brazed in place. Inner surface of duct shall be smooth and flush. Arrange the test connections as shown in SMACNA Testing, Balancing, and Adjusting Publication, Chapter 17.

3.2.5 Touch up damaged zinc with zinc-rich coating.

3.2.6 - Visual examination and acceptance criteria shall meet the requirements of AWS D9.1

3.3 DUCT INSTALLATION

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3.3.1 Attach hangers and supports rigidly to the primary structure of the building, equipment, and duct. Furnish and install secondary steel structures where required to support the duct or equipment. Installation of drop-in anchors shall be in accordance with the manufacturer's written instructions. (Cutting of embedded steel is unacceptable.) Hanger spacing shall be in accordance with SMACNA Low Pressure Duct Construction Standards.

3.4 DUCT CLEANING

3.4.1 Provide cleaning equipment, scaffolding, materials, and labor necessary to clean the ductwork.

3.4.2 Remove debris from the inside of the new duct and plenums. Then vacuum to remove small particles of foreign matter.

3.4.3 Duct removed for cleaning or damaged shall be replaced.

3.4.4 Install filters after debris has been removed.

3.5 DUCT INSULATION

3.5.1 Surfaces which are to receive insulation shall be clean, free of moisture, oil, dirt, scale, rust, and other foreign material.

3.5.2 Insulation and finish materials shall be thoroughly dry when applied.

3.5.3 Score or groove the insulation to fit the contours of the duct. Fill and seal scores, grooves, joints, and penetrations with insulating cement.

3.5.4 Install thermal insulation meeting the requirements of Article 2.8 on the exterior surfaces of interior duct.

3.5.5 Insulation shall be attached to metal surface with 100% coverage coat of insulation cement and held in place with adhered clips and washers. Fasteners shall be spaced not more than 12 inches on centers.

3.6 AUTOMATIC CONTROL SYSTEMS

3.6.1 Installation of Instruments and Wiring

3.6.1.1 Install instruments in accordance with the manufacturer's written instructions.

3.6.1.2 Install wiring in accordance with NFPA 70 (NEC).

3.6.1.3 Install low voltage wiring in conduit. Installation of the conduit is specified in Section 16400.

3.6.1.4 Instruments and controls located outside the building shall be provided with a weatherproof enclosure.

3.7 TESTING AND BALANCING HVAC SYSTEMS

3.7.1 General

3.7.1.1 After the system is completely installed and the duct has been cleaned, place exhaust and recirculating fans in operation in accordance with the manufacturer's written instructions. After the fans have been in operation for at least four hours, test and balance the heating, ventilating, and air conditioning systems in accordance with Chapter 17, SMACNA Testing, Balancing, and Adjusting Publication, and under the surveillance of the Government's Representative.

3.7.1.2 Furnish the instruments, materials, and labor required to perform the testing and balancing of the systems. Instruments shall have been calibrated by an approved testing laboratory with the date of calibration marked thereon.

3.7.1.3 Do not use instruments which are a part of the system for testing and balancing. Check the instruments of the system against the test instruments.

3.7.1.4 Check calibration of controls; recalibrate in accordance with the manufacturer's written instructions if required.

3.7.2 Data to be Recorded

3.7.2.1 After the test has been performed, submit the Test and Balance Data Report in accordance with Paragraph 1.1.3. Test data shall be tabulated and submitted with a flow sheet indicating the points of measurement. Include the characteristics of the systems that were observed during the tests. Include any failure of the system and control components to meet the operational functions required by the Drawings and this Specification.

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SECTION 16300

HIGH VOLTAGE DISTRIBUTION (Above 600-Volt)

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Approval Data: Submit the information listed in Column 5 of the Vendor Data List in this Section.

1.1.2 Certified Vendor Information (CVI): Submit the information specified in Column 6 of the Vendor Data List in this Section.

PART 2 - PRODUCTS

2.1 STANDARDS FOR MATERIALS

2.1.1 The listing of particular equipment or material in this Specification shall not be construed as being all of the materials and equipment required to complete the job and place it in satisfactory operating condition.

2.1.2 Materials and equipment shall be listed for the intended service by Underwriters Laboratories, Inc. (UL) in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory or other qualified testing laboratory and shall bear the mark of the testing laboratory. In the absence of a mark, submit a certification of applicable listing. Listing and marking by UL or other qualified electrical testing laboratory is not required for material and equipment that is specified by the manufacturer's part number on the Contract Drawings or in this Specification.

2.2 TRANSFORMERS, OUTDOOR DISTRIBUTION: Outdoor distribution transformers shall be single-phase, pole mounted, and be of the kVa ratings and voltages shown on the Drawings. Transformers shall be manufactured and tested in compliance with ANSI C57.1200 and C57.1220; with a minimum impedance of 6.5 percent and a basic impulse level (BIL) of 95. Transformers shall have manufacturer's standard high-voltage taps and bushings that will accept compression-type terminals. Mounting brackets and hardware shall be supplied. Transformers shall be certified to be PCB free.

2.3 FUSED CUTOUTS: 15 kV, 100 amp rating, ~~Coslyn Cat. No.~~ Westinghouse Type LVBB, No. J9254-2J, with 15E fuses. DT #39

2.4 LIGHTNING ARRESTERS

2.4.1 Lightning arresters shall be the distribution valve type rated 15 kV, 95 BIL, for use on a 13.8 kV grounded-neutral system, and meet the requirements of IEEE Std 28. The porcelain bodies shall be wet porcelain, free of defects, and have a uniform color glaze. Galvanized cap and base

hardware shall have bolted clamps for both line and ground connections. Mounting bolts shall be galvanized.

2.5 AERIAL LINE CONDUCTORS: 13.8 kv aerial line conductors shall be bare, ACSR, hard drawn, EC grade aluminum wire with standard coated steel core, aluminum/steel - 6/1, size as shown on the Drawings.

2.6 SOLDERLESS CONNECTORS AND TERMINALS: Pressure type, solderless connectors, and terminal lugs shall be rated for use with copper or aluminum conductors and listed by UL.

2.7 POWER POLES: Power poles shall be ⁴⁵ feet in length, Class 2, and meet the requirements of ANSI O5.1 and be western red cedar cut from live timber. Poles shall be butt-treated in accordance with ANPA C7, using preservatives meeting the requirements of ANPA C7 and P1. Each pole shall be given a single top cut at an angle of 30 degrees with the normal to the axis of the pole and at right angles to the sweep. Gains shall be cut so the roof will be at right angles to the line and so that the sweep of the pole will be in line. Roofs and gains shall be brush-treated with preservatives meeting the requirements of the ANPA P1. Each gain shall fit the crossarm tightly. Bolt holes shall not be more than 1/16-inch oversize.

2.8 ARMOR RODS: Provide armor rods at each pin insulator support on tangent poles. The armor rods shall be ^{aluminum alloy} ~~copper wire~~, preformed type, made by Preformed Line Products Company. The rod diameter and length shall be in accordance with the written instructions of the aerial line conductor manufacturer.

2.9 TIE WIRES: Tie wires shall be No. 4 ^{EC grade annealed aluminum} ~~soft drawn copper~~. The length and installation method shall be in accordance with the written instructions of the line conductor manufacturer.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

3.1.1 Interpretation of Drawings and Specification: The Drawings show the general layout of the complete electrical system including the arrangement of service equipment and conductors. Verify the scale dimensions on the Drawings since actual locations, distances, and levels shall be governed by actual field conditions. Perform all work in accordance with NFPA 70 (NEC) and ANSI C2.

3.1.2 Installation Instructions: Install all equipment and materials as shown on the Drawings and as specified. The term "equipment" is defined as all components of a wiring system including conductors, poles, crossarms, etc.

3.1.3 Use the appropriate special tools when installing devices for which special installation tools are recommended by the manufacturer.

3.2 HANDLING AND UNLOADING POLE LINE MATERIALS

3.2.1 Handle poles, conductors, fittings, insulators, and miscellaneous hardware with care at all times to prevent damage to the material. Unload pole line materials carefully from truck and do not drop.

3.2.2 Do not use construction hooks, tongs, or other sharp tools on the treated portion of poles. Do not drag poles.

3.2.3 If poles are to be stored for longer than two weeks, they shall be stacked carefully upon supports at least 1 foot above ground. Strength and spacing of supports and manner of stacking shall be such that no noticeable distortion will be produced in poles so stored.

3.2.4 Locate material stored at the construction site to prevent damage from weather and adjacent construction operations.

3.3 SETTING OF POLES

3.3.1 Excavate holes large enough to admit a tamping bar all around the pole at the butt. Do not use explosives to excavate pole holes.

3.3.2 Set pole 6'-0" deep. Use backfill materials which can be solidly compacted by hand tamping in 6 inch lifts. Compact surplus earth around the pole in a cone one foot high above grade. Add additional backfill where the backfill has settled, and tamp before completion of the work.

3.3.3 Set poles plumb and in line, except that the corners and other strain points which are guyed shall have butts displaced to keep tops in line where feasible. At such locations, the rake against the strain shall be approximately 3 inches for each 10 feet of height.

3.4 CROSSARM INSTALLATION

3.4.1 Mount crossarms at right angles to the axis of the poles. Bolts shall be of sufficient length for full thread engagement of the nut, but not protrude through poles or arms in excess of 2 inches. Bolt ends shall not be cut off. Use square washers with each thru-bolt and double-arming bolt to protect the pole and crossarms.

3.5 INSTALLATION OF GUYS AND ANCHORS

3.5.1 Install anchors to bear against undisturbed earth. Tamp backfill around anchors thoroughly, the entire depth of the hole.

3.5.2 Set anchor rods in earth in line with the strand and install with top of rod at least 6 inches above grade.

3.6 INSTALLING INSULATORS: Tighten pin insulators on the pin threads and adjust the top groove so that it is parallel with the line. Secure hold nuts with locknuts.

3.7 INSTALLING AERIAL CONDUCTORS

3.7.1 String conductors from rotating reels and do not drag along the ground nor permit conductors to lie where they may be run over by vehicles. Pull conductors through stringing sheaves or stringing blocks hung on messenger cable but do not pull around sharp corners. Inspect conductors as they leave the reels and cut out any weak or damaged sections and splice the ends. Do not make splices in adjacent spans, dead end spans, or within 4 feet of a support. Install conductors to the proper stringing tensions in accordance with the manufacturer's written instructions.

3.7.2 Do not use self-gripping or automatic tension splicing sleeves. Make taps between primary wires, jumpers, etc. with mechanical connectors.

3.7.3 Install hot line stirrups on all existing conductors where new feeder taps are made.

3.7.4 Sag conductors in accordance with ANSI C2 for medium loading districts and the manufacturer's written instructions.

3.8 AERIAL EQUIPMENT GROUNDING: Ground lightning arresters in accordance with the Drawings. Bond together any pole line hardware that is separated by less than 2 inches.

3.9 TESTING

3.9.1 Test electrical equipment and wiring installed under this Specification before any attempt is made to operate the equipment. Resistance, current, and voltage measurements may be made as work progresses. Maintain a systematic record by using a schedule or chart of all tests and measurements. Provide space to record readings, dates, and witnesses. Notify the Government's Representative before start of all required tests. Correct all items found, during testing or examination by the Government's Representative, to be at variance with the Drawings and this Specification. Deliver testing reports to the Government's Representative weekly as completed.

3.9.2 Furnish all instruments, labor, and equipment required to conduct the testing.

3.9.3 Use test instruments which bear a valid calibration stamp showing the date of calibration and expiration date of the stamp. The calibration and accuracy of test instruments shall be certified by an independent testing laboratory having laboratory standards traceable to the National Bureau of Standards.

3.9.4 In addition to the testing specified to be performed by the Contractor, the installation will be subject to examination by the Government's Representative for conformance with the design and all applicable codes. Assist the Government's Representative as requested.

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SECTION 16400

SERVICE AND DISTRIBUTION (600-Volt and Below)

PART 1 - GENERAL

1.1 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.1.1 Approval Data: Submit the information listed in Column 5 of the Vendor Data List in this Section.

1.1.2 Certified Vendor Information (CVI): Submit the information specified in Column 6 of the Vendor Data List in this Section.

PART 2 - PRODUCTS

2.1 STANDARDS FOR MATERIALS

2.1.1 The listing of particular equipment or material in this Specification shall not be construed as being all of the materials and equipment required to complete the job and place it in satisfactory operating condition.

2.1.2 Materials and equipment shall be listed for the intended service by Underwriters Laboratories, Inc. (UL) in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory or other qualified testing laboratory and shall bear the mark of the testing laboratory. In the absence of a mark, submit a certification of applicable listing. Listing and marking by UL or other qualified electrical testing laboratory is not required for material and equipment that is specified by the manufacturer's part number on the Contract Drawings or in this Specification.

2.1.3 Electrical equipment enclosures shall meet the requirements of NEMA ICS 6-110 and be Type 1 for indoor locations and Type 3R for outdoor locations.

2.2 METERING CABINET ASSEMBLY: The metering cabinet assembly shall consist of current transformers, potential transformers, a test switch, and a kilowatt-hour demand meter in a weatherproof enclosure per Sketch ES-526-FPD1, at the end of this Section.

2.3 PANELBOARDS

2.3.1 Panelboards shall be rated as shown on the Drawings and meet the requirements of FS W-P-115, Type I, Class 1.

2.3.2 Panelboard door locks shall be keyed alike with two keys provided for each panelboard.

2.3.3 Incoming feeders shall terminate with approved connectors defined in Paragraph 2.6. Provide multiple lugs for multiple feeder conductors.

2.3.4 Circuit breakers shall be the bolt-on type with thermal magnetic trips. The number and rating of circuit breakers shall be as shown on the Drawings. Circuit breakers marked "Spare" on the Panelboard Schedules shall be furnished in sizes designated. Circuit breaker positions marked "Space" shall be bussted for future breakers and provided with removable single-pole fillers.

2.3.5 Permanently number circuits. Plastic or steel buttons secured by means of rivets or grommets are acceptable. Circuit number tabs shall not be attached to, or be a part of, the circuit breaker.

2.3.6 Furnish panelboards with a printed directory containing the panelboard designation and power source. Each circuit function and location shall be typewritten on the directory.

2.3.7 Panelboard enclosures shall have a nameplate (see Paragraph 2.16), engraved with the panelboard designation shown on the Drawings. Fasten the nameplate to the outside of the panel door.

2.3.8 Furnish and install locking devices on circuit breaker handles as shown on the Panelboard Schedules.

2.4 TRANSFORMERS, GENERAL PURPOSE: General purpose transformers shall be dry type, 60 Hz, of the kVA rating shown on the Drawings. Transformers shall have two 2-1/2% taps above and two 2-1/2% taps below the normal rated primary voltage. The insulation system shall be rated 185 C with a 115 C winding temperature rise above ambient. Transformers shall be outdoor floor mounting and meet the requirements of NEMA ST 20. Provide an enclosure suitable for outdoor installation.

2.5 SAFETY SWITCHES: Safety switches shall meet the requirements of NEMA KS 1 and be heavy duty type HD, horsepower rated for 600 volt ac and be fusible. Fuses where required shall be the cartridge type, be single element, UL Class K5 and meet the requirements of ANSI C97.1.

2.6 SOLDERLESS CONNECTORS AND TERMINALS - 600 VOLTS AND LESS: Pressure type, solderless connectors and terminal lugs shall be rated for use with copper or aluminum conductors, and used in installations not exceeding 600 volts between conductors. Connectors with insulating caps or covers shall be rated for the system utilization voltage. Connectors shall be of types specified below:

2.6.1 For conductors #8 AWG and smaller:

2.6.1.1 Ideal Industries, Inc. - Wire-Nuts.

2.6.1.2 Thomas and Betts Company - Sta-Kon.

2.6.1.3 3M Company - Scotchlok.

2.6.2 For conductors #6 AWG and larger:

2.6.2.1 Burndy Engineering Company - Screw Pressure Connectors or Hypress.

2.6.2.2 Thomas and Betts Company - Lock-tite.

2.7 GROUNDING EQUIPMENT

2.7.1 Rebar Ground Grid: The ground grid shall consist of lengths of the foundation rebar, exothermically welded at each lap to form an electrically continuous loop around the building perimeter.

2.7.2 Grounding Electrodes: 5/8 inch stranded galvanized steel cables.

2.7.3 Grounding Plate: Erico Products Inc. Catalog No. S-330.

2.7.4 Exothermic Welds: Cadweld by Erico Products Inc. Type of Cadweld to match application.

2.8 LIGHTING FIXTURES

2.8.1 Lighting fixtures shall have all parts and fittings necessary to install the fixtures in accordance with the manufacturer's written instructions. Fixtures shall be wired from outlet to socket with #16 AWG minimum conductors having a temperature rating of 150 C minimum.

2.8.2 Fixtures of each type described in this Specification shall be of one manufacturer and of identical finish and appearance.

2.8.3 Fluorescent fixture ballasts shall be high power factor type and operate at 120 volts. Ballasts shall be suited for fixture temperature environment and be provided with an automatic resetting thermal protector. Ballasts shall meet the requirements of ANSI C82.1.

2.8.4 The lighting fixtures shall be as follows:

2.8.4.1 Type A: One-foot by four-foot, 2-lamp, rapid start, fluorescent fixture for flush mounting in suspended T-bar ceiling. Fixture shall have acrylic prismatic lens. Benjamin "Atlas" Catalog No. AGR-2224-4. Furnish with two F40CW lamps.

2.8.4.2 Type B: Four-foot, two-lamp, rapid start, surface-mounted, protected fluorescent fixture suitable for wet or corrosive locations. Housing constructed of ABS thermoplastic baked enamel steel with gasketed latching high-impact acrylic lens. Benjamin "Stream-Flo" Catalog No. FA-2424-4R. Furnish with two F40CW lamps.

2.8.4.3 Type C: Industrial fluorescent fixture; 8-foot, 2-lamp, rapid start, with porcelain enamel steel reflector Benjamin "Lite-Line" Catalog No. FL-1021-8U. Furnish with two cool white lamps.

2.8.4.4 Type F: Four-foot, two-lamp, rapid start, surface-mounted, fluorescent fixture with acrylic prismatic, wrap-around lens. Benjamin "Calumet" Catalog No. CD-2224-4. Furnish with two F40CW lamps.

2.8.4.5 Type G: 150-watt incandescent fixture with green globe and guard for pendant mounting, Crouse-Hinds Catalog No. VDA15GP with G55 globe and 60 watt "rough service" lamp.

2.8.4.6 Type H: 18 watt, low pressure, sodium fixture for exterior wall mounting. Bronze polycarbonate enclosure with clear gasketed lens. North American Philips Lighting Corporation Catalog No. LPS-18, 120 volt with photocell.

2.8.4.7 Type K: Same as Type H except 35 watt. Philips Catalog No. LPS-35.

2.8.4.8 Type L: 100 watt incandescent with recessed-mounted enclosure and round baked-white trim with Alba-Lite glass diffuser. Thomas Catalog No. R1 enclosure, R200-W trim and 100 watt R40 lamp.

2.8.4.9 Exit Lights: 120 volt unit with 8 inch high, 3/4 inch slash, green letters on white phosphorescent background to provide 1-1/2 hours of visibility after power failure. Fixtures shall be McPhilben, No. 40W-8K1GY suitable for surface wall mounting. Fixtures shall be provided with two 25-watt A19 incandescent lamps, single circuit.

2.8.4.10 Emergency Lights: Fully automatic, solid-state, with two sealed beam lamps, high-low rate charger and 6 volt sealed lead batteries, 120 volt ac. Cabinet shall be standard bronze hammertone. Provide a metal mounting bracket for wall mounting. ~~Dual-Lite Company No. AS-1608C~~
Chloride Technology Series TMFRE.

DT #112

2.9 RECEPTACLES: Duplex receptacles shall be specification grade, rated 15 amp, 120 volt, 3 wire, grounding type, meeting the requirements of NEMA WD 1 Designation 5-15R and have screw terminals arranged for side wiring. Self-grounding receptacles may be used instead of the ground requirements specified. Receptacles located in office, corridor, and restrooms shall be ivory in color. All other receptacles shall be brown in color.

2.9.1 Explosionproof Receptacle: 20 amp, 125 volt, 3 pole, 2 wire receptacle suitable for Class I, Division 1, Groups C, D. Crouse-Hinds Type CPS. Also furnish one Crouse-Hinds Type CPP plug with each Type CPS receptacle.

2.9.2 Clock Receptacle: 15 amp, 120 volt, 3 wire, recessed receptacle. Arrow-Hart Catalog No. 5707.

2.10 TOGGLE SWITCHES: Toggle switches shall be specification grade, rated 20 amps, 277 volts, with conventional handles and with screw terminals arranged for side wiring. Switches shall meet the requirements of FS W-5-896. Toggle switches located in office or restrooms shall be ivory in color. All other toggle switches shall be brown in color. Toggle switches shall be single-pole or three-way as indicated on the Drawing.

2.11 MANUAL MOTOR STARTING SWITCHES: Manual motor starting switches shall be 2-pole, toggle-operated, rated for a maximum of 10 hp at 480 volts, with handle lock-off and pilot light. Manual motor starting switches shall be Square D Co. Class 2510, Type KG-1A. Furnish nameplate as specified herein, engraved with legend as shown on the Drawings.

2.12 PLATES: Furnish and install plates for every wiring and control device. Finish shall be galvanized pressed steel for surface-mounted devices and ivory plastic for flush-mounted devices.

2.13 RACEWAYS, FITTINGS, AND BOXES

2.13.1 Conduit shall meet the requirements of the appropriate standard as follows:

2.13.1.1 Rigid Steel ANSI C80.1

2.13.1.2 Intermediate Metal UL 1242

2.13.1.3 Electrical Metallic Tubing (EMT) UL 797

2.13.1.4 PVC (Schedule 40) FS W-C-1094, Type II

2.13.1.5 Flexible Metal FS WW-C-566

2.13.1.6 Rigid Aluminum and Fittings FS WW-C-00540

2.13.2 PVC coating on rigid steel conduit shall be factory applied, and meet the requirements of NEMA RN 1, Type A-40.

2.13.3 Conduit fittings for rigid steel and EMT shall meet the requirements of NEMA FB 1. Only compression-type, threadless fittings shall be used with EMT.

2.13.4 Fittings used with flexible metal conduit shall meet the requirements of FS W-F-406 and be squeeze type only. Flexible metal conduit shall have an integral ground conductor.

2.13.5 Use "Myers" type watertight fittings or sealing lock nuts as manufactured by Midwest Electric Manufacturing Corp., for conduit entries into the sides or tops of NEMA Type 3 or NEMA Type 3R enclosures.

2.13.6 Interior lighting fixture outlet boxes shall be 4 inch octagonal pressed steel.

2.13.7 Exterior lighting fixture outlet boxes shall be cast with threaded hubs.

2.13.8 Telephone outlet boxes shall be 4 inches square x 2-1/8 inches deep with cover plate for single device.

2.14 CONDUCTORS

2.14.1 Conductors shall be copper and the type and AWG size specified or shown on the Drawings. Aluminum conductors may be substituted for copper in size #6 AWG and larger if conductors of equal or greater ampacity are used. The Contractor shall be responsible for verifying and increasing raceway sizes as required if this option is exercised.

2.14.2 Aerial Power Cable: Low voltage aerial power cable shall consist of three, 600 volt aluminum conductors with cross-link polyethylene insulation, spiraled around an ACSR messenger. Conductors shall be sized as shown on the Drawings.

2.14.3 Speaker Cable: Two-conductor, 16 gauge, stranded copper.

2.14.4 Conductors shall meet the requirements of Table E1.

TABLE E1
SINGLE CONDUCTORS

Three-Phase Circuits	Single-Phase Circuits	COLOR Notes 1 & 2	CODE TYPE	STRANDING
A Phase	Hot No. 2	Red or Marked Red	THHN, XHHW	#10 AWG and smaller may be solid unless otherwise specified. #8 AWG and larger shall be stranded.
B Phase	--	Yellow or Orange or Marked Yellow		
C Phase	Hot No. 1 (Black only)	Blue or Black		
Neutrals		White or grey only. #6 & smaller - or marked white larger than #6	THHN, XHHW	
Equipment grounding conductors		Green	THHN, XHHW	All sizes shall be stranded. Bare annealed copper wire may be used in place of insulated wire in sizes #1 to #4/0 AWG.

NOTES

- Wire with green color insulation shall be used for equipment grounding conductor only, and it shall not be otherwise marked or used for any other purpose. Equipment grounding conductors shall be stranded (sizes 12 to 2 - 7 strands, sizes 1 to 4/0 - 19 strands).

2. Colored plastic tape may be used to mark wire. The tape marking band shall be a minimum of two inches in width. Wires shall be identified at each outlet and junction box.

2.15 CONTACTORS: Contactors for manually re-energizing lighting and receptacles in flammable storage room after loss of power shall be electrically held and suitable for ballast and resistance loads. Contactors shall be two-pole, 20 ampere rated, with NEMA 1 enclosure and 120 volt coils. "ON" and "OFF" pushbuttons shall be installed in the enclosure cover. Contactors shall be Square D Co., Class 8903, Type LG-20, Form A12.

2.16 NAMEPLATES: Nameplates shall be 1/16 inch thick, black satin finish, laminated plastic with white core and letters sized to meet legend requirements. Engraved manufacturer's standard nameplates may be used if of equal quality and legibility. Attach nameplates with screws or rivets only.

2.17 ANCHORS: Concrete anchors and masonry anchors shall be Hilti, drop-in, HDI, size 1/4 inch or 5/16 inch.

2.18 WIRE PULLING COMPOUND: Wire pulling compound shall be "Y-er Eas" as manufactured by Electro Compound Company or as specified by the cable manufacturer.

2.19 TAPE

2.19.1 Plastic insulating tape shall be Scotch No. 33+ as manufactured by 3M Company.

2.19.2 Conduit protection tape shall be Scotchrap No. 50 as manufactured by 3M Company.

2.20 INSULATING PUTTY: "Scotch-Fill" as manufactured by 3M Company; GE No. 8389 as manufactured by General Electric Co.; or "Airseal" as manufactured by the Kearney Company.

2.21 TELEPHONE BACKBOARD: 4' by 4' by 3/4" exterior-grade A-C plywood painted with one coat of primer and two coats of white semgloss enamel.

2.22 DUCT SEALING COMPOUND: Duct sealing compound shall be "Duct-seal" as manufactured by Porcelain Products Co. or "Kerite" as manufactured by the Kerite Co.

2.23 CONDUIT HANGERS: Conduit hangers for individual conduits shall be factory-made, springable wrought steel clamps or malleable iron, split and hinged rings. For suspended conduit, clamps or rings shall be bolted to, or interlocked with a threaded suspension rod.

2.24 SEALING COMPOUND: Sealing compound for conduit wall penetrations shall be polysulfide meeting the requirements of FS TT-S-00230, Type II, Class B.

2.25 CONDUIT SEALS: Crouse-Hinds, Type EYS complete with Crouse-Hinds Type X fiber and Type A sealing compound.

2.26 PUBLIC ADDRESS SYSTEM

2.26.1 The public address (PA) system shall be a complete functioning system of compatible components including the following:

2.26.1.1 PA amplifier: 60 watt, solid-state unit designed for desk mounting. Output shall contain less than 1 percent total harmonic distortion and be within 2 dB at a frequency range of 40 Hz to 15 kHz. The amplifier shall have two microphone inputs with volume controls, base, treble, and master volume controls. Amplifier shall be Rauland "Precedence" Model PR 1506.

2.26.1.2 Microphone: Dynamic, omnidirectional desk microphone with push-to-talk switch and 7 foot cable. Microphone shall be high impedance (40 kHz) and be Rauland Model 1295.

2.26.1.3 Corridor and restroom speakers: 8 inch cone speaker with 8 ohm, 10 watt peak voice coil. Speaker shall be Rauland Type 908-8 with T240, 25/70 volt line matching transformer and Type 4908-8 surface wall baffle.

2.26.1.4 Cell area and outdoor speakers: Wide-angle paging horn with 30 watt driver, selectable impedance and 25/70 volt line matching transformer. Horn shall be suitable for indoor or outdoor use and shall be Rauland Type 3703.

2.26.1.5 Speaker terminal box: 2-1/8" x 4" x 2" deep box with flush ivory plate and 2-pole shielded phono jack. Also provide preassembled jumper cable consisting of 5 feet of 2-conductor, 16 gauge, shielded copper cable, phono plug to match jack specified above and spade terminals to connect to amplifier.

2.27 EVACUATION ALARM SYSTEM

2.27.1 Siren: Motor driven, 120 volt, 110 decibels at 10 feet. Benjamin Catalog No. KM-8199-115.

2.27.2 Enclosure: NEMA 1 flush mounted enclosure with hinged cover. 12" x 12" x 4" deep. Provide nameplate engraved: "EVACUATION ALARM PANEL."

2.27.3 Wailing Timer: Solid-state, repeat cycle timer 120 volt, 10 amp normally open and normally closed contacts. Adjustable timing range 0.3-30 seconds. Square D Co., Class 9050, Type FSR-2.

2.27.4 Relay: 240 volt, 10 amp rated, general purpose DPDT relay Square D Co., Class 8501, Type C015 with 120 volt coil.

2.27.5 Selector Switch: Three-position, maintained-contact, Square D Co., Class 9001, Type KS-438H2. Provide Type KN-399 legend plate engraved: "STEADY-OFF-WAIL."

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

3.1.1 Interpretation of Drawings and Specification: The Drawings show the general layout of the complete electrical system. Verify the scale dimensions on the Drawings since actual locations, distances, and levels shall be governed by actual field conditions. Perform all work in accordance with NFPA 70 (NEC).

3.1.2 Installation Instruction: - The term "equipment" is defined as all components of a wiring system. Fasten equipment securely to the structural members of the building, to metal supports attached to the structure, or to concrete surfaces. Fasten equipment to concrete or masonry with expansion anchors. Attachment to drywall shall be by screws into studs and to metal wall panels by weld studs, bolts, or self-tapping metal screws. Locate equipment, boxes, and conduit approximately where shown in relation to equipment served. Do not install conduit raceways and boxes in positions that interfere with the work of other trades. Identify safety switches and panelboards with designation or load served as shown on the Drawings. Attach the nameplates, previously specified, on the component.

3.2 INSTALLING GROUNDING SYSTEM

3.2.1 Rebar Ground Grid: Weld rebar loop per Paragraph 2.7.1. Install cable grounding electrodes where shown on the Drawings. Attach to rebar loop using exothermic welds.

3.2.2 Static Grounding: Ground the steel columns to grounding electrodes using exothermic welds.

3.2.3 Ground Plate: Install ground plate flush with floor slab directly below fire alarm panel. Attach ground plate to grounding electrode using exothermic weld.

3.2.4 Equipment Grounding Connections: Ground the equipment to the grounding electrodes using compression-type terminals.

3.2.5 System and Equipment Grounding: Solidly ground the neutral conductor of three-wire, single phase and four-wire, three phase, wye-connected distribution systems at the transformer neutral bushings only.

3.3 INSTALLING CONDUIT

3.3.1 General

3.3.1.1 Use rigid steel or intermediate metal conduit where subject to mechanical damage, where installed in concrete floors and walls, where installed exposed to the weather, or where installed 4 feet or less above

any floor. Electrical metallic tubing may be used elsewhere, when connecting electrical equipment 2 feet or less apart, and when entering the top of electrical equipment 4 feet minimum above the floor.

3.3.1.2 Install concealed conduits as directly as possible and with bend radii as long as possible. Install exposed conduit parallel with or at right angles to the building lines. Where conditions permit, maintain continuous exposed horizontal conduit runs along walls at a minimum height of 9 feet above floor level or grade.

3.3.1.3 Make elbows, offsets, and bends uniform and symmetrical. Bend conduit with approved bending devices. Install conduit without moisture traps wherever possible. Where practicable, provide drain holes in pull-boxes or fittings at low points in conduit systems and remove burrs from drilled holes. Use one-hole, conduit clamps equipped with clambacks to secure conduits.

3.3.1.4 Use conduit hangers with 3/8 inch rods for 2 inch conduit and smaller and conduit hangers with 1/2 inch rods for 2-1/2 inch conduit and larger. If conduit is suspended on rods more than 2 feet long, brace conduit rigidly to prevent horizontal motion or swaying.

3.3.2 Hazardous Locations

3.3.2.1 Perform all electrical work in hazardous locations as indicated on the Drawings, in accordance with NEC Article 501.

3.3.2.2 Where possible avoid installing couplings, boxes, and fittings within the hazardous area and within 12 inches beyond the boundary defined on the Drawings.

3.3.2.3 Conduit seals where required shall be installed in accordance with Paragraphs 501-5(a) and (c) of the NEC.

3.3.3 Conduit Below Floor or Below Grade

3.3.3.1 For conduit installed below the grade or below the floor slab, encase conduit in concrete a minimum of 3 inches on all sides or use PVC-coated, rigid, galvanized steel. Install PVC-coated conduit in accordance with the conduit manufacturer's written instructions. Repair all PVC coating, damaged during handling or installation, using PVC paint according to the conduit manufacturer's written instructions.

3.3.3.2 Set up joints in all conduit installed in concrete, underground or exposed to weather, with a high temperature, antiseize, conductive thread lubricant and sealing compound.

3.3.3.3 Install exposed conduit stubbing up through the floor slab so that it is straight and plumb. Install conduit at sufficient depth below slab to eliminate any part of the bend above top of slab. Wrap all conduit stub-ups with conduit protection tape from a point 2 inches below top of slab to

approximately 6 inches above slab. Remove tape down to top of slab after slab has cured. Verify all conduit stub-up locations with final equipment arrangements.

3.3.4 Attachment to Equipment

3.3.4.1 Use galvanized steel lock nuts and bushings for attachment to enclosures except threaded hubs may be used where permitted by the NEC. Threadless fittings will not be permitted for rigid conduit. Use Erickson-type couplings where required. Do not use running threads.

3.3.4.2 Cut conduit square, ream and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap all exposed conduit ends with standard conduit accessories until wires are pulled.

3.3.4.3 Use flexible conduit to make connections to motors and other equipment subject to vibration. Use liquid-tight, flexible metal conduit where the conduit and fittings are to be installed outdoors or where exposed to moisture or chemical fumes indoors. Flexible conduit may be used in lengths not exceeding 4 feet for other equipment, with approval of the Government's Representative.

3.3.5 Exterior Wall Penetrations

3.3.5.1 Seal opening around conduit at exterior wall penetrations and at penetrations of walls which form boundaries between adjoining ventilation zones, using the sealing compound described herein. Make the seal waterproof and finish the sealing compound flush with the surrounding wall surface.

3.3.5.2 Seal interior of conduits by applying duct sealing compound in the conduit at the box or enclosure nearest the penetration on both sides of the wall.

3.3.6 Seal and protect conduit stubs installed for future extensions with pipe caps. Double wrap the closed end with insulating tape for the last 6 inches.

3.3.7 Install a #14 gauge galvanized iron pull wire or a 1/8 inch polyethylene rope in conduit installed and left empty for future use and all telephone conduits.

3.4 INSTALLING BOXES, ENCLOSURES, AND WIRING DEVICES

3.4.1 Install boxes firmly secured in position and plumb.

3.4.2 Install an extension ring with blank cover on all flush-mounted junction boxes where the junction box serves permanently installed equipment.

3.4.3 Flush mount junction boxes served by concealed conduit unless otherwise noted.

3.4.4 Install dust covers on boxes until wires are pulled and permanent covers or devices are installed.

3.5 INSTALLING CONDUCTORS

3.5.1 Paint or pressure-sensitive colored tape may be used for color coding conductors instead of colored insulation on #8 AWG and larger wire only. Maintain phase color coding for all branch and feeder circuits up to and including equipment connections.

3.5.2 Use lubricant recommended by the cable manufacturer's written instructions, or the wire pulling compound specified, to decrease friction when pulling wire and cable through conduit. Do not exceed maximum pulling tension according to the cable manufacturer's written instructions.

3.5.3 Do not install or handle wires with thermoplastic insulation or jacket when the ambient temperature is 15 F or below.

3.6 SPLICES, TAPS, AND CABLE TERMINATIONS

3.6.1 Make splices and taps in building wire with solderless connectors described in Paragraph 2.6. Use solderless connectors in accordance with the manufacturer's written instructions.

3.6.2 Use plastic insulating tape for all uninsulated splices and taps on circuits up to 600 volts. Apply the insulating tape to a thickness at least equal to that of conductor insulation. Where a bolted splice or connection presents an irregular surface, apply insulating putty to the joints before taping.

3.6.3 Use crimp-on type spade lugs for wire terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.

3.7 INSTALLING LIGHTING FIXTURES

3.7.1 Mount suspended lighting fixtures securely on rods attached to building structural members or to framing channels attached to structural members. Use a fixture stud if the lighting fixture is hung from the outlet box.

3.7.2 Fixtures installed in, or surface-mounted below, the suspended "tee" ceiling shall be supported by hanger wires fastened to the building structure. Provide and install the hanger wires necessary to meet this requirement. Support 4 foot fixtures at each end with #9 gauge (minimum) galvanized hanger wires.

3.8 INSTALLING MOTOR - OPERATED EQUIPMENT: Wire motor-operated equipment in accordance with the Drawings, this Specification, and the manufacturer's written instructions. Install wiring to devices which do not appear on the Construction Drawings but which are included in the installation shown on the Manufacturer's Drawings.

3.9 TESTING

3.9.1 General

3.9.1.1 Test electrical equipment and wiring installed under this Specification before any attempt is made to operate the equipment. Resistance, current, and voltage measurements may be made as work progresses. Maintain a systematic record by using a schedule or chart of all tests and measurements. Provide space to record readings, dates, and witnesses. Notify the Government's Representative before the start of all required tests. Correct all items found, during testing or examination by the Government's Representative, to be at variance with the Drawings and this Specification. Deliver testing reports to the Government's Representative weekly as completed.

3.9.1.2 Furnish all instruments, labor, and equipment required to conduct testing.

3.9.1.3 Use test instruments which bear a valid calibration stamp showing the date of calibration and expiration date of the stamp. The calibration and accuracy of test instruments shall be certified by an independent testing laboratory having laboratory standards traceable to the National Bureau of Standards.

3.9.1.4 In addition to the testing specified to be performed by the Contractor, the installation will be subject to examination by the Government's Representative for conformance with the design and all applicable codes. Assist the Government's Representative as requested.

3.9.2 Motors

3.9.2.1 Check motors for correct rotation.

3.9.2.2 Measure and record voltage, current, and speed under normal operating loads.

3.9.3 Wiring Systems

3.9.3.1 Test all power conductors that are rated at 600 volts and are used for services, feeders, or branch circuits over 150 volts to ground phase-to-ground with a megger. The minimum acceptable value of insulation resistance shall be 200 megohms. The megger manufacturer's instruction pamphlet, furnished with the megger, shall provide instructions for conducting the tests. Temporarily disconnect all devices not capable of withstanding the voltage or current of the megger test (such as indicating instruments, relays, and lamps) before the test is made. The dc voltage output of the megger shall be 1000 (nominal).

3.9.3.2 The Contractor may elect to group and connect together all conductors within a raceway while performing the megger test. Record all readings which indicate less than the minimum acceptable value. Repeat megger test after replacement of defective wiring.

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SECTION 16720

ALARM AND DETECTION SYSTEMS

PART 1 - GENERAL

- 1.1 **SUBMITTALS:** Refer to Section 01300 for submittal procedures.
- 1.1.1 **Approval Data:** Submit the information listed in Column 5 of the Vendor Data List in this Section.
- 1.1.2 **Certified Vendor Information (CVI):** Submit the information specified in Column 6 of the Vendor Data List in this Section.

PART 2 - PRODUCTS

2.1 **STANDARDS FOR MATERIALS**

2.1.1 The listing of particular equipment or material in this Specification shall not be construed as being all of the materials and equipment required to complete the job and place it in satisfactory operating condition.

2.1.2 Materials and equipment shall be listed for the intended service by Underwriters Laboratories, Inc. (UL) in the Electrical Appliance and Utilization Equipment Directory or Electrical Construction Materials Directory or other qualified testing laboratory and shall bear the mark of the testing laboratory. In the absence of a mark, submit a certification of applicable listing. Listing and marking by UL or other qualified electrical testing laboratory is not required for material and equipment that is specified by manufacturer's part number on the Contract Drawings or in this Specification.

2.1.3 Use fire alarm equipment listed in the UL Fire Protection Equipment Directory or the FM Approval Guide bearing the mark of the listing organization.

2.1.4 The fire alarm system design, components, and installation shall meet the requirements of NFPA 70, 72B, and 1221.

2.2 **FIRE ALARM CONTROL PANEL**

2.2.1 Furnish a panel of NEMA 1 construction designed for surface mounting, with a key lockable hinged door. Panel door shall have a cylinder lock with key matched to Corbin Cat. 60 and be finished outside in "Signal Red," FED STD 595, Color 11105.

2.2.2 Provide four fire detection zones, minimum, each with end-of-line supervision to detect all open circuits or unintentional grounds, in accordance with NFPA 72B.

2.2.3 Label all indicating lights and switches with their function. Identify each zone with laminated plastic nameplates approximately 5/8 inch by 2 inches and engraved with the zone number and function. Unused zones shall be engraved "SPARE". Engrave laminated plastic nameplates with 1/8 inch high characters. Manufacturer's standard nameplates are acceptable if of equal quality and legibility.

2.2.4 Supply the following equipment mounted on or in the fire alarm control panel:

2.2.4.1 Indicating lights (LEDS):

- a. AC Power On (green)
- b. AC Power Off (amber)
- c. System Common Alarm (red)
- d. System Common Trouble (amber)
- e. City Disconnect (amber)
- f. System Ground Fault (amber)
- g. Battery Trouble (amber)
- h. Battery High Rate (amber)
- i. Zone Alarm for each zone (red)
- j. Zone Trouble for each zone (amber)
- k. Bell Supv. (amber)

2.2.4.2 Switches

a. Drill - To sound all audible alarm devices. Operation shall not transmit signal to the fire station unless an alarm occurs during the drill.

b. Alarm Off - To silence all audible alarm devices. Operation shall energize trouble circuit.

c. Trouble Off - To silence system trouble tone, with resound capability in the event a subsequent trouble condition occurs.

d. Reset - Ringback shall occur if operated when any other switch is not in normal position.

e. City Off - Operation shall energize trouble circuit.

f. Lamp Test - Operation shall energize trouble circuit.

2.2.4.3 Trouble alarm buzzer (tone alert).

2.2.4.4 Gong ringing circuit. The gong ringing circuit shall pulse the alarm gongs at a rate of 2 strokes per second.

2.2.4.5 Terminal blocks for wiring.

2.2.4.6 Automatic power transfer switch. Failure of the primary power supply shall cause automatic transfer to secondary supply. Return to

primary power shall occur automatically upon restoration of primary power supply. Transfer from primary to secondary power shall cause an audible trouble signal to be initiated and the supervisory code transmitter shall be actuated. No false alarms or interruption of fire alarm service shall occur due to loss or restoration of primary power.

2.2.4.7 Secondary power supply. Primary power will be from the facility power panel in accordance with the Drawings. Secondary power supply shall be a rechargeable battery in accordance with NFPA 72B to operate the fire alarm system and trouble signals in the event of failure of the primary power. Battery shall be heavy duty, sealed, maintenance-free type designed for fire alarm usage. The battery assembly shall be sized to operate the system for a minimum of 60 hours after loss of charging current at an ambient temperature of +40 F, and be capable of transmitting a fire alarm signal for not less than 5 minutes at the end of this period. Calculations similar to Appendix A shall be made to verify the size of the batteries required.

2.2.4.8 Battery charger. The battery charger shall be a compatible, automatic, solid state, constant voltage device with ac voltage compensation, dc voltage regulation and current limiting. The battery charger shall provide continuous taper charging, have a manual high rate switch to provide equalizing charge, and be capable of charging batteries from 75% of full charge to 100% of full charge in not more than 24 hours. The battery charger shall have a dc ammeter, a voltmeter, and an undervoltage relay with normally closed contacts that open when battery voltage drops to 75% of its rated normal voltage, and be enclosed in the fire alarm control panel.

2.2.4.9 Zone Modules. Each zone module shall have an alarm operated output.

2.2.5 Alarm signals shall latch and require manual reset devices.

2.2.6 Control Panel Operation:

2.2.6.1 On incoming fire alarm signal the fire alarm control panel shall:

- a. Transmit the coded alarm signal.
- b. Light the system common alarm indicating lamp.
- c. Light the incoming signal zone alarm indicating lamp.
- d. Operate the building alarm gongs.

2.2.6.2 On incoming trouble (supervisory) signal the fire alarm control panel shall:

- a. Transmit the coded trouble signal.
- b. Light the system common trouble indicating lamp.

- c. Light the incoming signal zone trouble indicating lamp.
- d. Sound an audible alarm at the panel.

2.2.6.3 A fire alarm signal shall be initiated by:

- a. Operating any manual pull box in system.
- b. Operation of the flow alarm pressure switch.

2.2.6.4 A trouble signal shall be initiated by:

- a. Disconnecting any device or wire in the system.
- b. Loss of primary (ac) circuit.
- c. Loss of, or low secondary (battery) voltage.
- d. Any open circuit.
- e. Any ground short not part of system design.
- f. Silencing alarm gong system.
- g. Operation of the post indicator valve tamper switch.

2.3 FIRE ALARM MUNICIPAL TRANSMITTER: The municipal transmitter shall meet the requirements of NFPA 1221 and be mounted in the fire alarm control panel. The transmitter shall be the positive noninterfering, local energy, successive type, capable of transmitting four rounds of Code Number 1614 to the fire station.

OPTIONAL FIRE ALARM MASTER BOX: The Contractor may elect to provide a separately mounted master box for transmitting fire alarm signals. If this option is chosen, the master box shall conform to the above requirements and be manually wound. The master box enclosure shall be "Signal Red," suitable for outdoor surface mounting and be the non-break, glass type. The master box shall be Gamewell Model No. M34-56. Vendor submittals shall show required conduit and conductor changes to the Drawings if this option is used.

2.4 SUPERVISORY CODE TRANSMITTER: The supervisory code transmitter shall be mounted in the fire alarm control panel. It shall be of the positive, noninterfering, local energy, successive type. The transmitter shall be capable of transmitting one round of the code number 71614 to the fire station. The transmitter shall be fully compatible with the existing area loop.

OPTIONAL SUPERVISORY CODE TRANSMITTER: The Contractor may elect to provide a separately mounted supervisory code transmitter. If this option is chosen, the transmitter shall conform to the above requirements and be manually wound. The enclosure shall be lockable, shall be finished in royal blue, and be suitable for outdoor surface mounting. The

transmitter shall be Gamewell Model No. M34-72. Vendor submittals shall show required conduit and conductor changes to the Drawings if this option is used.

2.5 **MANUAL FIRE ALARM STATIONS:** Manual fire alarm stations shall be noncoded, nonself-restoring type with double-pole, double-throw positive action contacts. The fire alarm manual stations shall meet the requirements of UL 38, be for indoor surface mounting, and be finished "Signal Red."

2.6 **END-OF-LINE DEVICE:** The end-of-line resistor, capacitor, or diode shall be sized and provided by the fire alarm equipment supplier.

2.7 **FIRE ALARM GONG:** The fire alarm gong shall be a single-stroke, 6 inch diameter bell with universal mounting plate. The fire alarm gong shall operate on 24 volt dc and be finished "Signal Red."

2.8 **SOLDERLESS CONNECTORS AND TERMINALS--600 VOLTS AND LESS:** Refer to Section 16400, Paragraph 2.6.

2.9 **RACEWAYS AND FITTINGS:** Refer to Section 16400, Article 2.13.

2.10 **CONDUCTORS**

2.10.1 **General**

2.10.1.1 Conductors shall be No. 14 AWG, minimum, stranded copper type THHN or XHHW and be of the AWG size shown on the Drawings.

2.10.1.2 Conductors shall be readily identified by a continuous permanent marking on the insulation to indicate the type, voltage, gauge, and manufacturer.

2.10.2 **Aerial Fire Alarm Cable:** Aerial cable shall be two-conductor, No. 14 AWG, self-supporting, 30 percent conductivity copper-covered steel with single extrusion high-density polyethylene insulation and red color PVC jacket. Triangle/PWC No. KN644253.

2.11 **LAMINATED PLASTIC NAMEPLATES:** Nameplates shall be 1/16 inch thick, black satin finish with white core. Front four edges shall have a 1/32 inch by 45 degree bevel.

2.12 **WIRE PULLING COMPOUND:** Wire pulling compound shall be "Y-er Eas" manufactured by Electro Compound Company or as specified by the cable manufacturer.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

3.1.1 **Interpretation of Drawings and Specification:** The Drawings show the general layout of the complete fire alarm system including the arrangement of circuits, control panels, manual stations, alarms, and other equipment. Verify the scale dimensions on the Drawings since actual locations,

distances, and levels shall be governed by actual field conditions. Perform all work in accordance with NFPA 70, 72B, and 1221.

3.1.2 Installation Instruction: The term "equipment" is defined as all components of a wiring system including conduit, raceways, control panels, cabinets, outlet boxes, lighting fixtures, etc. Fasten equipment securely to the structural members of the building, to metal supports attached to the structure, or to concrete surfaces. Use clamping devices for attaching to structural steel, or, when clamping is impracticable, obtain written authority from the Government's Representative to weld to, drill, or cut structural members to provide attachment. Fasten equipment to concrete or masonry with expansion anchors. Attachment to drywall shall be by screws into studs and to metal wall panels by weld studs, bolts, or self-tapping metal screws. Locate equipment, boxes, and conduit approximately where shown in relation to equipment served. Do not install conduit raceways and boxes in positions that interfere with the work of other trades.

3.1.3 Use the appropriate special tools when installing devices for which special installation tools are recommended by the manufacturer.

3.2 INSTALLING CONDUIT: Refer to Section 16400, Article 3.3.

3.3 INSTALLING CONDUCTORS

3.3.1 Do not bend cables installed in wireways to less than the cable manufacturer's recommended minimum bending radius.

3.3.2 Use the following color code for fire alarm system conductors:

<u>Circuit</u>	<u>Color of Wire Insulation</u>
Area Fire Alarm Loop--from Fire Station or from Area Fire Alarm Control Cabinet to the Fire Alarm Control Panel	Red
Alarm Initiating Devices--detectors, manual stations, etc.	Red
Supervisory Devices--limit switches, pressure supervisory switches, etc.	Yellow
Other Wiring	Different from preceding colors but not Green, Orange, Blue, or Brown
AC Power	Black and White

3.3.3 Use lubricant recommended by the cable manufacturer's written instructions, or the wire pulling compound specified, to decrease friction when pulling wire and cable through conduit.

3.3.4 Do not install or handle wires with thermoplastic insulation or jacket when the ambient temperature is 15 F or below.

3.4 INSTALLING DEVICES

3.4.1. Wiring and equipment within the fire alarm control panel shall be arranged so that individual sub-panels or components are readily accessible for adjustment or maintenance without disconnecting conductors.

3.4.2. If a separately mounted fire alarm master box and supervisory code transmitter are chosen in lieu of modules in the fire alarm control panel, the units shall be located as close as possible to the control panel on the exterior of the building. The Contractor shall modify conduit and conductor routings to comply with this option.

3.5 SPLICES, TAPS, AND CABLE TERMINATIONS: Refer to Section 16400 for cable terminations. Splices in fire alarm wiring are not acceptable.

3.6 TESTING

3.6.1 General

3.6.1.1 Test electrical equipment and wiring installed under this Specification before any attempt is made to operate the equipment. Resistance, current, and voltage measurements may be made as work progresses. Maintain a systematic record by using a schedule or chart of all tests and measurements. Provide space to record readings, dates, and witnesses. Notify the Government's Representative before the start of all required tests. Correct all items found, during testing or examination by the Government's Representative, to be at variance with the Drawings and this Specification. Deliver testing reports to the Government's Representative weekly as completed.

3.6.1.2 Furnish all instruments, labor, and equipment required to conduct testing.

3.6.1.3 Use test instruments which bear a valid calibration stamp showing the date of calibration and expiration date of the stamp. The calibration and accuracy of test instruments shall be certified by an independent testing laboratory having laboratory standards traceable to the National Bureau of Standards.

3.6.1.4 In addition to the testing specified to be performed by the Contractor, the installation will be subject to examination by the Government's Representative for conformance with the design and all applicable codes. Assist the Government's Representative as requested.

3.6.2 Wiring Systems

3.6.2.1 Test all fire alarm circuits for continuity.

3.7 The operability of the fire alarm system shall be verified by ATP No. 4536. This ATP is provided with the design package.

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APPENDIX A

SAMPLE BATTERY CALCULATION

ALARM MANUFACTURER: Fireco
ALARM PANEL TYPE: Model FACP-7
REFERENCE DRAWINGS: M123 Control Panel Wiring Diagram
M374 Zone Alarm Module
M339 Alarm Trouble Module, etc

CURRENT DEMAND

SYSTEM COMPONENTS	NORMAL SUPERVISORY	ALARM CONDITION
Zone Alarm Module	0.005A	0.065A
Trouble Module	0.003A	0.020A or 0.0
Fire Alarm Module	0.005A	0.050A
Ionization Detectors	0.003A	0.035A
Ultraviolet Detectors	0.005A	0.045A
Indicator Lamp	-	0.030A
Auxiliary Relay Coil	-	0.025A
Masterbox Coil	-	0.045A

SYSTEM COMPONENTS

NORMAL SYSTEM DEMAND

(6) Zone Alarm Modules	0.030
(1) Trouble Module	0.003
(1) Fire Alarm Module	0.005
(3) Ionization Detectors	0.009
(1) Ultraviolet Detector	0.005
	0.052A @ 60 hr = 3.120AH

SYSTEM COMPONENTS

FIRE ALARM DEMAND

(5) Zone Module (Supervisory)	0.025
(1) Zone Module (Alarm)	0.065
Fire Alarm Module	0.050
(2) Ionization Detectors	0.070
Indicator Lamp	0.030
Aux Relay Coil	0.025
Masterbox Coil	0.045
	0.310A @ 1 hr = 0.310AH

CONTINGENCY - 20% of normal Supr Demand 3.12 AH 0.624AH

TOTAL TIME ADJUSTED CURRENT DRAW: 4.054AH

END OF APPENDIX A

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APPENDIX 4B

DESIGN DRAWINGS

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APPENDIX 4B

DESIGN DRAWINGS

This appendix contains the following design drawings:

8	H-6-1552	CIVIL/DWG LIST SITE PLAN, SECTIONS & DETAILS ECN 626113 (12/08/95)	Rev. 4
9	H-6-1553	ARCHITECTURAL PLAN, ELEVATIONS & SECTIONS ECN 626021 (10/10/95) ECN 626113 (12/08/95)	Rev. 4
10	H-6-1554	ARCHITECTURAL PLAN, ELEVATIONS AND DETAILS (sheet 1 of 2) ECN 626021 (10/10/95)	Rev. 4
11	H-6-1554	ARCHITECTURAL PLAN, ELEVATIONS AND DETAILS (sheet 2 of 2) ECN 626021 (10/10/95)	Rev. 0
12	H-6-1555	ARCH PLAN, SCHED, DETAILS & SECTIONS	Rev. 3
13	H-6-1556	STRUCTURAL PLAN & SECTIONS (sheet 1 of 2) ECN 191786 (10/28/93) ECN 176589 (11/16/93) ECN 605639 (01/17/94) ECN 605649 (08/01/94) ECN 617714 (01/30/95) ECN 626021 (10/10/95)	Rev. 4
14	H-6-1557	STRUCTURAL ELEVATION, DETAILS & SECTIONS (sheet 1 of 2) CEO 041129 (01/08/87)	Rev. 3
15	H-6-1557	STRUCTURAL ELEVATION, DETAILS & SECTIONS (sheet 2 of 2)	Rev. 1
16	H-6-1558	STRUCTURAL PLAN, SECTIONS, EL & DETAILS	Rev. 2
17	H-6-1559	HVAC/PIPING PLANS, ELEVATION & SECTIONS (sheet 1 of 3) ECN 173594 (05/23/93) ECN 608525 (11/08/94) ECN 613355 (12/15/94) ECN 623622 (08/21/95) ECN 626021 (10/10/95) ECN 626113 (12/08/95)	Rev. 5
18	H-6-1559	HVAC/PIPING PLANS, ELEVATION & SECTIONS (sheet 2 of 3) ECN 173594 (05/20/93) ECN 623622 (05/21/95) ECN 626021 (10/10/95)	Rev. 2

1	H-6-1559	PIPING ISOMETRICS (sheet 3 of 3) ECN 173588 (10/22/92) ECN 608525 (11/08/94) ECN 613355 (12/15/94)	Rev. 1
2	H-6-1560	ELEC/PIPING EL, SECT, DIAG, SCHED & DET ECN 616253 (12/27/95) ECN 617748 (04/24/95) ECN 626001 (10/10/95) ECN 626113 (12/08/95)	Rev. 4
3	H-6-1561	ELECTRICAL PLANS, EL, DIAG & DET ECN 196404 (05/10/95) ECN 617727 (07/10/95) ECN 617748 (04/24/95) ECN 626021 (10/10/95) ECN 626113 (12/08/96)	Rev. 6
4	H-6-1608	ELECTRICAL RADIO FIRE ALARM PLAN AND DIAGRAM ECN 196404 (05/10/95) ECN 626021 (10/10/95) ECN 626113 (12/08/95)	Rev. 3
5	H-6-10610	FIRE PROTECTION SPRINKLER SYSTEM (sheet 1 of 2) ECN 626021 (10/10/95) ECN 626113 (12/08/95)	Rev. 0
6	H-6-10610	FIRE PROTECTION DETAILS AND SECTIONS (sheet 2 of 2) ECN 196404 (05/10/95) ECN 626021 (10/10/95) ECN 626113 (12/08/95)	Rev. 0

7

BOORUM & PEASE

212-32

MADE IN U.S.A. PATENT NO. 3,643,360

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IPF # 10

ENGINEERING CHANGE NOTICE

1. ECN 626113

Page 1 of 3

Proj.
ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. LJ GASCHOTT, 87250, T4-03, 373-4367	3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date December 8, 1995
	5. Project Title/No./Work Order No. NRDWSF/A5V78	6. Bldg./Sys./Fac. No. 616	7. Approval Designator N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) SEE BLOCK 12	9. Related ECN No(s). 626114	10. Related PO No. N/A

11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date
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12. Description of Change
Change the Essential/Support status of the drawings listed on page 3 of this ECN.

13a. Justification (mark one)

Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
Drawings on the essential and support drawing list have been re-evaluated. Essential drawings were determined to be unnecessary, and are changed to support drawings.

14. Distribution (include name, MSIN, and no. of copies)
LJ Gaschott, T4-03, 1
File, T4-03, 1
NP Emerson, T4-03, 1
PJ Crane, T4-04, 1
JT Schorzman, T4-04, 1

skt 3 4 15 20

RELEASE DATE
JAN 10 1996
DATE: _____
STA: **5**
HANFORD RELEASE
12

**ENGINEERING CHANGE NOTICE
CONTINUATION SHEET**

Page 3 of 3

ECN 626113

Date 12/8/95

Change the essential/support status of the following drawings:

H-6-1552, Sh. 1, Rev. 4, Change from essential to support
H-6-1553, Sh. 1, Rev. 4, Change from essential to support
H-6-1559, Sh. 1, Rev. 5, Change from essential to support
H-6-1560, Sh. 1, Rev. 4, Change from essential to support
H-6-1561, Sh. 1, Rev. 6, Change from essential to support
H-6-1608, Sh. 1, Rev. 3, Change from essential to support
H-6-10610, Sh. 1, Rev. 0, Change from essential to support
H-6-10610, Sh. 2, Rev. 0, Change from essential to support

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IPF 10

ESSENTIAL

ENGINEERING CHANGE NOTICE

1. ECN **626.021**

Page 1 of 3

Proj.
ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. LJ Gaschott, 87250, T4-03, 373-4367	3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date October 10, 1995
	5. Project Title/No./Work Order No. 616 Historical Drawings	6. Bldg./Sys./Fac. No. 616	7. Approval Designator NA
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) See Block 12		9. Related ECN No(s). NA	10. Related PD No. NA

11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. NA	11c. Modification Work Complete NA Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) NA Cog. Engineer Signature & Date
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12. Description of Change
Drawings affected by this ECN: See page 3
 Add the following statement to all drawings affected by this ECN:
"HISTORICAL -- For Historical Reference Only for 616. Not to be used as "as-built" drawing. This drawing may not reflect current configuration of 616."

13a. Justification (mark one)

Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
These drawings have not been "as-built" per WHC-CM-5-34. They are considered to be of minimal value to current operations, but are a good historical reference.

14. Distribution (include name, MSIN, and no. of copies)
LJ Gaschott, T4-03, 2
SWDPC, T4-03, 1
Rel sta 4, 5, 6, 20
PJ Crane, T4-04, 1
JT Schorzman, T4-04, 1
NP Emerson, T4-04, 1

RELEASE STAMP

OFFICIAL RELEASE
BY WHC **55**
DATE **OCT 20 1995**
Ata 5

Ata 3, 4, 5, 15, 20

ENGINEERING CHANGE NOTICE
CONTINUATION SHEET

ECN 626021

Page 3 of 3

Date 10/10/95

DRAWING NO	SHEET	REV
H 060000977	1	C01
H 060001553	1	R04
H 060001554	1	R04
H 060001554	2	C00
H 060001556	1	R04
H 060001559	1	R05
H 060001559	2	R02
H 060001560	1	R04
H 060001561	1	R06
H 060001608	1	C03
H 060010608	1	C00
H 060010610	1	C00
H 060010610	2	C00
H 130000014	1	C00

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ENGINEERING CHANGE NOTICE

1. ECN **191786**

Page 1 of 5

Proj.
ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> [X] Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. D.B. Bodily, 87250, T4-03, 373-2188	4. Date 10/28/93
5. Project Title/No./Work Order No. 616 LIFTING PLATFORM		6. Bldg./Sys./Fac. No. 616
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) SEE BLOCK 12		7. Impact Level 3SQ
9. Related ECN No(s). N/A		10. Related PO No. N/A

11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-93-00231	11c. Modification Work Complete Cog. Engineer Signature & Date
		11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date

- 12. Description of Change**
- 1) Add a sheet 2 and sheet 3 to drawing H-6-1556 Rev. 3., *SH. I.*
 - 2) Add drawings and details on page 3 of this ECN to sheet 2 of drawing H-6-1556 Rev. 0.
 - 3) Add assembly and detail drawings on page 4 of this ECN to sheet 3 of drawing H-6-1556 Rev. 0.
 - 4) Add information per the clouded area on page 5 of this ECN to drawing H-6-1556 Rev. 3

13a. Justification (mark one) As-Found <input type="checkbox"/>	Criteria Change <input type="checkbox"/>	Design Improvement <input checked="" type="checkbox"/> [X]	Environmental <input type="checkbox"/>
	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 These drawings and details document the location of the lifting platform at 616.

14. Distribution (include name, MSIN, and no. of copies) D.B. Bodily, T4-03, 1 S. Griffin, T4-03, 1 (File copy) S. Turner, T4-06, 1 J. Elliott, T4-06, 1 STA #4 RI-29	RELEASE STAMP <div style="border: 1px solid black; padding: 5px;"> OFFICIAL RELEASE BY WHC 63 DATE NOV 04 1993 <i>Sta #6</i> </div>
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ENGINEERING CHANGE NOTICE

15. Design Verification Required [X] Yes [] No	16. Cost Impact		CONSTRUCTION		17. Schedule Impact (days) Improvement [] Delay [] N/A
	ENGINEERING	Additional [] \$ Savings [] \$ N/A	Additional [] \$ Savings [] \$ N/A		

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD		Seismic/Stress Analysis		Tank Calibration Manual	
Functional Design Criteria		Stress/Design Report		Health Physics Procedure	
Operating Specification		Interface Control Drawing		Spare Multiple Unit Listing	
Criticality Specification		Calibration Procedure		Test Procedures/Specification	
Conceptual Design Report		Installation Procedure		Component Index	
Equipment Spec.		Maintenance Procedure		ASME Coded Item	
Const. Spec.		Engineering Procedure		Human Factor Consideration	
Procurement Spec.		Operating Instruction		Computer Software	
Vendor Information		Operating Procedure		Electric Circuit Schedule	
OM Manual		Operational Safety Requirement		ICRS Procedure	
FSAR/SAR		IEFD Drawing		Process Control Manual/Plan	
Safety Equipment List		Cell Arrangement Drawing		Process Flow Chart	
Radiation Work Permit		Essential Material Specification		Purchase Requisition	
Environmental Impact Statement		Fac. Proc. Samp. Schedule			
Environmental Report	N/A	Inspection Plan	N/A		N/A
Environmental Permit		Inventory Adjustment Request			

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
N/A		

20. Approvals

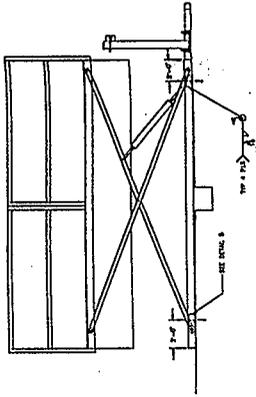
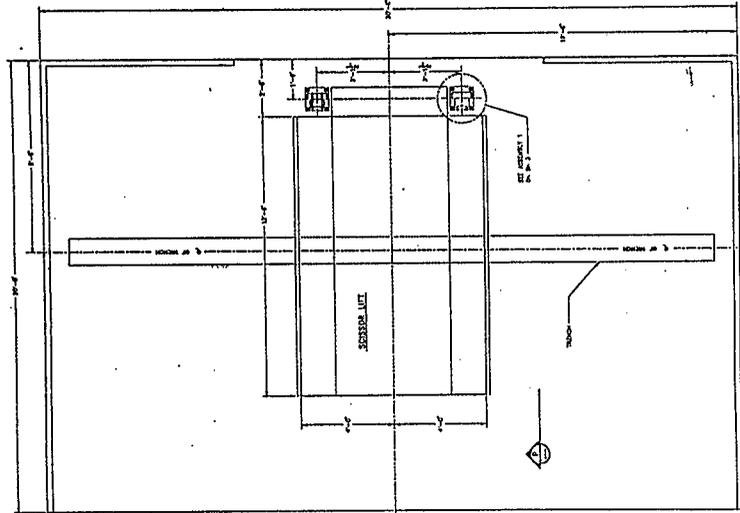
Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer <i>D.B. Aditya</i>	<u>10/28/93</u>	PE	_____
Cog. Mgr. <i>D. Stuebel</i>	<u>11/2/93</u>	QA	_____
QA <i>E. Elliott</i>	<u>11-2-93</u>	Safety	_____
Safety <i>W. P. ...</i>	<u>11-2-93</u>	Design	_____
Security	_____	Environ.	_____
Environ.	_____	Other	_____
Projects/Programs	_____		_____
Tank Waste Remediation System	_____		_____
Facilities Operations	_____	DEPARTMENT OF ENERGY	_____
Restoration & Remediation	_____	Signature or Letter No.	_____
Operations & Support Services	_____		_____
IRM	_____	ADDITIONAL	_____
Other Inv. Rep. <i>P.M. Rubens</i>	<u>10/28/93</u>		_____
<i>J. P. ...</i>	<u>11-2-93</u>		_____

ENGINEERING CHANGE NOTICE CONTINUATION SHEET

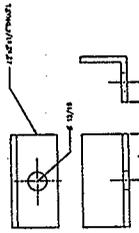
PAGE 4 OF 5

191786

1 ECH



ELEVATION
SCALE 3/4" = 1'-0"



DETAIL 5
SCALE 3/4"

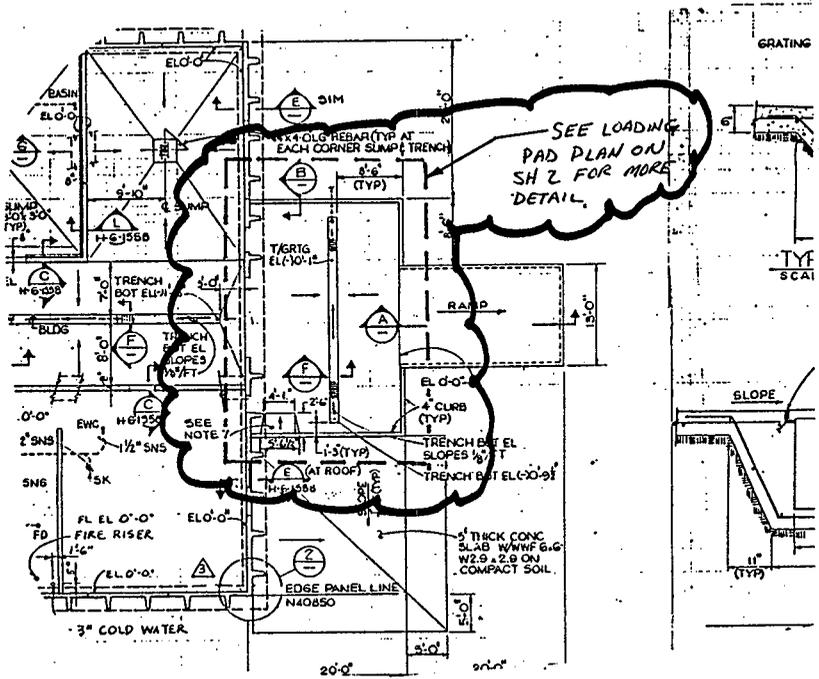
- GENERAL NOTES (CONTINUED FROM PAGE 3)
1. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
 2. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
 3. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
 4. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
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 18. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
 19. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.
 20. CHECK ALL DIMENSIONS AND SPACING AGAINST DRAWING.

LOADING PAD PLAN
SCALE 3/4" = 1'-0"

NO.	REVISION	DATE	BY	CHKD.	APP'D.
1	AS SHOWN				
2					
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20					

LOADING PAD
PLAN

DATE: 11-6-1958
BY: [Signature]
CHKD.: [Signature]
APP'D.: [Signature]

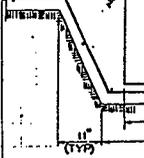


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ENGINEERING CHANGE NOTICE

CECN

1. ECN 176589

Page 1 of 3

Proj.
ECN

- ECN Category (mark one)
- Supplemental
 - Direct Revision
 - Change ECN
 - Temporary
 - Standby
 - Supersedeure
 - Cancel/Void

3. Originator's Name, Organization, MSIN, and Telephone No.
J.E. CONNER (C-1870), 23440, T2-03, 3-3154

4. Date
Nov 16, 1993

5. Project Title/No./Work Order No.
616 LIFTING PLATFORM

8. Bldg./Sys./Fac. No.
616

7. Impact Level
3SQ

8. Document Numbers Changed by this ECN (includes sheet no. and rev.)
H-6-1556, Rev 3, Sht 1

9. Related ECN No(s).
191786

10. Related PO No.
N/A

11a. Modification Work
 Yes (fill out Blk. 11b)
 No (NA Blks. 11b, 11c, 11d)

11b. Work Package No.
W/D 2H9301779F

11c. Modification Work Completed

Cog. Engineer Signature & Date

11d. Restored to Original Condition (Temp. or Standby ECNs only)
N/A

Cog. Engineer Signature & Date

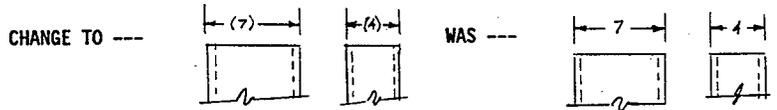
12. Description of Change

THIS ECN CHANGES ECN 191786 IN PART

(1) CHANGE THE MATERIAL/REFERENCE OF ITEM #5 (BUMPER POST), SHOWN ON ECN 191786, PAGE 3 OF 5 AS FOLLOWS:

CHANGE TO --- **ASTM A 500, GR. B** WAS --- **ASTM A 36**

(2) PAGE 3 OF 5, OF ECN 191786, DETAIL OF BUMPER POST IS AS FOLLOWS:



(3) PAGE 3 OF 5, OF ECN 191786, BUMPER GUARD ASSEMBLY DETAIL, WELDING OF ITEM #4 TO ITEM #5 IS AS FOLLOWS:



- 13a. Justification (mark one)
- Criteria Change
 - Design Improvement
 - Environmental
 - As-Found
 - Facilitate Const.
 - Const. Error/Omission
 - Design Error/Omission

13b. Justification Details
CHANGES REQUIRED TO CLARIFY WELDING, MATERIAL AND FABRICATION REQUIREMENTS.

14. Distribution (include name, MSIN, and no. of copies)

J.E. CONNER,	T2-03	D. BODILY,	T4-03
M. LACY,	T2-08	D. POWELL,	T4-03
J. BRESINA,	T2-06	A. PINES,	T4-10

RELEASE STAMP

OFFICIAL RELEASE 63
BY WHC

DATE **NOV 18 1993**
Sta #6

STA#4 *R1-29*

SUPPORT

ENGINEERING CHANGE NOTICE

Page 2 of 3

1. ECN (use no. from pg. 1)

176589

15. Design Verification Required

Yes
 No

16. Cost Impact

ENGINEERING

Additional \$ N/A
Savings \$ _____

CONSTRUCTION

Additional \$ N/A
Savings \$ _____

17. Schedule Impact (days)

Improvement N/A
Delay _____

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	_____	<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>	<u>N/A</u>	<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>	_____	<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
<u>N/A</u>	_____	_____
_____	_____	_____
_____	_____	_____

20. Approvals

Signature	Date
OPERATIONS AND ENGINEERING	
* Cog. Engineer <u>D. Brady</u>	<u>11/17/93</u>
* Cog. Mgr. <u>D. Poyzell</u>	<u>11/17/93</u>
* QA <u>Michael J. Jany (1-4)</u>	<u>11/17/93</u>
* Safety <u>A. Pines</u>	<u>11/17/93</u>
Security _____	_____
Environ. _____	_____
Projects/Programs _____	_____
Tank Waste Remediation System _____	_____
Facilities Operations _____	_____
Restoration & Remediation _____	_____
Operations & Support Services _____	_____
IRM _____	_____
Other <u>Independent Review Requester R.R. Barber</u>	<u>11/16/93</u> <u>11-17-93</u>

Signature	Date
ARCHITECT-ENGINEER	
PE _____	_____
QA _____	_____
Safety _____	_____
Design _____	_____
Environ. _____	_____
Other _____	_____
DEPARTMENT OF ENERGY	
Signature or Letter Number _____	_____
ADDITIONAL	
<u>Dep. Eng. (MWE) J. Thomas</u>	<u>11/16/93</u>
_____	_____
_____	_____

(4) PAGE 4 OF 5 OF ECN 191786, GENERAL NOTE 12 IS AS FOLLOWS:

CHANGE TO --- 12. WELD AND INSPECT PER AWS D1.1

WAS --- 12. WELD AND INSPECT PER AWS D1.3

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ENGINEERING CHANGE NOTICE

Page 1 of 3

1. ECN **605639**

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input checked="" type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>		3. Originator's Name, Organization, MSIN, and Telephone No. <i>MLCZWB</i> D. B. Bodily, 87250, T4-03, 373-2188			4. Date 1/17/94	
5. Project Title/No./Work Order No. <i>616 LIFTING 2X-93-231 PLATFORM</i>		6. Bldg./Sys./Fac. No. 616		7. Impact Level 3SQ		
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) See Block 12		9. Related ECN No(s). ECN 191786		10. Related PO No. N/A		
11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)		11b. Work Package No. 2X-93-231		11c. Modification Work Complete <hr/> Cog. Engineer Signature & Date		
11d. Restored to Original Condition (Temp. or Standby ECN only) N/A		Cog. Engineer Signature & Date		Cog. Engineer Signature & Date		
12. Description of Change Delete all-around designation on weld symbol in elevation detail "P" on drawing H-6-1556 Sht. 2 Rev. 3 ^{1, 2} and add note as shown on page 3 of this ECN. <div style="margin-left: 40px;"> 1 2 3 1/17/94 11/29/94 </div>						
13a. Justification Criteria Change <input type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const. <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input checked="" type="checkbox"/>						
13b. Justification Details Weld cannot be completed as shown in weld callout.						
14. Distribution (include name, MSIN, and no. of copies) D.B. Bodily, T4-03, 1 S. Griffin, T4-03, 1 S. Turner, T4-06, 1 J. Elliott, T4-06, 1					RELEASE STAMP <div style="border: 1px solid black; padding: 5px; text-align: center;"> OFFICIAL RELEASE BY WHC DATE JAN 20 1994 55 <i>Stale</i> </div>	

STA. 3.46

ENGINEERING CHANGE NOTICE

605639

15. Design Verification Required [X] Yes [] No	16. Cost Impact		17. Schedule Impact (days)	
	ENGINEERING	N/A	CONSTRUCTION	N/A
	Additional [] \$	Additional [] \$	Improvement []	Delay []
	Savings [] \$	Savings [] \$		

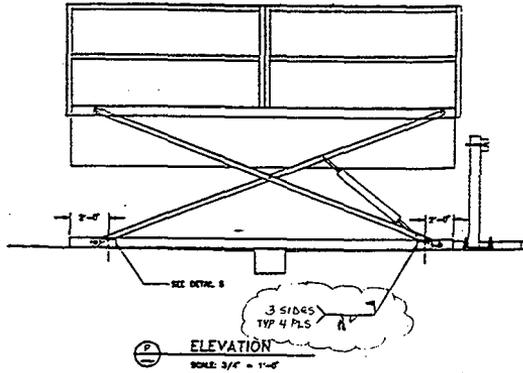
18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		
Environmental Report	[]	Inspection Plan	[]		
Environmental Permit	[]	Inventory Adjustment Request	[]		

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
N/A		

20. Approvals		20. Approvals	
Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer <i>W. J. Doherty</i>	<u>1/17/94</u>	PE	_____
Cog. Mgr. <i>D. B. Powell</i>	<u>1-17-94</u>	QA	_____
QA <i>Tom Elliott</i>	<u>1-17-94</u>	Safety	_____
Safety <i>A. J. Jones</i>	<u>1-17-94</u>	Design	_____
Security	_____	Environ.	_____
Environ.	_____	Other	_____
Projects/Programs	_____		_____
Tank Waste Remediation System	_____		_____
Facilities Operations	_____	DEPARTMENT OF ENERGY	
Restoration & Remediation	_____	Signature or Letter No.	
Operations & Support Services	_____		_____
IRM	_____	ADDITIONAL	
Other Ind. Review <i>P.M. Reardon</i>	<u>1/17/94</u>		_____
	_____		_____



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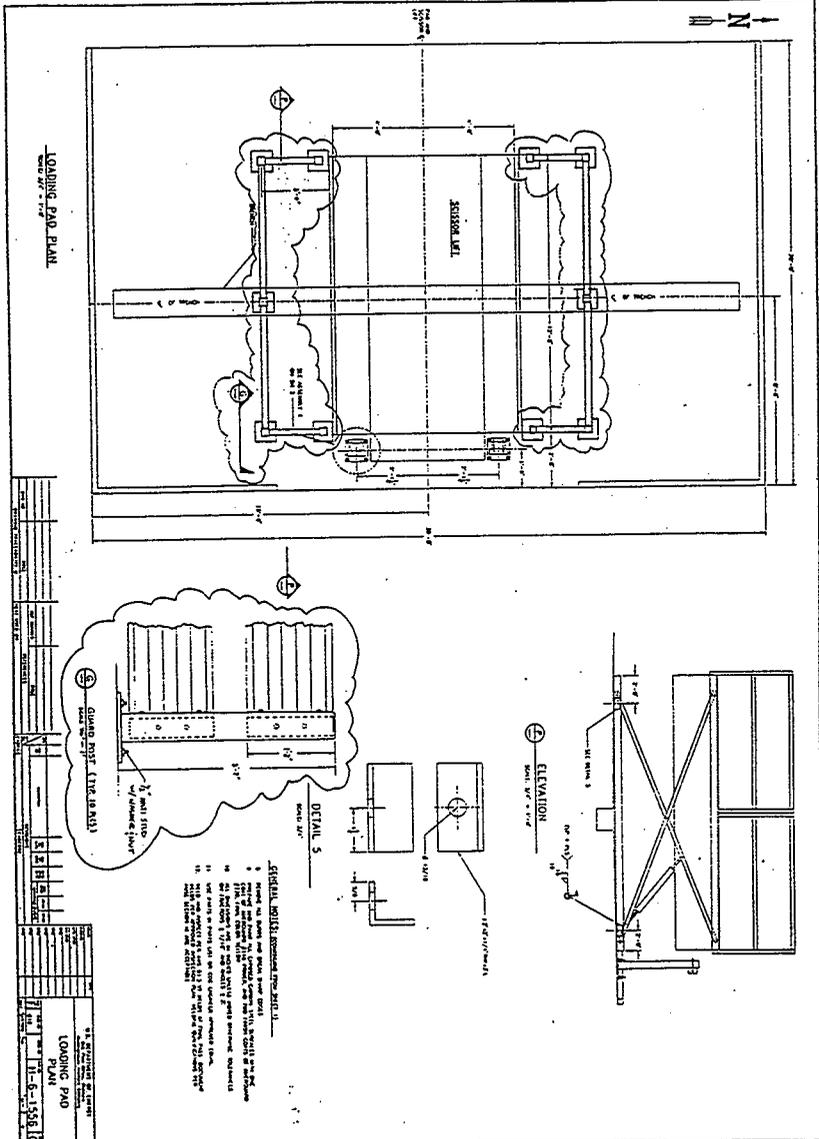
ENGINEERING CHANGE NOTICE

1. ECN 605649

Page 1 of 3

Proj.
ECN

<p>2. ECN Category (mark one)</p> <p>Supplemental <input checked="" type="checkbox"/> [X] Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/></p>	<p>3. Originator's Name, Organization, MSIN, and Telephone No.</p> <p>D.B. BODILY, 87250, T4-03, 373-2188 A130A</p>	<p>4. Date</p> <p>8-1-94</p>	
	<p>5. Project Title/No./Work Order No.</p> <p>INSTALL SCISSOR LIFT GUARDS</p>	<p>6. Bldg./Sys./Fac. No.</p> <p>616</p>	<p>7. Approval Designator</p> <p>N/A</p>
	<p>8. Document Numbers Changed by this ECN (includes sheet no. and rev.)</p> <p>SEE BLOCK 12 N/A 788 8/2/94</p>	<p>9. Related ECN No(s).</p> <p>N/A</p>	<p>10. Related PO No.</p> <p>N/A</p>
<p>11a. Modification Work</p> <p>[X] Yes (fill out Blk. 11b) [] No (NA Blks. 11b, 11c, 11d)</p>	<p>11b. Work Package No.</p> <p>2X-94-331</p>	<p>11c. Modification Work Complete</p> <p>MAR 06 1995 (12) C. Jackson 3/1/95 Cog. Engineer Signature & Date</p>	<p>11d. Restored to Original Condition (Temp. or Standby ECN only)</p> <p>N/A</p> <p>Cog. Engineer Signature & Date</p>
<p>12. Description of Change</p> <p>1 Rev. 4 888 per telecom 8/2/94 SMC</p> <p>Revise drawing H-6-1556 sheet 2, rev. 0 to add scissor lift personnel guard rails per clouded areas on page 3 of this ECN.</p> <p>Reinstate(Redraw) H-6-1556 Sheet 2 at Revision 2 to reflect information contained in ECN-191786 and Sheet 3 of this ECN. Also add additional sheets as necessary.</p>			
<p>13a. Justification Criteria Change [] Design Improvement [X] Environmental []</p> <p>(mark one) As-Found [] Facilitate Const. [] Const. Error/Omission [] Design Error/Omission []</p>			
<p>13b. Justification Details</p> <p>Installation of the personnel guards protect operators from potential pinch points on the scissor lift.</p> <p>DESIGN VERIFIED BY INDEPENDENT REVIEW.</p>			
<p>14. Distribution (include name, MSIN, and no. of copies)</p> <p>D.B. Bodily, T4-03, 1 S. Griffin, T4-03, 1 (file copy) S. Turner, T4-06, 1 CDWS #3, 52-05, 1 CDWS #4, R1-29, 1 CDWS #20, T4-00, 1</p>		<p>RELEASE STAMP</p> <p>OFFICIAL RELEASE (12) BY WHC DATE AUG 03 1994 Sta # 6</p>	



NO.	DESCRIPTION	DATE	BY	CHECKED	APPROVED
1	ISSUED FOR CONSTRUCTION	8/1/94	J. J. [Signature]	[Signature]	[Signature]
2	REVISION				
3	REVISION				
4	REVISION				
5	REVISION				
6	REVISION				
7	REVISION				
8	REVISION				
9	REVISION				
10	REVISION				
11	REVISION				
12	REVISION				
13	REVISION				
14	REVISION				
15	REVISION				
16	REVISION				
17	REVISION				
18	REVISION				
19	REVISION				
20	REVISION				

- DETAIL 5 (SEE SECTION A-A)
1. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 2. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 3. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 4. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 5. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 6. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 7. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 8. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 9. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 10. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 11. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 12. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 13. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 14. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 15. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 16. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 17. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 18. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 19. REVISION TO BE MADE TO THE ORIGINAL DESIGN.
 20. REVISION TO BE MADE TO THE ORIGINAL DESIGN.

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ENGINEERING CHANGE NOTICE

1. ECN No **617714**

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input checked="" type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersede <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. KR Busching, 87250, T4-03, 3-2106	3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date 1/30/95
	5. Project Title/No./Work Order No. Install Scissor Lift Guards	6. Bldg./Sys./Fac. No. 616	7. Approval Designator NA
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) H-6-1556 SH 1 REV 4		9. Related ECN No(s). 605649	10. Related PO No. NA

11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-94-331	11c. Modification Work Complete <hr/> Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) NA <hr/> Cog. Engineer Signature & Date
---	---	---	--

12. Description of Change
CHANGE 1/2" HILTI STUD TO 3/4" HILTI STUD ON SECTION G of page 3 of ECN 605649.

13a. Justification (mark one)

Criteria Change <input type="checkbox"/>	Design Improvement <input checked="" type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
**1/2" studs are too small for the holes.
 Design Verification by Independent Review**

14. Distribution (include name, MSIN, and no. of copies)
**CL Jackson, T4-03, 1 SA Griffin (File copy), T4-03, 1
 GS Turner, T4-06, 1 SWDPC, T3-01, 1
 Rel Sta 3, S2-05; 4, r1-29; 20,T4-00; 5,6; 1EA**

RELEASE STAMP

OFFICIAL RELEASE (2)

BY WHC

DATE **JAN 31 1995**

He 4

EO No. 41129

Priority E

Is A Cross Reference To AUTHORIZATION NO. WX52N

Prepared By J.H. HUBER 1-8-87 Date

Preparer's Immediate Manager J.M. Peter 1-20-87 Date

Checked By J.M. Peter 1-14-88 Date

Approved By J.M. Peter 1-8-87 Date

Copyist Design Manager J.M. Peter 1-20-87 Date

Quality Assurance P.E. Norton 1-16-87 Date

Health, Safety & Environment J.M. Peter 1-16-87 Date

Criticality Engineering & Analysis Date

Process Engineering Date

PLANT ENGINEERING Date

WELDING ENGINEER Date

OPERATIONS Date

RELEASE STAMP: J. S. M... 1/14/87

Draw # 3

OFFICIALLY FILED

1987 JUN 20 11 12 55

BD-6400-093.1 (12-84)

Change Type 2

Impact Level 1

Project No. 616

Responsible Engineer J.H. HUBER 3-1145

Responsible Organization PLT. F.M. 31570

Sheet No. 1

Rev. 1

Next Used On/Title STRUCTURAL ELEVATIONS, DETAILS & SECTIONS

THIS EO SUPERSEDES EO 40216, 12-31-86 IN FULL AND DIFFERS AS FOLLOWS: 1) HAND RAILING CHANGED 2) HEIGHT OF CAGE EXTENDED 3) SAFETY RAILING ON WALL ADDED.

Work Completed JUN 05 1990

Design Manager J.H. Huber

Approval

FOR DESIGN USE ONLY

DWG. TBC Yes No

Rockwell Hanford Operations
Richland, WA 99352

ENGINEERING ORDER

Index No. 1000

CEI No./Tree H-6-1557

Document No. H-6-1557

1) ADD "IMPACT LEVEL III" TO DWG.

2) ADD FOLLOWING NOTES TO DWA., APPLICABLE TO THE LADDER STEEL CAGE:
 1. ALL MATERIAL SHALL BE ASTM A 36 C.S. UNLESS OTHERWISE NOTED
 - IMPACT LEVEL III.

3. PREPARE AND PAINT ALL EXPOSED CARBON STEEL SURFACES WITH ONE COAT AMERCOAT #187 PRIMER, AND TWO FINISH COATS OF AMERCOAT #33, FINAL COLOR GREY ON CAGE AND LADDER, FINAL COLOR YELLOW ON ALL HAND RAILINGS AND SAFETY RAILINGS. SEE MFES INSTRUCTIONS - OR ENGR. APPROV. EQUAL.

4. REMOVE ALL BURRS AND BREAK SHARP EDGES.

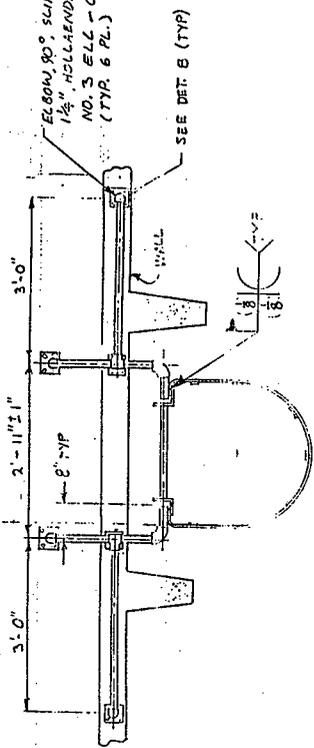
REASONS & ESR No. ESR-9030

ADDITION OF STEEL CAGE TO OUTDOOR LADDER

- SAFETY ITEM

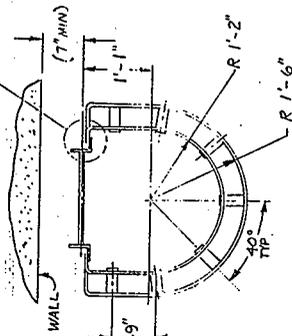
DISTRIBUTION: J.H. HUBER MO-047, J.P. KERWICK 272AW, G.T. FRATER, J. POORMAN 2750E, A.L. JONAS 2750E, R. ROBERTS 272 WA, J.L. WALKER 2751E, G.E. M. Spickson 2753E

5) ADD SECTION U-U



ELEVATION, 90° SLIP-ON/BOCP-DN
 1 1/2" HOLLOWER SPEED-841C
 NO. 3 ELL - OR EQUAL
 (TYP. 6 PL.)

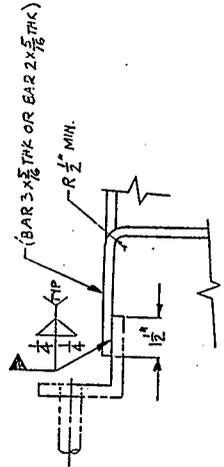
4) ADD SECTION R-R



SECTION R-R
 SCALE: NONE

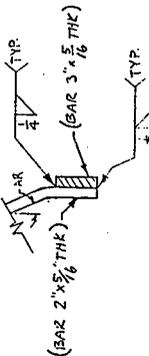
SECTION U-U
 SCALE: NONE

8) ADD DETAIL 7:



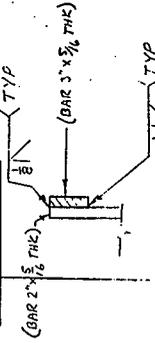
DETAIL 7 (TYP)
 SCALE: NONE

6) ADD SECTION P-P



SECTION P-P
 SCALE: NONE

7) ADD SECTION Q-Q



SECTION Q-Q
 SCALE: NONE

IPF#0

ESSENTIAL

ENGINEERING CHANGE NOTICE

1. ECN 173594

Page 1 of 4

Proj.
ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Supersedeure <input type="checkbox"/> Discovery <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. D. B. BODILY, 87250, T4-03, 3-2188	4. Date 5/20/93
	5. Project Title/No./Work Order No. INSTALL VENT TEST PORTS	6. Bldg./Sys./Fac. No. 616
	8. Document Number Affected (include rev. and sheet no.) SEE BLOCK 12	9. Related ECN No(s). N/A
	11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package Doc. No. 2X-93-036A
	11c. Complete Installation Work _____ Cog. Engineer Signature & Date	11d. Complete Restoration (Temp. ECN only) N/A _____ Cog. Engineer Signature & Date

12. Description of Change

1) ADD DETAILS 12-15 TO DRAWING H-6-1559, SHT. 2, REV. 2 PER ATTACHED PAGE 3.

2) REVISE VENTILATION PLAN DRAWING H-6-1559, SHT. 1, REV. 3 PER CLOUDED AREAS ON ATTACHED PAGE 4.

3 DL BODILY PER TELECON
MB
09/14/93

13a. Justification (mark one)

Criteria Change
 Design Improvement
 Environmental
 As-Found
 Facilitate Const.
 Const. Error/Omission
 Design Error/Omission

13b. Justification Details

THE TEST PORTS WILL MAKE IT EASIER FOR VENT AND BALANCE TO OBTAIN ACCURATE FLOW READINGS.

14. Distribution (include name, MSIN, and no. of copies)

D. B. BODILY T4-03 1
 S. TURNER T4-06 1
 N. WESTON T4-03 1 (FILE COPY)
 R. BRUNKE H6-23
 CDWS #4 R1-29

RELEASE STAMP

OFFICIAL RELEASE
 BY WHC

DATE SEP 14 1993

Sta. # 6

ENGINEERING CHANGE NOTICE

Page 2 of 4

1. ECN (use no. from pg. 1)
173594

15. Design Verification Required

Yes
 No

16. Cost Impact

ENGINEERING

Additional \$ N/A
Savings \$ _____

CONSTRUCTION

Additional \$ N/A
Savings \$ _____

17. Schedule Impact (days)

Improvement _____
Delay _____

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

<p>SDDDD <input type="checkbox"/></p> <p>Functional Design Criteria <input type="checkbox"/></p> <p>Operating Specification <input type="checkbox"/></p> <p>Criticality Specification <input type="checkbox"/></p> <p>Conceptual Design Report <input type="checkbox"/></p> <p>Equipment Spec. <input type="checkbox"/></p> <p>Const. Spec. <input type="checkbox"/></p> <p>Procurement Spec. <input type="checkbox"/></p> <p>Vendor Information <input type="checkbox"/></p> <p>OM Manual <input type="checkbox"/></p> <p>FSAR/SAR <input type="checkbox"/></p> <p>Safety Equipment List <input type="checkbox"/></p> <p>Radiation Work Permit <input type="checkbox"/></p> <p>Environmental Impact Statement <input type="checkbox"/></p> <p>Environmental Report <input type="checkbox"/></p> <p>Environmental Permit <input type="checkbox"/> <u>N/A</u></p>	<p>Seismic/Stress Analysis <input type="checkbox"/></p> <p>Stress/Design Report <input type="checkbox"/></p> <p>Interface Control Drawing <input type="checkbox"/></p> <p>Calibration Procedure <input type="checkbox"/></p> <p>Installation Procedure <input type="checkbox"/></p> <p>Maintenance Procedure <input type="checkbox"/></p> <p>Engineering Procedure <input type="checkbox"/></p> <p>Operating Instruction <input type="checkbox"/></p> <p>Operating Procedure <input type="checkbox"/></p> <p>Operational Safety Requirement <input type="checkbox"/></p> <p>IEFD Drawing <input type="checkbox"/></p> <p>Cell Arrangement Drawing <input type="checkbox"/></p> <p>Essential Material Specification <input type="checkbox"/></p> <p>Fac. Proc. Samp. Schedule <input type="checkbox"/></p> <p>Inspection Plan <input type="checkbox"/></p> <p>Inventory Adjustment Request <input type="checkbox"/> <u>N/A</u></p>	<p>Tank Calibration Manual <input type="checkbox"/></p> <p>Health Physics Procedure <input type="checkbox"/></p> <p>Spares Multiple Unit Listing <input type="checkbox"/></p> <p>Test Procedures/Specification <input type="checkbox"/></p> <p>Component Index <input type="checkbox"/></p> <p>ASME Coded Item <input type="checkbox"/></p> <p>Human Factor Consideration <input type="checkbox"/></p> <p>Computer Software <input type="checkbox"/></p> <p>Electric Circuit Schedule <input type="checkbox"/></p> <p>ICRS Procedure <input type="checkbox"/></p> <p>Process Control Manual/Plan <input type="checkbox"/></p> <p>Process Flow Chart <input type="checkbox"/></p> <p>Purchase Requisition <input type="checkbox"/></p> <p>_____ <input type="checkbox"/> <u>N/A</u></p> <p>_____ <input type="checkbox"/> <u>N/A</u></p>
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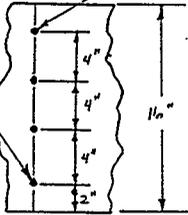
19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

<p>Document Number/Revision</p> <p><u>N/A</u></p>	<p>Document Number/Revision</p> <p><u>N/A</u></p>	<p>Document Number/Revision</p> <p><u>N/A</u></p>
_____	_____	_____
_____	_____	_____

20. Approvals

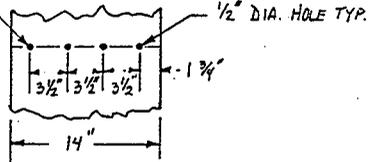
Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer <u>D.B. Brubaker</u>	<u>6/3/93</u>	PE _____	_____
Cog./Project Engr. Mgr. <u>D.J. Swell</u>	<u>6/8/93</u>	QA _____	_____
QA _____	_____	Safety _____	_____
Safety <u>R.E. Martin</u>	<u>9/13/93</u>	Design _____	_____
Security _____	_____	Other _____	_____
Proj. Prog./Dept. Mgr. _____	_____	_____	_____
Def. React. Div. _____	_____	_____	_____
Chem. Proc. Div. _____	_____	_____	_____
Def. Wst. Mgmt. Div. _____	_____	DEPARTMENT OF ENERGY	
Adv. React. Dev. Div. _____	_____	_____	_____
Proj. Dept. _____	_____	_____	_____
Environ. Div. _____	_____	ADDITIONAL	
IRM Dept. _____	_____	_____	_____
Facility Rep. (Ops) _____	_____	_____	_____
Other Inv. Rep. <u>B. K. Wilson</u>	<u>6/7/93</u>	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

HOLES ARE TO BE PLUGGED WITH 1/2" DIA. SHEET METAL HOLE PLUGS.



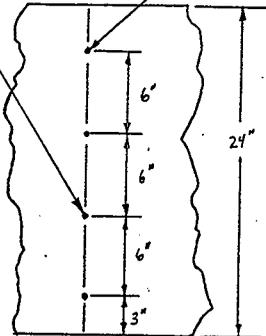
DETAIL (12) / 1

HOLES ARE TO BE PLUGGED WITH 1/2" DIA. SHEET METAL HOLE PLUGS.



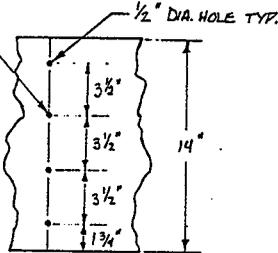
DETAIL (13) / 1

HOLES ARE TO BE PLUGGED WITH 1/2" DIA. SHEET METAL HOLE PLUGS.



DETAIL (14) / 1

HOLES ARE TO BE PLUGGED WITH 1/2" DIA. SHEET METAL HOLE PLUGS.



DETAIL (15) / 1

ENGINEERING CHANGE NOTICE

ESSENTIAL

1. ECN **608525**

Page 1 of 3

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input checked="" type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. KR Busching, SWMFE, T4-03, 373-2106		4. Date 08 November, 1994
	5. Project Title/No./Work Order No. 616 Valve Labeling	6. Bldg./Sys./Fac. No. 616/Sanitary Water System	7. Approval Designator NA
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) SEE BLOCK 12		9. Related ECN No(s). 605641

11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-94-253	11c. Modification Work Complete <input checked="" type="checkbox"/> Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) NA Cog. Engineer Signature & Date
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12. Description of Change **Block 8 Continued: H-6-1559 Sh. 1 Rev. 4 and Sheet 3 Rev. 1**

1: THIS ECN IS TO SUPERSEDE ECN #605641 ENTIRELY.

2: Add valve and hose bib numbers to H-6-1559 SH 1 REV 4 as shown in the clouded areas of sheets 6&7 of this ECN.

3: Add valve numbering to details 4, 6 & 7 on drawing H-6-1559 sh 3 rev 1 per clouded areas on pages 3, 4 & 5 of this ECN

4: Correct Drawing targets on H-6-1559 sheets 1&3 to accurately reflect proper drawing references as indicated in clouded areas on sheets 3, 4, 5 & 7 of this ECN.

5: Add hose bib #5 (HB-05) to H-6-1559 sheet 1 rev 4 as shown on page 7 of thfs ECN.

CONTINUED ON PAGE 3 OF THIS ECN

13a. Justification (mark one) As-Found <input type="checkbox"/>	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 The new labels will correspond to the new Master Equipment List which was developed after ECN 605641 was written and released.

14. Distribution (include name, MSIN, and no. of copies)
 KR Busching, SA Griffin (Record Copy) : T4-03, 1 ea.
 GS Turner, T4-06, 1: Sta 3, S2-05; STA 4, R1-29; STA 20, T4-00; STA 6, 72-03

RELEASE STAMP

OFFICIAL RELEASE
BY WHC 25

DATE **NOV 17 1994**

STA **6**

ENGINEERING CHANGE NOTICE CONTINUATION SHEET

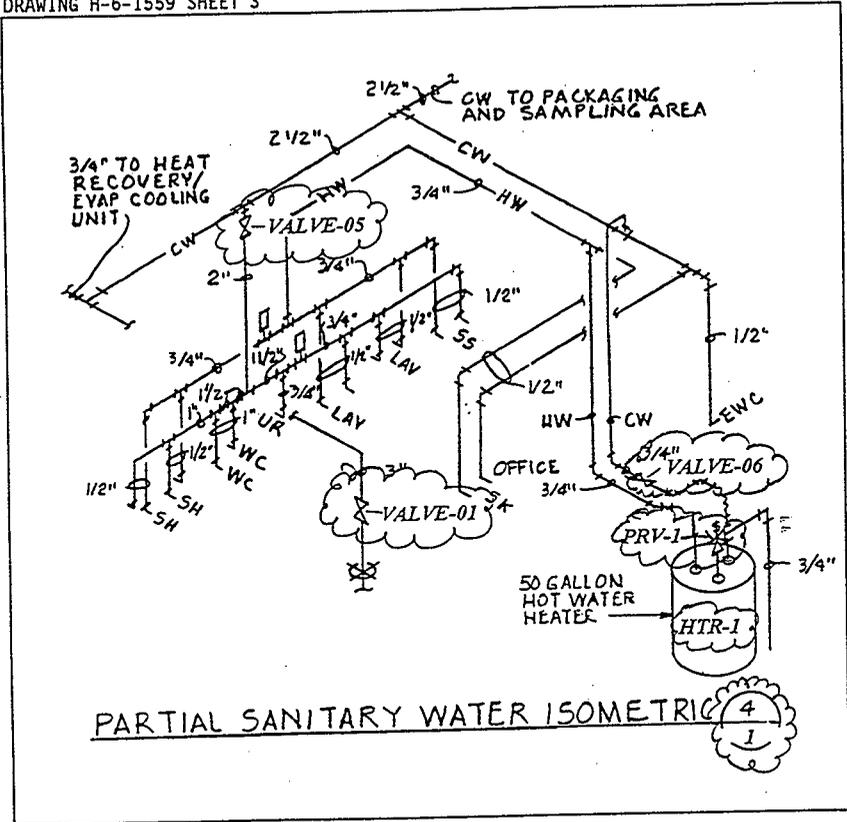
ECN 608525

Page 3 of 8

Date 11/08/94

6: Add label schedule as shown on page 8 of this ECN to H-6-1559 sh 1 rev 4 and add note to H-6-1559 sh 3 rev 1 to refer to sheet 1 for the label schedule.

FROM DRAWING H-6-1559 SHEET 3



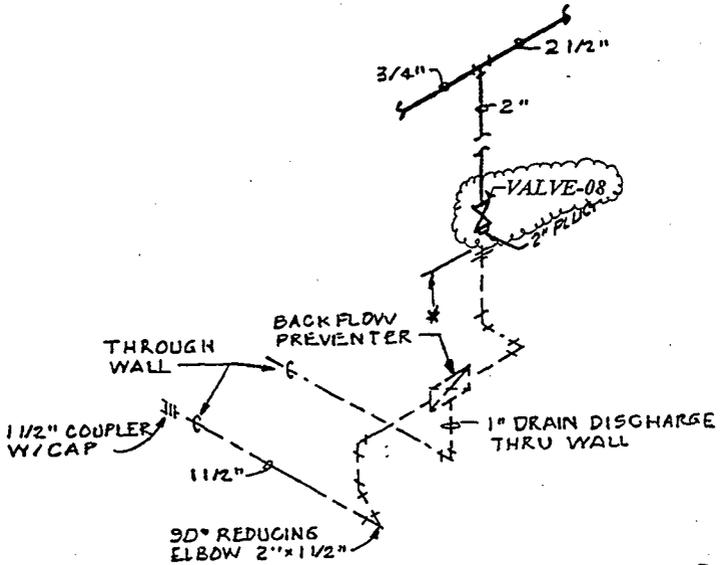
ENGINEERING CHANGE NOTICE
CONTINUATION SHEET

Page 4 of 8

ECN 608525

Date 11/08/94

FROM DRAWING H-6-1559 SHEET 3



BACKFLOW PREVENTER ISOMETRIC



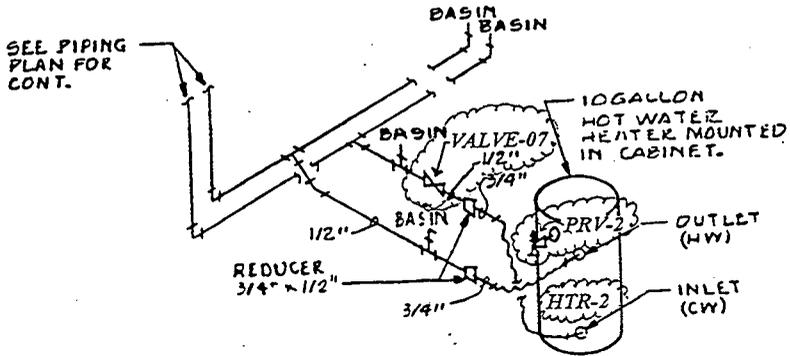
ENGINEERING CHANGE NOTICE
CONTINUATION SHEET

ECN 608525

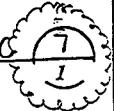
Page 5 of 8

Date 11/08/94

FROM DRAWING H-6-1559 SHEET 3



PACKAGING & SAMPLING SW ISOMETRIC



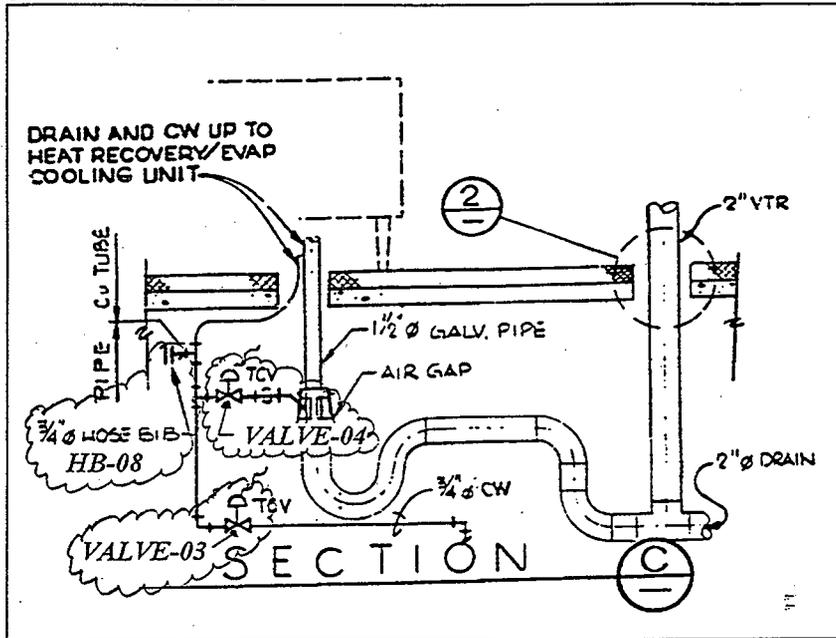
ENGINEERING CHANGE NOTICE
CONTINUATION SHEET

ECN 608525

Page 6 of 8

Date 11/08/94

FROM DRAWING H-6-1559 SHEET 1



ENGINEERING CHANGE NOTICE CONTINUATION SHEET

Page 8 of 8

ECN 608525

Date 11/08/94

DRAWING ITEM	COMPONENT NUMBER / LABEL	ITEM DESCRIPTION
VALVE-01	WATER-SW-VALVE-01	3" GATE VALVE
VALVE-02	WATER-SW-VALVE-02	3/4" GATE VALVE
VALVE-03	WATER-SW-VALVE-03	3/4" TEMPERATURE CONTROL VALVE
VALVE-04	WATER-SW-VALVE-04	3/4" TEMPERATURE CONTROL VALVE
VALVE-05	WATER-SW-VALVE-05	2" GATE VALVE
VALVE-06	WATER-SW-VALVE-06	3/4" GATE VALVE
VALVE-07	WATER-SW-VALVE-07	1/2" GATE VALVE
VALVE-08	WATER-SW-VALVE-08	2" GATE VALVE
PRV-1	WATER-SW-PRV-1	PRESSURE RELIEF VALVE
PRV-2	WATER-SW-PRV-2	PRESSURE RELIEF VALVE
HTR-1	WATER-SW-HTR-1	50 GALLON HOT WATER HEATER
HTR-2	WATER-SW-HTR-2	10 GALLON HOT WATER HEATER
HB-01	WATER-SW-HB-01	3/4" HOSE BIB
HB-02	WATER-SW-HB-02	3/4" HOSE BIB
HB-03	WATER-SW-HB-03	3/4" HOSE BIB
HB-04	WATER-SW-HB-04	3/4" HOSE BIB
HB-05	WATER-SW-HB-05	3/4" HOSE BIB
HB-06	WATER-SW-HB-06	3/4" HOSE BIB
HB-07	WATER-SW-HB-07	3/4" HOSE BIB
HB-08	WATER-SW-HB-08	3/4" HOSE BIB
HB-09	WATER-SW-HB-09	3/4" HOSE BIB
SSHWR-1	WATER-SW-SSHWR-1	SAFETY SHOWER/EYEWASH STATION
SSHWR-2	WATER-SW-SSHWR-2	SAFETY SHOWER/EYEWASH STATION

ENGINEERING CHANGE NOTICE

Page 1 of 5

1. ECN 613355

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input checked="" type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. KR Busching, 87250, T4-03, 373-2106		4. Date 15 Dec, 94
	5. Project Title/No./Work Order No. 616 Valve labeling	6. Bldg./Sys./Fac. No. 616	7. Approval Designator NA
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) See block 12 ECN 608525 ^{on 8/25/94}		9. Related ECN No(s). 608525 605641
11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-94-253	11c. Modification Work Complete Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) NA Cog. Engineer Signature & Date

12. Description of Change
 Replace Page 8 of ECN 608525 with pages 3 & 4 of this ECN.
 Replace Page 7 of ECN 608525 with page 5 of this ECN

H-6-1559 sh. 1 Rev. 4

H-6-1559 sh. 3 Rev. 4

13a. Justification (mark one)	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 Labeling criteria has changed.

14. Distribution (include name, MSIN, and no. of copies)
 KR Busching, SA Griffin: T4-03, 1 ea
 GS Turner, T4-06, 1: Sta 6, T2-03; 20, T4-00

RELEASE STAMP

OFFICIAL RELEASE
 BY WHC
 DATE JAN 05 1995
 55
 Sta. 5

Sta. 3, 4, 20

ENGINEERING CHANGE NOTICE CONTINUATION SHEET

Page 3 of 5

ECR 613355

Date 12/15/94

DRAWING ITEM	COMPONENT NUMBER / LABEL	ITEM DESCRIPTION
VALVE-01	SW MAIN ISOLATION 616-WATER-SW-VALVE-01	3" GATE VALVE
VALVE-02	SW HVAC ISOLATION 616-WATER-SW-VALVE-02	3/4" GATE VALVE
VALVE-03	HVAC TEMP CONTROL VALVE 616-WATER-SW-VALVE-03	3/4" TEMPERATURE CONTROL VALVE
VALVE-04	HVAC TEMP CONTROL VALVE 616-WATER-SW-VALVE-04	3/4" TEMPERATURE CONTROL VALVE
VALVE-05	SW RESTROOM ISOLATION 616-WATER-SW-VALVE-05	2" GATE VALVE
VALVE-06	HOT WATER HEATER ISOLATION 616-WATER-SW-VALVE-06	3/4" GATE VALVE
VALVE-07	HOT WATER HEATER ISOLATION 616-WATER-SW-VALVE-07	1/2" GATE VALVE
VALVE-08	FORMER BACKFLOW PREVENTER ISOLATION 616-WATER-SW-VALVE-08	2" GATE VALVE
PRV-1	PRESSURE RELIEF VALVE 616-WATER-SW-PRV-1	PRESSURE RELIEF VALVE
PRV-2	PRESSURE RELIEF VALVE 616-WATER-SW-PRV-2	PRESSURE RELIEF VALVE
HTR-1	HOT WATER HEATER 50 GAL 616-WATER-SW-HTR-1	50 GALLON HOT WATER HEATER
HTR-2	HOT WATER HEATER 10 GAL 616-WATER-SW-HTR-2	10 GALLON HOT WATER HEATER
HB-01	HOSE BIB 616-WATER-SW-HB-01	3/4" HOSE BIB
HB-02	HOSE BIB 616-WATER-SW-HB-02	3/4" HOSE BIB
HB-03	HOSE BIB 616-WATER-SW-HB-03	3/4" HOSE BIB
HB-04	HOSE BIB 616-WATER-SW-HB-04	3/4" HOSE BIB
HB-05	HOSE BIB 616-WATER-SW-HB-05	3/4" HOSE BIB
HB-06	HOSE BIB 616-WATER-SW-HB-06	3/4" HOSE BIB

**ENGINEERING CHANGE NOTICE
CONTINUATION SHEET**

ECN 613355

Page 4 of 5

Date 12/15/94

HB-07	HOSE BIB 616-WATER-SW-HB-07	3/4" HOSE BIB
HB-08	HOSE BIB 616-WATER-SW-HB-08	3/4" HOSE BIB
HB-09	HOSE BIB 616-WATER-SW-HB-09	3/4" HOSE BIB
SSHWR-1	SAFETY SHOWER/EYE WASH 616-WATER-SW-SSHWR-1	SAFETY SHOWER/EYEWASH STATION
SSHWR-2	SAFETY SHOWER/EYE WASH 616-WATER-SW-SSHWR-2	SAFETY SHOWER/EYEWASH STATION

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ESSENTIAL

ENGINEERING CHANGE NOTICE

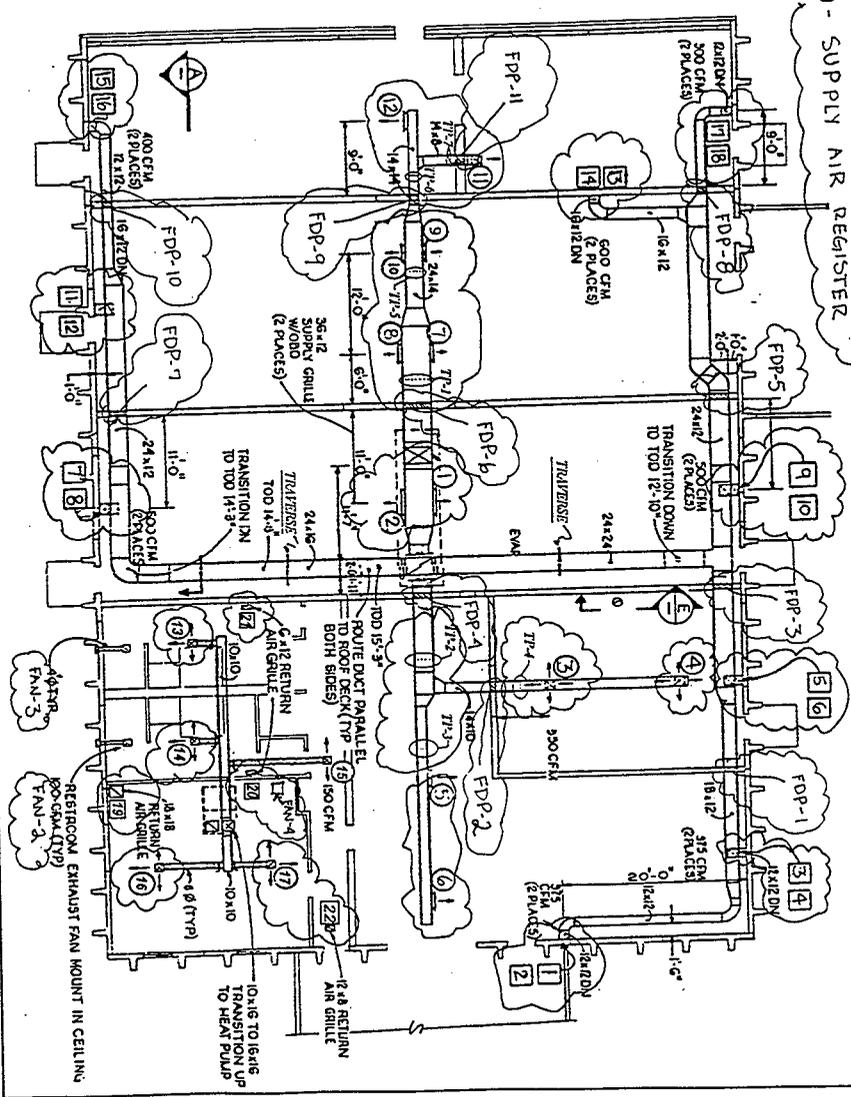
1. ECN **№ 623622**

Page 1 of 5

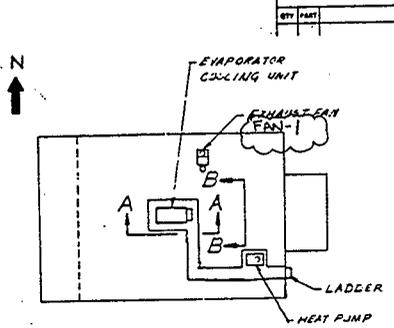
Proj.
ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. LJ Gaschott, 87250, T4-03, 373-4367	3a. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. Date 21 August, 1995
5. Project Title/No./Work Order No. 616 Labeling program	6. Bldg./Sys./Fac. No. 616	7. Approval Designator N/A	
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) H-6-1559, SH 1, REV 5 H-6-1559, SH 2, REV 2	9. Related ECN No(s). N/A	10. Related PO No. N/A	
11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A _____ Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A _____ Cog. Engineer Signature & Date
12. Description of Change Label all supply and return air registers, test ports and fans as shown on pages 3, 4 and 5 of this ECN. Label Fire Dampers (FDP-1 through FDP-11) as shown on page 3 of this ECN.			
13a. Justification (mark one) Criteria Change <input checked="" type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> Facility Deactivation <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>			
13b. Justification Details This ECN is to facilitate labeling of the HVAC units at the 616 facility.			
14. Distribution (include name, MSIN, and no. of copies) LJ Gaschott, File, T4-03 KR Busching, T4-03 NP Emerson, T4-03 PJ Crane, T4-04 JT Schorzman, T4-04 Rel. Sta. 3, 4, 6, 20, 5		RELEASE STAMP OFFICIAL RELEASE BY WHC 55 DATE <i>sta</i> OCT 23 1995 5	

- ☐ - RETURN AIR REGISTER
- - SUPPLY AIR REGISTER



ENGINEERING CHANGE NOTICE
CONTINUATION SHEET



ROOF PLAN 616 BLDG
SCALE: NONE

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ENGINEERING CHANGE NOTICE

Page 1 of 5

1. ECN 173588

Proj.
ECN

ECN Category (mark one)

- Supplemental
- Direct Revision
- Change ECN
- Temporary
- Supersedure
- Discovery
- Cancel/Void

3. Originator's Name, Organization, MSIN, and Telephone No.
DOUGLAS B. BODILY, 87233, T3-02, 3-2188

4. Date
10/22/92

5. Project Title/No./Work Order No. ML 3CA
BACK FLOW PREVENTER REMOVAL

6. Bldg./Sys./Fac. No.
616

7. Impact Level
4

8. Document Number Affected (include rev. and sheet no.)
SEE BLOCK 12

9. Related ECN No(s).
173587

10. Related PO No.
N/A

11a. Modification Work
 Yes (fill out Blk. 11b)
 No (NA Blks. 11b, 11c, 11d)

11b. Work Package Doc. No.
2X-92-0084

11c. Complete Installation Work

Cog. Engineer Signature & Date

11d. Complete Restoration (Temp. ECN only)
N/A

Cog. Engineer Signature & Date

12. Description of Change

ECN 173588 SUPERSEDES ECN 173587 IN ITS ENTIRETY ON ⁴⁵ H-6-1559 SHT. 1, REV 3.

1) REVISE DETAIL 6 "BACKFLOW PREVENTER ISOMETRIC" ON DRAWING NUMBER H-6-1559 REV. 0, SHT. 3 PER ATTACHED PAGE 3.

2) REVISE DRAWING H-6-1559 REV. 3 SHT. 1 PER ATTACHED PAGES 4 & 5.

FILE COPY

13a. Justification (mark one)

- Criteria Change
- Design Improvement
- Environmental
- As-Found
- Facilitate Const.
- Const. Error/Omission
- Design Error/Omission

13b. Justification Details

DETAIL 6 IS LOCATED ON SHT. 3 OF DRAWING H-6-1559 AND NEEDS TO BE REVISED TO REFLECT BACKFLOW PREVENTER REMOVAL.

14. Distribution (include name, MSIN, and no. of copies)

D. B. BODILY T3-02 1

N. L. WESTON T3-02 (FILE COPY) 1

G. S. TURNER T3-29 1

RELEASE STAMP

OFFICIAL RELEASE
BY WHC CS

DATE OCT 26 1992

Station 6

ENGINEERING CHANGE NOTICE

Page 2 of 5

1. ECN (use no. from pg. 1)

173588

15. Design Verification Required

Yes
 No

16. Cost Impact

ENGINEERING

Additional \$ N/A
Savings \$ _____

CONSTRUCTION

Additional \$ N/A
Savings \$ _____

17. Schedule Impact (days)

Improvement _____
Delay _____

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

<p>SDD/DD <input type="checkbox"/></p> <p>Functional Design Criteria <input type="checkbox"/></p> <p>Operating Specification <input type="checkbox"/></p> <p>Criticality Specification <input type="checkbox"/></p> <p>Conceptual Design Report <input type="checkbox"/></p> <p>Equipment Spec. <input type="checkbox"/></p> <p>Const. Spec. <input type="checkbox"/></p> <p>Procurement Spec. <input type="checkbox"/></p> <p>Vendor Information <input type="checkbox"/></p> <p>OM Manual <input type="checkbox"/></p> <p>FSARS/SAR <input type="checkbox"/></p> <p>Safety Equipment List <input type="checkbox"/></p> <p>Radiation Work Permit <input type="checkbox"/></p> <p>Environmental Impact Statement <input type="checkbox"/></p> <p>Environmental Report <input type="checkbox"/></p> <p>Environmental Permut <input type="checkbox"/></p>	<p>Seismic/Stress Analysis <input type="checkbox"/></p> <p>Stress/Design Report <input type="checkbox"/></p> <p>Interface Control Drawing <input type="checkbox"/></p> <p>Calibration Procedure <input type="checkbox"/></p> <p>Installation Procedure <input type="checkbox"/></p> <p>Maintenance Procedure <input type="checkbox"/></p> <p>Engineering Procedure <input type="checkbox"/></p> <p>Operating Instruction <input type="checkbox"/></p> <p>Operating Procedure <input type="checkbox"/></p> <p>Operational Safety Requirement <input type="checkbox"/></p> <p>IEFD Drawing <input type="checkbox"/></p> <p>Cell Arrangement Drawing <input type="checkbox"/></p> <p>Essential Material Specification <input type="checkbox"/></p> <p>Fac. Proc. Samp. Schedule <input type="checkbox"/></p> <p>Inspection Plan <input type="checkbox"/></p> <p>Inventory Adjustment Request <input type="checkbox"/></p>	<p>Tank Calibration Manual <input type="checkbox"/></p> <p>Health Physics Procedure <input type="checkbox"/></p> <p>Spares Multiple Unit Listing <input type="checkbox"/></p> <p>Test Procedures/Specification <input type="checkbox"/></p> <p>Component Index <input type="checkbox"/></p> <p>ASME Coded Item <input type="checkbox"/></p> <p>Human Factor Consideration <input type="checkbox"/></p> <p>Computer Software <input type="checkbox"/></p> <p>Electric Circuit Schedule <input type="checkbox"/></p> <p>ICRS Procedure <input type="checkbox"/></p> <p>Process Control Manual/Plan <input type="checkbox"/></p> <p>Process Flow Chart <input type="checkbox"/></p> <p>Purchase Requisition <input type="checkbox"/></p>
<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

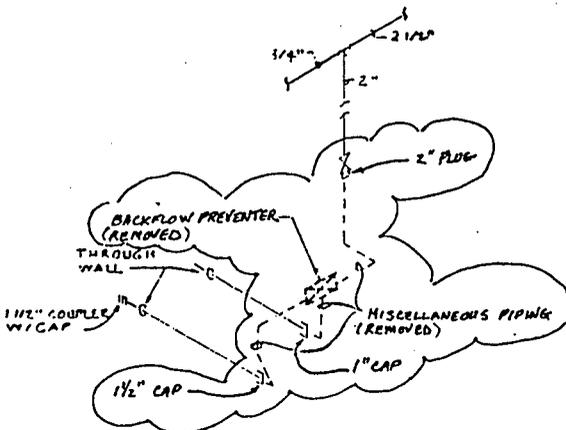
Document Number/Revision	Document Number/Revision	Document Number/Revision
<u>N/A</u>	_____	_____
_____	_____	_____
_____	_____	_____

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer <u>[Signature]</u>	<u>10/22/92</u>	PE _____	_____
Cog./Project Engr. Mgr. <u>[Signature]</u>	<u>10/22/92</u>	QA _____	_____
QA _____	_____	Safety _____	_____
Safety _____	_____	Design _____	_____
Security _____	_____	Other _____	_____
Proj. Prog./Dept. Mgr. _____	_____	_____	_____
Def. React. Div. _____	_____	_____	_____
Chem. Proc. Div. _____	_____	_____	_____
Def. Wst. Mgmt. Div. _____	_____	DEPARTMENT OF ENERGY	
Adv. React. Dev. Div. _____	_____	_____	_____
Proj. Dept. _____	_____	_____	_____
Environ. Div. _____	_____	ADDITIONAL	
IRM Dept. _____	_____	_____	_____
Facility Rep. (Ops) _____	_____	_____	_____
Other _____	_____	_____	_____
WATER PURVEYOR: <u>[Signature]</u>	<u>#2039</u>	<u>10/26/92</u>	_____

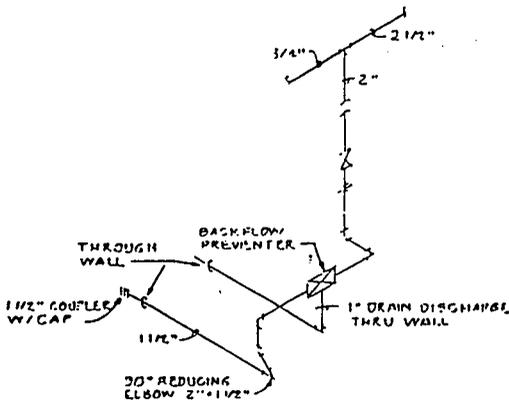
1)

IS



BACKFLOW PREVENTER ISOMETRIC (6)
4-6-1553

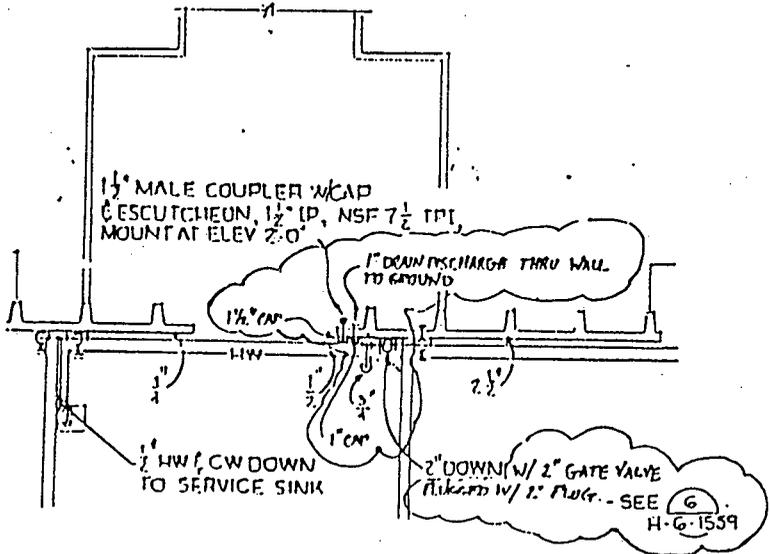
WAS



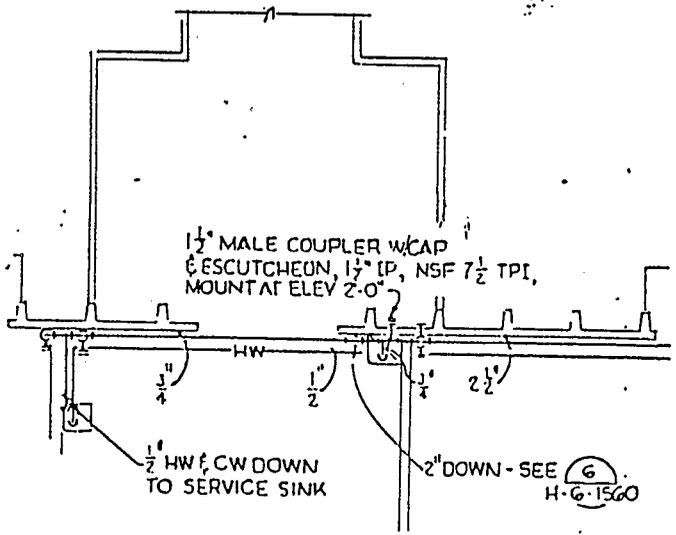
BACKFLOW PREVENTER ISOMETRIC (6)
4-6-1553

2)

IS:



WAS:



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ESSENTIAL ENGINEERING CHANGE NOTICE

1. ECH No **616253**

Page 1 of 3

Proj.
ECH

2. ECH Category (mark one) Supplemental <input checked="" type="checkbox"/> [X] Direct Revision <input type="checkbox"/> [] Change ECH <input type="checkbox"/> [] Temporary <input type="checkbox"/> [] Standby <input type="checkbox"/> [] Supersedure <input type="checkbox"/> [] Cancel/Void <input type="checkbox"/> []	3. Originator's Name, Organization, MSIN, and Telephone No. R.D. HODGSON, 87250, T4-03, 373-5770	3a. USQ Required? <input type="checkbox"/> [] Yes <input checked="" type="checkbox"/> [X] No	4. Date Dec 27, 1995
	5. Project Title/No./Work Order No. REPLACE PANEL A BREAKER 22 WITH GFCI BREAKER/A4V10	6. Bldg./Sys./Fac. No. 616, ELECTRICAL PANEL A	7. Approval Designator NA
	8. Document Numbers Changed by this ECH (includes sheet no. and rev.) H-6-1560, SHT 1, REV 4	9. Related ECH No(s). NA	10. Related PO No. NA
11a. Modification Work <input checked="" type="checkbox"/> [X] Yes (fill out Blk. 11b) <input type="checkbox"/> [] No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-95-337-W	11c. Modification Work Complete <div style="text-align: center;"> 55 MAR 07 1996 <i>[Signature]</i> 3/6/96 Cog. Engineer Signature & Date </div>	11d. Restored to Original Condition (Temp. or Standby ECH only) NA Cog. Engineer Signature & Date

12. Description of Change

ADD A GFCI SYMBOL NEXT TO PANEL A, BREAKER 22 ON DRAWING H-6-1560, SHT 1, REV 4 TO INDICATE THAT THIS CIRCUIT IS PROTECTED BY A GFCI BREAKER.

13a. Justification (mark one)

Criteria Change [] Design Improvement [X] Environmental [] Facility Deactivation []
 As-Found [] Facilitate Const [] Const. Error/Omission [] Design Error/Omission []

13b. Justification Details

Panel A, Breaker 22 feeds an outdoor receptacle that is not GFCI protected. This modification will provide GFCI protection to all of the receptacles on circuit A-22. Design verification method is by Independent Review.

14. Distribution (include name, MSIN, and no. of copies)

RD HODGSON	T4-03 (1)
SWMFE FILE	T4-03 (1)
JR FERGUSON	T4-06 (1)
NP EMERSON	T4-03 (1)
PJ CRANE	T4-03 (1)
JT SCHORZMAN	T4-04 (1)
CDWS #4	RI-29

STA 3, 4, 5, 6, 15

RELEASE STAMP

JAN 04 1996

DATE: HANFORD

STA: 5 ID: 55

RELEASE

RIAL FA CABLE



ELEVATION (B)
SCALE: NONE

EVAC ALARM ELEMENTARY DIAC

PANELBOARD		A		VOLTS 120/208V 3PH 4W		LOCATION CORRIDOR			
225 AMP BUSSING		<input type="checkbox"/> MAIN BRKR		AMP		<input type="checkbox"/> SURFACE MOUNTED		<input type="checkbox"/> TOP FEED	
225 AMP NEUTRAL		<input type="checkbox"/> MAIN LUGS ONLY				<input type="checkbox"/> FLUSH MOUNTED		<input type="checkbox"/> BOT FEED	
CRCT	LOAD DESCRIPTION	WATTS	INCH	INCH	WATTS	LOAD DESCRIPTION	CRCT		
1	PANEL "B" MAIN BRK	174.6 174.8 1813	60		2500 4700 4700	OFFICE/RESTROOM HEAT PUMP	2		
7	LIGHTING - OFFICE	1177	20		3514		5		
8	LIGHTING - CORR, RESTROOMS	957	20		3514	LIFT TRUCK 4AT CHGR (FUT)	6		
11	LIGHTING - MAIL HANDLING	1385	20		3514		8		
13	LIGHTING - PEG/SAMPLING	1045	20		2250		14		
15	LIGHTING - OLIDATORS CELL	480	20		2750	RESTROOM MTR 1+TR	14		
17	LIGHTING - CAUSTICS CELL	1015	20		1500		18		
19	EXTR & EXIT LIGHTING	500	20		555	WATER COOLER REPT	20		
21	MAIL HANDL IN REPT	360	20		540	DOOR & MAIL HANDL REPT	22		
23	MAIL HANDL IN REPT	360	20		540	OFFICE REPT	24		
25	CAUSTICS CELL REPT	360	20		540	OFFICE REPT	26		
27	CAUSTICS CELL REPT	360	20		540	OFFICE & CORALPDR REPT	28		
29	PEG/SAMPLING IN REPT	540	20		300	FIRE ALARM PANEL	30		
31	PEG/SAMPLING IN FAN	228	20		1054	EVAC ALARM PANEL	32		
33	LUNCH COUNTER REPT	360	20		300	TELEPHONE EPT REPT	34		
35	RESTROOM REPT	360	20		----	HIGH VAC FLOW LIGHT	36		
37	F D A S	----	20		----	SPARE	38		
39	SPACE	----			----		40		
41	SPACE	----			12400	LUNCH ROOM RANGE	44		
TOTAL CONNECTED LOAD		PH A = 14041 PH B = 22577 PH C = 24257 TOTAL = 60875 W		REMARKS		INSTALL DISJUNT COVER SKIRT, TOP OF PANEL TO CEILING. * INSTALL HANDLE LOCK-ON DEVICE ▲ PAINT BREAKER HANDLE RED ⊙ GFCI CIRCUIT BREAKER			

ADD GFCI (⊙) SYMBOL TO BREAKER 22

R CABLE IN LIT.

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IPF #10

ESSENTIAL

ENGINEERING CHANGE NOTICE

1. ECN No **617748**

Page 1 of 5

Proj.
ECN

<p>2. ECN Category (mark one)</p> <p>Supplemental <input checked="" type="checkbox"/> [X]</p> <p>Direct Revision <input type="checkbox"/> []</p> <p>Change ECN <input type="checkbox"/> []</p> <p>Temporary <input type="checkbox"/> []</p> <p>Standby <input type="checkbox"/> []</p> <p>Supersedure <input type="checkbox"/> []</p> <p>Cancel/Void <input type="checkbox"/> []</p>	<p>3. Originator's Name, Organization, MSIN, and Telephone No.</p> <p>RICHARD D. HODGSON/87250/T4-03/373-5770</p>	<p>4. Date</p> <p>April 24, 1995</p>
<p>5. Project Title/No./Work Order No.</p> <p>INSTALL EXHAUST FAN AND CABINET IN 616 BLDG. /A130A</p>		<p>6. Bldg./Sys./Fac. No.</p> <p>616 Building</p>
<p>8. Document Numbers Changed by this ECN (includes sheet no. and rev.)</p> <p>H-6-1561, sh. 1, rev 5 H-6-1560, sh. 1, rev 4</p>		<p>9. Related ECN No(s).</p> <p>N/A</p>
		<p>7. Impact Level</p> <p>N/A</p>
		<p>10. Related PO No.</p> <p>N/A</p>

<p>11a. Modification Work</p> <p><input checked="" type="checkbox"/> [X] Yes (fill out Blk. 11b)</p> <p><input type="checkbox"/> [] No (NA Blks. 11b, 11c, 11d)</p>	<p>11b. Work Package No.</p> <p>2X-94-329</p>	<p>11c. Modification Work Complete</p> <hr/> <p>Cog. Engineer Signature & Date</p>	<p>11d. Restored to Original Condition (Temp. or Standby ECN only)</p> <p>N/A</p> <hr/> <p>Cog. Engineer Signature & Date</p>
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12. Description of Change
ADD CHANGES SHOWN ON PAGE 3, 4, AND 5 TO DRAWINGS

<p>13a. Justification (mark one)</p> <p>As-Found <input type="checkbox"/> []</p>	<p>Criteria Change <input type="checkbox"/> []</p> <p>Facilitate Const. <input type="checkbox"/> []</p>	<p>Design Improvement <input checked="" type="checkbox"/> [X]</p> <p>Const. Error/Omission <input type="checkbox"/> []</p>	<p>Environmental <input type="checkbox"/> []</p> <p>Design Error/Omission <input type="checkbox"/> []</p>
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13b. Justification Details
Provide a ventilation hood and filter above the cooking surface of the range.

14. Distribution (include name, MSIN, and no. of copies)

SHERI GRIFFIN MSIN, T4-03
JR FERGUSON, MSIN T4-06
DICK HODGSON, MSIN T4-03
CDWS #4, R1-29 **CDWS #6 T2-03**
DWS #3 S2-05
CDWS #20 T4-00
IPF #10 S2-40

RELEASE STAMP

OFFICIAL RELEASE 12
 BY WHC

DATE **MAY 01 1995**

Sta #6

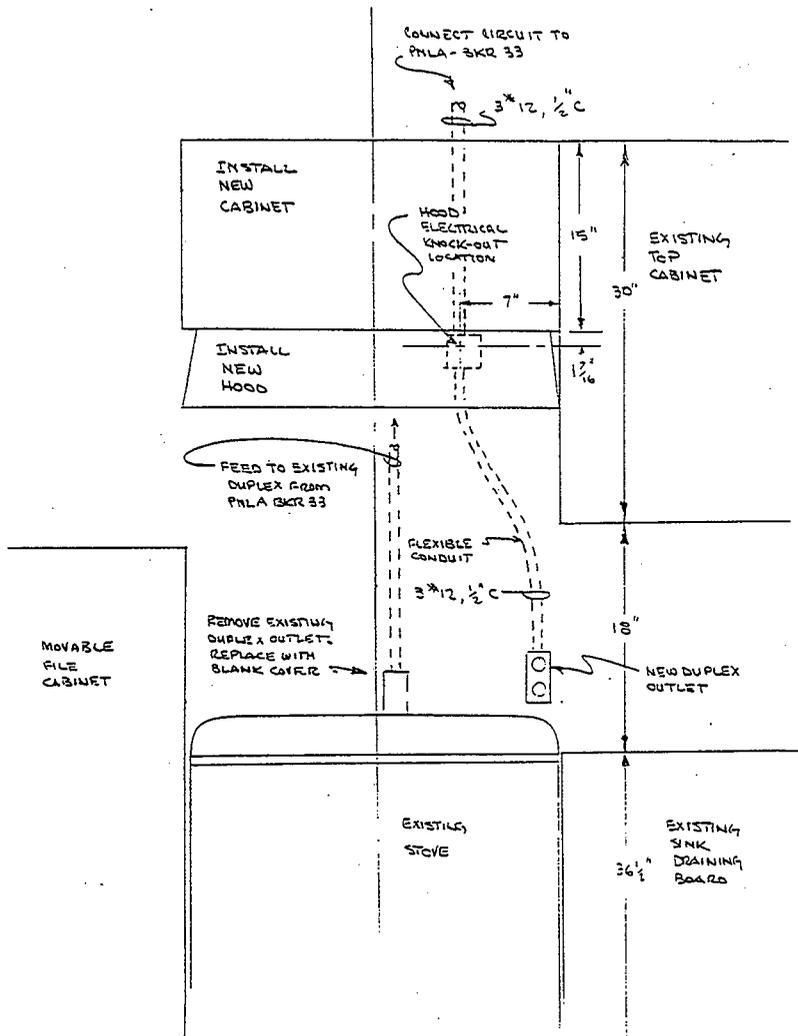
ENGINEERING CHANGE NOTICE

Page 2 of 5

1. ECN (use no. from pg. 1)

617748

<p>15. Design Verification Required</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>16. Cost Impact</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">ENGINEERING</td> <td style="width: 33%; text-align: center;">CONSTRUCTION</td> </tr> <tr> <td>Additional</td> <td style="text-align: center;"><input type="checkbox"/> \$N/A</td> <td>Additional</td> </tr> <tr> <td>Savings</td> <td style="text-align: center;"><input type="checkbox"/> \$</td> <td>Savings</td> </tr> </table>		ENGINEERING	CONSTRUCTION	Additional	<input type="checkbox"/> \$N/A	Additional	Savings	<input type="checkbox"/> \$	Savings	<p>17. Schedule Impact (days)</p> <p>Improvement <input type="checkbox"/></p> <p>Delay <input type="checkbox"/> N/A</p>																																																			
	ENGINEERING	CONSTRUCTION																																																												
Additional	<input type="checkbox"/> \$N/A	Additional																																																												
Savings	<input type="checkbox"/> \$	Savings																																																												
<p>18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.</p>																																																														
<p>SDD/DD <input type="checkbox"/></p> <p>Functional Design Criteria <input type="checkbox"/></p> <p>Operating Specification <input type="checkbox"/></p> <p>Criticality Specification <input type="checkbox"/></p> <p>Conceptual Design Report <input type="checkbox"/></p> <p>Equipment Spec. <input type="checkbox"/></p> <p>Const. Spec. <input type="checkbox"/></p> <p>Procurement Spec. <input type="checkbox"/></p> <p>Vendor Information <input type="checkbox"/></p> <p>OM Manual <input type="checkbox"/></p> <p>FSAR/SAR <input type="checkbox"/></p> <p>Safety Equipment List <input type="checkbox"/></p> <p>Radiation Work Permit <input type="checkbox"/></p> <p>Environmental Impact Statement <input type="checkbox"/></p> <p>Environmental Report <input type="checkbox"/></p> <p>Environmental Permit <input type="checkbox"/> N/A</p>	<p>Seismic/Stress Analysis <input type="checkbox"/></p> <p>Stress/Design Report <input type="checkbox"/></p> <p>Interface Control Drawing <input type="checkbox"/></p> <p>Calibration Procedure <input type="checkbox"/></p> <p>Installation Procedure <input type="checkbox"/></p> <p>Maintenance Procedure <input type="checkbox"/></p> <p>Engineering Procedure <input type="checkbox"/></p> <p>Operating Instruction <input type="checkbox"/></p> <p>Operating Procedure <input type="checkbox"/></p> <p>Operational Safety Requirement <input type="checkbox"/></p> <p>IEPD Drawing <input type="checkbox"/></p> <p>Cell Arrangement Drawing <input type="checkbox"/></p> <p>Essential Material Specification <input type="checkbox"/></p> <p>Fac. Proc. Samp. Schedule <input type="checkbox"/></p> <p>Inspection Plan <input type="checkbox"/></p> <p>Inventory Adjustment Request <input type="checkbox"/> N/A</p>	<p>Tank Calibration Manual <input type="checkbox"/></p> <p>Health Physics Procedure <input type="checkbox"/></p> <p>Spares Multiple Unit Listing <input type="checkbox"/></p> <p>Test Procedures/Specification <input type="checkbox"/></p> <p>Component Index <input type="checkbox"/></p> <p>ASME Coded Item <input type="checkbox"/></p> <p>Human Factor Consideration <input type="checkbox"/></p> <p>Computer Software <input type="checkbox"/></p> <p>Electric Circuit Schedule <input type="checkbox"/></p> <p>ICRS Procedure <input type="checkbox"/></p> <p>Process Control Manual/Plan <input type="checkbox"/></p> <p>Process Flow Chart <input type="checkbox"/></p> <p>Purchase Requisition <input type="checkbox"/></p>																																																												
<p>19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Document Number/Revision</td> <td style="width: 33%;">Document Number/Revision</td> <td style="width: 33%;">Document Number/Revision</td> </tr> <tr> <td style="text-align: center;">N/A</td> <td></td> <td></td> </tr> </table>			Document Number/Revision	Document Number/Revision	Document Number/Revision	N/A																																																								
Document Number/Revision	Document Number/Revision	Document Number/Revision																																																												
N/A																																																														
<p>20. Approvals</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 45%;">Signature</th> <th style="width: 10%;">Date</th> <th style="width: 40%;">Signature</th> <th style="width: 5%;">Date</th> </tr> </thead> <tbody> <tr> <td colspan="4">OPERATIONS AND ENGINEERING</td> </tr> <tr> <td>Cog Engineer <i>[Signature]</i></td> <td style="text-align: center;">4-24-95</td> <td>ARCHITECT-ENGINEER</td> <td></td> </tr> <tr> <td>Cog. Mgr. <i>[Signature]</i></td> <td style="text-align: center;">4-27-95</td> <td>PE</td> <td></td> </tr> <tr> <td>QA</td> <td></td> <td>QA</td> <td></td> </tr> <tr> <td>Safety</td> <td></td> <td>Safety</td> <td></td> </tr> <tr> <td>Security</td> <td></td> <td>Design</td> <td></td> </tr> <tr> <td>Environ.</td> <td></td> <td>Environ.</td> <td></td> </tr> <tr> <td>Projects/Programs</td> <td></td> <td>Other</td> <td></td> </tr> <tr> <td>Tank Waste Remediation System</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Facilities Operations</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Restoration & Remediation</td> <td></td> <td>DEPARTMENT OF ENERGY</td> <td></td> </tr> <tr> <td>Operations & Support Services</td> <td></td> <td>Signature or Letter No.</td> <td></td> </tr> <tr> <td>IRM</td> <td></td> <td>ADDITIONAL</td> <td></td> </tr> <tr> <td>Other: Independent Verifier <i>[Signature]</i></td> <td style="text-align: center;">4/25/95</td> <td></td> <td></td> </tr> </tbody> </table>			Signature	Date	Signature	Date	OPERATIONS AND ENGINEERING				Cog Engineer <i>[Signature]</i>	4-24-95	ARCHITECT-ENGINEER		Cog. Mgr. <i>[Signature]</i>	4-27-95	PE		QA		QA		Safety		Safety		Security		Design		Environ.		Environ.		Projects/Programs		Other		Tank Waste Remediation System				Facilities Operations				Restoration & Remediation		DEPARTMENT OF ENERGY		Operations & Support Services		Signature or Letter No.		IRM		ADDITIONAL		Other: Independent Verifier <i>[Signature]</i>	4/25/95		
Signature	Date	Signature	Date																																																											
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Operations & Support Services		Signature or Letter No.																																																												
IRM		ADDITIONAL																																																												
Other: Independent Verifier <i>[Signature]</i>	4/25/95																																																													



REF: DWG H-6-1560 sub 1 REV 4

PANELBOARD		VOLTS 120/208Y, 3PH, 4W		LOCATION CORRIDOR				
222 AMP BUSSING		<input type="checkbox"/> MAIN BRGR AMP		<input type="checkbox"/> SURFACE MOUNTED		<input type="checkbox"/> TOP FEED		
222 AMP NEUTRAL		<input checked="" type="checkbox"/> MAIN LUGS ONLY		<input type="checkbox"/> FLUSH MOUNTED		<input type="checkbox"/> BOT FEED		
CRCT	LOAD DESCRIPTION	WATTS/BRKR		BRKR	WATTS	LOAD DESCRIPTION	CRCT	
1	PANEL "B" MAIN BRK	1746 1768 1813	60		2500 4700 4700	OFFICE / RESTROOM HEAT PUMP	2	
7	LIGHTING - OFFICE	1177	20					
9	LIGHTING - CORR, RESTROOMS	957	20					
11	LIGHTING - MATL HANDLING	1385	20		3514 3514	LIFT TRUCK BAT CHGR (FUT)	6	
13	LIGHTING - PEG/SAMPLING	1045	20		2250	RESTROOM VTR STR	14	
15	LIGHTING - OXIDIZERS CELL	680	20		30			
17	LIGHTING - CAUSTICS CELL	1045	20		20	1500	PEG/SAMPLING RM VTR NTR	18
19	EXTR & EXIT LIGHTING	500	20		20	555	WATER COOLER RCPT	20
21	MATL HNDLG RM RCPT	360	20		20	540	L DOCK & MATL HNDLG RCPT	22
23	MATL HNDLG RM RCPT	360	20		20	540	OFFICE RCPT	24
25	OXIDIZERS CELL RCPT	360	20		20	540	OFFICE RCPT	26
27	CAUSTICS CELL RCPT	360	20		20	540	OFFICE & CORRIDOR RCPT	28
29	PEG/SAMPLING RM RCPT	540	20		20	300	FIRE ALARM PANEL	30
31	PEG/SAMPLING RM FAN	828	20		20	1054	EVAC ALARM PANEL	32
33	LUNCH COUNTER RCPT	360	20		20	300	TELEPHONE EXPT RCPT	34
35	RESTROOM RCPT	360	20		20	----	HIGH VAC FLOW LIGHT	36
37	F O A S	----	20		20	----	SPARE	38
39	SPACE				60	12400	LUNCH ROOM RANGE	40
41	SPACE							
TOTAL CONNECTED LOAD PH A = 14047 PH B = 22471 PH C = 22257 TOTAL = 60575 W				REMARKS: INSTALL CONDUIT OVER SKIRT, TOP OF PANEL TO CEILING. * INSTAL HANDLE LOCK-ON DEVICE ▲ PAINT BREAKER HANDLE RED ⊙ GFCI CIRCUIT BREAKER				

CHANGE BRK 33 TO

" LUNCH COUNTER RCPT & HOOD

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IPF 10

ESSENTIAL

ENGINEERING CHANGE NOTICE

1. ECN 626001

Page 1 of 5

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input checked="" type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersede <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. R. D. HODGSON/87250/T4-03/ 373-5770	3a. USQ Required? [] Yes [X] No	4. Date Sept. 15, 1995
	5. Project Title/No./Work Order No. INSTALL EXHAUST FAN AND CABINET IN 616 BLDG./A130A	6. Bldg./Sys./Fac. No. 616 BUILDING	7. Approval Designator NA
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) See Block 14 ECN 617748		9. Related ECN No(s). ECN 617748	10. Related PO No. N/A

11a. Modification Work [X] Yes (fill out Blk. 11b) [] No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. 2X-94-329	11c. Modification Work Complete SEP 27 1995 55 <i>R. D. Hodgson</i> 9/27/95 Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) _____ Cog. Engineer Signature & Date
--	------------------------------------	---	--

12. Description of Change
ADD CHANGES SHOWN ON PAGES 3, 4, AND 5, TO DRAWINGS LISTED IN BLOCK 8

H-6-01560 sh 1, Rev 11
H-6-01561 sh 1, 9-27-95
REV 6

13a. Justification (mark one)

Criteria Change <input type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input checked="" type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details

1. Elimination of the duplex outlet was made because of the costs associated with the removal, replacement and refinishing of dry-wall and a 4-plex GFCI outlet is available nearby. 2. Connection of the hood to Panel A, circuit 36 instead of Panel A, circuit 33 was permitted because of easier access to existing wire terminations. Design verified by independent review.

14. Distribution (include name, MSIN, and no. of copies)

RD HODGSON	T4-03 (1)
SWMFE FILE	T4-03 (1)
JR FERGUSON	T4-06 (1)
JM NIELSEN	T4-05 (1)
PJ CRANE	T4-03 (1)
RR DURFEE	T4-06 (1)
CDWS #4	R1-29

RELEASE STAMP

OFFICIAL RELEASE BY WHC 55

DATE SEP 27 1995

Att 5

Att 3, 4, 5, 20, 15

CONNECT CIRCUIT TO
PMLA - BKR 36.

$3 \times 12, \frac{1}{2} C$

INSTALL
NEW
CABINET

HOOD
ELECTRICAL
KNOCK-OUT
LOCATION

15"

30"

EXISTING
TOP
CABINET

7"

INSTALL
NEW
HOOD

$1 \frac{1}{16}$ "

FEED TO EXISTING
DUPLEX FROM
PMLA BKR 33

18"

NEW DUPLEX
OUTLET

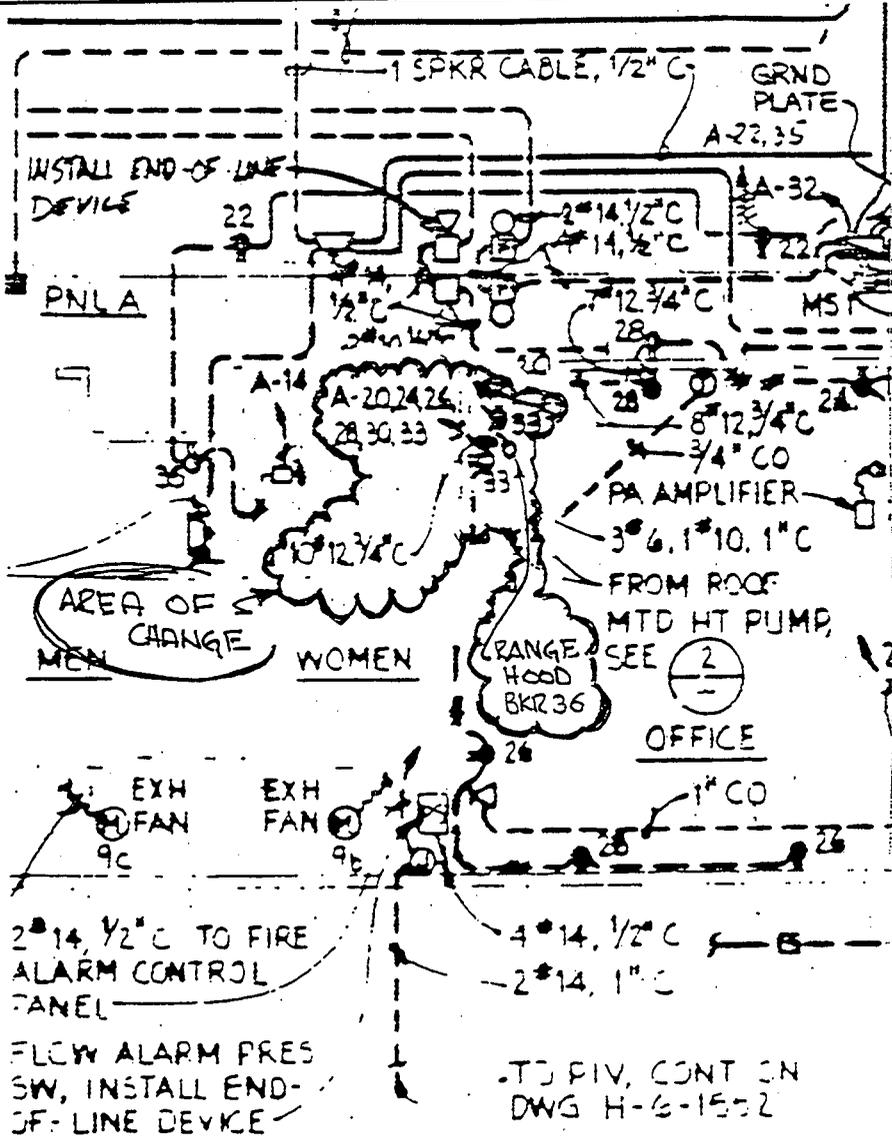
MOVABLE
FILE
CABINET

REMOVE EXISTING
DUPLEX OUTLET.
REPLACE WITH
BLANK COVER

EXISTING
STOVE

EXISTING
SINK
DRAINING
BOARD

$36 \frac{1}{2}$ "



REF. DWG H-6-1561 REV 6

REF: DWG H-6-1560 SH 1 REV 4

PANEL BOARD		VOLTS 120/208Y. 3P. 4W		LOCATION CORRIDOR		
<input type="checkbox"/> 225 AMP BUSSING	<input type="checkbox"/> MAIN BRKR	AMP	<input type="checkbox"/> SURFACE MOUNTED	<input type="checkbox"/> TOP FEED		
<input type="checkbox"/> 225 AMP NEUTRAL	<input type="checkbox"/> MAIN LUGS ONLY		<input type="checkbox"/> FLUSH MOUNTED	<input type="checkbox"/> BOT FEED		
CRCT	LOAD DESCRIPTION	WATTS	BRKR	WATTS	LOAD DESCRIPTION	CRCT
1	PANEL "B" MAIN BRK	1726 1748 1813	40	12500 14700 14700	OFFICE / RESTROOM HEAT PUMP	2
7	LIGHTING - OFFICE	1177	20	3314		
9	LIGHTING - CORR. RESTROOMS	957	20	3314		
11	LIGHTING - MAIL HANDLING	1385	20	3314	LIFT TRUCK BAT CHGR (FUT)	5
13	LIGHTING - PRG/SAMPLING	1045	20	2250		
15	LIGHTING - OXIDIZERS CELL	680	20	2250	RESTROOM VTR NTR	14
17	LIGHTING - CAUSTICS CELL	1045	20	1500	PRG/SAMPLING RN VTR NTR	118
19	EXTR & EXIT LIGHTING	500	20	555	WATER COOLER REPT	120
21	MAIL HANDLE RN REPT	350	20	540	IL DOCK & MAIL HANDLE REPT	122
23	MAIL HANDLE RN REPT	350	20	540	OFFICE REPT	124
25	OXIDIZERS CELL REPT	350	20	540	OFFICE REPT	126
27	CAUSTICS CELL REPT	350	20	540	OFFICE & CORR. LOCK REPT	128
29	PRG/SAMPLING RN REPT	540	20	300	FIRE ALARM PANEL	130
31	PRG/SAMPLING RN FAN	828	20	1054	EVAC ALARM PANEL	132
33	LUNCH COUNTER REPT	350	20	300	TELEPHONE EDPY REPT	134
35	RESTROOM REPT	350	20	---	HIGH VAC FLOW LIGHT	136
37	F.D.A.S	---	20	---	SPARE	138
39	SPACE	---	20	---		
41	SPACE	---	20	12400	LUNCH ROOM RANGE	60
TOTAL CONNECTED LOAD		PH A = 140,000 W PH B = 22,077 W PH C = 22,077 W TOTAL = 60,955 W	REMARKS: INSTALL CIRCUIT COVER SKIRT, TOP OF PANEL TO CEILING. * INSTALL HANDLE LOCK-ON DEVICE ▲ PAINT BREAKER HANDLE RED ⊙ GFCI CIRCUIT BREAKER			

CHANGE BKR 36 TO

"HIGH VAC FLOW LT / RANGE HOOD"

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IPF #10

ENGINEERING CHANGE NOTICE

Page 1 of 8

Proj. ECN

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>		3. Originator's Name, Organization, MSIN, and Telephone No. JP BAILEY 3C630 S2-40 376-8397			4. Date 05/10/95	
		5. Project Title/No./Work Order No. INSTALL BACKFLOW PREVENTER 2G-95-168/M		6. Bldg./Sys./Fac. No. 616/FIRE SYS		
		8. Document Numbers Changed by this ECN (includes sheet no. and rev.) SEE BLOCK 12		9. Related ECN No(s). N/A		
				10. Related PO No. N/A		
11a. Modification Work <input checked="" type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d)		11b. Work Package No. 2G-95-168/M	11c. Modification Work Complete AUG 08 1996 8-9-96 Cog. Engineer Signature & Date		11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date	

12. Description of Change
 H-6-10610 Rev. 0, Sheet 2
 See pages 3 and 4 for details. Install DCVA on fire system riser and include in Riser Detail.
 Make the changes reflected on this ECN.
 H-6-1561 Rev. 65, Sheet 1
 See pages 5 and 6 for details. Show 4 wires to FACP.
 Make the changes reflected on this ECN.
 H-6-1608 Rev. 3, Sheet 1
 See pages 7 and 8 for details. Show wiring configuration changes.
 Make the changes reflected on this ECN.

13a. Justification (mark one)	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 Changes to the design are required to facilitate the installation of a backflow preventer to meet the State of Washington Administrative Code 246-290-490.

14. Distribution (include name, MSIN, and no. of copies)					
KM Pittman	S2-40	1ea	STA 3	S2-05	
SM Korslund	S2-40	1ea	STA 4	R1-29	
PJ McKenna	S2-42	1ea	STA 20	T4-00	
MF Ferry	S2-40	1ea			
WL Craddock	S2-40	1ea			
KM McDonald	T4-03	1ea	IPF #10	S2-40	
JP Bailey	S2-40	1ea			

RELEASE STAMP
 OFFICIAL RELEASE BY WHC
 DATE JUN 06 1995
 STA. 6

ENGINEERING CHANGE NOTICE

15. Design Verification Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	16. Cost Impact <table style="width: 100%;"> <tr> <td style="text-align: center;">ENGINEERING</td> <td style="text-align: center;">CONSTRUCTION</td> </tr> <tr> <td>Additional <input type="checkbox"/> \$</td> <td>Additional <input type="checkbox"/> \$</td> </tr> <tr> <td>Savings <input type="checkbox"/> \$ N/A</td> <td>Savings <input type="checkbox"/> \$ N/A</td> </tr> </table>	ENGINEERING	CONSTRUCTION	Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$	Savings <input type="checkbox"/> \$ N/A	Savings <input type="checkbox"/> \$ N/A	17. Schedule Impact (days) Improvement <input type="checkbox"/> <div style="text-align: right;">N/A</div> Delay <input type="checkbox"/>
ENGINEERING	CONSTRUCTION							
Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$							
Savings <input type="checkbox"/> \$ N/A	Savings <input type="checkbox"/> \$ N/A							

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

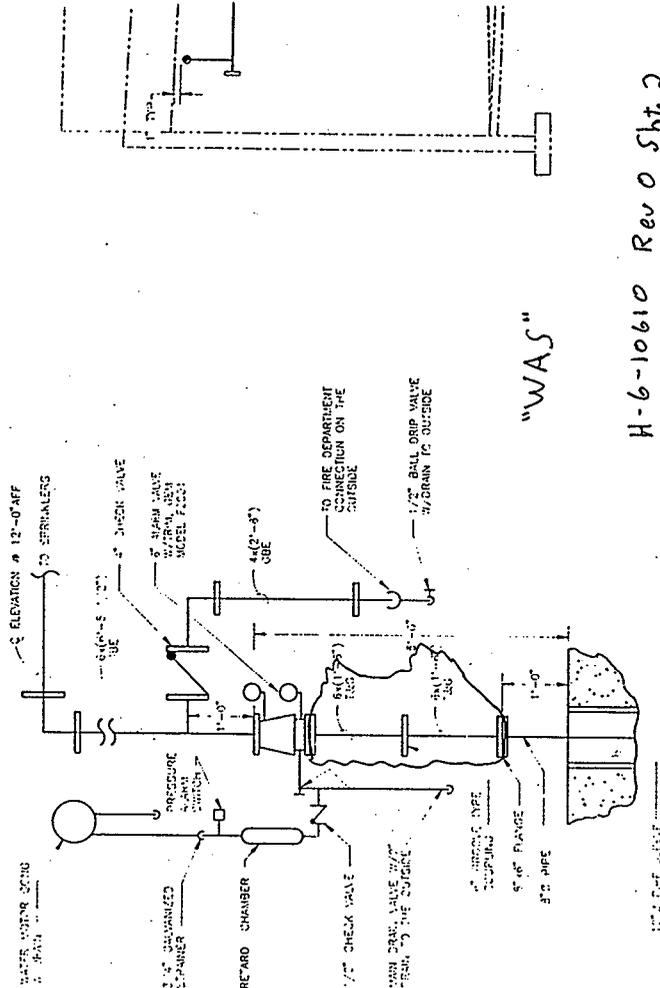
SDD/DD <input type="checkbox"/>	Seismic/Stress Analysis <input type="checkbox"/>	Tank Calibration Manual <input type="checkbox"/>
Functional Design Criteria <input type="checkbox"/>	Stress/Design Report <input type="checkbox"/>	Health Physics Procedure <input type="checkbox"/>
Operating Specification <input type="checkbox"/>	Interface Control Drawing <input type="checkbox"/>	Spares Multiple Unit Listing <input type="checkbox"/>
Criticality Specification <input type="checkbox"/>	Calibration Procedure <input type="checkbox"/>	Test Procedures/Specification <input type="checkbox"/>
Conceptual Design Report <input type="checkbox"/>	Installation Procedure <input type="checkbox"/>	Component Index <input type="checkbox"/>
Equipment Spec. <input type="checkbox"/>	Maintenance Procedure <input type="checkbox"/>	ASME Coded Item <input type="checkbox"/>
Const. Spec. <input type="checkbox"/>	Engineering Procedure <input type="checkbox"/>	Human Factor Consideration <input type="checkbox"/>
Procurement Spec. <input type="checkbox"/>	Operating Instruction <input type="checkbox"/>	Computer Software <input type="checkbox"/>
Vendor Information <input type="checkbox"/>	Operating Procedure <input type="checkbox"/>	Electric Circuit Schedule <input type="checkbox"/>
OM Manual <input type="checkbox"/>	Operational Safety Requirement <input type="checkbox"/>	ICRS Procedure <input type="checkbox"/>
FSAR/SAR <input type="checkbox"/>	IEFD Drawing <input type="checkbox"/>	Process Control Manual/Plan <input type="checkbox"/>
Safety Equipment List <input type="checkbox"/>	Cell Arrangement Drawing <input type="checkbox"/>	Process Flow Chart <input type="checkbox"/>
Radiation Work Permit <input type="checkbox"/>	Essential Material Specification <input type="checkbox"/>	Purchase Requisition <input type="checkbox"/>
Environmental Impact Statement <input type="checkbox"/>	Fac. Proc. Samp. Schedule <input type="checkbox"/>	<input type="checkbox"/>
Environmental Report <input type="checkbox"/>	Inspection Plan <input type="checkbox"/>	<input type="checkbox"/>
Environmental Permit <input type="checkbox"/>	Inventory Adjustment Request <input type="checkbox"/>	<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
--------------------------	--------------------------	--------------------------

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer JP Bailey <i>JP Bailey</i>	<u>5-18-95</u>	PE	_____
Cog. Mgr. E Blankingship <i>Blankingship</i>	<u>5-22-95</u>	QA	_____
QA	_____	Safety	_____
Safety PJ McKenna <i>P.J. McKenna</i>	<u>5-18-95</u>	Design	_____
Security	_____	Environ.	_____
Environ.	_____	Other	_____
Projects/Programs	_____		_____
Tank Waste Remediation System	_____		_____
Facilities Operations <i>K.M. McDonald</i>	<u>5/31/95</u>	DEPARTMENT OF ENERGY	
Restoration & Remediation <i>K.M. McDonald</i>		Signature or Letter No.	_____
Operations & Support Services	_____		_____
IRM	_____	ADDITIONAL	_____
Other SM Korslund <i>SM Korslund</i>	<u>5/21/95</u>		_____
<i>D.A. Rohl #2854</i>	<u>5/6/95</u>		_____



"WAS"

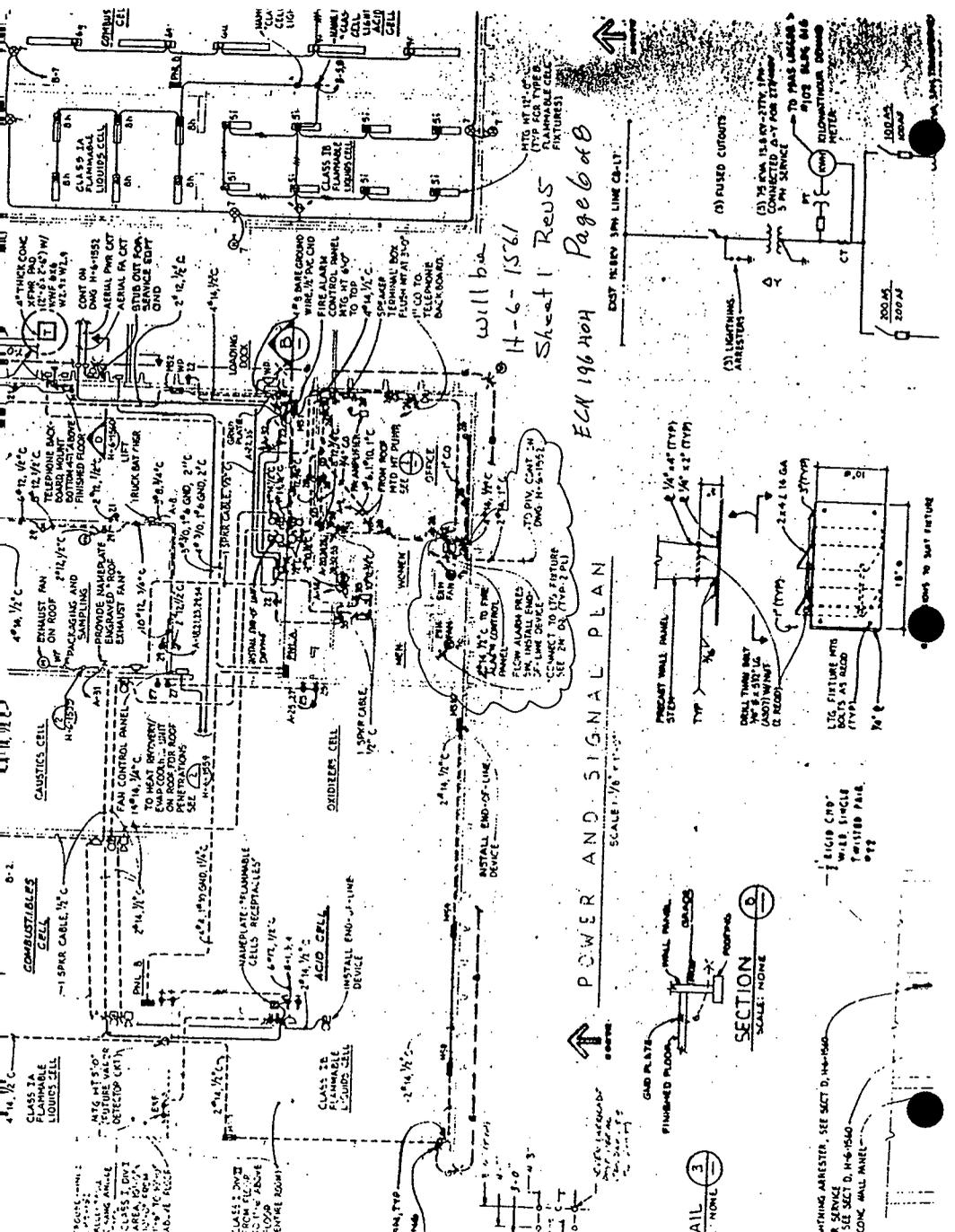
H-6-10610 Rev 0 Sht. 2

ECN 196404

Page 3 of 8

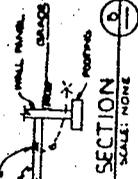
1 RISER DETAIL
SH

5'-0"00



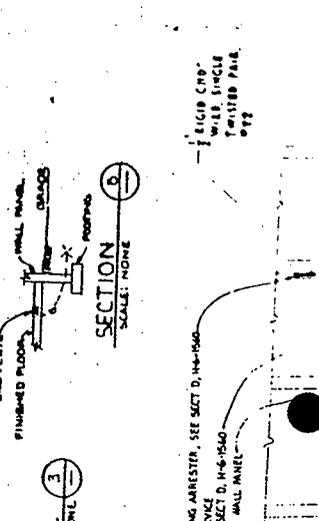
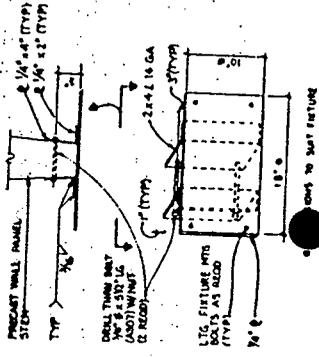
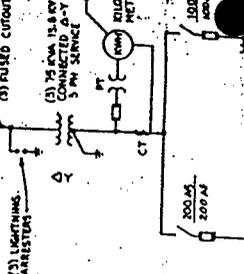
will be
H-6-1561
Sheet 1 Reus
Page 6 of 8

POWER AND SIGNAL PLAN
SCALE: 1/8" = 1'-0"



SIGN CHIP
WIRE SINGLE
PAINTED PAIR
EFT

WARNING ARRESTER, SEE SECT D, H-6-1560
SERVICE
CONNECTED TO 5 PH SERVICE
TO PASS LARGER
METER
ELECTROMECHANICAL
METER
100.00
200VA



MTG W/ 1\"/>

TO PIV. CONT. H
DNG H-61555
SEE 2ND FLOOR
PLAN (P-1)

INSTALL END-OF-LINE
DEVICE

CLASS 2B
FLAMMABLE
LIQUID CELL

CLASS 2C
FLAMMABLE
LIQUID CELL

CLASS 1A
FLAMMABLE
LIQUID CELL

CLASS 1B
FLAMMABLE
LIQUID CELL

CLASS 2D
FLAMMABLE
LIQUID CELL

CLASS 2E
FLAMMABLE
LIQUID CELL

CLASS 2F
FLAMMABLE
LIQUID CELL

CLASS 2G
FLAMMABLE
LIQUID CELL

CLASS 2H
FLAMMABLE
LIQUID CELL

CLASS 2I
FLAMMABLE
LIQUID CELL

CLASS 2J
FLAMMABLE
LIQUID CELL

CLASS 2K
FLAMMABLE
LIQUID CELL

CLASS 2L
FLAMMABLE
LIQUID CELL

CLASS 2M
FLAMMABLE
LIQUID CELL

CLASS 2N
FLAMMABLE
LIQUID CELL

CLASS 2O
FLAMMABLE
LIQUID CELL

CLASS 2P
FLAMMABLE
LIQUID CELL

CLASS 2Q
FLAMMABLE
LIQUID CELL

CLASS 2R
FLAMMABLE
LIQUID CELL

CLASS 2S
FLAMMABLE
LIQUID CELL

CLASS 2T
FLAMMABLE
LIQUID CELL

CLASS 2U
FLAMMABLE
LIQUID CELL

CLASS 2V
FLAMMABLE
LIQUID CELL

CLASS 2W
FLAMMABLE
LIQUID CELL

CLASS 2X
FLAMMABLE
LIQUID CELL

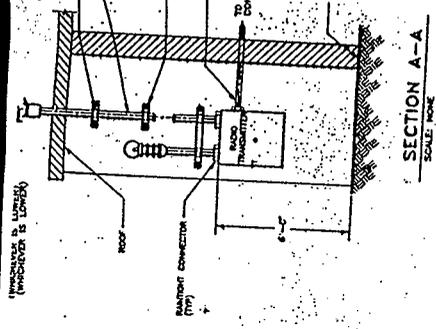
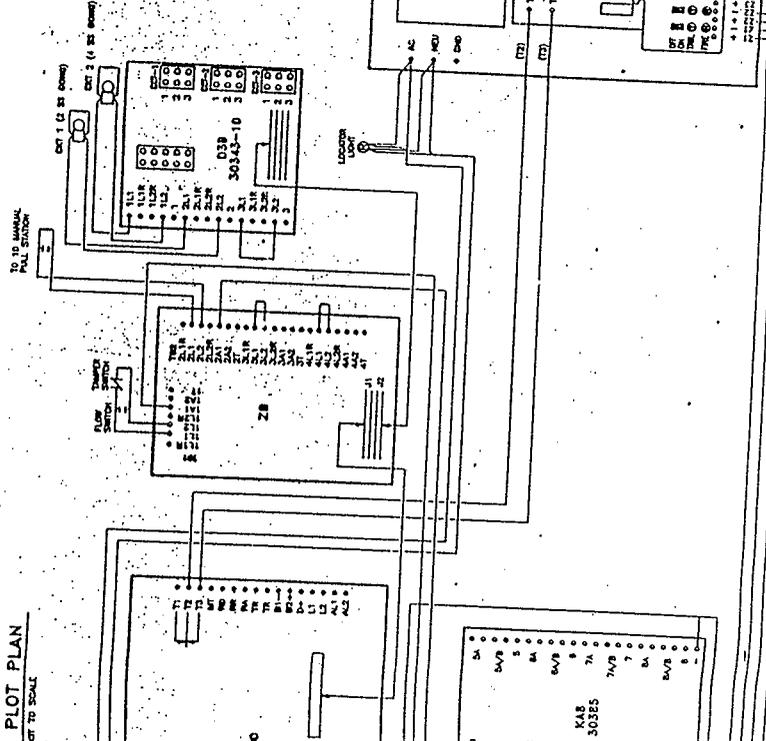
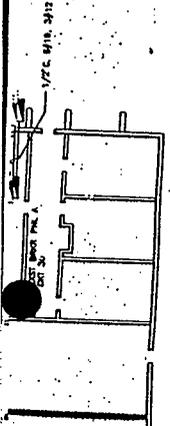
CLASS 2Y
FLAMMABLE
LIQUID CELL

CLASS 2Z
FLAMMABLE
LIQUID CELL

CLASS 2A
FLAMMABLE
LIQUID CELL

CLASS 2B
FLAMMABLE
LIQUID CELL

F PLOT PLAN
NOT TO SCALE



SECTION A-A
SOCKET MOUNT

MANUFACTURER'S LOCKER
(MANUFACTURER'S LOCKER)

was
H-6-1601
Sheet 1 Rev 3
Page 7 of 8
ECN 190-104

CAUTION
NOT COMPLETE WITH
CURRENT STATUS OF CUTS
FROM DATE 52.
MAY 08 1955

CONDUCTOR LEAD A. DIMENSIONS ARE VERIFIED WITH
DRAWING TOOLS. DIMENSIONS ARE VERIFIED WITH
DRAWING AS TO LEAD PATH, BUT ACTUAL MAY
VARY.

ESSENTIAL DR
U.S. DEPARTMENT OF
DEFENSE
NAVY AIR FORCE
ARMY AIR MAIL
POSTAL SERVICE
R.F. WOOD
RADIO ELECTRIC
RADIO FIRE

1	MARKET	U.S. AIR FORCE
2	MARKET	U.S. AIR FORCE
3	MARKET	U.S. AIR FORCE
4	MARKET	U.S. AIR FORCE
5	MARKET	U.S. AIR FORCE
6	MARKET	U.S. AIR FORCE
7	MARKET	U.S. AIR FORCE
8	MARKET	U.S. AIR FORCE
9	MARKET	U.S. AIR FORCE
10	MARKET	U.S. AIR FORCE

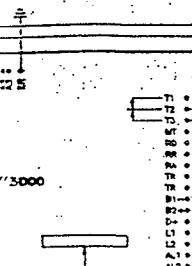
11	MARKET	U.S. AIR FORCE
12	MARKET	U.S. AIR FORCE
13	MARKET	U.S. AIR FORCE
14	MARKET	U.S. AIR FORCE
15	MARKET	U.S. AIR FORCE
16	MARKET	U.S. AIR FORCE
17	MARKET	U.S. AIR FORCE
18	MARKET	U.S. AIR FORCE
19	MARKET	U.S. AIR FORCE
20	MARKET	U.S. AIR FORCE

21	MARKET	U.S. AIR FORCE
22	MARKET	U.S. AIR FORCE
23	MARKET	U.S. AIR FORCE
24	MARKET	U.S. AIR FORCE
25	MARKET	U.S. AIR FORCE
26	MARKET	U.S. AIR FORCE
27	MARKET	U.S. AIR FORCE
28	MARKET	U.S. AIR FORCE
29	MARKET	U.S. AIR FORCE
30	MARKET	U.S. AIR FORCE

31	MARKET	U.S. AIR FORCE
32	MARKET	U.S. AIR FORCE
33	MARKET	U.S. AIR FORCE
34	MARKET	U.S. AIR FORCE
35	MARKET	U.S. AIR FORCE
36	MARKET	U.S. AIR FORCE
37	MARKET	U.S. AIR FORCE
38	MARKET	U.S. AIR FORCE
39	MARKET	U.S. AIR FORCE
40	MARKET	U.S. AIR FORCE

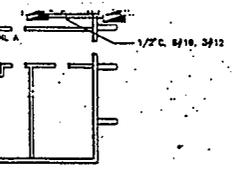
WAF PLOT PLAN

SCALE: NOT TO SCALE

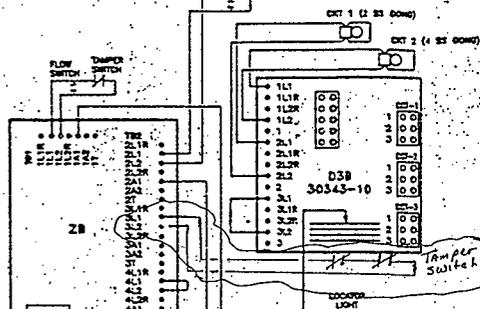


12A	21	5A
11A/B	5A/B	5
11	5	5
12A/B	22	6A
12A/B	6A/B	6
12	6	6
13A	7A	7A
13A/B	7A/B	7
13	7	7
14A/B	8A/B	8A/B
14	8	8

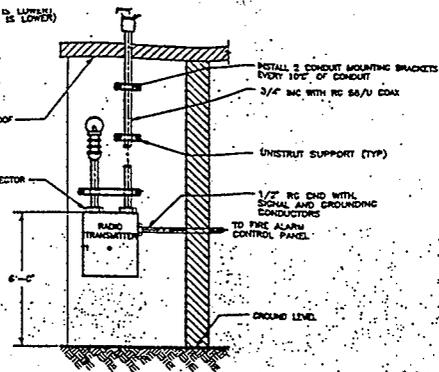
KAB
30325



TO 16 MANUAL
FLAT STATION



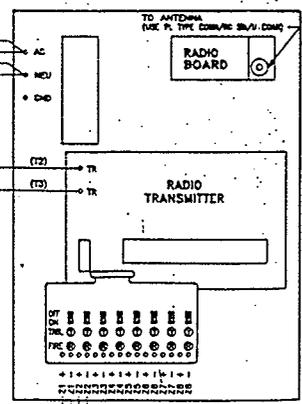
TRANSFORMER D. LOWERY
(WOODWARD IS. LOWERY)



SECTION A-A
SCALE: NONE

Will be
H-6-1607
Sheet 1 Rev 3
Page 9 of 8

ECN 196101



CAUTION
NOT COMPLETE W
CURRENT STATUS OF
SENS FROM DATA

MAY 08 1995

CONFIDENCE LEVEL A: CRITICAL DIMENSIONS ARE VERIFIED
DRAWING TOLERANCES: CONCEALED PIP
VERIFIED AS TO FLOW PATH, BUT ACTU
VERIFIED.

ESSENTIAL

3	181011	REVISION FOR ED - 181031	DATE	BY	CHKD	APPD
3	181011	REVISION FOR ED - 181031	DATE	BY	CHKD	APPD
3	181011	REVISION FOR ED - 181031	DATE	BY	CHKD	APPD

LARRY SATZ (42714)	D. R. MARLOW (42714)	D. R. MARLOW (42714)	D. R. MARLOW (42714)
D. R. MARLOW (42714)			

ELECTRICAL
RADIO I
PLAN A

IPF 10

ESSENTIAL

ENGINEERING CHANGE NOTICE

1. ECN No 617727

Page 1 of 4

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. Eric M. Pierce, 87250, T4-03, 373-3861.	3a. USQ Required? [] Yes [x] No	4. Date. 7-10-95
5. Project Title/No./Work Order No. 616 Labeling/	6. Bldg./Sys./Fac. No. 616	7. Approval Designator N/A	
8. Document Numbers Changed by this ECN (includes sheet no. and rev.) See Block 12	9. Related ECN No(s). N/A	10. Related PO No. N/A	

11a. Modification Work [] Yes (fill out Blk. 11b) [x] No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date
--	-------------------------------------	---	---

12. Description of Change Sirens
 Label Emergency Lighting, and Paging Speakers on drawing H-6-1561 sheet 1 Rev. 6. Shown on pages 3 and 4 of this ECN.

13a. Justification (mark one)

Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details
 This ECN is to facilitate labeling of Emergency Lighting and Paging Speakers at the 616 Facility.

14. Distribution (include name, MSIN, and no. of copies) LJ Gaschott, KR Busching; T4-03 lea. Rel. Sta 6, 20, 3, 4, 5, 15 File T4-03 NP Emerson, T403 PS Crane, T4-04 JT Schorzman, T4-04	RELEASE STAMP OFFICIAL RELEASE BY WHC 55 DATE OCT 20 1995 <i>Sto. S.</i>
--	--

APPENDIX 4C

CONTAINMENT CALCULATIONS

1
2
3
4

1
2
3
4
5

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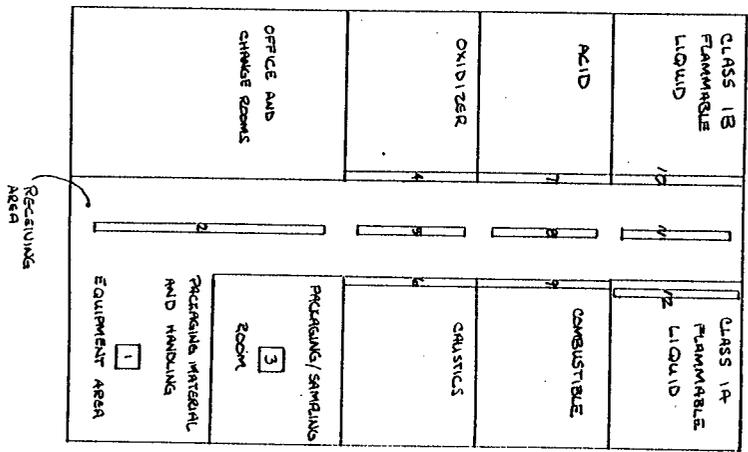
5-31-95

J. W. Olson

616 NRJSSF CONTAINMENT CALCULATIONS

1 / 5

NRJSSF TRENCHES AND SUMPS



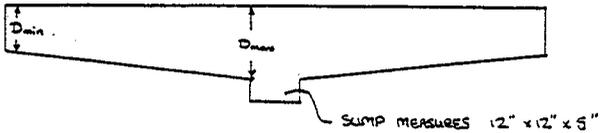
5-31-90

J.W. Olson

616 NRDWSF CONTAINMENT CALCULATIONS

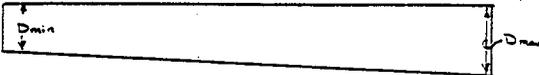
2/5

TRENCHES 4, 6, 7, 9, 10 AND 12 :



TRENCH	L	W	D _{min}	D _{max}
4	20'	12"	16"	18"
6	20'	12"	16"	18"
7	22'-4"	12"	16"	18 1/2"
9	22'-4"	12"	16"	18"
10	17'-4"	12"	15 1/2"	17"
12	15'-10"	12"	16"	17"

TRENCHES 2, 5, 8, AND 11



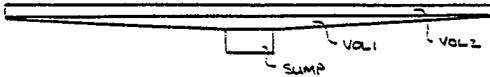
TRENCH	L	W	D _{min}	D _{max}
2	35'-2"	12"	8"	15"
5	14'-2"	12"	12"	14"
8	16'-3"	12"	13"	15"
11	11'-3"	12"	13"	14"

TRENCHES 1 AND 3

THESE TRENCHES ARE CUBES 3' ON A SIDE

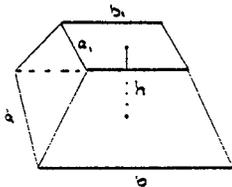
VOLUME = 27 ft³ OR 202 gal (7.48 gal/ft³)

TRENCH VOLUME CALCULATIONS FOR 4, 6, 7, 9, 10 AND 12:



THESE TRENCHES ARE BROKEN INTO 3 VOLUME ELEMENTS VOL 1, VOL 2 AND SUMP. THE SUMP ON ALL TRENCHES IS IDENTICAL.

VOL 1 WILL BE CALCULATED USING THE FORMULA FOR AN OBELISK:



$$\text{VOLUME} = \frac{1}{6} h [ab + (a+a_1)(b+b_1) + a_1b_1]$$

$$h = D_{max} - D_{min}$$

VOL 2 IS A SOLID RECTANGLE $D_{min} \times L \times W$

THE SUMP VOLUME IS $1' \times 1' \times \frac{5'}{12} = 0.42 \text{ ft}^3$

VOL 1

TRENCH	a	a ₁	b	b ₁	h	VOL 1
4	1.44	1 ft	20 ft	1 ft	0.17 ft	1.79
6	1	1	20	1	0.17	1.79
7	1	1	22.33	1	0.21	2.46
9	1	1	22.33	1	0.17	1.98
10	1	1	17.33	1	0.13	1.19
12	1	1	15.33	1	0.08	0.67

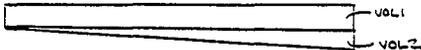
VOL 2

TRENCH	D _{min}	L	W	VOL 2
4	1.33 ft	20 ft	1 ft	26.6 ft ³
6	1.33	20	1	26.6
7	1.33	22.33	1	29.7
9	1.33	22.33	1	29.7
10	1.29	17.33	1	22.4
12	1.33	15.33	1	21.0

TRENCH	VOL1	VOL2	SUMP	TOTAL
4	1.79 ft ³	26.6 ft ³	0.42 ft ³	28.8 ft ³
6	1.79	26.6	0.42	28.8
7	2.45	29.7	0.42	32.6
9	1.98	29.7	0.42	32.1
10	1.19	22.4	0.42	24.0
12	0.67	21.0	0.42	22.1

TRENCH CALCULATIONS FOR 2, 5, 8 AND 11

THESE TRENCHES ARE BROKEN INTO 2 VOLUME ELEMENTS VOL1 AND VOL2.

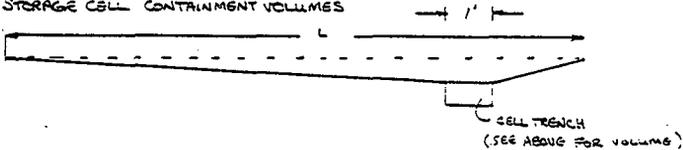


$VOL1 = L \times W \times D_{min}$

$VOL2 = \frac{1}{2} L \times W \times (D_{max} - D_{min})$

TRENCH	L (ft)	W (ft)	D _{min}	D _{max} - D _{min}	VOL1	VOL2	TOTAL
2	35.17	1	0.67 ft	0.58 ft	23.56 ft ³	10.20 ft ³	33.76 ft ³
5	14.17	1	1	0.17	14.17	1.20	15.37
8	16.25	1	1.09	0.17	17.55	1.38	18.93
11	11.25	1	1.08	0.08	12.15	0.45	12.60

STORAGE CELL CONTAINMENT VOLUMES



THE CELL CONTAINMENT VOLUME WILL BE CALCULATED USING THE FORMULA FOR AN OBBLISK AGAIN

CELL	a	a ₁	b	b ₁	h	VOLUME
Refrigerant/ump	21.9 ft	3 ft	25.9 ft	3 ft	0.08	17.3 ft ³
OXIDIZER	21.33	21.3	29.6	1	0.25	81.5
CAUSTIC	21.3	21.3	29.6	1	0.25	81.5
ACID	23.5	23.5	29.6	1	0.25	89.8
COMBUSTIBLE	23.5	23.5	29.6	1	0.25	89.8
CLASS 1B	17.4	17.4	32.2	1	0.25	72.2
CLASS 1A	17.2	17.2	28.4	1	0.25	63.1

5-31-90

J. W. Olson 616 NRDSF CONTAINMENT CALCULATIONS

5/5

TOTAL CELL CONTAINMENT VOLUME IS THE SUM OF THE CELL TRENCH VOLUME AND CELL CONTAINMENT VOLUME

CELL	TRENCH	CONTAINMENT	TOTAL CONTAINMENT VOLUME	
Packaging/ Sump	27 ft ³	17.3 ft ³	44.3 ft ³	OR 331 gal
OXIDIZER	28.8	81.5	110.3	825
CAUSTIC	28.8	81.5	110.3	825
ACID	32.6	89.8	122.4	915
COMBUSTIBLE	32.1	89.8	121.9	912
CLASS 1B	24.0	72.2	96.2	719
CLASS 1A	22.1	63.1	85.2	637

MAXIMUM STORED CAPACITY OF EACH CELL

CELL	TIER 1	TIER 2 [†]	TOTAL VOLUME
OXIDIZER	50-55 gal	40-55/10-30	5250 gal
CAUSTIC	50-55	40-55/10-30	5250
ACID	60-55	40-55/20-30	6100
COMBUSTIBLE	58-55	40-55/18-30	5930
CLASS 1B	40-55	40-30	3400
CLASS 1A	32-55	32-20	2535 [†]

† TIER 2 SINGLE ROWS: CONTAINERS MAY BE NO LARGER THAN 30 GALLONS

† INCLUDING A 135 GALLON STORAGE CABINET

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APPENDIX 4D

CONCRETE SEALANT PROPERTIES AND PERFORMANCE DATA

1
2
3
4

1
2
3
4
5

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date of prep : 07/12/95

SECTION I

manufacturer : STEELCOTE MANUFACTURING COMPANY
 address : ONE STEELCOTE SQUARE
 ST. LOUIS, MO
 63103
 telephone : (314) 771-8053
 emergency : (800) 424-9500 CHEMTREC

- H A Z A R D -

HEALTH	: 3
FLAMMABILITY	: 1
REACTIVITY	: 0
PERSONAL PROTECT.	:

product class: EPOXY CURING AGENT (HAZARD RATINGS : 0-least, 1=slight, 2=moderate, 3=high, 4=extreme, *==chronic)

sfq. code id : RD7870100604

trade name : COLORTOP SELF-LEVELING EPOXY PTA

SECTION II-A

HAZARDOUS COMPONENTS

no.	component	CAS#	% by wt.	SARA	vapor pressure (at 20 C)	LEL (@ 25 C)
1	MONYL PHEROL	25154-52-3	35 - 40	NO	1.00	N/A
2	POLYXYPROPYLENE DIAMINE	9046-10-0	30 - 35	NO	1.00 @ 100 C	N/A
3	PIPERAZINE-ETHANAMINE	140-31-8	5 - 10	NO	.05	N/A
4	POLYPROPYLENE GLYCOL GLYCIDYL ETHER	9072-42-2	20 - 25	NO	N/A	N/A

>> None of the components of this product are recognized as carcinogenic.

(N/A = not applicable)

SECTION II-B

OCCUPATIONAL EXPOSURE LIMITS

no.	{OSHA} PEL/TWA	PEL/CEILING	PEL/STEL	skin
1	N/E	N/E	N/E	N/E
2	N/E	N/E	N/E	N/E
3	N/E	N/E	N/E	N/E
4	N/E	N/E	N/E	N/E

no.	{ACGIH} TLV/TWA	TLV/CEILING	TLV/STEL	skin
1	N/E	N/E	N/E	N/E
2	N/E	N/E	N/E	N/E
3	N/E	N/E	N/E	N/E
4	N/E	N/E	N/E	N/E

>> The dried film of this product may become a dust nuisance when removed by sanding or grinding. OSHA recommends a PEL/TWA of 15 ug/m3 for total dust and 5 ug/m3 for the respirable fraction. ACGIH recommends a TLV/TWA of 10 ug/m3 for total dust.

>> (SKIN) absorption may contribute to the overall exposure to this material. Take appropriate measures to prevent skin contact.

(N/E = not established)

SECTION III

PHYSICAL DATA

boiling point	: not established	% volatile by volume	: not applicable
evaporation rate	: < 1 (ether = 1)	% volatile by weight	: not applicable
vapor density	: > 1 (air = 1)	weight per gallon	: 8.13 (theoretical)

MSDS# 029326

SECTION IV

HEALTH INFORMATION

EYE CONTACT

BASED ON THE PRESENCE OF COMPONENTS 1, 2 AND 3 PRODUCT IS PRESUMED TO BE CORROSIVE TO THE EYES. EXPOSURE MAY CAUSE CHEMICAL BURNS AND EXTENSIVE CORNEAL INJURY.

SKIN CONTACT

BASED ON THE PRESENCE OF COMPONENTS 1, 2 AND 3 PRODUCT IS PRESUMED TO BE CORROSIVE TO THE SKIN AND EXPOSURE MAY CAUSE CHEMICAL BURNS. BASED ON THE PRESENCE OF COMPONENT 2 PROLONGED OR REPEATED CONTACT MAY RESULT IN DEFATTING AND DRYING OF THE SKIN WHICH MAY RESULT IN DERMATITIS. BASED ON THE PRESENCE OF COMPONENT 2 CONTACT WITH THE SKIN MAY RESULT IN SKIN SENSITIZATION TO AMINES, POLYAMINES, POLYANIDES AND RELATED COMPOUNDS. INDIVIDUALS WHO HAVE DEVELOPED A SKIN SENSITIZATION CAN DEVELOP THESE SYMPTOMS AS A RESULT OF CONTACT WITH VERY SMALL AMOUNTS OF LIQUID MATERIAL OR AS A RESULT OF EXPOSURE TO VAPOR. THIS SKIN SENSITIZATION MAY BE TEMPORARY OR PERMANENT. ONCE AN INDIVIDUAL IS DIAGNOSED AS BEING SENSITIZED, NO FURTHER EXPOSURE CAN BE PERMITTED. BASED ON THE PRESENCE OF COMPONENT 4 CONTACT WITH THE SKIN MAY RESULT IN SKIN SENSITIZATION. INDIVIDUALS WHO HAVE DEVELOPED A SKIN SENSITIZATION CAN DEVELOP THESE SYMPTOMS AS A RESULT OF CONTACT WITH VERY SMALL AMOUNTS OF MATERIAL OR AS A RESULT OF EXPOSURE TO VAPOR. THIS SKIN SENSITIZATION MAY BE TEMPORARY OR PERMANENT. ONCE AN INDIVIDUAL IS DIAGNOSED AS BEING SENSITIZED, NO FURTHER EXPOSURE CAN BE PERMITTED.

INHALATION

BASED ON THE PRESENCE OF COMPONENT 2 PRODUCT VAPORS AND/OR MISTS ARE CORROSIVE TO THE NOSE, THROAT, RESPIRATORY TRACT, AND OTHER MUCOUS MEMBRANES. OVEREXPOSURE MAY RESULT IN CHEMICAL PNEUMONITIS OR PULMONARY OEDEMA WHICH ARE POTENTIALLY FATAL.

INGESTION

BASED ON THE PRESENCE OF COMPONENT 4 PRODUCT IS PRESUMED TO BE SLIGHTLY TOXIC.

SIGNS AND SYMPTOMS

SYMPTOMS OF EYE IRRITATION INCLUDE PAIN, TEARING, REDDENING AND SWELLING. SYMPTOMS OF SKIN IRRITATION INCLUDE REDDENING, SWELLING, RASH AND REDNESS. SYMPTOMS OF RESPIRATORY IRRITATION INCLUDE RUNNY NOSE, SORE THROAT, COUGHING, CHEST DISCOMFORT, SHORTNESS OF BREATH AND REDUCED LUNG FUNCTION. SYMPTOMS OF GASTROINTESTINAL IRRITATION INCLUDE SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING AND DIARRHEA. BASED ON THE PRESENCE OF COMPONENT 2 SKIN SENSITIZATION RESULTS IN ALLERGIC DERMATITIS WHICH MAY INCLUDE RASH, ITCHING, HIVES AND SWELLING OF EXTREMITIES. BASED ON THE PRESENCE OF COMPONENT 2 LONG SENSITIZATION RESULTS IN ASTHMA-LIKE SYMPTOMS: CHEST TIGHTNESS, SHORTNESS OF BREATH, WHEEZING AND COUGHING. THESE SYMPTOMS MAY BE IMMEDIATE OR DELAYED UP TO SEVERAL HOURS.

AGGRAVATED MEDICAL CONDITIONS

PREEXISTING SKIN, EYE AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PERSONS WITH ASTHMATIC-TYPE CONDITIONS, CHRONIC BRONCHITIS, OTHER CHRONIC RESPIRATORY DISEASES, RECURRENT SKIN ECZEMA, SENSITIZATION OR ALLERGIES SHOULD BE EXCLUDED FROM WORKING WITH AMINES, POLYAMINES, POLYANIDES AND RELATED COMPOUNDS.

OTHER HEALTH EFFECTS

BASED ON THE PRESENCE OF COMPONENT 3 NITRITES MAY REACT WITH SECONDARY OR TERTIARY AMINES UNDER CERTAIN CONDITIONS TO FORM CARCINOGENIC NITROSAMINES.

SECTION V

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT

IMMEDIATELY FLUSH EYES WITH CORDIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. SEEK PROMPT MEDICAL ATTENTION.

SKIN CONTACT

REMOVE CONTAMINATED CLOTHING AND SHOES. WIPE EXCESS FROM SKIN AND FLUSH WITH WATER USING SOAP IF AVAILABLE. SEEK MEDICAL ATTENTION IF IRRITATION OCCURS. DO NOT REUSE CLOTHING UNTIL THOROUGHLY DECONTAMINATED. CONTAMINATED LEATHER ARTICLES CANNOT BE DECONTAMINATED AND SHOULD BE DISPOSED.

INHALATION

GROSS OVER EXPOSURE TO NUISANCE PARTICLES MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT.

MSDS#029326

INGESTION

DO NOT INDUCE VOMITING. VOMITING WILL CAUSE FURTHER DAMAGE TO THE THROAT. OILIVE BY GIVING WATER OR MILK TO DRINK IF THE VICTIM IS CONSCIOUS. CONSULT A PHYSICIAN, HOSPITAL OR POISON CONTROL CENTER AND/OR TRANSPORT TO AN EMERGENCY FACILITY IMMEDIATELY.

SECTION VI**FIRE AND EXPLOSION HAZARDS**

Flammability classification - OSHA : COMBUSTIBLE LIQUID - CLASS III
 - DOT : NOT REGULATED

Flash point : 200 TCC

EXTINGUISHING MEDIA

USE WATER FOG, FOM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

CLEAR FIRE AREA OF UNPROTECTED PERSONNEL. DO NOT ENTER CONFINED FIRE SPACE WITHOUT HELMET, FACE SHIELD, BUNKER COAT, GLOVES, RUBBER BOOTS, AND A POSITIVE PRESSURE NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS

CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE.

SECTION VII**REACTIVITY**

STABILITY : STABLE

HAZARDOUS POLYMERIZATION : WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID

BASED ON THE PRESENCE OF COMPONENT 2 AVOID OXIDIZING MATERIALS. BASED ON THE PRESENCE OF COMPONENTS 3 AND 4 AVOID STRONG ACIDS. BASED ON THE PRESENCE OF COMPONENT 4 AVOID ANINES AND ALKANOLAMINES. BASED ON THE PRESENCE OF COMPONENT 3 AVOID WATER CONTAMINATION.

HAZARDOUS DECOMPOSITION PRODUCTS

OXIDES AND COMPOUNDS OF NITROGEN, AMMONIA, ALDEHYDES AND ACIDS, CARBON DIOXIDE, CARBON MONOXIDE AND UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED DURING COMBUSTION.

SECTION VIII**EMPLOYEE PROTECTION****RESPIRATORY PROTECTION**

USE VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS - AT LEAST 10 AIR CHANGES PER HOUR ARE RECOMMENDED FOR GOOD GENERAL ROOM VENTILATION. IF EXPOSURE EXCEEDS THE PEL/TLY, USE THE APPROPRIATE NIOSH-APPROVED RESPIRATOR.

PROTECTIVE CLOTHING

WEAR SAFETY GLASSES, GOGGLES, OR A SPLASH SHIELD TO PREVENT EYE CONTACT. CONTACT LENSES SHOULD NOT BE WORN. WEAR APPROPRIATE GLOVES AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND CLOTHING.

ADDITIONAL PROTECTIVE MEASURES

EYE WASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE AVAILABLE FOR USE IN AN EMERGENCY.

MSDS# 029326

SECTION IX

ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

LARGE SPILLS >> EVACUATE THE HAZARD AREA OF UNPROTECTED PERSONNEL. WEAR APPROPRIATE RESPIRATOR AND PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. IF VAPOR CLOUD FORMS, WATER FOG MAY BE USED TO SUPPRESS; CONTAIN RUN-OFF. REMOVE WITH VACUUM, TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTIONS AS ABOVE. SMALL SPILLS >> TAKE UP WITH AN ABSORBENT MATERIAL AND PLACE IN NON-LEAKING CONTAINERS; SEAL TIGHTLY FOR PROPER DISPOSAL.

WASTE DISPOSAL

OBSERVE ALL FEDERAL, STATE, AND LOCAL REGULATIONS REGARDING PROPER DISPOSAL.

SECTION X

ADDITIONAL PRECAUTIONS

CONTAINERS CAN CONTAIN HAZARDOUS PRODUCT RESIDUES EVEN WHEN EMPTY. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, WE MAKE NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. WE ASSUME NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

MSDS# 029326

MSDS# 033513

*** MATERIAL SAFETY DATA SHEET ***

date of prep : 07/12/95

40787A023804 (page 1)

SECTION I

manufacturer : STEELCOTE MANUFACTURING COMPANY
 address : ONE STEELCOTE SQUARE
 ST. LOUIS, MO
 63103
 telephone# : (314) 771-9053
 emergency# : (800) 424-9300 CHEMTREC

- H M I S -

HEALTH	: 2
FLAMMABILITY	: 1
REACTIVITY	: 0
PERSONAL PROTECT.	: 1

product class: EPOXY COATING

(HAZARD RATING : 0-least, 1-slight, 2-moderate, 3-high, 4-extreme, *=chronic)

mfg. code id : A0787A023804

trade name : COLORTOP PART B (NON-LEADED COLORS)

SECTION II-A

HAZARDOUS COMPONENTS

no.	component	CAS#	SARA	vapor pressure (@ 20 C)	LEL (@ 25 C)
1	BISPHENOL A/EPICHLORHYDRIN RESIN	25068-38-6	NO	N/A	N/A
2	TITANIUM DIOXIDE	13463-67-7	NO	N/A	N/A

>> None of the components of this product are recognized as carcinogenic.

(N/A = not applicable)

SECTION II-B

OCCUPATIONAL EXPOSURE LIMITS

no.	(OSHA) PEL/TWA	PEL/CEILING	PEL/STEL	skin
1	N/E	N/E	N/E	N/E
2	15 ug/a3	N/E	N/E	N/E

no.	(ACGIH) TLV/TWA	TLV/CEILING	TLV/STEL	skin
1	N/E	N/E	N/E	N/E
2	10 ug/a3 Total Dust	N/E	N/E	N/E

>> the dried film of this product may become a dust nuisance when removed by sanding or grinding. OSHA recommends a PEL/TWA of 15 ug/a3 for total dust and 5 ug/a3 for the respirable fraction. ACGIH recommends a TLV/TWA of 10 ug/a3 for total dust.

>> (SKIN) absorption may contribute to the overall exposure to this material. Take appropriate measures to prevent skin contact.
 (N/E = not established)

SECTION III

PHYSICAL DATA

boiling point	: not established	% volatile by volume	: .24 (Theoretical)
evaporation rate	: < 1 (ether = 1)	% volatile by weight	: .17 (Theoretical)
vapor density	: > 1 (air = 1)	weight per gallon	: 10.24 (Theoretical)

SECTION IV

HEALTH INFORMATION

EYE CONTACT

ANY FOREIGN MATERIAL GOTTEN INTO THE EYE MAY CAUSE IRRITATION.

SKIN CONTACT

EXPOSURE MAY PRODUCE SKIN IRRITATION. BASED ON THE PRESENCE OF COMPONENT 1 CONTACT WITH THE SKIN MAY RESULT IN SKIN SENSITIZATION TO EPOXIDES. INDIVIDUALS WHO HAVE DEVELOPED A SKIN SENSITIZATION CAN DEVELOP THESE SYMPTOMS AS A RESULT OF CONTACT WITH VERY SMALL AMOUNTS OF LIQUID MATERIAL OR AS A RESULT OF EXPOSURE TO VAPOR. THIS SKIN SENSITIZATION MAY BE TEMPORARY OR PERMANENT. ONCE AN INDIVIDUAL IS DIAGNOSED AS BEING SENSITIZED, NO FURTHER EXPOSURE CAN BE PERMITTED.

INHALATION

EXPOSURE MAY PRODUCE IRRITATION TO THE NOSE, THROAT, RESPIRATORY TRACT, AND OTHER MUCOUS MEMBRANES. BASED ON THE PRESENCE OF COMPONENT 1 AS A RESULT OF REPEATED OVEREXPOSURES OR EXPOSURE TO A SINGLE LARGE DOSE, CERTAIN INDIVIDUALS MAY DEVELOP LUNG SENSITIZATION (CHEMICAL ASTHMA) TO EPOXIDES WHICH WILL CAUSE THEM TO REACT TO A LATER EXPOSURE AT VERY LOW LEVELS. ONCE AN INDIVIDUAL DIAGNOSED AS BEING SENSITIZED, NO FURTHER EXPOSURE CAN BE PERMITTED. THIS LUNG SENSITIZATION MAY BE EITHER TEMPORARY OR PERMANENT.

INGESTION

THIS PRODUCT MAY BE IRRITATING TO THE GASTROINTESTINAL TRACT IF INGESTED.

SIGNS AND SYMPTOMS

SYMPTOMS OF EYE IRRITATION INCLUDE PAIN, TEARING, REDDENING AND SWELLING. SYMPTOMS OF SKIN IRRITATION INCLUDE REDDENING, SWELLING, RASH AND REDNESS. SYMPTOMS OF RESPIRATORY IRRITATION INCLUDE RUNNY NOSE, SORE THROAT, COUGHING, CHEST DISCOMFORT, SHORTNESS OF BREATH AND REDUCED LUNG FUNCTION. SYMPTOMS OF GASTROINTESTINAL IRRITATION INCLUDE SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING AND DIARRHEA. BASED ON THE PRESENCE OF COMPONENT 1 SKIN SENSITIZATION RESULTS IN ALLERGIC DERMATITIS WHICH MAY INCLUDE RASH, ITCHING, HIVES AND SWELLING OF EXTREMITIES. BASED ON THE PRESENCE OF COMPONENT 1 LUNG SENSITIZATION RESULTS IN ASTHMA-LIKE SYMPTOMS: CHEST TIGHTNESS, SHORTNESS OF BREATH, WHEEZING AND COUGHING. THESE SYMPTOMS MAY BE IMMEDIATE OR DELAYED UP TO SEVERAL HOURS.

AGGRAVATED MEDICAL CONDITIONS

PREEXISTING SKIN, EYE AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PERSONS WITH ASTHMATIC-TYPE CONDITIONS, CHRONIC BRONCHITIS, OTHER CHRONIC RESPIRATORY DISEASES, RECURRENT SKIN ECZEMA, SENSITIZATION OR ALLERGIES SHOULD BE EXCLUDED FROM WORKING WITH EPOXIDES.

OTHER HEALTH EFFECTS

BASED ON THE PRESENCE OF COMPONENT 2 CHRONIC OVEREXPOSURE TO TiO2 DUST MAY CAUSE SLIGHT LUNG FIBROSIS.

SECTION V**EMERGENCY AND FIRST AID PROCEDURES****EYE CONTACT**

IMMEDIATELY FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF ANY SYMPTOMS PERSIST.

SKIN CONTACT

REMOVE CONTAMINATED CLOTHING AND SHOES. WIPE EXCESS FROM SKIN AND FLUSH WITH WATER USING SOAP IF AVAILABLE. SEEK MEDICAL ATTENTION IF IRRITATION OCCURS. DO NOT REUSE CLOTHING UNTIL THOROUGHLY DECONTAMINATED. CONTAMINATED LEATHER ARTICLES CANNOT BE DECONTAMINATED AND SHOULD BE DISPOSED.

INHALATION

GROSS OVER EXPOSURE TO NUISANCE PARTICLES MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT.

INGESTION

DILUTE WITH LIQUID UNLESS THE VICTIM IS UNCONSCIOUS OR VERY DROWSY. IF VOMITING SPONTANEOUSLY OCCURS, KEEP THE VICTIM'S HEAD BELOW THE HIPS TO PREVENT ASPIRATION INTO THE LUNGS. CONSULT A PHYSICIAN, HOSPITAL OR POISON CONTROL CENTER AND/OR TRANSPORT TO AN EMERGENCY FACILITY IMMEDIATELY.

MSDS# 033513

SECTION VI

FIRE AND EXPLOSION HAZARDS

Flammability classification - OSHA : COMBUSTIBLE LIQUID - CLASS 111B
 - DOT : NOT REGULATED

Flash point : 485 FOC

EXTINGUISHING MEDIA

USE WATER FOG, FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

CLEAR FIRE AREA OF UNPROTECTED PERSONNEL. DO NOT ENTER CONFINED FIRE SPACE WITHOUT HELMET, FACE SHIELD, BUNKER COAT, GLOVES, RUBBER BOOTS, AND A POSITIVE PRESSURE MISH-APPROVED SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS

CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE.

SECTION VII

REACTIVITY

STABILITY : STABLE

HAZARDOUS POLYMERIZATION : WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID

BASED ON THE PRESENCE OF COMPONENT 1 AVOID AMINES, POLYAMINES, AND POLYAMIDES UNDER UNCONTROLLED CONDITIONS.

HAZARDOUS DECOMPOSITION PRODUCTS

CARBON DIOXIDE, CARBON MONOXIDE AND UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED DURING COMBUSTION.

SECTION VIII

EMPLOYEE PROTECTION

RESPIRATORY PROTECTION

USE VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS - AT LEAST 10 AIR CHANGES PER HOUR ARE RECOMMENDED FOR GOOD GENERAL ROOM VENTILATION. IF EXPOSURE EXCEEDS THE PEL/TLV, USE THE APPROPRIATE MISH-APPROVED RESPIRATOR.

PROTECTIVE CLOTHING

WEAR SAFETY GLASSES, GOGGLES, OR A SPLASH SHIELD TO PREVENT EYE CONTACT. CONTACT LENSES SHOULD NOT BE WORN. WEAR APPROPRIATE GLOVES AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND CLOTHING.

ADDITIONAL PROTECTIVE MEASURES

EYE WASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE AVAILABLE FOR USE IN AN EMERGENCY.

SECTION IX

ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

LARGE SPILLS >> EVACUATE THE HAZARD AREA OF UNPROTECTED PERSONNEL. WEAR APPROPRIATE RESPIRATOR AND PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. IF VAPOR CLOUD FORMS, WATER FOG MAY BE USED TO SUPPRESS; CONTAIN RUN-OFF. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTIONS AS ABOVE. SMALL SPILLS >> TAKE UP WITH AN ABSORBENT MATERIAL AND PLACE IN NON-LEAKING CONTAINERS; SEAL TIGHTLY FOR PROPER DISPOSAL.

WASTE DISPOSAL

RESERVE ALL FEDERAL, STATE, AND LOCAL REGULATIONS REGARDING PROPER DISPOSAL.

MSDS# 033513

SECTION 4

ADDITIONAL PRECAUTIONS

CONTAINERS CAN CONTAIN HAZARDOUS PRODUCT RESIDUES EVEN WHEN EMPTY. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, WE MAKE NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. WE ASSUME NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

MSDS# 033513

MATERIAL SAFETY DATA SHEET
COATINGS AND RESINS GROUP

SECTION I - PRODUCT INFORMATION

MANUFACTURER'S NAME: PPG INDUSTRIES, INC.
PRODUCT CODE/IDENTITY: 97-57 (112586E)
CUSTOMER PART#/NAME:
PRODUCT TRADE NAME: CLEAR EPOXY FLOOR SEALER
CHEMICAL FAMILY: POLYAMIDE

SHIPPING INFORMATION

US-DOT: SHIPPING NAME: PAINT, FLAMMABLE LIQUID
HAZARD CLASS:
UN NUMBER: UN1263

ICAO: NAME: UNAVAILABLE
HAZARD LABEL: UNAVAILABLE

INTERNATIONAL: SHIPPING NAME: UNAVAILABLE
HAZARD CLASS: UNAVAILABLE

SARA 311/312 CATEGORIES FOR THIS PRODUCT
ACUTE=Y CHRONIC=Y FLAM=Y PRESS=N REAC=N

ALL CHEMICAL SUBSTANCES IN THIS PRODUCT COMPLY WITH ALL APPLICABLE
RULES OR ORDERS UNDER THE ENVIRONMENTAL PROTECTION AGENCY'S TOXIC
SUBSTANCES CONTROL ACT.

PRODUCT SAFETY INFO: 260 KAPPA DRIVE
PITTSBURGH, PA 15238
(412) 963-5822

EMERGENCY MEDICAL INFO: (304) 843-1300
EMERGENCY SPILL INFO: (304) 843-1300
DATE OF MSDS PREPARATION: 6/09/89

THIS MATERIAL SAFETY DATA SHEET HAS BEEN PREPARED IN ACCORDANCE
WITH THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200),
CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM, THE
SUPPLIER NOTIFICATION REQUIREMENTS OF SARA TITLE III, SECTION 313,
AND OTHER APPLICABLE RIGHT-TO-KNOW REGULATIONS. ABBREVIATIONS
AND OTHER DESIGNATIONS USED ON THIS MATERIAL SAFETY DATA SHEET
INCLUDE THE FOLLOWING:

U/I = UNKNOWN INFORMATION; N/A = NOT APPLICABLE;
NOT ESTAB. = NOT ESTABLISHED; CERT. LTR. = CHEMICAL
O.K. ON TSCA INVENTORY; CAS NO. NOT AVAILABLE

BAJ0608891 (CUSTOMER NO.) LOCATION : 9809 8997/57/////609

CONTINUATION OF MANUFACTURER'S CODE: 97-57

DATE OF PREP: 6/09/89

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SECTION II - INGREDIENTS

INGREDIENTS	%	WEIGHT	OCCUPATIONAL EXPOSURE LIMITS						SARA TITLE III & CERCLA RATING										
			TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL	IPEL-TWA	IPEL-STEL	HS (102)	ES (302)	TS (313)	RD (LBS)	TPQ (LBS)	SARA 311/312	AC	CH	PL	PR	RE
ENE (1330-20-7))... ACUTE: SKIN IRRITANT	25-30	100	ppm	150 ppm ORAL= 4.30	100 ppm DERM=U/I	NOT ESTAB.	100 ppm INHL= 21.71	150 ppm	Y	N	Y	1000	N/A	Y	N	Y	N	N	N
10.UENE ... (108-88-3))... ACUTE: SKIN IRRITANT	10-15	100	ppm	150 ppm ORAL= 5.00	200 ppm DERM=	300 ppm 14.00	100 ppm INHL=U/I	150 ppm	Y	N	Y	1000	N/A	Y	N	Y	N	N	N
1: PROPYL ALCOHOL, ANHYDROUS ... (67-63-0))... ACUTE: EYE IRRITANT	10-15	400	ppm	500 ppm ORAL= 5.84	400 ppm DERM=	NOT ESTAB.	400 ppm INHL=U/I	500 ppm	N	N	Y	N/A	N/A	Y	N	Y	N	N	N
ETHYLENE GLYCOL MONOPROPYL ETHER ... (2807-30-9))... ACUTE: EYE IRRITANT	10-15	NOT ESTAB.		NOT ESTAB. ORAL= .50	NOT ESTAB.	NOT ESTAB.	NOT ESTAB. INHL=	NOT ESTAB.	N	N	Y	N/A	N/A	Y	Y	Y	N	N	N
FILM FORMERS, RESINS, AND ADDITIVES ... (NOT ESTAB.))... ACUTE: SKIN IRRITANT	30-35	NOT ESTAB.		NOT ESTAB. ORAL=U/I	NOT ESTAB.	NOT ESTAB.	NOT ESTAB. INHL=U/I	NOT ESTAB.	N	N	N	N/A	N/A	Y	N	N	N	N	N

ORAL= LD50 ORAL (RAT), (g/kg) DERM= LD50 DERMAL (RABBIT), (g/kg) INHL= LC50 INHALATION (RAT), (mg/L)

* INGREDIENTS IN THE TC COLUMN ARE SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III. SEE 40 CFR PART 372.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

(FORMULA VALUES, NOT SALES SPECIFICATIONS)

BOILING RANGE: 82 - 153 DEG. C SOLUBILITY IN WATER: 24.2%
VAPOR PRESSURE: 13.9mmHg WT/GAL (LBS): 7.55 (U.S.)
VAPOR DENSITY: HEAVIER THAN AIR pH: U/I
% VOL/VOLUME: 70.80 % SOLID BY WEIGHT: 32.67
EVAP RATE(BUOAc=100): 123 SPECIFIC GRAVITY: .91
ODOR/APPEARANCE: VISCOUS LIQUID WITH AN OOR CHARACTERISTIC OF THE
SOLVENTS LISTED IN SECTION II.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

US-DOT CATEGORY: FLAMMABLE
FLASHPOINT: 59 DEG. F PMCC FLAMMABLE LIMITS: LEL 1.4 UEL U/I
EXTINGUISHING MEDIA:

USE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CLASS B EXTINGUISHERS (CARBON DIOXIDE, DRY CHEMICAL, OR UNIVERSAL AQUEOUS FILM FORMING FOAM) DESIGNED TO EXTINGUISH NFPA CLASS IB FLAMMABLE LIQUID FIRES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAMES. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT. DO NOT APPLY ON HOT SURFACES. TOXIC GASES MAY FORM WHEN PRODUCT IS CONTACTED BY FLAME OR HOT SURFACES.

SPECIAL FIRE FIGHTING PROCEDURES:

WATER SPRAY MAY BE INEFFECTIVE. WATER SPRAY MAY BE USED TO COOL CLOSED CONTAINERS TO PREVENT PRESSURE BUILD-UP AND POSSIBLE AUTOIGNITION OR EXPLOSION WHEN EXPOSED TO EXTREME HEAT. IF WATER IS USED, FOG NOZZLES ARE PREFERABLE. FIRE-FIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS.

SECTION V - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: NOT EXPECTED TO OCCUR
INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID):

AVOID CONTACT WITH STRONG ALKALIES, STRONG MINERAL ACIDS, OR STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS:

MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS WHEN HEATED. WELDING, BRAZING, OR FLAME-CUTTING ON SURFACES COATED WITH THIS PRODUCT MAY PRODUCE FUMES INCLUDING: Carbon Monoxide, Oxides of Nitrogen

SECTION VI - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

PROVIDE MAXIMUM VENTILATION. ONLY PERSONNEL EQUIPPED WITH PROPER RESPIRATORY AND SKIN AND EYE PROTECTION SHOULD BE PERMITTED IN THE AREA. REMOVE ALL SOURCES OF IGNITION. TAKE UP SPILLED MATERIAL WITH SAWDUST, VERMICULITE, OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR DISPOSAL.

WASTE DISPOSAL METHOD:

WASTE MATERIAL MUST BE DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE, PROVINCIAL, AND LOCAL ENVIRONMENTAL CONTROL REGULATIONS. EMPTY CONTAINERS SHOULD BE RECYCLED OR DISPOSED OF THROUGH AN APPROVED WASTE MANAGEMENT FACILITY.

SECTION VII - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE FROM:

INGESTION:

-HARMFUL OR FATAL IF SWALLOWED.

EYE CONTACT:

-CAUSES SEVERE EYE IRRITATION.

SKIN CONTACT:

-MAY CAUSE MODERATE SKIN IRRITATION.
-MAY BE ABSORBED THROUGH THE SKIN.

INHALATION:

-VAPOR AND SPRAY MIST HARMFUL IF INHALED.
-VAPOR IRRITATES EYES, NOSE, AND THROAT.
-REPEATED EXPOSURE TO HIGH VAPOR CONCENTRATIONS MAY CAUSE IRRITATION OF THE RESPIRATORY SYSTEM AND PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
-INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS CAN BE HARMFUL OR FATAL.

CHRONIC OVEREXPOSURE:

AVOID LONG TERM AND REPEATED CONTACT.
-THIS PRODUCT CONTAINS AN ETHYLENE-SERIES GLYCOL ETHER AND/OR ACETATE WHICH HAS BEEN SHOWN TO CAUSE DAMAGE TO THE KIDNEYS, LIVER, BLOOD AND/OR BLOOD-FORMING TISSUES. THE ETHYL AND METHYL DERIVATIVES HAVE CAUSED BIRTH DEFECTS AND REPRODUCTIVE ORGAN DAMAGE IN LABORATORY ANIMALS. THERE IS NO EVIDENCE OF THESE EFFECT

SIGNS AND SYMPTOMS OF OVEREXPOSURE:

CONTINUED ON PAGE 4

-EYE WATERING, HEADACHES, NAUSEA, DIZZINESS, AND LOSS OF COORDINATION ARE INDICATIONS THAT SOLVENT LEVELS ARE TOO HIGH.
-REDNESS, ITCHING, BURNING SENSATION AND VISUAL DISTURBANCES MAY INDICATE EXCESSIVE EYE CONTACT.
-DRYNESS, ITCHING, CRACKING, BURNING, REDNESS, AND SWELLING ARE CONDITIONS ASSOCIATED WITH EXCESSIVE SKIN CONTACT.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: NOT APPLICABLE

SECTION VIII - FIRST AID PROCEDURES

INGESTION:

IF SWALLOWED, DO NOT INDUCE VOMITING.

EYE CONTACT:

IN CASE OF EYE CONTACT, FLUSH EYES IMMEDIATELY WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SKIN CONTACT:

IN CASE OF SKIN CONTACT, REMOVE PROMPTLY BY WIPING, FOLLOWED BY WATERLESS HAND CLEANER AND SOAP AND WATER.

INHALATION:

IF AFFECTED BY INHALATION OF VAPOR OR SPRAY MIST, REMOVE TO FRESH AIR. APPLY ARTIFICIAL RESPIRATION AND OTHER SUPPORTIVE MEASURES AS REQUIRED.

OTHER:

IF ANY OF THE FOLLOWING OCCUR DURING OR FOLLOWING USE OF THIS PRODUCT, CONTACT A POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN IMMEDIATELY; HAVE MATERIAL SAFETY DATA SHEET INFORMATION AVAILABLE. *INGESTION *EXCESSIVE EXPOSURE TO A CORROSIVE MATERIAL.
* PERSISTENT SKIN/EYE IRRITATION OR BREATHING DIFFICULTIES.

SECTION IX - PROTECTION INFORMATION

PERSONAL PROTECTIVE EQUIPMENT FOR:

EYE PROTECTION:

WEAR CHEMICAL-TYPE SPLASH GOGGLES OR FULL FACE SHIELD.

SKIN PROTECTION:

WEAR PROTECTIVE CLOTHING, INCLUDING IMPERMEABLE APRON AND GLOVES CONSTRUCTED OF: NITRILE RUBBER, NEOPRENE RUBBER OR POLYVINYL ALCOHOL

RESPIRATORY PROTECTION:

OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH/MSHA-APPROVED (TC-23C-) PAINT SPRAY OR AIR SUPPLIED (TC-19C-) RESPIRATORS MAY ALSO REDUCE EXPOSURE. READ RESPIRATOR MANUFACTURER'S INSTRUCTIONS AND LITERATURE CAREFULLY TO DETERMINE THE TYPE OF AIRBORNE CONTAMINANTS AGAINST WHICH THE RESPIRATOR IS EFFECTIVE AND HOW IT IS TO BE PROPERLY FITTED.

OTHER EQUIPMENT:

CLEAN OR DISCARD CONTAMINATED CLOTHING AND SHOES.

VENTILATION REQUIREMENTS:

PROVIDE GENERAL DILUTION OR LOCAL EXHAUST VENTILATION IN VOLUME AND PATTERN TO KEEP THE CONCENTRATION OF INGREDIENTS LISTED IN SECTION II BELOW THE LOWEST SUGGESTED EXPOSURE LIMITS, THE LEL IN SECTION IV BELOW THE STATED LIMIT, AND TO REMOVE DECOMPOSITION PRODUCTS DURING WELDING OR FLAME CUTTING ON SURFACES COATED WITH THIS PRODUCT.

SECTION X - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

DO NOT STORE ABOVE 120 DEGREES F. STORE LARGE QUANTITIES IN BUILDINGS DESIGNED AND PROTECTED FOR STORAGE OF NFPA CLASS IB FLAMMABLE LIQUIDS.

OTHER PRECAUTIONS:

IF THIS MATERIAL IS PART OF A MULTIPLE COMPONENT COATING SYSTEM, READ THE MATERIAL SAFETY DATA SHEET(S) FOR THE OTHER COMPONENT OR COMPONENTS BEFORE BLENDING AS THE RESULTING MIXTURE MAY HAVE THE HAZARDS OF ALL OF ITS PARTS.
CONTAINERS SHOULD BE GROUND WHEN POURING. AVOID FREE FALL OF LIQUIDS IN EXCESS OF A FEW INCHES.

MATERIAL SAFETY DATA SHEET
COATINGS AND RESINS GROUP

SECTION I - PRODUCT INFORMATION

MANUFACTURER'S NAME: PPG INDUSTRIES, INC.
PRODUCT CODE/IDENTITY: 97-98 (080388E)
CUSTOMER PART#/NAME:
PRODUCT TRADE NAME: AQUAPON CLEAR - COMP. B
CHEMICAL FAMILY: EPOXY

SHIPPING INFORMATION

US-DOT: SHIPPING NAME: PAINT, FLAMMABLE LIQUID
HAZARD CLASS:
UN NUMBER: UN1263

ICAO: NAME: UNAVAILABLE
HAZARD LABEL: UNAVAILABLE

INTERNATIONAL: SHIPPING NAME: UNAVAILABLE
HAZARD CLASS: UNAVAILABLE

SARA 311/312 CATEGORIES FOR THIS PRODUCT
ACUTE=Y CHRONIC=Y FLAM=Y PRESS=N REAC=N

ALL CHEMICAL SUBSTANCES IN THIS PRODUCT COMPLY WITH ALL APPLICABLE
RULES OR ORDERS UNDER THE ENVIRONMENTAL PROTECTION AGENCY'S TOXIC
SUBSTANCES CONTROL ACT.

PRODUCT SAFETY INFO: 260 KAPPA DRIVE
PITTSBURGH, PA 15238
(412) 963-5822

EMERGENCY MEDICAL INFO: (304) 843-1300
EMERGENCY SPILL INFO: (304) 843-1300
DATE OF MSDS PREPARATION: 6/09/89

THIS MATERIAL SAFETY DATA SHEET HAS BEEN PREPARED IN ACCORDANCE
WITH THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200),
CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM, THE
SUPPLIER NOTIFICATION REQUIREMENTS OF SARA TITLE III SECTION 313,
AND OTHER APPLICABLE RIGHT-TO-KNOW REGULATIONS. ABBREVIATIONS
AND OTHER DESIGNATIONS USED ON THIS MATERIAL SAFETY DATA SHEET
INCLUDE THE FOLLOWING:

U/I = UNKNOWN INFORMATION; N/A = NOT APPLICABLE;
NOT ESTAB. = NOT ESTABLISHED; CERT. LTR. = CHEMICAL
O.K. ON TSCA INVENTORY; CAS NO. NOT AVAILABLE

BAJ0608891 (CUSTOMER NO.) LOCATION : 9809 8997/98/////609

CONTINUATION OF MANUFACTURER'S CODE: 97-98

DATE OF PREP: 6/09/89

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SECTION II - INGREDIENTS

INGREDIENTS	%	OCCUPATIONAL EXPOSURE LIMITS						SARA TITLE III & CERCLA RATING									
		WEIGHT	ACGIH	OSHA	PPG	IPEL	NS	ENS	TC	RO	TPQ	SARA 311/312	RO	TPQ	SARA 311/312		
		TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL	IPEL-TWA	IPEL-STEL	(102)	(302)	(313)	(LBS)	(LBS)	AC	FL	PR	RE	
XYLENE ... (1330-20-7)...	ACUTE: SKIN IRRITANT	25-30	100 ppm	150 ppm	100 ppm	NOT ESTAB.	100 ppm	150 ppm	Y	N	Y	1000	N/A	Y	N	Y	N
				ORAL= 4.30	DERM-U/I	INHL= 21.71											
ETHYLENE GLYCOL MONOPROPYL ETHER ... (2807-30-9)...	ACUTE: EYE IRRITANT	5-10	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	N	N	Y	N/A	N/A	Y	Y	Y	N	N
				ORAL= .50	DERM=	INHL= 6.52											
TOLUENE ... (108-88-3)...	ACUTE: SKIN IRRITANT	5-10	100 ppm	150 ppm	200 ppm	300 ppm	100 ppm	150 ppm	Y	N	Y	1000	N/A	Y	N	Y	N
				ORAL= 5.00	DERM= 14.00	INHL-U/I											
1-METHOXY-2-PROPANOL ... (107-98-2)...	ACUTE: NO SEVERE HAZARDS IDENTIFIED	10-15	100 ppm	150 ppm	NOT ESTAB.	NOT ESTAB.	100 ppm	150 ppm	N	N	N	N/A	N/A	Y	N	Y	N
				ORAL= 5.20	DERM= 13.00	INHL= 55.28											
FILM FORMERS, RESINS, AND ADDITIVES ... (NOT ESTAB.)...	ACUTE: SKIN SENSITIZER	45-50	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	NOT ESTAB.	N	N	N	N/A	N/A	Y	N	N	N	N
				ORAL-U/I	DERM-U/I	INHL-U/I											

ORAL = L50 ORAL (RAT), (g/kg) DERM = L50 DERMAL (RABBIT), (g/kg) INHL = L50 INHALATION (RAT), (mg/L)

* INGREDIENTS IN THE TC COLUMN ARE SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III. SEE 40 CFR PART 372.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

(FORMULA VALUES, NOT SALES SPECIFICATIONS)

BOILING RANGE: 110 - 153 DEG. C	SOLUBILITY IN WATER: 18.0%
VAPOR PRESSURE: 8.3mmHg	WT/GAL (LBS): 8.43 (U.S.)
VAPOR DENSITY: HEAVIER THAN AIR	pH: U/I
% VOL/VOLUME: 59.60	% SOLID BY WEIGHT: 47.95
EVAP RATE(B ₁₀ A _C =100): 89	SPECIFIC GRAVITY: 1.01
ODOR/APPEARANCE: VISCOUS LIQUID WITH AN ODOR CHARACTERISTIC OF THE SOLVENTS LISTED IN SECTION II.	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

US-DOT CATEGORY: FLAMMABLE
FLASHPOINT: 57 DEG. F PMCC
FLAMMABLE LIMITS: LEL 1.3 UEL U/I

EXTINGUISHING MEDIA:

USE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CLASS B EXTINGUISHERS (CARBON DIOXIDE, DRY CHEMICAL, OR UNIVERSAL AQUEOUS FILM FORMING FOAM) DESIGNED TO EXTINGUISH NFPA CLASS B FLAMMABLE LIQUID FIRES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAMES. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT. DO NOT APPLY ON HOT SURFACES. TOXIC GASES MAY FORM WHEN PRODUCT IS CONTACTED BY FLAME OR HOT SURFACES.

SPECIAL FIRE FIGHTING PROCEDURES:

WATER SPRAY MAY BE INEFFECTIVE. WATER SPRAY MAY BE USED TO COOL CLOSED CONTAINERS TO PREVENT PRESSURE BUILD-UP AND POSSIBLE AUTOIGNITION OR EXPLOSION WHEN EXPOSED TO EXTREME HEAT. IF WATER IS USED, FOG NOZZLES ARE PREFERABLE. FIRE-FIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS.

SECTION V - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: NOT EXPECTED TO OCCUR

INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID):

AVOID CONTACT WITH STRONG ALKALIES, STRONG MINERAL ACIDS, OR STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS:

MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS WHEN HEATED. WELDING, BRAZING, OR FLAME-CUTTING ON SURFACES COATED WITH THIS PRODUCT MAY PRODUCE FUMES INCLUDING:
Carbon Monoxide,

SECTION VI - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

PROVIDE MAXIMUM VENTILATION. ONLY PERSONNEL EQUIPPED WITH PROPER RESPIRATORY AND SKIN AND EYE PROTECTION SHOULD BE PERMITTED IN THE AREA. REMOVE ALL SOURCES OF IGNITION. TAKE UP SPILLED MATERIAL WITH SAWDUST, VERMICULITE, OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR DISPOSAL.

WASTE DISPOSAL METHOD:

WASTE MATERIAL MUST BE DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE, PROVINCIAL, AND LOCAL ENVIRONMENTAL CONTROL REGULATIONS. EMPTY CONTAINERS SHOULD BE RECYCLED OR DISPOSED OF THROUGH AN APPROVED WASTE MANAGEMENT FACILITY.

SECTION VII - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE FROM:

INGESTION:

- HARMFUL OR FATAL IF SWALLOWED.

EYE CONTACT:

- CAUSES SEVERE EYE IRRITATION.

SKIN CONTACT:

- MAY CAUSE MODERATE SKIN IRRITATION.
- MAY BE ABSORBED THROUGH THE SKIN.
- PROLONGED OR REPEATED CONTACT MAY CAUSE AN ALLERGIC SKIN REACTION.

INHALATION:

- VAPOR AND SPRAY MIST HARMFUL IF INHALED.
- VAPOR IRRITATES EYES, NOSE, AND THROAT.
- REPEATED EXPOSURE TO HIGH VAPOR CONCENTRATIONS MAY CAUSE IRRITATION OF THE RESPIRATORY SYSTEM AND PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
- INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS CAN BE HARMFUL OR FATAL.

CHRONIC OVEREXPOSURE:

AVOID LONG TERM AND REPEATED CONTACT.

- THIS PRODUCT CONTAINS AN ETHYLENE-SERIES GLYCOL ETHER AND/OR ACETATE WHICH HAS BEEN SHOWN TO CAUSE DAMAGE TO THE KIDNEYS, LIVER, BLOOD AND/OR BLOOD-FORMING TISSUES. THE ETHYL AND METHYL DERIVATIVES HAVE CAUSED BIRTH DEFECTS AND REPRODUCTIVE ORGAN DAMAGE IN LABORATORY
CONTINUED ON PAGE 4

ANIMALS. THERE IS NO EVIDENCE OF THESE EFFECTS IN HUMANS.

SIGNS AND SYMPTOMS OF OVEREXPOSURE:

- EYE WATERING, HEADACHES, NAUSEA, DIZZINESS, AND LOSS OF COORDINATION ARE INDICATIONS THAT SOLVENT LEVELS ARE TOO HIGH.
- REDNESS, ITCHING, BURNING SENSATION AND VISUAL DISTURBANCES MAY INDICATE EXCESSIVE EYE CONTACT.
- DRYNESS, ITCHING, CRACKING, BURNING, REDNESS, AND SWELLING ARE CONDITIONS ASSOCIATED WITH EXCESSIVE SKIN CONTACT.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: NOT APPLICABLE

SECTION VIII - FIRST AID PROCEDURES

INGESTION:

IF SWALLOWED, DO NOT INDUCE VOMITING.

EYE CONTACT:

IN CASE OF EYE CONTACT, FLUSH EYES IMMEDIATELY WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SKIN CONTACT:

IN CASE OF SKIN CONTACT, REMOVE PROMPTLY BY WIPING, FOLLOWED BY WATERLESS HAND CLEANER AND SOAP AND WATER.

INHALATION:

IF AFFECTED BY INHALATION OF VAPOR OR SPRAY MIST, REMOVE TO FRESH AIR. APPLY ARTIFICIAL RESPIRATION AND OTHER SUPPORTIVE MEASURES AS REQUIRED.

OTHER:

IF ANY OF THE FOLLOWING OCCUR DURING OR FOLLOWING USE OF THIS PRODUCT, CONTACT A POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN IMMEDIATELY; HAVE MATERIAL SAFETY DATA SHEET INFORMATION AVAILABLE. *INGESTION *EXCESSIVE EXPOSURE TO A CORROSIVE MATERIAL.
* PERSISTENT SKIN/EYE IRRITATION OR BREATHING DIFFICULTIES.

SECTION IX - PROTECTION INFORMATION

PERSONAL PROTECTIVE EQUIPMENT FOR:

EYE PROTECTION:

WEAR CHEMICAL-TYPE SPLASH GOGGLES OR FULL FACE SHIELD.

SKIN PROTECTION:

WEAR PROTECTIVE CLOTHING, INCLUDING IMPERMEABLE APRON AND GLOVES CONSTRUCTED OF: POLYVINYL ALCOHOL, NEOPRENE RUBBER, NITRILE RUBBER/BUTYL RUBBER OR LATEX RUBBER

RESPIRATORY PROTECTION:

OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH/MSHA-APPROVED (TC-23C-) PAINT SPRAY OR AIR SUPPLIED (TC-19C-) RESPIRATORS MAY ALSO REDUCE EXPOSURE. READ RESPIRATOR MANUFACTURER'S INSTRUCTIONS AND LITERATURE CAREFULLY TO DETERMINE THE TYPE OF AIRBORNE CONTAMINANTS AGAINST WHICH THE RESPIRATOR IS EFFECTIVE AND HOW IT IS TO BE PROPERLY FITTED.

OTHER EQUIPMENT:

CLEAN OR DISCARD CONTAMINATED CLOTHING AND SHOES.

VENTILATION REQUIREMENTS:

PROVIDE GENERAL DILUTION OR LOCAL EXHAUST VENTILATION IN VOLUME AND PATTERN TO KEEP THE CONCENTRATION OF INGREDIENTS LISTED IN SECTION II BELOW THE LOWEST SUGGESTED EXPOSURE LIMITS, THE LEL IN SECTION IV BELOW THE STATED LIMIT, AND TO REMOVE DECOMPOSITION PRODUCTS DURING WELDING OR FLAME CUTTING ON SURFACES COATED WITH THIS PRODUCT.

SECTION X - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

DO NOT STORE ABOVE 120 DEGREES F. STORE LARGE QUANTITIES IN BUILDINGS DESIGNED AND PROTECTED FOR STORAGE OF NFPA CLASS 1B FLAMMABLE LIQUIDS.

OTHER PRECAUTIONS:

IF THIS MATERIAL IS PART OF A MULTIPLE COMPONENT COATING SYSTEM, READ THE MATERIAL SAFETY DATA SHEET(S) FOR THE OTHER COMPONENT OR COMPONENTS BEFORE BLENDING AS THE RESULTING MIXTURE MAY HAVE THE HAZARDS OF ALL OF ITS PARTS.
CONTAINERS SHOULD BE GROUNDING WHEN POURING. AVOID FREE FALL OF LIQUIDS IN EXCESS OF A FEW INCHES.

AQUAPON PERFORMANCE DATA

PPG Industries Manufacturer's Data

24-HOUR CHEMICAL SPOT TESTS ON AQUAPON EPOXY COATINGS

Chemical name	Formula	Results ^a
Ferric nitrate	Fe(NO ₃) ₃	Dis
Sodium hypocarbonate	NaHCO ₃	-
Sodium carbonate	Na ₂ CO ₃	-
10% trisodiumphosphate		-
50% hydrogen peroxide	H ₂ O ₂	Complete
Calcium hypochlorate(?)	Ca(OCl) ₂	-
Butyl alcohol(?)	BUOH	Soft
Methyl isobutyl ketone	MIBK	SL, Soft
Trichloroethylene	C ₂ HCl ₃	-
Xylene	C ₆ H ₄ (CH ₃) ₂	-
Gasoline		-
Cellosolve acetate ^b		-
Iodine		Dis
5% phenol acetate		SL, Soft
Skydrol 500B*		Soft, SW, LG
Machine oil		-

^a - No effect
 Complete Complete failure
 Dis Discoloration
 LG Loss of gloss
 SL Soft
 Soft Softening
 SW Swelling

^b Ethylene glycol monoethyl ether acetate

* Skydrol 500B is a trademark of Monsanto Company.

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APPENDIX 7A

BUILDING EMERGENCY PLAN - 616 BUILDING

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This plan covers the 616 Nonradioactive Dangerous Waste Storage Facility.

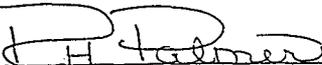
Approved:



Building Emergency Director

12-5-94

Date



Emergency Preparedness

12-5-94

Date



Hanford Fire Department

12-5-94

Date

This document will be reviewed annually and updated as required by the Building Emergency Director and approved by the Manager of Emergency Preparedness (or delegate) and the Hanford Fire Department.

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FIGURES

Figure 1. The 616 NRDWSF Layout, Exits, and Staging Area 32

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1.0 GENERAL INFORMATION

The 616 Nonradioactive Dangerous Waste Storage Facility (NRDWSF) is located on the Hanford Site, a 560 square mile U.S. Department of Energy (DOE) reservation in southeastern Washington State. The 616 Nonradioactive Dangerous Waste Storage Facility is located in the west portion of the 600 Area near the north end of the Hanford Site.

1.1 FACILITY NAME: U.S. Department of Energy Hanford Site
616 Nonradioactive Dangerous Waste Storage Facility

1.2 FACILITY LOCATION: Benton County, Washington; within the 600 Area.

The facility covered by this plan is the 616 NRDWSF.

1.3 OWNER: U.S. Department of Energy
Richland Operations Office
825 Jadwin Avenue
Richland, Washington 99352

FACILITY MANAGER: Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

1.4 DESCRIPTION OF THE FACILITY AND OPERATIONS

The 616 NRDWSF is designed and used for the receipt and storage of nonradioactive dangerous waste generated on the Hanford Site and for the preparation of shipments to permitted offsite treatment, storage, or disposal facilities. Sampling for waste verification may also be performed. The 616 NRDWSF encompasses an area of approximately 7,700 square feet. To support safe response to potential spills, the 616 NRDWSF features independent collection trenches, sloped floors, and curbing.

1.5 BUILDING EVACUATION ROUTING (BUILDING LAYOUT)

Figure 1 provides identification of emergency evacuation routes from the 616 NRDWSF to the staging area(s).

The primary staging area for the 616 NRDWSF is located 200 feet (61 meters) east of the main entrance. If it becomes necessary to evacuate the primary staging area, the staging area manager or the BED shall direct personnel to an alternate staging area or destination.

2.0 PURPOSE

This plan describes both the facility hazards and the basic responses to upset and/or emergency conditions. "Emergency" as used in this document includes events meeting the Washington Administrative Code (WAC) 173-303 definition of Emergency as well as Department of Energy (DOE) Order 5000.3B categories of Unusual Occurrence and Emergency. These events include spills or releases as a result of processing, fires and explosions, transportation activities, movement of materials, packaging, storage of hazardous materials and natural and security contingencies. When used in conjunction with the "Hanford Facility Contingency Plan," DOE/RL-93-75, this plan meets the requirements for contingency planning as required by WAC 173-303. z

3.0 BUILDING EMERGENCY ORGANIZATION

3.1 BUILDING EMERGENCY DIRECTOR

The Building Emergency Director (BED) or his/her designated alternate has overall responsibility for implementing this plan. The BED has the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360 and is also the Event Commander for facility related events. A list of all BEDs and alternates and their work and home telephone numbers is maintained by Emergency Preparedness. The list is distributed to various people and locations throughout the Hanford Site. The BEDs have the authority to commit all necessary resources (both equipment and personnel) to respond to any emergency. Additional responsibilities have been delegated to Hanford Fire Department personnel who are authorized to act for the BED when the BED is absent. These Hanford Fire Department personnel have the authority to commit all necessary resources (both equipment and personnel) to respond to any emergency.

3.2 OTHER MEMBERS

As a minimum, the BED appoints and trains individuals to perform as Personnel Accountability Aides and Staging Area Managers. The accountability aides are responsible for facilitating the implementation of protective actions (evacuation or take cover) and for facilitating the accountability of personnel after the protective actions have been implemented. Staging Area Managers are responsible for coordinating/conducting activities at the staging area. In addition, the BED may identify additional support personnel (Health Physics [HP], Maintenance, Engineering, Hazardous Material Coordinators, etc.) to be part of the building emergency organization.

The building emergency organization for the 616 NRDWSF is listed in a separate publication found at the facility.

4.0 IMPLEMENTATION OF THE PLAN

To meet the requirements of the WAC, this plan will be considered to be implemented when the BED has determined that a release, fire, or explosion that could threaten human health or the environment (WAC 173-303 Emergency) has occurred at the facility. An incident requiring evacuation of personnel or the summoning of emergency response units will not necessarily indicate that the plan has been implemented. The incident classification process for a WAC 173-303 Emergency is described in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

Under the DOE guidance, this plan will be considered implemented whenever the BED determines that one of the incidents listed in subsection 6.0 has or will occur and that the severity is or will be such that there is a potential to endanger human health or the environment (DOE Unusual Occurrence or Emergency). The 616 NRDWSF will implement this plan through specific implementing procedures. These procedures are referenced where appropriate and a list of the procedures is included as Attachment A.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Patrol, Fire, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the Patrol Operations Center and request the desired assistance. To request other resources or assistance from outside the facility, the Patrol Operations Center business number is used (373-3800) to request contact of the Emergency Duty Officer.

5.0 FACILITY HAZARDS

Hazards at the 616 NRDWSF Facility potentially include chemical, ergonomic, and other industrial hazards.

5.1 HAZARDOUS MATERIALS

Hazardous materials used at the 616 NRDWSF may include fuels, pesticides, cleaning products, paint, etc. They are stored as indicated on Figure 1.

5.2 INDUSTRIAL HAZARDS

Hazards associated with industrial accidents include the potential for injuries from drum handling, moving equipment, falls, or exposure to hazardous chemicals.

5.3 HAZARDOUS WASTE

Hazardous wastes at the 616 NRDWSF are specified on Figure 1. Solid Waste Management (SWM) is responsible for maintaining the waste in a compliant manner.

5.4 RADIOACTIVE MATERIALS

Radioactive materials ARE NOT used and/or stored in the 616-NRDWSF.

5.5 CRITICALITY - N/A

6.0 POTENTIAL EMERGENCY CONDITIONS

Potential emergency conditions may fall into one of three basic categories: operational (process upsets, fires and explosions, loss of utilities, spills, and releases), natural phenomena (e.g., earthquakes), and security contingencies (bomb threat, hostage situation, etc.). The following are conditions that may lead to an emergency situation (WAC or DOE defined) at the 616 NRDWSF and require the implementation of this plan.

6.1 OPERATIONAL

6.1.1 Loss of Utilities

1. Loss of Electricity. Hazards associated with a loss of electricity include potential exposure to toxic chemical vapors/particulates due to shutdown of the ventilation system.
2. Loss of Water. Loss of water could disable the wet-pipe sprinkler system, resulting in an increased fire hazard.
3. Loss of Ventilation. Loss of ventilation could result in exposure to toxic chemical vapors/particulates in the event of a hazardous material spill/release.

6.1.2 Major Process Disruption/Loss of Plant Control - N/A

6.1.3 Pressure Release - N/A

6.1.4 Fire and/or Explosion

Fire hazards include exposure to toxic chemicals, smoke inhalation, burns, explosion, and damage to equipment. Sealed containers also could become pressure hazards.

6.1.5 Hazardous Material Spill

Hazardous material storage and control are managed by plant operating procedures (POP) and Material Safety Data Sheets (MSDS), which are located in the 616-NRDWSF Packaging Materials/Handling Equipment Area. Spills or releases could result in the conditions described in the following section.

1. Spill of Hazardous Material. Hazards associated with the spill of a hazardous material include exposure to corrosive and toxic materials or fumes and potential environmental damage.
2. Fires or Explosions Involving Hazardous Material. A fire or explosion in the 616-NRDWSF could produce flying objects and cause the release of hazardous waste to the air or soil.
3. Toxic Fumes Hazards. Hazards associated with toxic fumes include potential exposure to personnel and the environment.
4. Reactive Chemical/Corrosive Material Hazards. Improper segregation of incompatible materials could cause an explosive reaction. Hazards are the same as for spills.
5. Thermal Reactions/Hazards. Thermal reactions could cause burns, chemical burns, and toxic fumes, and cause pressure hazards in sealed containers.
6. Flammable Material/Liquids Hazards. Hazards associated with flammable materials and liquids include fire, explosion, and release of hazardous waste.
7. Asbestos Release. The 616-NRDWSF structure does not contain asbestos, but dangerous waste containing asbestos could be stored inside the drums stored within the structure. Release of friable asbestos waste could result in an inhalation hazard, if present.

6.1.6 Mixed Waste Spill - N/A

6.1.7 Transportation and/or Packaging Incidents

When container integrity is questionable, initial steps may be taken to prevent a release, such as overpacking.

6.1.8 Unusual, Irritating, or Strong Odors

Sampling that includes opening hazardous waste containers may result in the release of airborne chemical hazards, which represent a potential hazard. Call Odor Response (pager 85-8971) for unusual, irritating, or strong odors at 616 Facility.

6.1.9 Radiological Material Release - N/A

6.1.10 Criticality - N/A

6.2 NATURAL PHENOMENA

6.2.1 Seismic Event

Depending on the magnitude of the event, severe structural damage can occur resulting in serious injuries or fatalities and the release of hazardous materials/wastes. Damaged electrical circuits and wiring could result in the initiation of multiple fires.

6.2.2 Volcanic Eruption/Ashfall

Though not expected to cause structural damage, the ash could cause shorts in electrical equipment and plug ventilation system filters.

6.2.3 High Winds/Tornados

High winds or tornados may cause structural damage to systems containing hazardous materials/wastes resulting in a release to the environment.

6.2.4 Flood - N/A

6.2.5 Range Fire

The hazards associated with the range fire include those associated with a building fire plus potential site access restrictions and travel hazards such as poor visibility.

6.2.6 Aircraft Crash

In addition to the potential serious injuries or fatalities, an aircraft crash could result in the direct release of hazardous materials/wastes or cause a fire that could lead to the release.

6.3 SECURITY CONTINGENCIES

6.3.1 Bomb Threat

A bomb threat may be received by anyone who answers the telephone or receives mail. The major effect on the facility is that it will need to perform an emergency shutdown in order to be evacuated. If a bomb explodes, the effects are the same as those discussed under fire and explosion.

6.3.2 Hostage Situation

A hostage situation can pose an emergency situation if there is the potential to adversely impact the facility. This can be as a result of losing facility control (operators removed from their stations) or when the situation results in the coercion of an employee to take some malevolent action.

6.3.3 Suspicious Object

The major effect on the facility is that it will need to perform an emergency shutdown in order to be evacuated.

7.0 INCIDENT RESPONSE

The initial response to any emergency will be to immediately protect the health and safety of persons in the immediate area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment will be the secondary responses.

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in subsection 6.0. The Hanford Facility Contingency Plan (DOE/RL-93-75) provides a description of generic incident responses, describes the process for assessing and identifying the hazardous materials and/or dangerous waste, and describes the process for categorizing and classifying an incident.

7.1 PROTECTIVE ACTIONS RESPONSES

7.1.1 Evacuation

The 616-NRDWSF facility personnel must be notified immediately if any conditions that affect occupants or operations are discovered.

If an evacuation is ordered or the evacuation siren sounds, employees should proceed to the:

616 NRDWSF STAGING AREAS	AREA	LOCATION
PRIMARY STAGING AREA	616 Building	200 feet east of main entrance
SECONDARY STAGING AREA	616 Building	Announced by the Building Emergency Director

If it becomes necessary to evacuate the primary staging area, the staging area manager or the BED shall direct personnel to an alternate staging area or destination.

For an area evacuation, the following steps should be conducted concurrently and directed by the building emergency director, if possible. Area evacuations are either rapid or controlled; differences between them are pointed out as follows:

AREA EVACUATION PROCEDURE
Halt any operations or work and place the building in a safe condition. Use emergency shutdown procedures for rapid evacuation.
Use whatever means are available (PA system, bullhorns, runners, etc.) to pass the evacuation information to employees.
Issue the order to evacuate by any available means.
Evacuate personnel to the staging area; group employees as follows: those with potentially contaminated protective clothing, those with keys immediately available for vehicles, those needing rides.
Conduct personnel accountability. Report personnel accountability results to the Northern Area Emergency Control Center (ECC) (373-3876, 373-1786, or 544-8085).
Relay pertinent evacuation information (routes, destination etc.) to drivers.
Dispatch vehicles as soon as the vehicles are loaded.
Report status to the ECC, request additional transportation (provided by taxi dispatcher) if required, and report if any people remain who are performing late shutdown duties.

7.1.2 Take Cover

7.1.2.1 Take Cover Response

When the Take Cover Alarm is activated, personnel should take cover in the nearest building. The following actions should be taken or considered:

- Close all exterior doors and windows
- Report your location to line manager or BED
- If possible, secure (turn off) unnecessary electronic or electrical equipment
- Turn off cell and office area ventilation systems.

7.2 RESPONSE TO OPERATIONAL EMERGENCIES

7.2.1 Loss of Utilities

7.2.1.1 Utility Disconnect Plan For 616 NRDSWF

Use these steps to place the utilities in a safe and secure condition when an emergency has been declared or when directed by the BED.

1. Heating, Ventilation, and Air Conditioning

- a. Inspect all waste storage cells. If any containers are leaking or ruptured, notify management.
- b. After inspecting containers, close all cell doors inside the NRDSWF.
- c. Open all exterior doors.
- d. Evacuate storage areas.
- e. If ventilation loss will be longer than 1 hour, evacuate the building (unless shutdown is part of the take cover alarm response for this facility).
- f. Maintain surveillance of the building to prevent unauthorized personnel entry.
- g. Proceed to roof or main panel marked "Heat Pump" near men's room.
- h. Locate ON/OFF switch.
- i. Place switch in OFF position.
- j. Do not reenter the building until the ventilation system has been reestablished and operating for at least 30 minutes.

2. Electrical

NOTE: This building should be shut down only in an extreme emergency.

- a. Follow item 1, above, instructions for shutdown of the ventilation system.
- b. Proceed to outside the northeast corner wall or to the hallway near the men's room.
- c. Locate the main electrical distribution panel labeled "Main Switch Transformer."

- d. Locate the ON/OFF switch labeled "2 of 2."
- e. Place switch in the OFF position.
- f. Do not reenter the building until power and ventilation has been restored for at least 30 minutes.

3. Fire Sprinkler System

NOTE: This building should be shut down only in an extreme emergency and preferably by the Hanford Fire Department.

- a. Proceed to the outside of the south wall of the 616 Building.
- b. Locate the red valve (inside of four red posts).
- c. Break the seal with the attached wrench.
- d. Turn the valve to the SHUT position.

4. Sanitary Water/Sewer

- a. Proceed to women's change room.
- b. Locate the main valve on the south wall labeled "Sanitary Water Shutoff."
- c. Turn valve until closed.

7.2.1.2 Loss of Electricity

Loss of electricity will result in loss of operation of the building ventilation system.

1. Evacuate the building.
2. Maintain surveillance of the building to prevent unauthorized personnel entry.
3. Notify the BED.
4. If instructed by management, close all cell doors inside the building, and open all exterior doors.
5. Do not reenter the building until the electrical/ventilation systems have been reestablished and have been operating for at least 30 minutes.

7.2.1.3 Loss of Water

1. Notify the BED.
2. Notify the Hanford Fire Department.
3. Establish a fire watch.
4. Notify appropriate maintenance personnel for repair.

7.2.1.4 Loss of Ventilation

Follow the subsection 7.2.1.2 instructions for Loss of Electricity.

7.2.2 Major Process Disruption/Loss of Plant Control - N/A

7.2.3 Pressure Release - N/A

7.2.4 Fire and/or Explosion

In the event of a fire, the discoverer activates a fire alarm and calls 911. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) also is possible. Trained personnel may use portable fire extinguishers for small fires. Personnel will use their best judgment whether to fight a fire or to evacuate. Under no circumstances will personnel remain to fight a fire if unusual hazards exist.

1. On actuation of the fire alarm, personnel shut down equipment, secure waste, and lock up classified documents (or carry the documents with them) ONLY if time permits. The alarm automatically signals the Hanford Fire Department and the Hanford Patrol Operations Center.
2. Personnel leave the area/building by the nearest safe exit and proceed to the designated staging area for accountability unless they are told otherwise.
3. The BED proceeds directly to the scene, obtains all necessary information pertaining to the incident, and meets the Hanford Fire Department or sends a representative to meet them and establish an Event Command Post.
4. The BED informs the site organization as to the extent of the emergency (including estimates of dangerous waste quantities released to the environment).
6. If operations are stopped in response to the fire, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
7. Hanford Fire Department fire fighters extinguish the fire.
8. The BED ensures that all emergency equipment is cleaned and fit for its intended use following completion of cleanup procedures.

7.2.5 Hazardous Material, Dangerous Waste Spill

Spills can result from many sources including leaks, container spills or leaks, damaged packages or shipments, or personnel error. These spills normally fall into one of two categories: minor spills or major spills. The response to the two types are discussed below.

7.2.5.1 Response To Minor Spills

Facility personnel generally perform immediate cleanup of minor spills or releases using sorbents and emergency equipment. Personnel detecting such spills or releases contact the BED, who ensures that the Hanford Fire Department, appropriate regulatory support personnel, and Health Physics personnel (if applicable) are notified. Response to minor spills generally does not require the implementation of this plan.

A spill or release of hazardous material or dangerous or mixed waste is considered "minor" if all of the following are true:

- The spill does not threaten the health and safety of occupants of the building, i.e., an evacuation is not necessary
- The spill is small in size
- The composition of the material or waste is known or can be quickly determined from label, manifest, MSDSs, or disposal request information.

If one or more of the foregoing conditions are not met, responses are performed as outlined below.

7.2.5.2 Response To Major Spills

The discoverer performs the following actions for a major release:

1. Notifies facility personnel (including BED) of discovery of spill or release by sounding the appropriate alarm, using the public address (PA) system, etc.
2. Initiates notifications to the Hanford Fire Department by calling 911, and provides all known information.
3. Takes action to contain and/or to stop the spill or container leak if all of the following are true:
 - The identity of the substance(s) involved is known
 - Appropriate protective equipment and control/cleanup supplies, e.g., absorbents, are readily available

- Discoverer can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

If any of the above conditions are not met or there is any doubt, the discoverer evacuates the area and remains outside, upwind of the spill, pending the arrival of the BED. The discoverer remains available for consultation with the BED, Hanford Fire Department, or other emergency response personnel and restricts access to the area until the arrival of the BED.

The BED performs or arranges for the following:

1. Establishes a command post at a safe location, and coordinates further spill mitigation activities.
2. Obtains all available information pertaining to the incident and determines if the incident requires implementation of the contingency plan.
3. Arranges for care of any injured persons.
4. Maintains access control at the incident site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control if control of the boundary is difficult (e.g., repeated incursions). In determining controlled access areas, considers environmental factors such as wind velocity and direction.
5. Arranges for proper remediation of the incident after evaluation.
6. Remains available for fire, patrol, and other authorities on the scene, and provides all required information
7. Enlists the assistance of alternate BED(s), if response activities are projected to be long term.
8. Ensures the use of proper protective equipment, remedial techniques, transfer procedures, (including ignition source control [e.g., nonsparking tools, grounding containers, isolation of ignition sources, use of explosion-proof electrical equipment, etc.] for flammable or reactive spills), and decontamination procedures by all involved personnel, if remediation is performed by facility personnel.
9. Remains at the scene to oversee activities and to provide information, if remediation is performed by the Hanford Fire Department Hazardous Materials Response Team or other response teams.
10. Ensures proper containerization, packaging, and labeling of recovered spill materials and overpacked containers.

NOTE - Overpacked containers are marked and labeled in the same manner as the contents. All containers of spill debris, recovered product, etc., are managed in the same manner as waste containers. Overpacks in use are marked with information pertaining to their contents and noted as to whether the container inside the overpack is leaking or is in good condition.

11. If operations are stopped in response to the release, ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
12. Ensures decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations
13. Provides required reports after the incident, in accordance with DOE/RL-93-75.

7.2.5.3 Transportation Incidents

The discoverer may also take the following actions for leaks or spills resulting from a hazardous materials/wastes transportation incident if the actions can be performed without jeopardizing personnel safety, as appropriate.

- Determines the nature of incident
 - Personnel injuries
 - Hazardous material/waste spill with fire
 - Hazardous material/waste spill without fire.
- Assists injured personnel.
- Initiates notifications to the single point-of-contact by any means available (telephone, radio, passing motorist, etc.) to request assistance from the Hanford Fire Department (Emergency Coordinator/Event Commander for these type of events), Hanford Patrol, and medical personnel.
- Remains in a safe location and attempts to isolate the area to prevent inadvertent personnel access.

7.2.5.4 Receipt of Damaged or Unacceptable Shipments

When a damaged shipment of hazardous material or dangerous waste arrives at the 616 NRDWSF and the shipment is unacceptable for receipt, the damaged shipment should not be moved. Personnel instead perform the following steps.

1. If the release from damaged package is a "minor" spill under the criteria of subsection 7.2.5.1, the following actions are performed.
 - a. Notify the BED, the Hanford Fire Department, and the single point-of-contact to advise of the situation. The BED responds and assists in the evaluation of, and response to, the incident.
 - b. Notify the generating unit of the damaged shipment, and request any information necessary to assist in responding to the "minor" spill.
 - c. Proceed with remedial action, including overpacking damaged containers, cleanup of spilled material, or other necessary actions to contain the spill.
2. Implement subsection 7.2.5.2 if the release does not meet the criteria of a "minor" spill as noted previously, or the extent of the spill cannot be determined.

7.2.6 Unusual, Irritating, or Strong Odors

If an unusual, irritating, or strong odor is detected and the discoverer believes that the odor might be the result of an uncontrolled release of a toxic or dangerous material, the discoverer performs the following:

- Activates the building evacuation alarm or fire alarm system to evacuate the building
- Notifies the BED.

If the discoverer knows of the source and scope of the release, this information is reported quickly to the BED. Measures are taken to contain the release as described in subsection 7.2.5 and ventilate the area, if safe and advisable to do so.

If an unusual odor is detected within the building or structure and the source of the odor is unknown, notify Odor Response (pager 85-8971).

7.2.7 Radiological Material Release - N/A

7.2.8 Criticality - N/A

7.3 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

The BED, in coordination with emergency response organizations, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

1. Isolates the area of the initial incident by shutting off power, closing off ventilation systems, etc., to minimize the spread of a release and/or the potential for a fire or explosion.
2. Inspects containment for leaks, cracks, or other damage.
3. Inspects for toxic vapor generation.
4. Removes released material and waste remaining inside of containment structures as soon as possible.
5. Contains and isolates residual waste material using dikes and adsorbents.
6. Covers or otherwise stabilizes areas where residual released materials remain to prevent migration or spread from wind or precipitation runoff.
7. Installs new structures, systems, or equipment to enable better management of hazardous materials or dangerous waste.
8. Reactivates adjacent operations in affected areas only after cleanup of residual waste materials is achieved.

7.4 RESPONSE TO NATURAL PHENOMENA

7.4.1 Seismic Event

The WHC emergency response organization's primary role in a seismic event is coordinating the initial response to injuries, fires, and fire hazards and acting to contain or control hazardous material/waste releases.

Individuals should remain calm and stay away from windows, steam lines, and hazardous material/waste storage locations. Once the shaking has subsided, individuals should evacuate carefully and assist those needing help. The location of any trapped individuals is reported to the BED or is reported to 911.

The BED takes whatever actions are necessary to minimize damage and personnel injuries. Actions include:

1. Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.)
2. Conducting accountability

3. Securing utilities and facility operations.
4. Arranging rescue efforts, and notifying 911 for assistance.
5. Assembling damage assessment teams.
6. Determining if hazardous materials were released.
7. Determining current local meteorological conditions.
8. Warning other facilities and implement protective actions if release of hazardous materials poses a danger.
9. Providing personnel and resource assistance to other facilities, if required and possible.

7.4.2 Volcanic Eruption/Ashfall

When notified of an impending ashfall, the BED will implement measures to minimize the impact of the ashfall, such as:

1. Installing filter media over building ventilation intakes.
2. Installing filter media or protective coverings on outdoor equipment that may be adversely affected by the ash (diesel generators, equipment rooms etc.).
3. Shutting down some or all operations and processes.
4. Sealing secondary use exterior doors.
5. Releasing all but essential personnel to go home.

If as a result of the ashfall other emergency conditions arise (e.g., fires due to electrical shorts or lightning), response is as described in other paragraphs of this section.

7.4.3 High Winds/Tornados

Upon notification of impending high winds, the BED takes steps necessary to secure all outdoor waste and hazardous material/waste containers and storage locations. All doors and windows are shut, and personnel are warned to use extreme caution when entering or exiting the building.

7.4.4 Flood - N/A

7.4.5 Range Fire

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the facility boundary, the response is as described in subsection 7.2.4.

7.4.6 Aircraft Crash

The response to an aircraft crash is the same as that listed in subsection 7.2.5.3 for responding to transportation incidents.

7.5 SECURITY CONTINGENCIES

7.5.1 Bomb Threat

7.5.1.1 Telephone Threat

Individuals receiving telephoned threats try to gain as much information as possible from the caller (using the Bomb Threat Checklist if available). Upon conclusion of the call, notify the BED and Security via a 911 call.

The BED evacuates the facility and queries personnel at the staging area regarding any suspicious objects in the facility.

When Security personnel arrive, follow their instructions.

7.5.1.2 Written Threat

Receivers of written threats handle the letter as little as possible. Notify the BED and Security. Depending on the content of the letter, the facility may or may not be evacuated. The letter is turned over to Security personnel, and their instructions are then followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation or armed intruder reports it to 911 and to the BED, if possible. The BED, after conferring with Security personnel, may covertly evacuate areas of the facility not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Security will determine the remaining response actions and will activate the Hostage Negotiating Team, if necessary.

7.5.3 Suspicious Object

The discoverer of a suspicious object reports it to the BED and to 911, if possible, and ensures that the object is not disturbed.

The BED will evacuate the facility and (based on the description provided by the discoverer) attempt to determine the identity or owner of the object. This may be done by questioning facility personnel at the staging area.

If the identity/ownership of the object cannot be determined, then Security will assume command of the incident. An Emergency Ordinance Team will be dispatched to the facility to properly dispose of the device.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

8.1 TERMINATION OF EVENT

The BED declares the termination of an event. However, if additional emergency centers are activated, only the highest activated level of the emergency organization, in conjunction with the BED, will declare that an event has ended. If the RL-Emergency Action and Coordination Team (EACT) is activated, only the RL director officially terminates the event. In all cases, however, the BED must be consulted before reentry is initiated.

8.2 INCIDENT RECOVERY AND RESTART OF OPERATIONS

A recovery plan is developed when necessary. A recovery plan is needed following an event when further risk could be introduced to personnel, the facility, or the environment through recovery action and/or to maximize the preservation of evidence. Depending on the magnitude of the event and the effort required to recover from it, recovery planning may involve personnel from RL and other contractors. If a recovery plan is required, it is reviewed by appropriate personnel and approved by a Recovery Manager before restart. Restart of operations is performed in accordance with the approved plan.

If this plan was implemented for a WAC emergency (see subsection 4.0), the Washington State Department of Ecology (Ecology) must be notified before operations can resume. Section 9.0 of DOE/RL-93-75 discusses different reports to outside agencies. This notification is in addition to those required reports and must include the following:

1. There are no incompatibility issues with the waste and released materials from the incident
2. All the equipment has been clean, fit for its intended use, and placed back into service. The notification may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions may be included in the required 15-day report identified in DOE/RL-93-75.

For emergencies not involving activation of the ECC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in RL and WAC emergency procedures. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization will be appointed by the appropriate contractor's emergency director.

8.3 INCOMPATIBLE WASTE

After an event resulting in a hazardous material/waste release, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by facility personnel or other assigned personnel. Actions to be taken might include, but are not limited to, any of the following:

- Neutralization of corrosive spills
- Chemical treatment of reactive materials to reduce hazards
- Overpacking or transfer of contents from leaking containers
- Use of sorbents to contain and/or absorb leaking liquids for containerization and disposal
- Decontamination of solid surfaces impacted by released material, e.g., intact containers, equipment, floors, containment systems, etc.
- Disposal of contaminated porous materials that cannot be decontaminated and any contaminated soil
- Containerizing and sampling of recovered materials for classification and determination of proper disposal technique
- Followup sampling of decontaminated surfaces to determine adequacy of cleanup techniques, as appropriate.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed, as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected. Examples include modification of an incompatibility chart or increased scrutiny of waste from a generating unit when incorrectly designated waste caused or contributed to an incident.

8.4 POSTEMERGENCY EQUIPMENT MAINTENANCE AND DECONTAMINATION

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumables and disposed materials are restocked. Fire extinguishers are recharged or replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

Factors to consider when establishing an equipment and personnel decontamination station are as follows:

- Water supplies
- Containment/catch basins and/or systems
- Staff necessary to accomplish proper decontamination
- Protective clothing
- Decontamination supplies (buckets, brushes, soap, chemicals as needed)
- Risk to personnel
- Weather conditions; i.e., severe heat, cold (current and forecasted)
- Toxicity of material
- Porosity of equipment to be decontaminated
- Disposal requirements of decontamination rinse
- Use of controlled zones to maintain contamination control.

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in DOE/RL-93-75, Section 7.

9.1 FIXED EMERGENCY EQUIPMENT

FIXED EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Wet-pipe overhead sprinkler system	Throughout building	Activated by heat. Designed to meet Extra Hazard, Group 2, NFPA requirements
Fire hydrant	Southeast exterior corner of the building enclosed in four yellow posts	Supply water for fighting fires
Eye wash/shower stations	Two units - one in combustible cell, and one in Packaging and Sampling Room	Immediate decontamination of personnel exposed to hazardous materials

9.2 PORTABLE EMERGENCY EQUIPMENT

PORTABLE EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Fire extinguishers	Flammable Cell 1B Combustible Cell Hall near Change Rooms and Office Packaging and Material Handling Room	ABC Type
Dry Chemical	(See Above)	ABC Type

9.3 COMMUNICATIONS EQUIPMENT/WARNING SYSTEMS

COMMUNICATIONS EQUIPMENT		
SIREN SYSTEM		
Sirens are operated manually from the 616 NRDWSF Office		
SIGNAL	MEANING	ACTIONS
Steady Siren	Evacuate	Evacuate as directed
Waivering Siren	Take Cover	Seek shelter immediately
FIRE ALARM SYSTEM		
TYPE	LOCATION	CAPABILITY
Fire Alarm Button	Outside main entrance to the 616 NRDWSF	Alerts building occupants and the fire station
Fire Alarm Pull Box	In flammable cell 1B, acid cell, combustible cell, caustic cell, oxidizer cell, packaging room, and inside the main entrance	Alert occupants and fire station
OTHER COMMUNICATIONS EQUIPMENT		
Loss of ventilation indicator lights	616 NRDWSF Office	Indicate when the office and cell ventilation systems are operable
Crash Alarm Telephone System	Position No. W-34 in the 616 Facility Identified with <u>yellow</u> label on the handle	Telephone system used to disseminate emergency messages; dialing a single number connects teh initiator to a predetermined number of telephones
Public Address (PA) System	616 Facility	Used for incidents that affect only a limited area near the incident
Telephones Radios	616 Office	Used for communication

9.4 PERSONAL PROTECTIVE EQUIPMENT

PROTECTIVE EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Corrosive material gloves	Packaging and Material Handling Room	Provide protection for hands when exposed to corrosive materials
Solvent resistant gloves	Packaging and Material Handling Room	Provide protection for hands when exposed to solvents, alcohols, and water-based solutions
Abrasion resistant gloves	Packaging and Material Handling Room	Provide abrasion, cut and puncture protection for hands when handling containers and tools
Response gloves	Packaging and Material Handling Room	Provide protection for hands when exposed to an undetermined chemical or a wide variety of toxic/hazardous materials
Chemical resistant coveralls	Outside Men's Change Room	Provide protection when overpacking containers

9.5 SPILL CONTROL AND CONTAINMENT SUPPLIES

SPILL CONTROL EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Drum dolly	Material/equipment storage area	Specialized hand truck for moving drums
Absorbent material - cat litter, diatomaceous earth	Material/equipment storage area	Absorbing spills
Overpack drums	Material/equipment storage area	Overpack damaged containers
Chemical transfer pumps (hand pumps)	Material/equipment storage area	Transfer liquids to secure containers
(electrical)	Packing and sampling room	Transfer liquids to secure containers
(explosion-proof)	Flammable cell 1-A	Transfer liquids to secure containers
Nonsparking tools	Material/equipment storage area	Handling flammables

9.6 EMERGENCY RESPONSE CENTER

The Emergency Response Center for 616 NRDWSF Facility is the 616 Building office unless the facility is not habitable. In such an event, proceed as directed by the organization in charge.

10.0 COORDINATION AGREEMENTS

RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in Section 8.0 of DOE/RL-93-75.

11.0 REQUIRED REPORTS

Three types of written postincident reports are required for incidents on the Hanford site. The reports are summarized in DOE/RL-93-75.

12.0 PLAN LOCATION

Copies of this plan are maintained at the following locations:

- 616 Building Office
- All BEDs and Alternates Offices
- Northern Area ECC
- Hanford Local Area Network (HLAN).

13.0 REFERENCES

DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information"

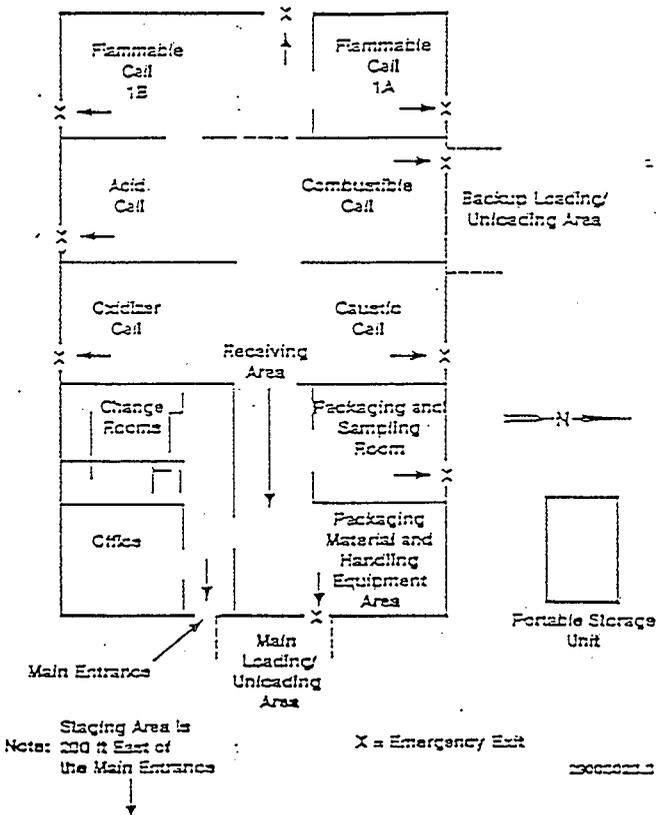
DOE Order 5500.1B, "Emergency Management Systems"

DOE/RL-93-75, *Hanford Facility Contingency Plan*

NIOSH, 1985, *Pocket Guide to Chemical Hazards*, National Institute of Occupational Safety and Health, U.S. Department of Health and Human Resources, Public Health Service, Centers for Disease Control, Washington, D.C.

WAC 173-303, "Dangerous Waste Regulations," Washington State Department of Ecology, Olympia, Washington.

Figure 1. The 616 NRDWSF Layout, Exits, and Staging Area



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ATTACHMENT A

Listing of Procedures and Guides

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The list is maintained at the facility and will be provided upon request.

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APPENDIX 8A

TRAINING

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WESTINGHOUSE HANFORD COMPANY

Manual
Section
Page
Issue Date
Organization

WHC-CM-5-34
1.8, REV 4
1 of 21
April 1, 1996
PSS/Solid Waste
Disposal

SOLID WASTE DISPOSAL
OPERATIONS ADMINISTRATION

TITLE:

Approved by

TRAINING PLAN

Original signed by
W. H. Hamilton, Jr., Director
Solid Waste Disposal

1.0 PURPOSE

This training plan implements the training requirements for Solid Waste Disposal (SWD) personnel. It represents a graded systematic approach to training requirements of pertinent federal, state and/or contractor regulations that apply to SWD personnel. This training plan also represents the training plan required by WAC-173-303 (2) and 29 CFR 1910.120 (e)(1)(i) for hazardous waste treatment, storage, and/or disposal (TSD) facilities and implements the requirements specified in the negotiated labor union contracts.

2.0 SCOPE

This training plan applies to all SWD personnel. It also specified minimum requirements for other personnel to enter and work in SWD Facilities. It specifies the training requirements and responsibilities for new and continuing employees, to ensure personnel are qualified to perform their job assignments. This training plan describes training program implementation, functions, and responsibilities.

3.0 DEFINITIONS

The following definitions apply to SWD.

Exception. A formal waiver granted to exempt an individual from a required training course.

Extension. Delay granted to meet initial training requirements or delay beyond the last date of the retrain zone granted to meet retraining requirements:

Facility. Equipment, systems, buildings, and other property units that facilitate or make an activity possible. Also used to refer to a TSD unit.

Function Manager. Any manager reporting directly to the division director.

Team Leader. Any first-line leader of a group.

Job Performance Measure (JPM)/Performance Demonstration (PD). A tool designed to evaluate related knowledge, skills, and abilities for a specific task or subtask.

Maintenance Manager. An operating facility level 4 manager of maintenance first-line managers and bargaining unit personnel.

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Plant/Facility Manager. Manager of an operating facility.

Operating Facility. An SWD operating facility that encompasses the facilities in Solid Waste Management (SWM), T Plant, and the Waste Receiving and Processing (WRAP 1) facility.

Operations Manager. An operating facility manager of operations team leaders and bargaining unit personnel.

4.0 RESPONSIBILITIES

This section outlines the responsibilities and organizational structure of SWD and operations training as related to SWD Operations.

4.1 Managers/Team Leaders

All SWD managers/team leaders are responsible for the following (as applicable):

- Providing an individual training plan for all employees newly assigned to SWD. The training plan will define actual training required by job assignment and will be placed in the employee's field training file.
- Ensuring that employees assigned to them receive required initial training, continuing training, and retraining as needed to be qualified to perform their assigned duties (Appendix A)
- Maintaining up-to-date personnel training records for the employees assigned to them, in accordance with Section 5.3 of this training plan. Managers will be able to demonstrate that their employees are qualified to perform their assigned tasks, in accordance with this training plan
- Functioning as the qualifying official for all assigned personnel except as noted in Sections 4.2 and 4.3.
- Determining the specific qualification goals for each individual, consistent with this training plan
- Providing development and review support for training materials; recommending material(s) for approval
- Supervising and/or conducting on-the-job training (OJT), and JPM/PD of assigned personnel
- Recommending training exceptions or extensions
- Participating in oral examinations as required
- Serving as a member of the Training Review Board, which affects assigned personnel

TRAINING PLAN

- Ensuring that emergency drills performed are safe and efficient
- Assisting the drill coordinator in preparing and implementing drill exercises.

4.2 Plant/Facility Manager

The plant/facility manager is responsible for the following:

- Ensuring that the training program and qualification programs are administered, improved, maintained, and are consistent with and applicable to facility configuration.
- Functioning as the operating facility qualifying official by acting as signature authority for all qualified operations managers/team leaders.
- Approving exceptions or extensions in individual training plans.

4.3 Operations Manager

The operations manager is responsible for the following functions for operations personnel:

- Acting as the approval authority for all operations training
- Maintaining the quality of operator training.

4.4 Operations Team Leaders

The team leaders of operations bargaining unit personnel assigned to SWM, WRAP 1, and T Plant are responsible for the following:

- Ensuring a sufficient number of trained and qualified personnel are available to safely meet the operations schedules of the SWD facilities
- Ensuring that operations personnel assigned to an operations job are qualified on that job or work under the direction of properly qualified personnel.
- Ensuring the training progress of assigned personnel and that all training requirements are met.
- Maintaining the quality of Operator training.
- Administration JPM/PD.

4.5 Maintenance Managers

All SWD maintenance managers are responsible for the following (as applicable to maintenance personnel):

- Acting as the approval authority for all maintenance training
- Maintaining the quality of maintenance training.

4.6 Maintenance Team Leader

The team leaders of maintenance bargaining unit personnel assigned to SWM, WRAP 1, and T Plant are responsible for the following:

- Ensuring a sufficient number of trained and qualified personnel are available to safely meet the maintenance schedules of the SWD facilities
- Ensuring that maintenance personnel assigned to a maintenance job are qualified on that job or work under the direction of properly qualified personnel
- Ensuring the training progress of assigned personnel and that all training requirements are met
- Maintaining the quality of maintenance training.

4.7 OJT Instructors

Qualified operators and maintenance craft personnel may be trained as OJT instructors. The OJT process is described in Section 5.8.

The OJT instructors are responsible for the following:

- Providing supervised hands-on training in the work environment to accomplish performance objectives required for completion and evaluation of the training tasks
- Ensuring that the trainee has satisfactory knowledge of and competence in skills requirements, as defined on the qualification card and in the study guide
- Signing and dating the OJT qualification card, indicating that the acceptable performance levels were met as required by plant operating procedures, study guide references, and the appropriate OJT qualification cards.

4.8 Employees

All SWD employees and support personnel are responsible for the following:

- Working with their managers to define appropriate training
- Completing necessary training to gain/maintain qualifications.
- Attending all training as scheduled.

4.9 Training Manager/Team Leader

The training manager/team leader establishes, conducts, and administers the training program for the SWD facility managers to ensure personnel are trained to meet their assigned jobs. In addition to the minimum training requirements listed in Appendix A, the training team leader will also qualify as a operations manager/team leader at the discretion of the plant manager.

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The training managers/team leaders provide classroom instruction and training in accordance with the requirements established in this training plan. As defined in this training plan, training team leaders support final written and oral examinations and OJT documentation. SWD facility managers are responsible for OJT and qualification.

The training managers/team leaders are responsible for the following:

- Developing and conducting training
- Assigning dedicated instructors to the facilities to meet the needs of SWD facility personnel
- Assisting managers/team leaders in implementing training requirements for their personnel
- Reviewing training requirements annually (at a minimum) for adequacy of need and adherence to regulations
- Reporting overdue training to SWD managers
- Processing extensions/exceptions to training requirements
- Assisting managers in scheduling training classes
- Evaluating training program effectiveness
- Instructing training classes
- Indoctrinating and training assigned instructors
- Developing and updating training texts and lesson plans
- Preparing, administering, and evaluating written and oral board examinations
- Preparing and updating study guides and OJT qualification cards
- Preparing and administering requalification lectures and examinations
- Preparing and administering JPMs/PDs
- Preparing and updating quarterly, as a minimum, a list of the qualification status for all personnel assigned. This list must include job title and name of the employee. The list, this training plan, and all personnel training files (Section 5.3) comprise the training plan required by WAC-173-303-330(2) and are subject to regulator inspection/audit.

4.10 Instructor

The instructor is a primary contact between the SWD personnel and the training organization. The instructor should understand the processes and equipment pertinent to facility operations. The instructor coordinates training activities for SWD with the respective operations managers. Instructors may be assigned responsibility for the following:

- Developing and maintaining study guides and OJT qualification cards
- Developing, maintaining, and administering written examinations
- Developing and conducting training on both new and existing systems or equipment
- Maintaining and coordinating the development and revision of training materials
- Providing (or assisting in conducting) designated training
- Providing or supporting special training programs
- Providing and updating facility-specific training schedules
- Providing periodic status reports, and assisting with designated training reports
- Advising management of changing training needs, scope, and contractual requirements
- Developing JPMs/PD for use in conducting operational examinations.

5.0 GENERAL ADMINISTRATIVE REQUIREMENTS

Administrative training requirements for all SWD personnel are specified in the sections that follow. The SWD operations training program requirements are specified in Section 6.0.

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5.1 Training Identification

The position terminology used in Appendix A represents the standard nomenclature used on the Hanford Site. For the purpose of compliance with WAC-173-303-330(2), the following position equivalencies are established:

<u>WAC 173-303 Position Categories</u>	<u>Appendix A Positions Included in WAC 173-303 Categories</u>
All Employees	Hanford Site personnel, visitors, and subcontractors not included in one of the following categories who enter a TSD unit where regulated or permitted dangerous waste management activities are conducted in accordance with the WAC 173-303.
General Worker	Hanford Site personnel, visitors, and subcontractors with waste management duties such as waste generation, container packaging, conducting surveys, loading containers, or providing direct oversight to waste handling activities. Examples include the following positions (Appendix A): <ul style="list-style-type: none">• Maintenance personnel• Contractor crafts• Radiological control technicians• Truck drivers• Process crane operators• Engineer.
Advanced General Worker	Hanford Site personnel whose duties exceed that of General Workers as follows: <ul style="list-style-type: none">• Nuclear process operators (NPO) qualified in the T Plant complex• NPOs qualified in any of the SWM facilities• NPOs qualified in the WRAP facility.
General Managers	Hanford Site personnel who hold positions or responsibilities in the following areas: <ul style="list-style-type: none">• Personnel who act as the Emergency Coordinator and/or alternate• T Plant, Solid Waste, or WRAP operations managers, operations person-in-charge (PIC), or operations team leaders• T Plant, Solid Waste, or WRAP building emergency directors• T Plant, Solid Waste, or WRAP environmental compliance officers• Engineer/scientist/hazardous material specialist/team leader in the Generator and Waste Acceptance Services group• Engineers who affect the process/safety systems of a SWD facility (may include cognizant, systems, test, and/or maintenance engineers).
General Shipper	Hanford Site personnel who prepare and sign waste movement documentation for onsite and offsite shipments.

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Appendix A provides training classes applicable to each position.

5.2 Minimum Position Requirements

Minimum position requirements are established for all positions. For bargaining unit, nonexempt, and nonmanagement exempt positions, the requirements are specified in standard position descriptions located in each individual's training field file. For management and team leaders the requirements are specified in individual position descriptions, subject to the minimum requirements specified in Appendix A, Table 1. For exceptions to these standard requirements where an individual does not meet the literal education requirements, consideration may be given to the collective experience of the person with two years of experience equal to one year of formal education. Individuals who do not meet the experience requirements for a position may be assigned to that position, providing the overall operating organization is considered balanced and strong. Exceptions are approved on a case-by-case basis by the SWD manager on the appropriate employment documentation.

Table 1. Minimum Position Requirements for Selected Positions.

Position	Education degree	Related experience
Managers	Bachelor	4 Years
Team Leaders	High School	3 Years
Operators.	High School	--

All personnel assigned to SWD on or before August 12, 1992 are considered to meet the requirements of Section 5.2 for their current and future positions within SWD.

5.3 All Employees

New employees must meet the training requirements described in Appendix A within six months of assignment to SWD. In addition, as new requirements are identified and indicated in this training plan, SWD personnel will comply the new requirements within six months of the effective date of the revision. All SWD managers will prepare a training field file for all their employees. The training field file includes the following:

- Employee profile system worksheet (not required for bargaining unit personnel)
- Health evaluation (as applicable)
- Completed Hanford Site training
- Individual training plan and annual reviews and updates
- Qualifications achieved (both company and outside sources)
- Correspondence related to exceptions or extensions to training
- Position description.

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In addition to the items listed in Sections 5.0 through 5.2, all operations managers, operations team leaders, and operators complete the 200 Area Operations fundamental training programs. Exceptions to this requirement may be authorized by the SWD director based on formal education background and technical experience.

The operations managers and operations team leaders will demonstrate a satisfactory level of knowledge in all areas in which their employees must be qualified by meeting the requirements identified in Appendix A. The operations managers, operations team leaders, and criticality safety representatives also will demonstrate a satisfactory knowledge level to an oral examination board before final qualification.

5.4 Examinations, Tests, and Quizzes

Where specified on the course outline, training courses provide a method to evaluate whether an employee is ready for either a new or continuing assignment and how much required training has been completed. In these cases, the employee must demonstrate a satisfactory knowledge of all required subjects covered in the training program. This demonstration may include written, oral, and operational examinations as appropriate to the position, experience, and educational level of the employee. Quizzes may be used for intermediate evaluation of the effectiveness of on-going training.

5.4.1 Examination Development

Examinations cover subjects in which personnel are expected to be proficient and emphasize those subjects covered by the continuing training program. Requalification and continuing training program examinations cover materials in accordance with training requirements.

The goal of an examination is to produce a fair and consistent evaluation of an employee's readiness for either a new or continuing assignment to specific tasks and/or completion of required training.

Examinations test the depth of knowledge defined in the related study guides and practical knowledge defined on the OJT qualification cards for the position.

5.4.2 Administration of Written Examinations for SWD Operations

Written examinations are given as part of the qualification or requalification process for personnel in job positions requiring formal qualification. Written examinations for requalifications are required every two years for the following qualifications:

- Managers plant specifics (SWM only)
- T Plant surveillance
- T Plant waste handler
- T Plant Canyon decontamination
- 2706-T decontamination
- Central Waste Complex operations
- Transuranic (TRU) Storage and Assay Facility (TRUSAF)

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- Nonradioactive Dangerous Waste Storage Facility
- Low-Level Burial Grounds
- Radioactive Mixed Waste Land Disposal Facility
- TRU Retrieval program
- Solid Waste verification sampling
- WRAP 1 Shipping and receiving operator
- WRAP 1 Process glovebox operator
- WRAP 1 Restricted waste glovebox operator
- WRAP 1 Control room operator
- WRAP 1 Operations manager/operations team leaders.

5.4.3 Administration of JPMS/PDS for SWD Operations

Completion of JPMS/PDS is the final step in achieving job qualification for SWD operators. The JPMS/PDS are administered by qualified independent evaluators who are either operations team leaders or training personnel, but not the immediate team leader of the employee being evaluated. The examination consists of a minimum of two, and not more than 15, JPMS/PDS sufficient to evaluate an individual's knowledge, skills, and abilities in all important areas of job performance. Independent evaluators act as the final approval authority for the qualification process.

5.4.4 Examination Control

The training team leaders approve qualification examinations. Completed examinations are retained as part of completed qualification records. Examinations are controlled to prevent compromise of examination material. The examinations are stored in a locked storage container or in password protected computer files except as required for administering to a student, review by the oral examination board, for audit purposes, or update by examination author. Approved locations for storage of written examination material are designated by the training organization.

5.4.5 Oral Examinations

The final step of a qualification process for operations managers/team leaders is an oral examination. This evaluation assesses the candidate's knowledge of operations, systems, and interactions to determine the candidate's readiness for qualification and for assuming the responsibilities of a qualified SWD manager/team leader or Criticality Safety Representative.

5.4.5.1 Oral Examination Board. The Oral Examination Board consists of a minimum of four members. These members evaluate and score the candidate's responses. The board is chosen from the following (or their designees):

- Operations support manager (as applicable)
- Facility operations manager
- Operations engineering manager
- Nuclear, safety, and/or environmental manager
- Applicable SWD training team leader
- Radiological control manager
- Plant or deputy plant manager.

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The plant manager or deputy plant manager acts as the board's chairperson and performs the following:

- Ensures all prerequisites are met before commencing the oral board
- Provides a schedule for the candidate and board members with the time and location at least five working days before the board meeting
- Ensures the board is conducted in a professional manner and that the established rules and guidelines are followed
- Ensures the candidate is aware of the following:
 - The general conduct, scope, and length of the examination, and other pertinent information
 - The candidate's right to seek clarification of the examiner's questions when necessary
- Provides the candidate with the results of the board.

5.4.5.2 Oral Examination Categories. The oral examination consists of documented questions from (but not limited to) the following specific areas, if applicable to the facility or position:

- Design, control, operating, safety/safety analysis report limitations, and facility permit requirements
- Means by which facility design, operations, or procedures may be changed
- Radioactive and nonradioactive hazards within the facilities or plant
- Handling, controlling, and disposing of radioactive and nonradioactive hazardous materials and effluents
- Criticality safety requirements and procedures
- Industrial and fire safety, security, conduct of operations, and emergency systems, including reporting procedures
- Mechanical, electrical, and chemical theory
- Facility operating characteristics
- Job Control System (JCS).

5.4.5.3 Documentation and Evaluation of Oral Examinations. Each oral examination is documented on an oral examination form identified in the examination procedures and supplied to each examiner. The examiner documents only the comments that are relevant to determining a pass or fail conclusion.

The candidate and selected training personnel may see the comments. Each examiner evaluates the candidate's responses to every question that the examiner feels able to properly assess.

The following system is used for grading the examination.

- S--(SAT). Excellent to good knowledge and understanding of the subject. The candidate has demonstrated sufficient knowledge to safely carry out the responsibilities of the position.
- M--(Marginal). Fair working knowledge and understanding of the subject. The candidate may have difficulty answering questions in depth and relating the interaction between various systems.
- U--(UNSAT). Poor working knowledge and understanding of the subject. The candidate is unable to provide an answer, or the answers are incorrect or incomplete. The candidate shows obvious unfamiliarity with the subject, such as unusually hesitant answers or lack of understanding.

All grades are awarded on the basis of the candidate's verbal responses during the oral examination. The use of marginal evaluations should be minimized. Areas where the candidate's knowledge is marginal should be explored further in an attempt to determine if an "S" or "U" rating is warranted. If the marginal evaluation stands, supporting notes should be included, and the examiners objectively judge whether the candidate should pass or fail the examination. The candidate may be allowed to take additional training at a later date and retake an unsatisfactory or marginal portion of the Oral Board Examination, at the board's discretion.

The forms pertaining to the examination should be used only as an aid to the examiners in conducting the examination and as a means of documenting the basis for the examiner's pass/fail determination. The pass/fail determination is based on an audit of the candidate's level of knowledge, and (as such) all applicable areas should be explored in varying degrees of depth.

Each examiner must recommend approval or disapproval of the qualification based on the results of the entire examination. To successfully pass the oral examination, the candidate must receive a passing grade from each of the examiners.

5.4.6 Grading Standards--Written Examinations

For bargaining unit personnel, the satisfactory performance level for any objectively graded written examination is 70 percent. If the average grade is less than 70 percent, the entire examination must be retaken following remedial training, as specified in Section 5.11 and in accordance with the agreement between Westinghouse Hanford Company (WHC) and Hanford Atomic Metal Trades Council (HAMTC).

For exempt personnel, the satisfactory performance level for any objectively graded written examination is 80 percent. If the average grade is less than 80 percent, the entire examination must be retaken following remedial training, as specified in Section 5.11.

5.5 Qualification Card and Study Guide Administration for Operations

The qualification card contains the requirements for qualification. Requirements may include facility-specific training, classroom training, individualized instruction, OJT, comprehensive written exam, and operational exam. The qualification card documents qualification status and is an auditable record of an individual's participation in the performance based training program. The elements in the card are based on job analysis and supported by a task list.

Qualification cards are instruments for tracking and proving accomplishments and provide the employee with a list of requirements and a path of progression. The minimum required level of accomplishment shall be specified in the respective checklist for all requirements.

The study guide contains instructions and evaluation criteria. Knowledge requirements for the task to be performed are also found in the study guide. Qualification guides are developed and used to provide consistent OJT from trainer to trainer.

5.6 Provisional Qualification

Provisional qualification shall be established by the facility manager when the performance level required for full qualification cannot be satisfied. The provisional training program shall be approved by the training and operations managers and shall be established at the highest practical level consistent with work to be performed and existing constraints. Provisional qualification only covers tasks contained in the qualification card. Full qualification is necessary for unrestricted operation of a system or process. A provisional qualification is limited in scope and duration and will be in force only until full qualification can be achieved.

Provisional qualifications are valid for a maximum of one year.

5.7 OJT Qualification Guides for Maintenance Personnel

Maintenance OJT Instructors use OJT qualification guides to implement the OJT training process. A job-task analysis is used to determine which tasks are covered in the OJT qualification guides. The OJT qualification card documents the OJT process.

The OJT qualification card is an auditable record of an individual's participation in the performance-based training program. The OJT qualification card contains specific tasks identified by the job-task analysis for discussion, performance, and/or simulation. Upon completion of the training and evaluation process, the OJT instructor will sign off each task item.

The OJT qualification guide contains specific knowledge and skill requirements, specific technical material and references to enable the student to complete the identified task. The OJT qualification guide is a study reference document, training guidance instrument, and evaluation criteria for trainers; instructors, evaluators, and managers.

Section 1 of the OJT qualification guide identifies the specific task and the supporting skills and knowledge. Section 2 contains the technical material that addresses each knowledge factor. Section 3 contains the hands-on training where the student practices the specific skill factors. Section 4 contains the JPM and the qualification card.

OJT qualification guides should be reviewed by a subject matter expert who was not directly involved in their development and approved before use.

5.8 OJT

All OJT in SWD facilities is performance based. The method of conducting OJT, the required level of accomplishment, and performance test criteria are determined during the training material development process. The training and performance testing a trainee receives will qualify that individual to perform the task. Study guides and OJT qualification cards for individual qualification are developed to document training and to provide guidance for the instructor and the trainee.

The OJT instructors, subject matter experts, selected operators, maintenance crafts personnel, managers, and operations team leaders will be qualified to conduct OJT and performance tests in their areas of expertise. The primary method used to conduct OJT is the demonstration-performance method. When conditions warrant, alternate methods (such as discussion or simulation) may be used.

5.9 Proficiency Maintenance

It is necessary to maintain proficiency in facility operations and maintenance. This requires periodic hands-on experience to supplement the formal qualifications for facilities and/or watch stations. The following requirements will be met to ensure that proficiency is maintained:

1. An operator who fills one of the operator qualification positions must have completed a full shift in the same position within the last six months.
2. An operator who does not complete a full shift in a position in any six-month period has not maintained proficiency. This can be rectified by reviewing the facility/position status with the responsible manager and documenting satisfactory review in the individual's training file.
3. Operations managers, operations team leaders, and plant/facility managers will maintain proficiency through their normal duties.

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4. Proficiency of SWD maintenance personnel will be maintained by performance of assigned tasks or through equivalent training.

5.10 Failure Criteria

Failure to complete a component of a training program, failure to meet specified criteria during initial and continuing training, and/or a demonstrated deficiency requires initiating a remedial training program. An employee who has failed all or part of a training program must be assigned duties that do not require the failed training or be supervised by a trained individual. Remedial training is conducted in accordance with Section 5.11.

5.11 Remedial Training

Remedial training is an individually prepared program transmitted to the individual by internal memo from their immediate manager along with a remedial/retraining plan (the plan need not be more than one page in length). The program gives the individual experiencing difficulty written direction for actions to achieve required results. The remedial training program evaluates the effectiveness of the remedial training (i.e., for a classroom examination failure, a re-examination; for operational difficulties, an operational evaluation).

Remedial training programs are assigned as necessary, but must be assigned for the following:

- Failed classroom examinations
- Failed written qualification examinations
- Failed JPMs and PDs
- Failed oral board examinations
- Failed biennial written examinations.

The remedial training should be designed to ensure that the individual acquires additional knowledge. A two-week minimum waiting period is required before an employee may retake a failed written qualification examination. Remedial training may be recommended by the individual's immediate manager, instructors, or training evaluators.

Remedial training must be approved by the appropriate line manager. The completed copy of the remedial/retraining plan and its results will be filed with the individual's training field file.

5.12 Training Review Board

The employee's immediate manager or team leader determines and recommends to the Training Review Board the requirements for the following:

- Individual requalification for previously qualified personnel returning to work following extended absences (greater than six months for SWM and WRAP 1; and three months for T Plant) and/or corrective action

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- Individual requalification for previously qualified personnel demonstrating poor performance in the training program or facility operations.

The Training Review Board consists of the following:

- Individual's function manager
- Individual's facility/field operations manager or operations team leader
- WRAP 1, SWM, or T Plant training team leader or Operations Support team leader (when applicable)
- A bargaining unit member as applicable.

A copy of approved corrective actions and applicable milestones must be filed in the individual's field training file. Documentation of completion of corrective actions is submitted with completion of the associated training.

The Training Review Board approves a recommended course of action.

5.13 Continuing Training Program

Continuing training is designed to support and enhance the proficiency of operations personnel.

Continuing training provides qualification-oriented training and refresher training in selected areas.

The program, at the option of the training manager/team leader, may include:

- Attendance at selected continuing training lectures
- Completion of required reading
- Completion of selected OJT tasks
- Completion of all courses to maintain job qualifications
- Drills in the facility for response to abnormal or accident situations.

The training managers/team leaders document the completion of continuing lectures and OJT (beyond that required for qualification).

Continuing training lectures are scheduled and conducted as required.

If employees miss a lecture, their team leader/manager or another team leader/manager will cover the equivalent material and document the lectures in their training file.

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Training is specific to each operating facility. The SWD training team leaders, maintenance team leaders, and/or Operations Support team leaders compile the agenda for the lectures based on information received from operations, engineering, maintenance, and/or training needs. The lecture topics could include the following:

- Changes and upgrades to qualification packages
- Procedural changes
- Process/structural changes
- Industry events
- Unusual occurrences
- Lessons learned
- Demonstrated knowledge deficiencies
- Upgrading existing knowledge levels.

5.14 Required Reading

Important information relative to job assignments must be made available to appropriate personnel. The SWD uses required reading as a formal system to ensure that appropriate individuals receive important information. See Section 3.20 of this manual for further amplification.

5.15 Drill Program Description

Drills are conducted for operations personnel to develop and maintain proficiency in responding to abnormal or accident conditions. Teamwork skills are integrated into situations where technical knowledge and team skills are necessary. The objective is to establish, maintain, and enhance the performance of the individual and the team. Drill scenarios should identify and correct performance deficiencies related to abnormal and/or emergency situations.

5.16 Training Material Development

Training material is developed using a systematic approach (e.g., performance-based training) to ensure that all personnel are qualified to perform job requirements.

The affected group management, operations training, and facility management approve training materials. In addition, training material may be reviewed by other support organizations, as determined by SWD management.

5.17 Training Material Maintenance

Training material will be reviewed for accuracy as changes to state or federal regulations, plant or facility design or processes change, or changes in plant operating procedures take place. Training material will be reviewed and updated at intervals not to exceed two years.

5.18 Training Status Records

Training records are maintained by using the training records information (TRI) or TMX system and with the updates to employee training field file.

The following sections discuss exceptions and extensions.

5.19.1 Exceptions

Exceptions to initial and continuing training are considered on a case-by-case basis and are initiated by individual's immediate manager or team leader. The employee's name, the subject for which the exception is requested, and justification for the exception are sent to a plant/facility manager, or manager equal in authority for approval.

Under certain conditions, employees may be granted equivalency or be exempted or waived from specific qualification prerequisites or requirements.

Any deviation from the normal qualification requirements or qualification path must be documented on the individual's training field file. This documentation states what specific variation is requested and provides a short justification for the variation. No employee can be exempted from written or oral examination requirements associated with a qualification.

5.19.2 Extensions

Extensions of qualifications may be granted on a case-by-case basis by the plant/facility manager or manager equal in authority. Requests for extensions are prepared and processed by the applicable training team leader for approval by the applicable manager. An individual's manager or team leader will initiate the request for extension and should include, as a minimum, the following:

- The length of extension
- An explanation of the circumstances that prevented the person from completing the requirements
- A description of the operational schedule and/or commitment that necessitated the extension.

NOTE: Extensions of qualification for nuclear operators, operations team leaders, and managers usually will not be granted.

Anyone whose qualification has lapsed will be designated as a trainee in that area. Trainees will perform work as an extension of a qualified person only if the trainees are physically controllable by the qualified person.

5.20 Instructor Subject Matter Experts

The subject matter experts may be part-time instructors under the following conditions.

- The subject matter expert is qualified (or previously qualified) and/or experienced in a particular subject, topic, system or duty area.

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- The technical competence of the subject matter expert is verified by virtue of the individual's job assignment and overall command of the subject matter.
- An subject matter expert may be used to team-teach with the primary instructor.

5.21 Training Records

The SWD processes training records as follows.

- The original records are sent to and recorded on the TRI/TMX system.
- Field copies of records are maintained in the employee's training file. Contents of these files are listed in Section 5.3.
- A current training record is maintained by the individual's manager or team leader for the duration of employment in the facility, plus a three-year audit period. Personnel training records may accompany personnel transferred within the same company.
- The responsible team leader/manager reviews individual training records annually to ensure that tasks assigned and training received are appropriate for their employees.
- Letters or statements indicating the acceptance or denial of a request for exception to training and the basis for the justification are maintained in the employee's training field file.
- As required by Section 5.3, the employee profile system worksheet, recent health evaluation, position description, and statement of qualifications achieved also are maintained in the training field file as applicable.

The following forms can be obtained from applicable SWD training sections and are used to support and document the SWD training programs.

- The Individual Training Plan documents the training required for an employee. This record is maintained in the employee's training field file and reviewed and updated (as necessary) at least annually.
- The OJT qualification cards are used during the qualification process to record the completion of the required task items. The OJT qualification cards provide a permanent record of the qualification for each qualification package.
- The Oral Examination form records both the questions asked and key points from answers given during an Oral Board Examination. The Oral Examination form provides a permanent record to qualify the individual for qualification.

5.22 Qualified Personnel Status Report

The WRAP 1, SWM, and T Plant Training organizations issue a monthly report to WRAP 1, Solid Waste, and T Plant facility managers that provides the current training status for each of their employees. The managers are responsible for scheduling their employees for the applicable training.

NOTE: Managers are encouraged to use their training sections to assist them in scheduling and tracking training.

The PC&A manager compiles and issues a monthly report to the manager, SWD, identifying the qualification status of SWD personnel.

5.23 Facility Modifications, Procedure Changes, and Operating Experiences

Training on selected facility modifications, procedure changes, and operating experience is conducted during the continuing training program. When warranted by the significance of the information, the manager, team leader, or other appropriate personnel conduct a brief personnel lecture on the subject, incorporate the information into the support training schedule, or include the information in required reading.

5.24 Qualification Restrictions and Durations

Qualifications are granted only if the following conditions are met.

- All qualification requirements are completed (written and/or oral examinations, OJT requirements, and JPMS/PDs).
- Other specified requirements are completed (e.g., medical examinations).
- Immediate manager gives approval.
- For operations qualifications, an independent training evaluator verifies satisfactory completion of tasks that result in qualification.

5.25 Requalification Process

All employees will complete all training programs and/or courses in accordance with the established guidelines for the individual program/course. Requalification for specific job assignments is specified in Appendix A.

Written and/or oral examinations and proficiency demonstrations are used (to the extent possible) for requalification if the facility is not operated frequently enough to meet normal proficiency requirements.

If an employee has not received the job-specific training or retraining required for the work assignment within the required time, the employee will be relieved from the assignment until the required training or retraining is complete. The employee will, however, be allowed to work in the assignment under the direction of a qualified employee.

6.0 SOLID WASTE DISPOSAL TRAINING PROGRAMS

Training requirements for SWD personnel and visitors are defined in Appendix A.

7.0 DESIGNATED REVIEWING ORGANIZATIONS

This procedure does not require review outside of the SWD Division.

8.0 REFERENCES

WHC-IP-0867, *Operation Training Materials Development Guidelines*.

9.0 BIBLIOGRAPHY

DOE 1324.2A, "Records Disposition."

DOE 5480.1B, "Environment, Safety, and Health Program for DOE Operations."

WAC-173-303-330, "Personnel Training."

40 CFR 264.16, "Personnel Training."

WHC-CM-1-3, *Management Requirements and Procedures*.

WHC-CM-3-5, *Document Control and Records Management Manual*.

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APPENDIX A
TRAINING AND QUALIFICATION REQUIREMENTS

The training addressed in this appendix is presented in three tables. Table 1 identifies training requirements by job position and lists course requirements by categories. In most cases job position titles are generic. Managers are responsible for determining which job position category is applicable for employees and the subsequent required training. Categories A through E identify RCRA required training and is subject to review and/or audit by the Washington State Department of Ecology. Categories F through K identify non-RCRA required training and, in regard to an Ecology audit, is intended as information only.

Tables 2 and 3 list courses by category. In Table 2, the categories correspond to the position categories addressed in paragraph 5.1 of this training plan. Table 3 categories organize courses into general groupings. Managers must determine the specific course requirements for employees based on both general requirements and requirements unique to an employee's job assignment. Some courses are annotated with a qualifier such as "As required by job assignment" or "For Solid Waste only." In these cases where an employee's assignment does not warrant certain courses, or the employee works for a facility other than the target audience of a course, the course is not considered required training. A listing of additional training (classified as enhanced training) to improve on an employee's job skills, but not otherwise required, can be obtained from the facility training groups.

To determine required training for an employee, refer to Table 1 and find a corresponding job position. Adjacent to the job position is a series of X's and numbers. The X's indicate all training in that category is required unless otherwise noted (e.g., "As required by job assignment," "For Solid Waste only," etc.). The numbers in place of X's under the main categories indicate the requirement to receive training only in the identified sections of that category. As an example, under Category C, a trainer is required only to take courses under C-1. A nuclear process operator is required to take all courses in Category C indicated in Table 1. For employees falling into more than job one position or assignment, the requirements of both job position categories apply.

A dotted line separating courses distinguishes initial and retraining courses. For example, course number 02006A is retrained in 000001. The initial course is listed first, followed by a dotted line then the requalification course. A dashed line between courses are courses that are interrelated and normally have a required prerequisite course or courses.

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Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)						
	A	B	C	D	E	F	G	H	I	J	K	
SUPPORT PERSONNEL												
ACTIVITY ADMINISTRATOR/ENGINEER	X						3					
CLERK	X						3					
COMPUTER TECHNICIAN	X						3					
SECRETARY	X						3					
ENGINEERING WRITER	X						3				1	
RECORDS SPECIALIST	X						3					
PROJECT CONTROL ANALYST	X						3					
PLANNER/SCHEDULER	X						3					
STAFF ASSISTANT	X						3					
SYSTEMS ANALYST	X						3					
WORK CONTROL PERSONNEL												
JOB CONTROL ADMINISTRATOR	X						1+3			1	1	
JOB CONTROL CLERK	X						3			1	1	
PLANNER/SCHEDULER	X						1+3			1	1	
MATERIAL CONTROL SPECIALIST	X						3			1	1	
MATERIAL COORDINATOR	X						3			1	1	
TECHNICAL SUPPORT PERSONNEL												
ENGINEER/SCIENTIST (Facility)	X	1		2			1+6	1+3		1+6	1	1+12
ENGINEER/SCIENTIST (NON-Facility)	X			2			1+6	3				1
ENGINEER/SCIENTIST (Environmental)	X	X		2	1		1+6	3	2			
ENGINEER TECHNICIAN	X	X						3		1		
ENVIRONMENTAL COMPLIANCE OFFICER	X	X	2	2	1		1	3	2	1		1+4+7
ENVIRONMENTAL ENGINEER (T Plant)	X	X	2	2	1		1+6	1+3	2	1	1	1+12
HEALTH PHYSICIST	X	1					1	3				1
HAZARDOUS MATERIAL SPECIALIST	X	X		2			1+6	3	2			1
FIRE PROTECTION ENGINEER	X	1					1	3+9				3+6
INDUSTRIAL HYGIENIST	X	1					1	3+9				3
INDUSTRIAL SAFETY ENGINEER	X	1					1	1+3+9				3+6

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Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)					
	A	B	C	D	E	F	G	H	I	J	K
NUCLEAR SAFETY ENGINEER	X	1				1+6	3+9				3+6
PLANT ENGINEER (Facility)	X	1				1+6	1+3			1	1
PLANT ENGINEER (NON-Facility)	X						3				
PLANT ENGINEER (Environmental)	X	X		2	1	1+6	3	2			
QUALITY ASSURANCE ENGINEER	X	1				1	3				
RADIOLOGICAL CONTROL ANALYST (RCT)	X	1				1	3				1
RCT NUCLEAR ENGINEER	X	1				1	3				1
TRAINING INSTRUCTOR	X	1	1			1+6	1+3	2			1+2+8
TRAINING EVALUATOR	X	1	2	2+4	1	1+6	1+3+9	2	1+4		1+2+8+10
CRAFT PERSONNEL											
ELECTRICIAN	X	1				1+5	1+3+4+8+9			2+5 +11	1
INSTRUMENT TECHNICIAN	X	1				1+5	1+3+8+9			9 +11	1
INSULATOR	X	1				1+5	1+3+5+9				1
MILLWRIGHT	X	1				1+5	1+3+4+9			10 +11	1
NUCLEAR PROCESS OPERATOR	X	1	X			1+4	1+3+4+9	1	3+4+5+6	1+5	1+2
PAINTER	X	1				1+5	1+3+4+9			5	1
PIPEFITTER	X	1				1+5	1+3+4+9			5+6 +11	1
PROCESS CRANE OPERATOR	X	1				1+5	1+3+9			8	1
RADIOLOGICAL CONTROL TECHNICIAN	X	1				2+5	1+3+4+9				1
RIGGER	X	1				1+5	1+3+4+9		4	7	1
SIGN PAINTER	X	1				1+5	1+3+9			5	1
TOOL CRIB ATTENDANT	X						3+9				1
TRUCK DRIVER	X	1				1+5	1+3+9	1	3	4	1
WELDER	X	1				1+5	1+3+4+9				1
MANAGEMENT PERSONNEL											
DIVISION DIRECTOR	X			1			3				1
MANAGERS/DEPUTY MANAGERS											
ENGINEERING (Facility)	X	1		2		1+6	1+2+3		1+6	1	1+3+6+7 +12
ENVIRONMENTAL ENGINEERING	X	X	X	2	1	1+6	1+2+3+9	2	1+6	1	1+3+4+6+7

Table 1. Training Matrix.

Job Position	RCRA (Table 2)					NON-RCRA (Table 3)					
	A	B	C	D	E	F	G	H	I	J	K
MAINTENANCE	X	1		2		1+6	1+2+3		1+6	1	1+3+6+10
OPERATIONAL READINESS REVIEW	X	1				1	1+2+3+9		1+2		1+3+6
OPERATIONS	X	1	X	2+3+4	1	1+6	1+2+3+9	2	1+2+4+6	1	1+2+3+6+7+10+12
OPERATIONS SUPPORT & WORK CONTROL	X	1		2			1+2+3		1+6	1	1+3+6+10
OTHER (NON-FACILITY MGRS)	X						3		1		
PLANT MGR/DEPUTY MGR	X	1		1		1+6	1+2+3		1+6		1+3+6+12
RADIOLOGICAL CONTROL	X	1		2		1+3+5	2+3+9		1+2+6		1+3
TRAINING	X	1	X	2		1	1+2+3		1+6		1+2+3
TEAM LEADERS											
GENERATOR & WASTE SERVICES	X	X				1+6	2+3	2	1		1
MAINTENANCE	X	1					1+2+3+6		1+6	1	1+3+6+10
OPERATIONS	X	1	X	2+3+4	1	1+6	1+2+3+9	2	1+2+4+6	1	1+2+3+6+10
OPERATIONS SUPPORT	X	1					1+2+3+6		1+6		1+3+6+10
RADIOLOGICAL CONTROL	X	1		2		1+3+5	2+3+9		1+2+6		1+3
TRAINING	X	1	X	2		1	1+2+3		1+6		1+2+3
WORK CONTROL	X	1					1+2+3+6		1+6	1	1+3+6
SPECIAL: GROUPS/MEMBERS/COMMITTEES/ASSIGNMENTS											
ASBESTOS ABATEMENT MANAGEMENT PLANNER	X	1					3				9
BUILDING WARDEN	X					1+6	1+3				5
CORRECTIVE ACTION EVALUATION GROUP	X						3				6+7
CRITICALITY SAFETY REPRESENTATIVE	X	1				1+6+7	3				
MANAGER-ON-CALL	X	1		2+3							10
OCCURRENCE REPORT WRITER/INVESTIGATOR	X	1				1	3				7+10+11
PERSON-IN-CHARGE (PIC)	X	1				1+6	1+3+6+8+9		6	1+3	
PLANT REVIEW COMMITTEE	X						3				12
PROCEDURE WRITER	X	X					3		1+6		
SHIPPER	X	1	2	2	X	1+6	3	2+3			
UNREVIEWED SAFETY QUESTION EVALUATOR	X										12
OTHER PERSONNEL											
SWD VISITOR/VENDER	REFER TO PAGE 17 OF THIS APPENDIX FOR REQUIRED TRAINING										

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Table 2. RCRA Required Training.

COURSE NUMBER	CATEGORY A GENERAL WORKER TRAINING	RETRAINING (months)
02006A	Hanford Site Orientation (HSO) <small>The following are part of HSO: (Required for new employee only.) 000087 Initial Security Briefing (DOE Order 5631.1B & DOE Order 5631.2C) *02006B Hazardous Communication and Waste Orientation (Washington Administrative Code (WAC) 173-303 & 29 Code of Federal Regulation (CFR) 1910.1200)</small>	12 - 000001
000001	Hanford General Employee Training (HGET) <small>The following are part of HGET: 000100 "Escort Training" *02006B "Hazard Communications Orientation" (WAC 173-303) 000165 "Asbestos General Employee Training" 020108 "Non-radioactive Worker Safety Orientation" 003000 "Lock & Tag-General" 020196 "Noise Control Requalification" 020005 "Criticality Safety - Nonfissile Material Handler" 120196 "Computer Security Awareness" 02006F "Fire Extinguisher Safety Orientation" 162236 "QA Program Overview"</small>	12 - 000001
* Denotes the RCRA portion of these courses.		
300700 SWM ONLY	Solid Waste Operations Facility Orientation	24 - 300700
301740 SWM ONLY	Solid Waste Management Hazard Communication <small>The following are part of 301740: Facility Emergency and Hazard Information Checklist - courses, 03E044 - LLBG, 03E045 - 616, 03E046 - 224T, & 03E047 - CWC; buildings not included in this list will use the "Emergency Response Information Board."</small>	12 - 301740
450700 T PLANT ONLY	Facility Orientation - T Plant	24 - 450700
03E048 T PLANT ONLY	Facility Emergency and Hazard Information Checklist - T Plant Complex <small>Buildings not included will use the "Emergency Response Information Board"</small>	12 - 03E048
306750 WRAP 1 ONLY	WRAP 1 Facility Orientation (including Haz. Comm. and BEP)	12 - 306750
CATEGORY B GENERAL WORKER TRAINING		
B-1		
031110	24-Hour RCRA TSD Hazardous Waste <small>The following are part of course 031110: 020032 "Scott SKAPAK-MSA PAPER Requalification" (29 CFR 1910.34)(As required by training needs analysis) 02006G "Hazardous Communication and Waste Management Awareness" (29 CFR 1910.1200, WAC 173-303)(ONE TIME ONLY) 020194 "Noise Control" (ONE TIME ONLY)</small>	12 - 032020
032020	Hazardous Waste Refresher Training <small>The following are part of course 032020: 020030 - SCBA Annual is given with this class if requested. (29 CFR 1910.134)(As required by training needs analysis) 020032 - Scott SKAPAK is given with this course if requested. (29 CFR 1910.134)(As required by training needs analysis)</small>	12 - 032020
031310	Hazardous Waste Operations Mgr/Supervisor - 8 hr <small>(For 24 hr or 40 hr Hazardous Waste Training - Operations managers/team leaders only)</small>	N/A
020041	Basic Respiratory Protection <small>(as required by training needs analysis.)</small>	12 - 020041
020044	Quantitative Mask Fit <small>(as required by training needs analysis.)</small>	12 - 020044
B-2		
301310	Solid Waste Facility Recordkeeping <small>(Required for SWITS data entry personnel only)(and as required by needs analysis.)</small>	N/A

TRAINING PLAN

Table 2. RCRA Required Training.

CATEGORY B GENERAL WORKER TRAINING (continued)		
B-3		
301315	Solid Waste Acceptance Requirements <small>(As required by training needs analysis)</small>	N/A
CATEGORY C ADVANCED GENERAL WORKER TRAINING		RETRAINING (months)
C-1		
300010 300020 300025 300030 300040 300050 300080 SWM ONLY	SW TRU Waste Retrieval OQ Central Waste Complex OQ Mixed Waste Land Disposal Facility OQ TRUSAF - Operator Qualification Low-Level Burial Grounds Facility Non-Radioactive Dangerous Waste Storage Facility OQ Solid Waste Verification Sampling <small>*For operators only. Operators must qualify in the their assigned duties unless escorted by a qualified operator. Operators are not required to maintain all qualifications. SWO operations managers/team leaders will take course 300590, manager qualification. The training team leader, trainers, and training evaluator may take either applicable operator qualifications or course 300590.</small>	24 - 3000XX
450010 450020 450030 450040 T PLANT ONLY	T Plant Canyon Decontamination OQ T Plant Surveillance OQ 2706-T Decon OQ Waste Handler OQ <small>*Operators must qualify in the their assigned duties unless escorted by a qualified operator. Operators are not required to maintain all qualifications. T Plant operations managers/team leaders, training team leader, and trainers must take all operator qualifications.</small>	24 - 4500XX
306500 306515 306520 306525 WRAP 1 ONLY	WRAP 1 Restricted Waste Management Glovebox Qualification WRAP 1 Shipping and Receiving Qualification WRAP 1 Control Room Qualification WRAP 1 Process Glovebox Qualification <small>The above are for operators. Operations manager/operations team leaders/trainers take course 306510.</small>	24 - 3065XX
C-2		
035100	Core Waste Management Training - Initial <small>(For Operators, Operations Team leaders only)WAC 173-903, 40 CFR, & 49 CFR)</small>	12 - 035110
035110	Core Waste Management Training - Refresher	12 - 035110
450600 T PLANT ONLY	EP/APC - Operator <small>(Operators only - Managers/Team Leaders will take course 450660, Cat. D-4)</small>	12 - 450600
CATEGORY D GENERAL MANAGER TRAINING		
D-1		
035040	Environmental Regulations at Hanford	N/A
D-2		
035050	Environmental Compliance at Hanford <small>(As required by training needs analysis)(may take 035040 as equivalent training)</small>	N/A

Table 2. RCRA Required Training.

CATEGORY D GENERAL MANAGER TRAINING (continued)		
D-3		
02028B	Building Emergency Director Training <small>Required for Building Directors and operations managers/team leaders</small>	12 - 037510
037510	BED/BW Requalification Training	12 - 037510
D-4		
300060 <small>SWM ONLY</small>	Managers Oral Boards Qualification	N/A
306760 <small>WRAP 1 ONLY</small>	WRAP 1 Operations Manager/Team Lead Oral Boards	N/A
300590 <small>SWM ONLY</small>	SWO Managers Qualification	24 - 300590
306510 <small>WRAP 1 ONLY</small>	WRAP 1 Operations Manager/Operations Team Leader Qualification	24 - 306510
450660 <small>T PLANT ONLY</small>	EP/APC Manager	12 - 450660
***** <small>T PLANT ONLY</small>	T Plant Manager Oral Board	N/A
COURSE NUMBER	CATEGORY E GENERAL SHIPPER	RETRAINING (months)
NOTE: See Table 3, Category H for non-RCRA courses required for shipper certification. Personnel classified as General Workers, Advanced General Workers, or General Managers may also be required to take some or all of the following courses at the discretion of management.		
E-1		
035020	Facility Waste Sampling & Analysis <small>(As required by training needs analysis) (WAS-173-303, 40 CFR & 49 CFR)</small>	N/A
035010	Waste Designation Support <small>(WAC 173-303) (For information only, does not allow participant to sign manifest.)</small>	N/A
If course 035012 is taken, this requirement is met.		
E-2		
020159	Dept. of Transportation Hazardous Waste Shipment Certification <small>(Required for those who sign manifests) (Must have taken course 020064 first.) FOR HAZARDOUS WASTE SHIPPERS. (49 CFR 172)</small>	24 - 020159
035012	Waste Designation Certification Test <u>only</u> .	12 - 035012
035120	Waste Management Administrative - Initial <small>(For employees who sign manifest).</small>	12 - 035130
035130	Waste Management - Administrative - Refresher	12 - 035130

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Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY F RADIATION WORKER TRAINING	RETRAINING (months)
F-1		
10 CFR Part 835.902 Radiological Workers		
020001	Radiological Worker II Training - Initial (As required by training needs analysis)	24 - 020003
020003	Radiological Worker II Retraining Requalification	24 - 020003
020702	Rad Worker I/II Refresher	24 - 020702
This course is taken the off year of 020003		
020900	ALARA For Technical Support Personnel (For facility technical support staff only and as required by training needs analysis)	N/A
300745	Personal Self-Survey - Solid Waste (Completion of 034520 and 024530 satisfy requirement for 300745)(Required for all SWM operators and operations team leaders only)	24 - 300745
450850	Personal Self-Survey - T-Plant (Completion of 034520 and 024530 satisfy requirement for 450850)(Required for all T-Plant operators and operations team leaders only)	24 - 450850
F-2		
10 CFR Part 835.903 Radiological Control Technicians		
022004	RCT Academic Training Program	24 - 022002
022002	RCT Recertification Program	24 - 022002
022120	RCT Continuing Training Cycle #1	Continuous
022122	RCT Continuing Training Cycle #2	Continuous
022124	RCT Continuing Training Cycle #3	Continuous
022126	RCT Continuing Training Cycle #4	Continuous
This training is continuous; once the employee finishes this course, the employee repeats the cycle. NOTE: Technician-specific training is conducted in accordance with the applicable requirements, and ESQ/HSF monitors certification.		
023105 SWM ONLY	SWO Facility OJT - RCT	24 - 023105
451500 T PLANT ONLY	RCT OJT T-Plant	24 - 451500
306770 WRAP 1 ONLY	WRAP 1 Facility OJT - RCT	24 - 306770
F-3		
(RCT Level 4 managers & team leaders only)		
023001	1st Line Manager Oral Boards	N/A
024000	1st Line Manager Fundamentals	N/A
F-4		
DOE 5480.24		
020010	Criticality Safety Training - Fissionable Material Handlers	24 - 020110
020110	Criticality Safety - Fissionable Material Handlers Retraining	24 - 020110
020301	Criticality Safety Job Safety Orientation - Fissile (JSO)	24 - 020301

TRAINING PLAN

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY F RADIATION WORKER TRAINING (continued)	RETRAINING (months)
F-5		
020020 T PLANT ONLY	Criticality Safety Training - For Support Personnel	12 - 020020
F-6		
020012	Criticality Safety Training Managers & Engineers (As required by training needs analysis)	24 - 020013
020013	Criticality Safety Manager/Engineer Retraining	24 - 020013
020302	Criticality Safety Job Specific Orientation- Manager/Engineer (JSO)	24 - 020302
F-7		
*****	Board Certification - Criticality Safety Representative	24 - *****
CATEGORY G 29 CFR (OSHA) & WAC 296-65 (WISHA) TRAINING		
G-1		
003035 SWM AND WRAP 1 ONLY	Lock & Tag - Authorized Worker (As required by training needs analysis) (29 CFR 1910.147) (For WRAP 1 003035 or 450800 meet this requirement.)	12 - 003036
003036 SWM AND WRAP 1 ONLY	Lock & Tag Refresher (29 CFR 1910.147)	12 - 003036
450800 T PLANT ONLY	Lock and Tag T Plant (29 CFR 1910.147) (As required by training needs analysis)	12 - 450800
G-2		
004005	Managers' Safety Training	12 - 004005
G-3		
020107	Behavior Based Safety Training (Fed Reg Vol 54 No. 16)	N/A
G-4		
02006L	Asbestos Control (29 CFR 1910.1001) (As required by training needs analysis) (Qualifies support personnel to enter an Asbestos-Regulated Area for support purposes only. Not needed if the 170055 or 170060 course has been taken)	12 - 02006L
G-5		
170055	QTRC - Certified Asbestos Worker (WAC 296-65) (As required by training needs analysis)	12 - 170057
170057 INSULATOR ONLY	QTRC - Certified Asbestos Worker Requalification (WAC 296-65)	12 - 170057
G-6		
170060	Asbestos Supervisor - QTRC (Cert)	12 - 170062
170062	Asbestos Requal - QTRC (As required by training needs analysis)	12 - 170062
(Required for any manager, team leader, or PIC who supervises any support personnel who enter an Asbestos-Regulated Area) (WAC 296-65)		

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY G 29 CFR (OSHA) & WAC 296-65 (WISHA) TRAINING (continued)	RETRAINING (months)
G-7 (TRU Retrieval Program Only)		
031220	40-Hour Hazardous Waste Operations Training (For waste remediation sites; i.e. the TRU Retrieval program. Training is required according to job assignment).	12 - 032020 (See Cat. B)
031230	16-Hour Hazardous Waste Operations Upgrade Training (Upgrade from 24 hour to 40 hour training) (As required)	N/A
031410	1-Day Waste Site Field Experience (course taken addition to 24-hour RCRA TSD Hazardous Waste, course 031110, if working on a non-TSD project)	
031420	3-Day Waste Site Field Experience (For anyone who takes the 40-Hour training and who goes into an waste site area unescorted.)	N/A
G-8		
044480	Medium Risk Electrical Safety (For instrument specialists. Dependent on job assignment, may be required to take course 043870 instead.)	36 - 044480
043870	High Risk Electrical Safety (Required for electricians and electrical team leaders/managers.)	36 - 043875
G-9		
020130	Confined Space Entry (As required by training needs analysis)(29 CFR 1910.146)	24 - 020130
020140	Fall Protection & Retrieval Devices (For anyone who uses fall protection equipment and as required by training needs analysis. A HEHF medical clearance is required for entry to this course.)(29 CFR 1910.66)	N/A
170500	Medic First Aid(As required by training needs analysis)(29 CFR 1910.120)	24 - 170500
170648	Bloodborne Pathogens - SPT (29 CFR 1910.1030) (Required for RCTs only)	12 - 170651
170651	Bloodborne Pathogens Update (29 CFR 1910.1030)	12 - 170651
170656	QTRC - Hands on Fire Extinguisher Training (29 CFR 1910.157) (As required by training needs analysis.)	12 - 170656
CATEGORY H 49 CFR (DOT) TRAINING		
H-1		
020075	Hazardous Material General Awareness Training	24 - 020075
020076	Hazardous Material Driver's Training (Truck Drivers only)	24 - 020076
050410	Vehicle Inspection/Load Tie-Down Securement for Driver's Training (Truck Drivers only)	N/A
H-2:		
NOTE: (1) The following courses are the non-RCRA requirements for becoming a certified hazardous material shipper (also see Category E for RCRA requirements). Non-shipper personnel may be required to take some or all of the following courses as specified in their training needs analysis. (2) Retraining for the below listed course is not required if courses specified in H-3 are completed.		
020059	Basic RAM Shipment Awareness - Module 3 (Must have taken course 020064 first) FOR RADIOACTIVE OR MIXED WASTE SHIPPERS.	24 - 020059
020064	Basic Dept of Trans Haz Mat Regs Awareness - Module 1 (Prerequisite for 020059, 020069, & 020159)	24 - 020064
020068	Basic Hazardous Material Training - Module 2	24 - 020068

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Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY H 49 CFR (DOT) TRAINING (continued)	RETRAINING (months)
H-3		
020069	Radioactive material Shipment Certification - Advanced Module 3 (Required for those who sign RSRs)	24 - 020069
020159	Hazardous Waste Shipper Certification - Advanced Module 2 (Required for those who sign HMSRs)	24 - 020159
CATEGORY I OPERATIONS TRAINING		
I-1		
080820	Safe/Drug-Free Workplace (Managers only)	24 - 080820
080910	Equal Employment Opportunity (Managers only)	N/A
080969	New Manager Orientation/EEO 2000 (Managers only)	N/A
REQUIRED FOR NEW MANAGERS/TEAM LEADERS HIRED AFTER 07/93.		
***** SWM Only	Support Manager/Tech Staff Checklist (As required by training needs analysis.)(Not required for operations Managers/Team Leaders)	N/A
451420 T Plant only	Manager/Tech Staff Checklist	12 - 451420
306700 WRAP 1 only	WRAP 1 Technical Staff Training	12 - 306700
I-2		
081050	Managing People, The Art of Leadership	N/A
061950	Manager Fundamentals Training	N/A
I-3		
044470	Fork Truck Operator Training (As required by training needs analysis)	36 - 041890
041890	Fork Truck Operator Regualification	36 - 041890
I-4		
040784	Basic Crane & Rigging (As required by training needs analysis)	36 - 040788
040788	Basic Crane & Rigging Regualification	36 - 040788
I-5		
065911	NPO Mathematics	N/A
065912	NPO Chemistry	N/A
065914	NPO Electrical Theory	N/A
065915	NPO Instrumentation	N/A
065917	NPO Mechanical Fundamentals	N/A
I-6		
451410 T PLANT ONLY	T Plant Operational Safety Requirements	N/A

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY J MAINTENANCE TRAINING	RETRAINING (months)
J-1		
301730 SWM AND WRAP 1 ONLY	Solid Waste Job-Specific JCS (For WRAP 1, 301730 or 450500 satisfy this requirement). Required for Solid Waste employees working in operations, engineering, or work control areas directly in support of a facility. (May have taken course 010108 in place of this course)	N/A
450500 T PLANT ONLY	T Plant Work Control/JCS Required for T Plant employees working in operations, engineering, or work control areas directly in support of a facility. (May have taken course 010108 in place of this course)	N/A
J-2		
035065	PCB Awareness (Required for electricians only) (40 CFR 761)	N/A
459001	Maintenance Training System Overview (As required by training needs analysis)	N/A
452202	T Plant Circuit Breakers (As required by training needs analysis)	N/A
452210	T Plant Hoists and Cranes (Electrical) (As required by training needs analysis)	N/A
452217	Maintenance of 2706-T Ventilation and Exhaust Equipment (As required by training needs analysis)	N/A
452225	Maintenance of 271-T Air Supply Fan (As required by training needs analysis)	N/A
J-3		
300550	PIC Training--for Solid Waste employees	N/A
450550	PIC Training--for T Plant employees	N/A
306550	WRAP 1 PIC Training--for WRAP 1 employees	N/A
J-4		
020089	Defensive Driving Course	24 - 020089
042730	Flagging and Traffic Control	36 - 042730
043220	Load Securing for Transport	36 - 043220
J-5		
042720	Aerial Lifts (As required by training needs analysis)	36 - 043920
043920	Aerial Lifts Operator Requalification	36 - 043920
J-6		
042590	Pressure Relief Valves	24 - 042590
459001	Maintenance Training System Overview (As required by training needs analysis)	N/A
J-7		
042820	Wire Rope/Rigging Hardware Inspection	36 - 042822
J-8		
042830	Overhead Crane Mechanical	36 - 042830

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY J MAINTENANCE TRAINING (continued)	RETRAINING (months)
J-9		
459001	Maintenance Training System Overview - Instrument (As required by training needs analysis)	N/A
451800	Radiation Detection Fundamentals (As required by training needs analysis)	N/A
451801	Eberline Alpha Continuous Air Monitor (As required by training needs analysis)	N/A
451802	Eberline models AMS-3 and AMS-3A beta air monitor (As required by training needs analysis)	N/A
451803	Eberline PCM-1B portal monitors (As required by training needs analysis)	N/A
451804	Eberline PM-6A portal monitors (As required by training needs analysis)	N/A
451805	Eberline RMS-II Radiation Monitor (As required by training needs analysis)	N/A
451808	Honeywell UDC 5000 Differential Temperature Controller (As required by training needs analysis)	N/A
451810	Kurz Flow Controller (As required by training needs analysis)	N/A
451816	Chino Programmable Recorder (As required by training needs analysis)	N/A
451819	Kent 100 Programmable Recorder (As required by training needs analysis)	N/A
306535	EG&G Alpha/Beta Stack (As required by training needs analysis)	24 - 306535
042370	Eberline Beta Cam (As required by training needs analysis)	24 - 042370
042670	Eberline PCM-1B (As required by training needs analysis)	24 - 042670
J-10		
459001	Maintenance Training System Overview - Millwright (As required by training needs analysis)	N/A
452101	Pump Theory and Maintenance (As required by training needs analysis)	N/A
J-11		
306545	WRAP 1 Hydraulic Safety (As required by training needs analysis)	24 - 306545
COURSE NUMBER	CATEGORY K OTHER EMPLOYEE TRAINING	RETRAINING (months)
K-1		
000079	Comprehensive Security Briefing Required for badge levels 2 or 3	12 - 000080
000080	Security Refresher Briefing Required for badge levels 2 or 3	12 - 000080
305100	Solid Waste Disposal Operations Administration Conduct of Operations (Facility personnel only)	N/A

Table 3. Non-RCRA Required Training.

COURSE NUMBER	CATEGORY K OTHER EMPLOYEE TRAINING (continued)	RETRAINING (months)
K-2		
000390	On-the-Job Training Workshop (As required by training needs analysis)	N/A
000397	On-the-Job Evaluator Trainer (As required by training needs analysis)	N/A
K-3		
001000	Manager Conduct of Operations (DOE Order 5480.19) May have taken course number 001002 in place of this class	N/A
K-4		
02006J	EPCRA 312 REPORTING REQUIREMENTS (Previously called SARA) (40 CFR 370)	12 - 02006J
02006K	EPCRA 313 TOXIC CHEMICAL RELEASE REPORTING (Previously called SARA) (40 CFR 372)	12 - 02006K
K-5		
037500	Building Warden Training	12 - 037510
K-6		
170002	QTRC - Risk Evaluation	N/A
K-7		
170015	Root Cause Basics	N/A
170026*	Root Cause Techniques Workshop (As required by training needs analysis)(Required for employees who perform root cause analysis for PPG values \geq 25. Optional for Corrective Action Evaluation Group)	N/A
170027*	Root Cause Mini-Mort Workshop (As required by training needs analysis)	N/A
K-8		
170011	Train the Trainer (or equivalent level of training)	N/A
K-9		
170600	AHERA Management Planner	12 - 170600
170610	AHERA Building Inspector Required for engineers who manage asbestos within SWD facilities (40 CFR Part 61, WAC 296-62-077)	12 - 170610
K-10		
170640	Introduction to Occurrence Reporting (DOE Order 5000.3B)	N/A
K-11		
170642	Occurrence Report Writing (DOE Order 5000.3B)	N/A
K-12		
300970	SWD USQ Evaluator (DOE Order 5480.21) (As required by training needs analysis)	24 - 300970

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COURSE NUMBER	SWD VISITOR OR VENDOR	RETRAINING (months)
Print Name _____		Date _____
RADIATION TRAINING		
• 020001	Radiation Worker Training - Initial <small>In accordance with: 10 CFR Part 835.902</small>	24 - 020003
RCRA TRAINING		
000090	Visitor/vendor Training	N/A
• 031110	24-Hour RCRA TSD Hazardous Waste <small>In accordance with: 29 CFR 1910.120</small>	12 - 032020
FACILITY ORIENTATION		
300700 <small>SWM ONLY</small>	Solid Waste Operations Facility Orientation	24 - 300700
450700 <small>T PLANT ONLY</small>	Facility Orientation - T Plant	24 - 450700
306750 <small>WRAP 1 ONLY</small>	WRAP 1 Facility Orientation (including Haz. Comm. and BEP)	12 - 306750
• As required by job		
Job Description:		
<p>All hazardous waste and radiation worker training has been met or equivalent classes have been taken, if working in facility area containing radioactive or hazardous materials. Facility orientation will be taken unless escorted by an employee certified in this area.</p>		
<p><u>Visitor or Vender Signature</u></p>		
<p><u>NOTE: This data needs to be turned into Facility Operations Manager before initiating work.</u></p>		
<p><u>Operations Manager</u></p>		
<p><u>ECO (T Plant only)</u></p>		

NOTE: Craft-specific training is conducted in accordance with the applicable requirements of parent company. However, crane operators must be certified to the requirements of the Hanford Hoisting and Rigging Manual and have evidence of their certification.

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EXHIBIT - 3

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APPENDIX 11A

RANDOM NUMBERS TABLE

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Table APP 11A-1. Random Numbers Table.* (sheet 1 of 2)

Location	X (1,13)	Y (1,11)
East loading pad	5	2
	4	8
	1	4
	3	5
	8	10
	5	6
	13	4
	7	3
	10	1
Location	X (1,9)	Y (1,13)
North loading pad	4	8
	2	12
	7	1
	1	11
	5	5
	3	5
	1	10
	8	7
	5	13

*Random numbers generated on Lotus 123. Lotus 123 is a Registered Trademark of the Lotus Development Corporation.

Table APP 11A-1. Random Numbers Table.* (sheet 2 of 2)

Location	X	Y
<u>Packaging, sampling, and receiving area sumps and trenches</u>		
Packaging materials handling equipment area sump	2	2
Packaging/sampling room sump	3	2
Receiving area trench	1	18
<u>Cell trenches</u>		
Caustic cell	1	2
Oxidizer cell	1	13
Combustible cell	1	16
Acid cell	1	3
Flammable 1A cell	1	14
Flammable 1B Cell	1	9
<u>Walkway trenches</u>		
Caustic/oxidizer	1	5
Combustible/acid	1	15
Flammable 1B/1A	1	9
<u>Loading pad trenches</u>		
East pad trench	1	25
North pad trench	1	16

*Random numbers generated on Lotus 123. Lotus 123 is a Registered Trademark of the Lotus Development Corporation.

APPENDIX 11B

DESCRIPTION OF PROCEDURES

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APPENDIX 11B

Refer to Attachment 10 of Hanford Facility RCRA Permit (Ecology 1994).

The specific sections of Attachment 10 which are incorporated into the Permit are listed as follows by procedure. No part of Attachment 10 shall supersede any part of Attachment 8.

Number	Procedure	Pages	Sections
11B-1	Preparing Health and Safety Plan	1-4	1.0, 2.0, 3.0, 4.2, 5.0, 5.1, 5.2, 6.0, 6.1, 6.2
11B-2	Decontaminating Sampling Equipment	23-24	1.0, 2.0, 3.0, 5.2, 5.3, 6.1, 6.2, 6.3
11B-3	Evaluating Data	25-26, 28-29	1.0, 2.0, 3.0, 4.7, 5.0
11B-4	Packaging Samples	32-35	1.0, 4.0, 4.1, 5.0, 5.1, 5.2
11B-5	Soil and Sediment Sample Containers	6-11	1.0, 3.0, 4.2, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8
11B-6	Ensuring Quality Control of Records and Documentation	70-77	1.0, 3.0, 4.0, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.0, 6.2, 6.3, 6.4, 6.5, 6.6
11B-7	Maintaining a Field Logbook	44-48	1.0, 3.0, 5.0, 5.1, 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 6.0, 6.1, 6.2, 7.0
11B-8	Chain-of-Custody	39-43	1.0, 3.0, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, 5.0, 6.0, 6.1, 6.2, 6.3, 6.4, 6.5, 6.7
11B-9	Controlling Unknown Suspected Waste	49-59	1.0, 3.0, 4.1, 4.2, 4.3, 4.4, 4.5, 5.0, 5.1, 5.2, 6.0, 6.1, 6.2, 6.3, 6.4, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11
11B-10	Deviating from Procedures Used During Closure	60-64	1.0, 2.0, 4.0, 4.2, 5.0, 5.1, 5.2, 5.2.1, 5.2.2, 5.3

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