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ADDENDUM F
PREPAREDNESS AND PREVENTION

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ADDENDUM F
PREPAREDNESS AND PREVENTION

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1 **F PREPAREDNESS AND PREVENTION**

2 **F.1 Preparedness and Prevention Requirements**

3 The following section documents the preparedness and prevention measures taken at the 325 HWTUs.

4 **F.1.1 Equipment Requirements**

5 The following sections describe the internal and external communications and emergency equipment in
6 use at the 325 HWTUs.

7 **F.1.1.1 Internal Communications**

8 Internal communication systems are used to provide immediate emergency instruction to personnel in the
9 325 HWTUs. Internal communications address general emergencies that might occur in the 300 Area and
10 the 325 Building, as well as specific emergencies that might occur. Personnel have access to these
11 internal communication devices whenever waste is handled.

12 Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside
13 of the 325 HWTUs that could impact operations and personnel. Fire alarm signals are located in each
14 building throughout the 300 Area. The nearest emergency siren for 'area evacuation' and 'take cover' is
15 located approximately 46 meters northwest of the 325 Building on top of the 326 Building and is audible
16 in all parts of the 325 Building. Numerous criticality howlers (horns) are located throughout the
17 325 Building and are audible in all parts of the building.

18 Internal communications to provide emergency instruction in the event of an emergency in the
19 325 HWTUs and in the 325 Building are listed below:

- 20 • Fire alarms
- 21 • Differential pressure alarms (for the SAL)
- 22 • Differential pressure alarm in the glove box in Room 528
- 23 • Leak detection alarms (for the SAL)
- 24 • Building-wide public address (PA) system
- 25 • Intercom system (for the SAL)
- 26 • Telephones

27 The fire alarms are used to provide notification for immediate evacuation of the 325 Building. The fire
28 alarms are initiated on activation of the manual pull boxes, heat detectors, and the sprinkler system. Fire
29 alarm pull boxes are located as indicated in Figures F.1 through F.3. Air monitoring systems with alarms
30 are located in the 325 HWTUs. The PA system is used for building wide broadcasting of verbal
31 emergency instructions to 325 Building personnel. The telephone system is used to provide verbal
32 emergency instructions to 325 HWTUs personnel. The telephones can also be used to transmit verbally
33 emergency information to personnel outside of the 325 HWTUs and to request emergency services. A
34 network of telephones is provided throughout the 325 Building. Locations of telephones within the
35 325 HWTUs are shown in Figures F.1 through F.3. In addition to the telephone communication system,
36 personnel have access to hand-held radios. The radios are available from the Building Manager. All of
37 the radios transmit at the same frequency and are capable of summoning the PNNL Single Point Contact
38 in case of an emergency.

39 **Hazardous Waste Treatment Unit**

40 There are two fire alarm pull boxes near the HWTU; one is located in the hall north of the entrance to
41 Room 528, and one is in the hallway just east of the south entrance to Room 520. Rooms 520 and 528 are
42 equipped with smoke detectors that, upon activation, initiate the fire alarm system and close dampers
43 between the two rooms and the corridor. Heat detectors are provided in the glove box in Room 528.
44 There are two fire alarm bells just outside the HWTU. These fire alarm bells are located north of the
45 entrance to Room 528 in the hall and east of the south entrance to Room 520 in the hall.

1 Additionally, a fire alarm strobe is installed in Room 528. The locations of the fire pull boxes are shown
2 in Figure F.1.

3 The glove box in Room 528 is equipped with a differential air pressure alarm that monitors the glove box
4 for loss of negative pressure. If a loss occurs, a local alarm is sounded.

5 The PA system speakers are located in Rooms 520 and 528.

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7 There are four fire alarm pull boxes provided in the SAL; three are in Room 201, and one in Room 203.
8 Additionally, a fire alarm pull box is located just outside of Room 32. Heat detectors are provided in the
9 six large interconnected hot cells in the SAL. Several fire alarm bells are located throughout the
10 325 Building, including two fire alarm bells within the SAL (one each in Rooms 201 and 203). These
11 alarms are audible at all locations within the SAL.

12 The six interconnected hot cells in the SAL are equipped with a differential air pressure alarm that
13 monitors the hot cells for loss of negative pressure. If a loss occurs, a local alarm is sounded.

14 A cable leak detection system is installed in Room 200. The cable runs behind the back wall of all six hot
15 cells. Liquid escaping from the hot cells on the rear face (Room 200) would contact the cable and
16 automatically sound an alarm device in Room 201. This conductivity cable runs from the hot cells to the
17 secondary containment pan for the SAL tank in Room 32. Any release of the tank system contents to this
18 pan, which contacts the cable, initiates the cable leak detection alarm.

19 The SAL tank is equipped with a conductivity probe for leak detection within the annulus of this double-
20 shelled tank. The tank also is equipped with a high-liquid-level alarm. In the event of an interstitial leak
21 or overfilling, audible alarms sound at the SAL tank's main control panel in Room 201.

22 The PA system speakers are located in Rooms 200, 201, and 203. An intercommunication system
23 supplies two-way voice communications between Rooms 32, 200, 201, and 201a.

24 **F.1.1.2 External Communications**

25 As mentioned in Section F.1.1.1, a fire alarm system and telephone network system are in place at the
26 325 HWTUs. Both systems can be used to summon emergency assistance. The fire alarm system
27 summons direct response from the Hanford Fire Department. The telephone system can be used to access
28 the PNNL Single Point Contact directly by dialing 375-2400 or by dialing the emergency number 911
29 from office phones 373-0911 from cellular phones. For USDOE-RL and other non-PNNL contractor
30 personnel dialing 911 from office phones 373-0911 from cellular phones from onsite phones, the call goes
31 directly to the Hanford Patrol, which calls the PNNL Single Point Contact. Locations of fire alarm pull
32 boxes and telephones are provided in Figures F.1 through F.3. Personnel on the premises have access to
33 these external communication devices.

34 **F.1.1.3 Emergency Equipment**

35 Emergency equipment available for trained 325 HWTUs personnel includes portable fire extinguishers, a
36 fire suppression system, spill response equipment, and decontamination equipment.

37 With the exception of the hot cells, the entire building also is equipped with automatic sprinkler
38 protection consisting of Schedule 40 steel pipe per ASTM A120 (ASTM 1991) and 150-pound malleable
39 iron fittings per ANSI B16.3 (ANSI 1992). All components are UL-listed or FM-approved. The fire
40 sprinkler system was designed and installed in accordance with NFPA 13 for 'ordinary hazard'
41 (NFPA 1996).

42 Absorbent pillows are capable of absorbing small quantities of spilled inorganic and organic liquids and
43 can be used to contain temporarily any spills of these materials. Their rated absorption capacities range
44 from 250 to 4,000 milliliters.

45 Mercury spill kits are capable of cleaning up to 25 milliliter of spilled mercury. Acid, caustic, and solvent

1 spill kits contain the materials necessary to clean up small spills of acids, bases, and organic solvents.
2 The absorbent kits in the SAL contain absorbent pads and other materials needed to temporarily contain
3 and clean up small chemical spills.

4 The appropriate spill kits can be applied, respectively, to small acid and base spills for neutralization
5 during cleanup efforts. The caustic neutralizer has similar capabilities for neutralizing small quantities of
6 spilled bases.

7 Hazardous Waste Treatment Unit

8 Two portable 4.5 kilogram ABC fire extinguishers are available adjacent to the HWTU as shown in
9 Figure F.1. The portable fire extinguishers are located in the hall outside the entrance to Room 524 and in
10 the hall south of the south entrance to Room 520.

11 For chemical contamination needs, an emergency shower is located in the hall outside the entrance to
12 Room 524 (Figure F.2). Emergency eyewashes are located in Rooms 520 and 528. Any contaminated
13 water will be contained and cleaned up in accordance with the Addendum J, Contingency Plan.

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15 Four 9.0-kilogram ABC portable fire extinguishers are located in the SAL. A portable fire extinguisher is
16 located in Room 201 and Rooms 200 and 203 each have one portable fire extinguisher. The fourth is
17 located just outside Room 32. Additionally, ABC dry chemical fire extinguishers are provided for each of
18 the six large interconnected hot cells in Room 201. These extinguishers are mounted on the outside of
19 each cell with the distribution system within the cells. The cell manipulator arms are used to direct the
20 discharge at a fire within the cell.

21 Two emergency eye wash/showers are located in Rooms 200 and 201 (Figure F.2). Any contaminated
22 water will be contained and cleaned up in accordance with Addendum J, Contingency Plan.

23 **F.1.1.4 Water for Fire Control**

24 The five water pipelines that service the 325 Building for fire protection supply adequate water volume
25 and pressure. Each of these lines is 15.2 centimeters in diameter.

26 Three fire hydrants are located in immediate proximity to the 325 Building; one is approximately
27 30.4 meters east of the southeast corner of the 325 Building; one is approximately 21.3 meters directly
28 north of the northwest corner of the 325 Building, and one is 33.5 meters west of the southwest corner of
29 the 325 Building.

30 **F.1.2 Aisle Space Requirements**

31 Aisle spacing is sufficient to allow the movement of personnel and fire protection equipment in and
32 around the containers. This storage arrangement also meets the requirements of the National Fire
33 Protection Association and the Life Safety Code (NFPA 1994) for the protection of personnel and the
34 environment. A minimum 76.0-centimeter aisle space is maintained between rows of containers as
35 required by [WAC 173-303-630\(5\)\(c\)](#).

36 **F.2 Preventive Procedures, Structures, and Equipment**

37 The following sections describe preventive procedures, structures, and equipment.

38 **F.2.1 Unloading Operations**

39 Procedures have been developed to prevent hazards and to minimize the potential for breakage, punctures,
40 or the accidental opening of containers during the transfer of waste to the 325 HWTUs. All waste is
41 inspected before acceptance to ensure that the waste is in appropriate containers and that the containers
42 are in good condition. Inspection of containers before acceptance minimizes the potential for spills
43 during unloading operations. The potential for spills during waste handling also is minimized using
44 appropriate container handling equipment; small waste items can be unloaded by hand.

1 The volumes of dangerous waste entering and exiting the SAL are in relatively small containers
2 (Addendum C, Process Information) and, have secondary containment because of the packaging
3 requirements for the mixed waste materials. Any spill from such containers will be contained and not
4 released to the environment.

5 **F.2.2 Run-off**

6 The 325 HWTU and SAL were designed to eliminate the likelihood of waste migration via run-off.
7 Because the 325 HWTUs are enclosed completely (i.e., complete roof and no open walls), run-off of
8 precipitation is not a factor. The following paragraphs address additional design features provided to
9 eliminate the likelihood of run-off.

10 **Hazardous Waste Treatment Unit**

11 The concrete floor in Rooms 520 and 528 of the HWTU is provided with a chemical resistant
12 polypropylene coating. The coating covers the entire floor and extends approximately 10 centimeters up
13 on each perimeter wall in each room. The rooms also are provided with floor drains and floor trenches at
14 each entrance. The trenches and floor drains flow into the firewater containment tank located in the
15 basement of the 325 Building. The management of any mixed waste that might accumulate in the tank
16 because of a fire is discussed in Addendum C, Process Information.

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18 The secondary containment in the SAL is divided into three systems based on three designated areas of
19 the SAL. These areas are the six large, interconnected hot cells, the front face (Room 201), and the back
20 face (Rooms 200, 202, and 203).

21 The secondary containment system for the six large, interconnected hot cells consists of the stainless steel
22 base of the cell. All waste requiring it is stored in secondary containment consisting of larger containers
23 (e.g. "paint cans" as noted in Addendum C, Section C.1.2.2) and/or pans/trays.

24 Typically, the use of the secondary containment system is enough to ensure that waste is safely contained.
25 If there were to be a larger scale failure of secondary containment, however, the cell base and trough
26 would collect any spilled waste within the cell. The trough drains by gravity through openings in the
27 bottom of the trough and stainless steel piping to the SAL tank.

28 Specially designed, shielded, 208-liter containers are used as the secondary containment system for the
29 back face of the SAL. The back face of the SAL is used to store mainly solid mixed waste in cans, which
30 are packed in the containers. Any liquids stored here are placed in compatible secondary containment.

31 The secondary containment system for the front face of the SAL, which is only used minimally to store
32 mixed waste, consists of the same practice of using the plastic, pan type containers described previously.

33 The secondary containment system for the HWTU and SAL is described in detail in Addendum C.

34 **F.2.3 Water Supplies**

35 The 325 Building is designed and operated to contain safely waste and to prevent any contamination of
36 water supplies. The secondary containment systems, described in Addendum C, prevent releases to the
37 environment and infiltration of waste that could contaminate groundwater. The containment systems also
38 prevent waste run-off that could contaminate surface water. The nearest water supply is the 300 Area
39 water intake located on the Columbia River, which is less than 0.8 kilometers from the 325 HWTUs.

40 **F.2.4 Equipment and Power Failure**

41 The 325 Building is provided with an emergency power system that initiates upon failure of the primary
42 power system, thereby minimizing the likelihood of the release of dangerous waste or mixed waste during
43 a power failure or equipment failure. The 325 HWTUs have emergency lighting systems that operate
44 automatically during power failure incidents. For actions to be taken in the event of power failure to unit
45 systems or equipment, refer to Addendum J, Contingency Plan.

1 **F.2.5 Personal Protection Equipment**

2 Protective clothing and equipment are provided to employees during normal and emergency operations.
3 Protection levels for emergencies are determined either in consultation with an industrial hygienist, or
4 applicable control work permits or applicable operating procedure.

5 Per the identified work requirements, protective clothing and equipment is available for all staff working
6 at the SAL. Protective clothing and equipment available at the SAL include, but are not limited to, the
7 following:

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- 9 • Safety glasses (Room 201)
- 10 • Chemical protective suits (Rooms 200 and 201) (part of absorbent kits)
- 11 • Goggles (Rooms 200 and 201) (part of absorbent kits)
- 12 • Gloves (Rooms 200 and 201) (part of absorbent kits).

13 Storage and treatment of dangerous waste can occur in Room 520, 524, and 528 of the HWTU. Personal
14 protective equipment is required for personnel working these areas of the HWTU. Protective clothing and
15 equipment available at the HWTU include, but are not limited to, the following:

16 Hazardous Waste Treatment Unit

- 17 • Laboratory coats (325 Building – men’s/women’s change room)
- 18 • Shoe covers (325 Building – men’s/women’s change room)
- 19 • Surgeon gloves (Rooms 520, 524 and 528)
- 20 • Chemical resistant gloves (Rooms 520, 524 and 528)
- 21 • Chemical resistant aprons (Rooms 520, 524 and 528)
- 22 • Face shields (Rooms 520, 524 and 528)
- 23 • Hard hats (Room 528)
- 24 • Safety glasses (Rooms 520, 524 and 528).

25 The protective equipment storage areas are well stocked at all times. This equipment is replaced
26 periodically as it is used. The above inventory reflects each type of personal protective equipment that
27 typically is present at the 325 HWTUs. Additional personal protective equipment can be obtained, as
28 needed, from storage locations and sources outside of the 325 HWTUs. These areas include the personal
29 protective equipment storage area in the 700 hall men’s and women’s change rooms, Room 529, and the
30 men’s and women’s change rooms in the south end (first floor) of the 325 Building. This personal
31 protective equipment also can be obtained from onsite suppliers for the 325 HWTUs.

32 Respiratory protective equipment (air purifying, full-face/negative pressure respirators) that can be used
33 by personnel is managed by the 325 Building Manager and must be checked out. This equipment is
34 stored within the 325 Building. In addition, the 700 hall men’s and women’s change rooms normally
35 contain a one-week supply of coveralls, laboratory coats, hoods, skull caps, cloth shoe covers, rubber shoe
36 covers, and gloves (canvas, surgeons, and cannery).

37 **F.3 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste**

38 The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

39 **F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste**

40 The 325 HWTUs are used to store a variety of ignitable waste. Precautions to prevent ignition of
41 ignitable waste involve separation of waste from sources of ignition and use of procedures to minimize
42 the potential for accidental ignition. There are no routine sources of ignition or open flame in the
43 325 HWTUs. Work with ignition or heat sources, if required, is limited and controlled in the following
44 ways by management and is performed in compliance with internal requirements for elimination of

1 ignition sources.

- 2 • Use of open flame equipment when working with flammable liquids is prohibited.
- 3 • Smoking is prohibited around flammable liquids (no smoking is allowed in the 325 Building).
- 4 • Electrical equipment used in flammable or explosive atmospheres is required to comply with the
5 National Electrical Code, NFPA 70.
- 6 • Use of equipment with automatic, adjustable temperature controls and high temperature limit
7 switches is required to prevent overheating.
- 8 • Placement of flammable liquids on hot surfaces is prohibited.
- 9 • All static electricity sources require grounding in areas where ignitable vapors might be present.
- 10 • Bonding of conductive containers is required when transferring flammable liquids.
- 11 • Use of non-sparking tools is required in flammable waste storage areas.

12 All maintenance or modifications in the 325 HWTUs that require work with ignition sources must receive
13 prior approval by a safety engineer. This approval is documented in the Hanford Facility Operating
14 Record, 325 HWTUs File. Smoking is not allowed in the 325 Building at any time, and the interior and
15 exterior of the building are clearly posted with 'No Smoking' signs. Waste storage areas are not heated by
16 any radiant heat source. All tools used to open ignitable waste containers are constructed of non-sparking
17 materials.

18 A fire safety engineer familiar with the Uniform Fire Code inspects ignitable waste storage areas
19 annually. This inspection is documented in the Hanford Facility Operating Record, 325 HWTUs File.
20 There also are storage restrictions at the 325 HWTUs for combustible waste as part of fire safety
21 requirements. The storage restrictions defined in the Uniform Building Code for Class B Occupancy
22 apply to the 325 Building (ICBO 1991).

23 **F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible** 24 **Waste**

25 As described in Section F.3.1, ignitable waste is managed to protect the waste from sources of ignition or
26 open flame. Ignitable waste containers are maintained in good condition and inspected weekly to
27 minimize the potential for releases that could result in fire. Containers of ignitable waste are protected
28 from high temperatures to prevent the potential for pressurization and buildup of ignitable vapors.
29 Containers of ignitable waste are stored in flammable material storage cabinets within waste storage areas
30 (Addendum C). Limitations on sizes of containers and amount of storage in cabinets are discussed in
31 Addendum C.

32 Small quantities of reactive waste are accepted for storage in the 325 HWTUs. Information on all
33 reactive and other waste accepted by the HWTU and SAL is documented on a waste tracking form, which
34 is reviewed carefully by personnel before accepting the waste. This form contains information on the
35 unique handling requirements of the waste. Any reactive waste requiring special handling and storage to
36 prevent unwanted reactions is appropriately packaged before arriving at the 325 HWTUs. This packaging
37 safeguards against reactions resulting from air or water contact, shock, and other causes. Reactive waste
38 is handled and stored in a manner commensurate with the specific reaction hazards posed by the waste.
39 This includes segregating the waste from other waste and reagent chemicals with which the waste
40 potentially could react.

41 Because a wide variety of waste can be accepted at the 325 HWTUs, the potential exists for storage of
42 incompatible waste. Mixing of incompatible waste is prevented through waste segregation and storage
43 procedures. Chemical waste stored in the 325 HWTUs is separated by compatibility and hazard class and
44 stored in separate storage areas. Separate storage shelves and cabinets are used within the storage areas
45 (Addendum C) to provide further waste segregation. Before accepting waste from generating units, waste
46 management staff determine the DOT hazard class for each waste (see Addendum B) so that waste can be
47 stored with compatible materials. The following general guidance is used to segregate and separate

1 chemicals:

- 2 • Store acids on a low storage shelf or in acid storage cabinets
- 3 • Separate acids from bases and alkaline metals such as potassium or sodium
- 4 • Separate oxidizing acids from organic acids and flammable or combustible materials
- 5 • Store bases away from acids and store solutions of inorganic hydroxides in polyethylene
- 6 containers
- 7 • Store oxidizers away from flammable or combustible materials and reducing agents such as zinc,
- 8 alkaline metals, and formic acid
- 9 • Store peroxide forming chemicals in air-tight containers in a dark, cool, and dry place (inside of
- 10 cabinets)
- 11 • Store flammable materials in approved containers or cabinets
- 12 • Separate flammable materials from oxidizing acids and oxidizers and keep them away from
- 13 sources of ignition
- 14 • Clearly mark cabinets to identify the hazards associated with their contents.

15 The potential for waste ignition or reaction at the 325 HWTUs also is minimized through storage
16 restrictions on hazardous materials quantities. The storage restrictions defined in the Uniform Building
17 Code for Class B Occupancy apply to the 325 HWTUs (ICBO 1991). The weekly inspection of the
18 325 HWTUs includes checking to see if waste inventories are below these limits. These inspections are
19 documented in the Hanford Facility Operating Record, 325 HWTUs File.

20 In the unlikely event the fire sprinkler system in Rooms 520, 524, and 528 is activated, the resulting run-
21 off will be contained in the firewater collection tank located in the basement of the 325 Building. This
22 tank is described in detail in Addendum C.

23 **F.3.3 Management of Incompatible Waste in Tank Systems**

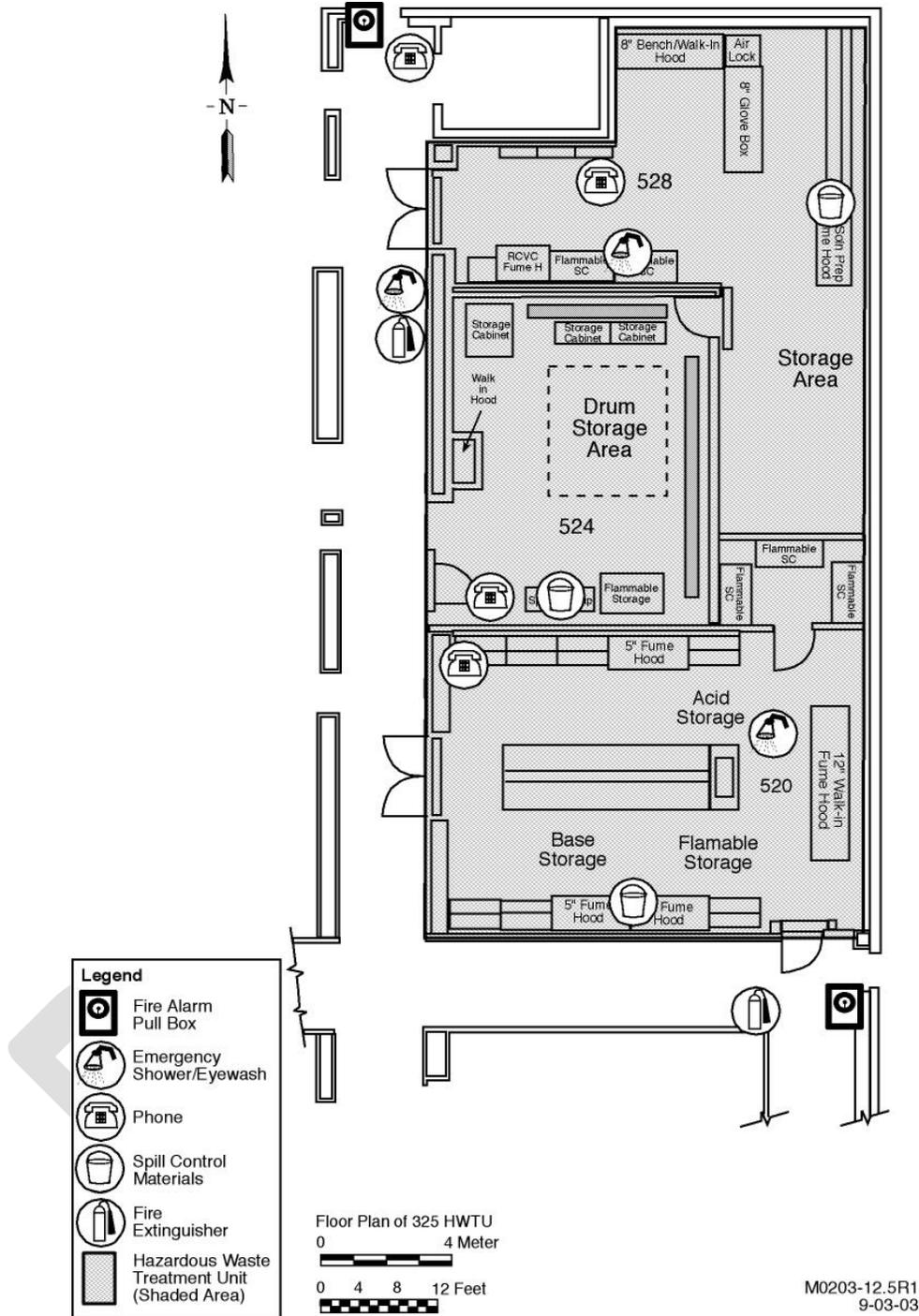
24 Waste discharged to the SAL tank from the hot cells typically consists of the same type of waste managed
25 in the hot cells. Sampling and analysis would be used if sufficient process knowledge were not available
26 to characterize the waste for waste acceptance criteria purposes. The waste is treated in the SAL tank, if
27 necessary.

28 **F.3.4 Management of Incompatible Waste in Containers or Tanks**

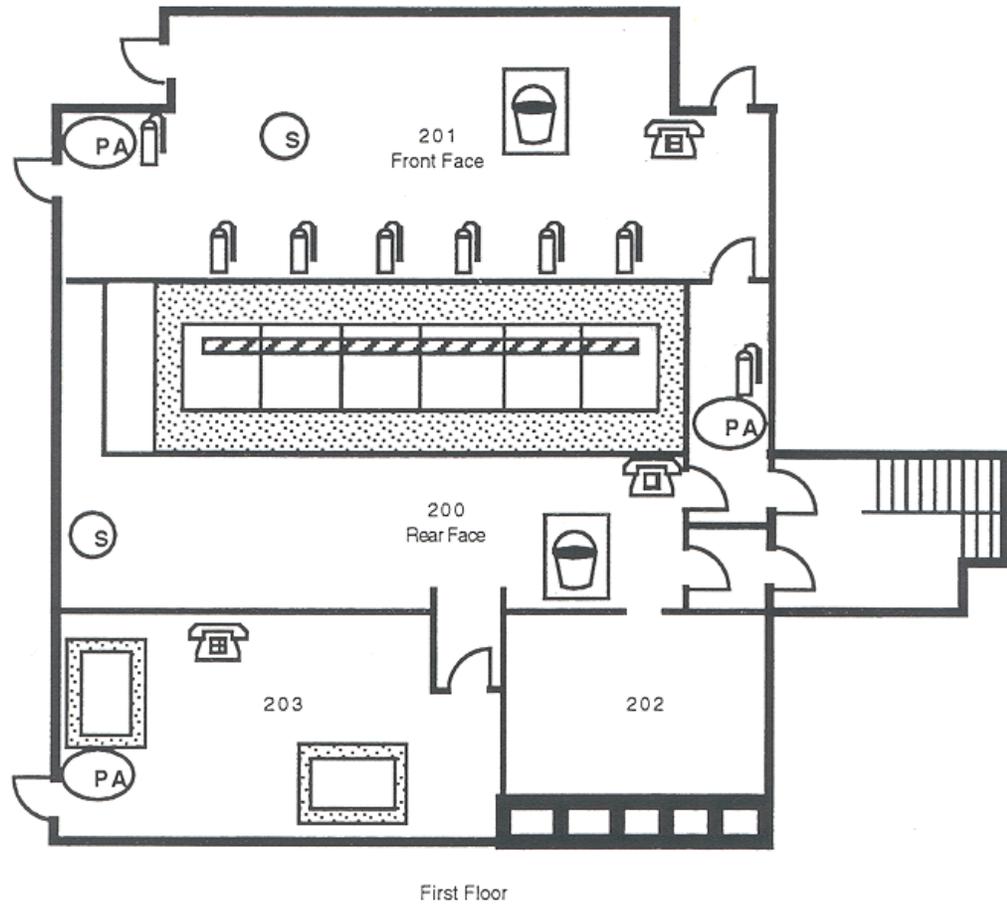
29 Incompatible waste and other materials are handled as described in Section F.3.2 and in accordance with
30 established operating methods. Storage restrictions that ensure proper separation of containers of
31 incompatible material in the 325 HWTUs are described in Section F.3.2.

32 Ignitable or reactive waste is not placed in the tank systems unless the waste has been treated, rendered, or
33 mixed so that the waste no longer meets the definition of ignitable or reactive waste under
34 [WAC 173-303-090](#).

35 Drawings of the 325 HWTUs are available to ensure that ignitable and/or reactive waste is located at least
36 15 meters from the unit's property line.



1 **Figure F.1. Locations of Emergency Equipment at the Hazardous Waste Treatment Units**
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Emergency Shower/Eyewash



Phone



Fire Alarm Pull Box



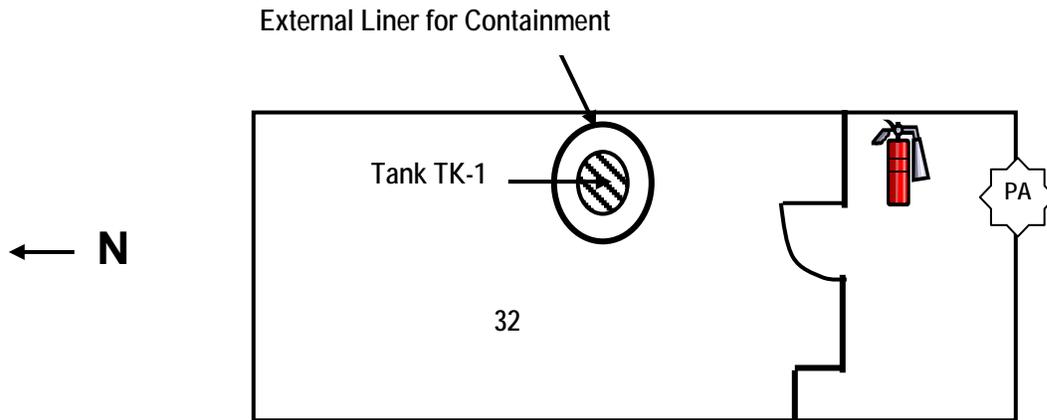
Fire Extinguisher



Spill Control Materials

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Figure F.2. Locations of Emergency Equipment at the Shielded Analytical Laboratory (First Floor)



Fire Alarm Pull Box



Fire Extinguisher

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Figure F.3. Locations of Emergency Equipment at the Shielded Analytical Laboratory (Basement)

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