

AMWTP HWMA/RCRA PERMIT  
FOR THE  
IDAHO NATIONAL LABORATORY

**ATTACHMENT 6**

Section F

PROCEDURES TO PREVENT HAZARDS

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1 **F-3 Preparedness and Prevention Requirements**

2 This section discusses the emergency preparedness and prevention measures at the  
3 MWMUs.

4 **F-3a Equipment Requirements [IDAPA 58.01.05.008 and 58.01.05.012;**  
5 **40 CFR 264.32 and 270.14(b)]**

6 The following sections describe the alarms and communications equipment, emergency  
7 equipment, fire protection systems, and water for fire control at the MWMUs. The inspection  
8 and maintenance of equipment located within a MWMU is included in Attachment 4.

9 **F-3a(1) Alarms and Communication Equipment [IDAPA 58.01.05.008; 40 CFR 264.32(a)]**

10 The MWMU buildings and the AMWTP Outside Storage Area are not continuously  
11 manned. They are locally and manually operated. The MWMU buildings are equipped with  
12 communications equipment, monitoring systems, and alarms to monitor storage conditions,  
13 operating conditions, treatment operations, and to automatically summon emergency assistance  
14 or notify personnel working in the area of emergency conditions. Alarms and parameters that are  
15 monitored include manual fire alarm pull stations, water flow alarms, low air-temperature alarm  
16 (for fire sprinkler riser room), and loss of power. Fire alarm signals are transmitted to the alarm  
17 room Fire Alarm Control Panel (FACP) and subsequently to the INL Fire Department.  
18 Notifications may then be made to ARP Balance of Plant Shift Desk/Warning Communications  
19 Center (WCC), as required, via telephone. The AMWTP Outside Storage Area is not equipped  
20 with monitoring systems, however, AMWTP personnel have access to portable radios which  
21 allows for immediate access to summon emergency assistance.

22 Additionally, the WSF, SWEPP, and WMF-636 Pad 2 allow for multiple CAM locations.  
23 A minimum of one CAM is located in the WSF, SWEPP, and WMF-636 Pad 2 when MW is  
24 present. The CAMs are equipped to provide readings of operational and alarm status, and sound  
25 an audible alarm if readings exceed pre-established setpoints. Alarms from CAM monitors are  
26 locally audible and visible.

1 **F-3a(2) Internal Communications [IDAPA 58.01.05.008; 40 CFR 264.32(a)]**

2 Telephone systems in the MWMUs other than the AMWTP Outside Storage Area  
3 provide communication service between offices, control rooms, selected process areas, the  
4 maintenance building, INL emergency services, and off-Site areas. Additional subsystems such  
5 as voice-mail, paging, intercom, portable radios, and call accounting are incorporated, as  
6 required. WMF-634, at a minimum, is equipped with a telephone in the assay and RTR control  
7 rooms. The Type I Module, Type II Modules, SWEPP, and WMF-676 are each equipped, at a  
8 minimum, with one telephone. Hand-held radios are the primary communication method  
9 routinely used during normal and emergency operations for all of the MWMUs including  
10 WMF-636 Pad 2 and the AMWTP Outside Storage Area.

11 The AMWTP fire alarm system, which serves all TSA MWMUs, is linked to the INL  
12 central fire alarm monitoring system. Any alarm condition within the AMWTP is transmitted to  
13 the alarm room. The INL Fire Department and WCC are then notified.

14 Initiating devices may include manual pull stations, area smoke and heat detectors, duct  
15 smoke detectors, sprinkler riser flow and tamper (valve position) switches, alarm cabinet door  
16 switches, environmental and radiation monitoring alarm contacts, and alarm contacts from any  
17 other extinguishing systems panels. Manual pull boxes initiate local and remote alarm signals.  
18 Control devices may include door holders, contact outputs for fan and damper control, and alarm  
19 and speaker signals.

20 An emergency notification system allows emergency communications from the AMWTP  
21 operator control stations via speakers located throughout the RWMC. The speakers are capable  
22 of broadcasting various distinct AMWTP local or global (local refers to the AMWTP control  
23 areas, while global includes all RWMC areas including the AMWTP control areas) alarm  
24 signals. The MWMUs other than the AMWTP Outside Storage Area are equipped with  
25 evacuation/voice paging speakers and manual fire alarm stations. Outdoor weatherproof  
26 evacuation/voice paging speakers are located in the vicinity of the AMWTP Outside Storage  
27 Area to provide emergency notification.

1 **F-3a(3) External Communications [IDAPA 58.01.05.008; 40 CFR 264.32(b)]**

2 External communication to summon emergency assistance is typically made via the  
3 AMWTP telephone system, vehicle two-way radios, hand-held two-way portable radios, and  
4 automatic alarms. In the event of an emergency, the organizations that may be contacted  
5 include: security personnel, the INL Fire Department, and/or the Emergency Control Center  
6 (ECC). See Attachment 7 for additional information on reporting requirements. The WCC  
7 summons by telephone any outside emergency response organizations, as requested by  
8 the AMWTP.

9 **F-3a(4) Emergency Equipment [IDAPA 58.01.05.008; 40 CFR 264.32(c)]**

10 Adequate spill control equipment, PPE, decontamination equipment, monitoring and  
11 survey equipment, and fire control equipment are available where required to respond to  
12 emergencies at the MWMUs. A list of the emergency equipment available at the MWMUs and  
13 its location is provided in Attachment 7.

14 **F-3a(5) Fire Protection System [IDAPA 58.01.05.008; 40 CFR 264.32(c)]**

15 Fire protection in the MWMUs buildings is provided through a combination of smoke  
16 detectors, remote and local alarms, automatic fire extinguishing systems (sprinklers), CO<sub>2</sub> Fire  
17 Suppression System (located on the arm of the floor-mounted manipulator), portable fire  
18 extinguishers, and MgO sand fire suppressant for potential pyrophoric radionuclides  
19 management. Manual fire alarm stations are generally located next to personnel access doors.  
20 Once a fire is detected, the alarm sounds, the building HVAC system shuts down (except WMF-  
21 676), and water is introduced through overhead piping. Once initiated, fire suppression systems  
22 are shut-off manually.

## 1 **AMWTP Waste Characterization Building**

2 The fire protection system design for WMF-634 complies with the UBC occupancy  
3 classification F-1, and Type II-N regulations. The building fire protection design is in  
4 accordance with NFPA requirements. The fire protection system for WMF-634 meets the  
5 requirements for the Type II Modules, as discussed below.

6 Additional fire protection is provided in the control rooms of WMF-634. The RTR and  
7 assay control rooms and the drum coring room utilize a water based fire suppression system. A  
8 dedicated (high pressure mist) detection and suppression system is provided in the interior of the  
9 DCSRS gloveboxes. Fire protection is provided in areas of the DCSRS ventilation system.  
10 Deluge systems, connected to the primary fire water system, are provided to the HEPA filters (final  
11 stage) and carbon absorption systems.

## 12 **Type II Modules**

13 Fire protection for the Type II Modules is provided through a combination of smoke  
14 detectors, remote and local alarms, an automatic fire extinguishing system, and portable fire  
15 extinguishers. One manual alarm station is located next to each personnel access door in the  
16 storage area and in the electrical room. The fire protection system is designed to provide  
17 approximately 0.29 gallons per minute (gpm)/ft<sup>2</sup> over a 2,600 ft<sup>2</sup> area with an approximate inside  
18 hose allowance of 100 gpm and an approximate outside hose allowance of 400 gpm. The  
19 sprinkler riser is located in the fire sprinkler riser room next to the electrical room on the exterior  
20 of the Type II Modules.

## 21 **Type I Module**

22 The Type I Module design complies with UBC occupancy classification H-7, and  
23 Type II-N regulations. The building fire protection design is in accordance with NFPA.

24 Fire protection for the Type I Module is provided through a combination of smoke  
25 detectors, remote and local alarms, two water-based automatic fire extinguishing systems, and  
26 fire extinguishers. Manual fire alarm pull stations and audible/visible alarm indication devices  
27 are installed throughout the Type I Module. Smoke detectors are located in the storage areas,

1 electrical room, and drum venting area. The fire protection room in the northwest corner of the  
2 MSA houses the sprinkler riser and valves for the Type I Module. The two sprinkler systems in  
3 the building provide full area coverage. One system protects the PAAA/WCRA and the TLA.  
4 The second system protects the remaining portions of the building, including the DVF. The  
5 systems are designed to deliver a water density of approximately 0.47 gpm/ft<sup>2</sup> over 2,500 ft<sup>2</sup> in  
6 the PAAA/WCRA and approximately 0.29 gpm/ft<sup>2</sup> over 2,600 ft<sup>2</sup> in the remaining portions of  
7 the building. Both designs include an approximate 500 gpm hose stream allowance.

### 8 **SWEPP**

9 Fire protection for the SWEPP is provided through a combination of smoke detectors,  
10 remote and local alarms, water based fire extinguishing systems, and fire extinguishers. Manual  
11 fire alarm pull stations and audible/visible alarm indication devices are installed throughout  
12 SWEPP.

13 The sprinkler system for the SWEPP building is a water-based fire suppression system.  
14 The main line of the sprinkler system runs to the center of the building and then runs the length  
15 of the building at ceiling level. Multiple branch sprinkler lines connect to the main sprinkler  
16 line, and sprinkler heads are located along the sprinkler line to provide coverage for the central  
17 areas of the building. The sprinkler system in the High Bay is designed to provide  
18 approximately 0.19 gpm/ft<sup>2</sup> over 1,500 ft<sup>2</sup>.

### 19 **WMF-636 Pad 2**

20 Fire protection for WMF-636 Pad 2 is provided through a combination of smoke  
21 detectors, remote and local alarms, automatic fire extinguishing systems (sprinklers), and  
22 portable fire extinguishers. Manual fire alarm pull stations and audible/visible alarm indication  
23 devices are installed throughout the WMF-636 Pad 2 building. The sprinkler system for  
24 WMF-636 Pad 2 is a water-based fire suppression system.

### 25 **AMWTP Outside Storage Area**

26 Fire protection for the AMWTP Outside Storage Area is provided by a fire hydrant  
27 located on the south side of the area. Manual fire alarm pull stations are available nearby in the

1 building entrances to the WMF-636 Pad 1 area. Additionally, equipment used to transport  
2 containers are typically equipped with fire extinguishers.

### 3 **AMWTP Treatment Facility**

4 WMF-676 is divided into a process area and a non-process area, which are separated by a  
5 two-hr fire wall running east to west. One sprinkler riser serves each area, and these two riser  
6 systems are interconnected by the wet sprinkler system to provide operating flexibility during  
7 upset conditions. Two risers serve the process area with a 4-in. main backup that serves seven  
8 suppression systems and eight deluge systems. Three risers serve the non-process areas that serve  
9 six systems. Redundancy is designed in for operating flexibility and reliability.

10 The process area fire riser is located in the northeast stairwell and serves the first and  
11 second floors and the interstitial space of the process area. It is served by a separate fire  
12 sprinkler riser supplied from the 10-in. main and an additional fire sprinkler riser supplied from  
13 the 8-in. main. The fire sprinkler system includes both a wet and a preaction system for various  
14 areas. The preaction system fire riser is located in the northeast stairwell. This riser connects to  
15 the 10-in. primary fire main east of WMF-676.

16 The non-process area fire sprinkler risers are located in the southwest stairwell and  
17 Utility Room 102 and serve the first and second floor non-process areas, interstitial space, the  
18 central conveyor area, the attached Utility Room 102, and the penthouse. The riser is located in  
19 the southwest stairwell. The riser connects to the 10-in. secondary fire main south of WMF-676.

20 All WMF-676 areas have a sprinkler density of 0.20 gpm/ft<sup>2</sup> and a minimum design area  
21 of 1,500 ft<sup>2</sup>, for a capacity of 300 gpm. The maximum fire water flow (800 gpm) is the sum of  
22 the maximum sprinkler flow (300 gpm) plus the required fire hose allowance (500 gpm). To  
23 maintain an 800 gpm water flow, the estimated residual pressure required for the non-process  
24 area is 105 psi, and 96 psi for the process area.

25 Additional fire protection is provided in areas of WMF-676. These secondary fire  
26 protection systems vary from preaction dry pipe fire suppression systems to deluge systems.  
27 Gloveboxes are provided with stand-alone misting systems (not supplied by risers). The floor-  
28 mounted manipulator arms are provided with manually operated carbon

1 dioxide suppression systems. Also, each of the floor-mounted manipulator arms are independent  
2 systems. Each of these systems consists of two 100-pound high pressure carbon dioxide bottles,  
3 located outside of the box lines. One of these bottles acts as the primary CO<sub>2</sub> source, with the  
4 second held in a reserve capacity. The second bottle can be armed by operating a switch in the  
5 box line control room. Each system is connected via rigid piping and flexible hose to a  
6 dispersion nozzle located on the manipulator arm. A manual switch located at the respective  
7 operator's station triggers each system, and the nozzle is aimed by the operator adjusting the arm  
8 position. Carbon dioxide suppression systems are designed in accordance with the requirements  
9 of NFPA 12, Standard on Carbon Dioxide Extinguishing Systems.

10 Thirty gallons of MgO sand fire suppressant will be located in each box line (228B and  
11 229B) within reach of the box line manipulator arms when potential pyrophoric radionuclides are  
12 managed.

13 The processing of waste containing potentially pyrophoric radionuclides (certain forms of  
14 uranium and plutonium) that can exhibit spontaneous heating due to a rapid oxidation reaction,  
15 requires prevention of water introduction to the box line process environment. Evaluation of the  
16 potential impacts of a reaction has been completed for the WMF-676 Box line Fire Detection  
17 Systems. Impairment of the approved in-cell Protectowire fire detection system in the box line  
18 being used and the associated pre-action sprinkler system only during the processing of such  
19 waste will provide the required prevention should a thermal reaction occur. These systems will  
20 be returned to active status upon completion of processing these wastes.

21 The Protectowire fire detection and pre-action sprinkler systems are required by  
22 International Building Code and the permit for protection of personnel safety and the  
23 environment respectively. Very specific control measures are to be implemented during  
24 impairment of these systems to provide the necessary means to detect, then control and suppress  
25 any reaction that may be encountered during processing of the potentially pyrophoric  
26 radionuclides waste.

27 **F-3a(6) Water for Fire Control [IDAPA 58.01.05.008; 40 CFR 264.32(d)]**

28 The appropriate fire extinguishing media for a fire involving pyrophoric radionuclides  
29 will be decided by the INL Fire Department. The INL Fire Department is notified of all  
30 locations where containers with pyrophoric radionuclides are managed at the AMWTP.

1 Fire water for the MWMUs is supplied by the RWMC and consists of two 250,000-gal  
2 water storage tanks fed by a deep well. One of the water storage tanks is dedicated for fire water  
3 storage and supplies a dedicated fire water distribution system. The second water storage tank  
4 supplies the RWMC potable water distribution system, which can be configured to supply  
5 backup fire water to the distribution system as needed. The fire water distribution system runs  
6 throughout the TSA to provide fire water supplies to (or in the immediate vicinity of) the  
7 MWMUs. The MWMUs are equipped with automatic sprinklers. Fire hydrants are located in  
8 the vicinity of the MWMUs. The RWMC is able to provide water through the fire water supply  
9 system at adequate volume, pressure, and duration to supply automatic sprinkler systems and  
10 hose streams to successfully fight fires at the MWMUs. Details of the fire water supply system  
11 are provided below.

12 The automatic fire sprinkler system for the WMF-676 box lines will be impaired only  
13 during active processing of potentially pyrophoric radionuclides that are known to be in excess  
14 of 21 kg in the north and 12 kg in the south box lines respectively. Upon completion of  
15 processing, the fire sprinkler system will be restored, and the facility will return to compliance  
16 with International Building Code requirements.

- 17 • A dedicated and continuous manned fire watch consisting of trained personnel will be  
18 present at times that the fire sprinkler system is impaired
- 19 • A thermal imaging camera will be installed inside the box lines to assist the fire  
20 watch in determining if a thermal reaction is occurring
- 21 • CCTV cameras used by operators will be used as a secondary means to monitor  
22 activities in the box line and assist in identifying thermal reactions
- 23 • 30 gallons of MgO sand will continue to be staged in the box line and will be present  
24 during processing of drums suspected of containing potentially pyrophoric radionuclides
- 25 • No material removed from a drum containing potentially pyrophoric radionuclides  
26 may remain un-contained during non-operational periods
- 27 • Only one drum at a time may be opened and processed when the box line fire  
28 sprinkler system is impaired due to processing of potentially pyrophoric radionuclides



1 tank and is maintained to provide a minimum 2-hr water supply to meet RWMC's worst-case  
2 fire demand. Water is discharged directly into the firewater distribution piping system. Both the  
3 tank level and water temperature are monitored by the RWMC fire alarm system. A circulation  
4 pump/water heating system is provided to move and heat the tank water as needed.

#### 5 **Potable Water Storage Tank**

6 The 250,000-gal potable water storage tank (WMF-709) serves as a backup fire water  
7 tank. Both the tank level and water temperature are monitored as part of the RWMC fire alarm  
8 system. The potential for water freezing is reduced by recirculating the water, accomplished by  
9 using either the domestic pump or the auxiliary electric fire pump in WMF-603, with a portion of  
10 the discharge directed back to the tank. Water can be discharged through a backflow preventer  
11 into the fire water distribution piping system.

#### 12 **Water Storage Tank Feed (Deep Well Pump)**

13 The potable water tank (WMF-709) is supplied by a deep well. The deep well pump is  
14 controlled automatically by the water level in the potable water tank. The fire water tank  
15 (WMF-727) is supplied from the potable water tank (WMF-709). The domestic pumps in the  
16 pump house (WMF-603) are used to move water from the potable water tank, through a  
17 backflow preventer to the fire water tank. The fire water tank can also be filled from the deep  
18 well pump if necessary, bypassing the potable water tank.

#### 19 **Fire Water Distribution System**

20 The fire water storage tank discharges to the fire water distribution piping via pumps and  
21 a discharge header. The static water pressure is maintained at 135-150 psi throughout the  
22 distribution system. Within the TSA, there is a looped fire main system, with 8-in. and 10-in.  
23 mains with hydrants extending along three major roads to provide adequate fire water for all  
24 AMWTP MWMUs.

#### 25 **F-3b Aisle Space Requirements [IDAPA 58.01.05.008; 40 CFR 264.35]**

26 The storage configuration for the MWMUs is described in Attachments 1.A, 1.B, 1.C,  
27 1.D, 1.E, 1.F, 1.G, and 1.H.

1 **F-4 Preventive Procedures, Structures, and Equipment**

2 The following sections describe the preventive procedures, structures, and equipment  
3 used at the MWMUs to prevent or minimize releases of MW to the environment and to protect  
4 human health and the environment during MW management activities.

5 **F-4a Unloading Operations [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(i)]**

6 Unloading operations and container handling operations are described in detail in  
7 Attachments 1.A, 1.B, 1.C, 1.D, 1.E, 1.F, 1.G, 1.H, 1.H.i, 1.H.ii, 1.H.iii, 1.H.iv, and 2.

8 **F-4b Run-Off [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(ii)]**

9 As described in Attachment 1.A, the MWMUs are provided with a variety of flood  
10 control and drainage control measures to facilitate the drainage of water away from the TSA.  
11 The area around the MWMUs is graded to facilitate the drainage of precipitation away from the  
12 MWMUs. Storm water flows from the sloped roof of the structure and is then directed away  
13 from the MWMUs via the storm water drainage system. Culverts in the vicinity of the MWMUs  
14 are designed to discharge peak flows from a 25-yr storm event.

15 As described in Attachment 1.G, containers stored in the AMWTP Outside Storage Area  
16 are elevated (e.g., pallet, riser, trailer). The asphalt of the AMWTP Outside Storage Area is  
17 graded to slope to the northwest. This serves to prevent run-on of precipitation towards the  
18 containers and facilitates run-off away from the containers stored in the AMWTP Outside  
19 Storage Area.

20 **F-4c Water Supplies [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(iii)]**

21 Contamination of the RWMC water supply by MW management activities conducted at  
22 the MWMUs is prevented by the design of the MWMUs and the depth to groundwater. The  
23 MWMUs are designed to isolate the waste containers in storage from the environment, prevent  
24 deterioration of container integrity during long-term storage, and prevent released waste from  
25 entering the environment. The MWMUs, other than the AMWTP Outside Storage Area, are  
26 enclosed buildings. The AMWTP Outside Storage Area only allows for the storage of containers

1 with no free liquids other than containers with up to 1% free liquid by volume that are stored  
2 within TRUPACT containers, and the integrity of the container must be in good condition.  
3 Further, frequent inspections of container condition and the presence of waste leaks and/or spills  
4 are conducted, as described in Attachment 4, to allow timely response and cleanup for any waste  
5 leak and/or spill. The design features and operational practices described above prevent leaks  
6 and/or spills from contacting soil which could migrate to the groundwater.

7 **F-4d Equipment and Power Failure [IDAPA 58.01.05.012; 40 CFR**  
8 **270.14(b)(8)(iv)]**

9 Operational equipment failures can occur within the MWMUs without a power failure.  
10 Such failures do not unduly affect waste handling or storage activities. Operational equipment of  
11 concern at the MWMUs includes waste handling equipment (e.g., conveyors, forklifts, pallet-lift  
12 trucks), ventilation systems (e.g., air handlers, dampers, etc.), and monitoring equipment (e.g.,  
13 detectors, alarms, etc.). If a malfunction occurs in the waste handling equipment during  
14 container handling, the equipment is designed to cease functioning and hold containers in  
15 position. Some of the systems identified above have local and/or remote alarms to signal  
16 trouble.

17 All of the above-described equipment undergoes periodic inspections to detect  
18 malfunctions and preventive maintenance to ensure acceptable operating performance. This is  
19 described in additional detail in Attachment 4. All personnel operating waste handling  
20 equipment are trained and qualified on the equipment. Training requirements are described in  
21 Attachment 5.

22 The RWMC and AMWTP have standby power sources for continued operation of critical  
23 systems during periods of commercial power outage. All generators come online automatically  
24 when commercial power is interrupted, unless manually overridden. They can be started  
25 manually and are equipped with time delays of several seconds to prevent nuisance starts.

26 A battery to supply continuous emergency power to the RWMC Emergency Control  
27 Center is provided by an uninterruptible power supply (UPS) system. In addition, the fire alarm  
28 system has a battery backup, in case of power failure.

1 Specific information about the various standby power sources for the MWMUs is  
2 provided below.

### 3 **Type II Module (Other Than WMF-634), Type I Module, WMF-636 Pad 2, and SWEPP**

4 A 75-kW generator is located at the SWEPP, which supplies power for nearby lights and  
5 power receptacles, as well as for other TSA facilities. A 500-kW diesel generator supplies  
6 standby power to the various RWMC/AMWTP facilities, and is located on the east side of the  
7 TSA-RE. These standby generators ensure continued monitoring and alarm detection of fire  
8 detection systems, CAMs (except WMF-634), and other critical monitors and response systems  
9 for wastes in storage. In the event of a loss of standby power to the CAMs in one of Type II  
10 Modules (other than WMF-634), the Type I Module, WMF-636 Pad 2, or SWEPP or if a CAM is  
11 temporarily non-functional; then radiological surveys are performed, as required, to detect  
12 possible releases of MW/MW constituents.

### 13 **AMWTP Waste Characterization Building**

14 WMF-634 has its own standby power supply that maintains certain HVAC systems and  
15 alarm systems. The power supply is supplied by a diesel generator, located on the exterior  
16 northwest wall, which provides sufficient power for WMF-634 to continue operations and  
17 shutdown characterization equipment in an operationally sound manner. The fire alarms are  
18 equipped with separate battery backup to provide at least 24 hrs of standby operation.  
19 Emergency lighting at WMF-634 is provided from battery-operated, automatically recharging,  
20 push-to-test lighting units and exit lights located at all doors to light egress routes upon loss of  
21 commercial power. The CAM(s) located in WMF-634 are not provided with standby power. In  
22 the event of a loss of power to WMF-634, radiological surveys are performed, as required, to  
23 detect possible releases of MW/MW constituents.

### 24 **AMWTP Treatment Facility**

25 The WMF-676 electrical power system is designed such that there are no single point  
26 failures to the devices supplied that will prevent proper protective action when required.  
27 Standby power for WMF-676 is supplied from a diesel-powered generator adequate to support  
28 all critical and safety-related loads. The diesel-powered generator also supplies power to

1 essential process loads that cannot tolerate periods of interruption in excess of one hour.  
2 Additionally, WMF-676 is equipped with UPS systems that supply power to electrical loads that  
3 require continuous operation without interruption or perturbation. Additional detail on the  
4 WMF-676 electrical system is provided in Drawings 54-0101, 54-0102, and 54-0103 in  
5 Appendix IX.

6 The WMF-676 UPS is located in the electrical room adjacent to the computer room and  
7 is continuous duty and solid state. It consists of an alternate current inverter, rectifier/battery  
8 charger, storage batteries, control circuitry, status and metering panels, and a bypass transfer  
9 switch. The UPS supplies power to the UPS power distribution panel board, also housed in the  
10 electrical room. The UPS storage batteries are located in a cabinet next to the UPS.

11 Battery operated lighting is provided in areas that may be in use during emergencies or  
12 power outages, including those along the appropriate egress routes. Self-contained,  
13 battery-operated fixtures provide exit lighting. The CCR, the computer room, and the backup  
14 monitoring room lighting fixtures are provided with emergency power. Select lighting fixtures  
15 throughout WMF-676 are provided with standby power to aid in restoring WMF-676 to normal  
16 operations or to aid in safe shutdown during a power outage.

17 **F-4e Personnel Protection Equipment [IDAPA 58.01.05.012;**  
18 **40 CFR 270.14(b)(8)(v)]**

19 Personnel are notified of and protected from chemical and radiological hazards associated  
20 with wastes managed at the MWMUs through radiological monitoring of personnel and  
21 containers, use of PPE (as may be required for particular tasks), and alarmed monitoring  
22 equipment. All operations are conducted such that employee exposures to MW are as low as  
23 reasonably achievable (ALARA), in accordance with AMWTP policy. All personnel involved in  
24 the management of MW are instructed in the use of PPE, as appropriate to their job functions and  
25 assigned tasks.

26 Prior to the start of any operation that may expose employees to the risk of injury or  
27 exposure to MW constituents, AMWTP personnel review the operation to ensure that the nature  
28 of hazards that might be encountered are properly considered; appropriate PPE is selected; and  
29 appropriate safety procedures and equipment are included. This review typically involves

1 radiological control, industrial hygiene, and safety personnel, in addition to knowledgeable  
2 operations personnel.

3 If a particular activity to be conducted has not previously been performed or there are  
4 unique considerations to be addressed, appropriate work control documentation specifies  
5 precautions, PPE, monitoring, industrial safety, and industrial hygiene controls or activities to be  
6 performed. The work control documents also present the sequence of activities to be completed,  
7 limiting factors to be identified, information to be recorded, and situations that may require  
8 operations to be shut down.

### 9 **F-5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste**

10 Containers stored at the MWMUs are packaged, handled, and managed to prevent the  
11 reaction of ignitable and incompatible wastes. HWMA/RCRA-regulated wastes (i.e., hazardous  
12 only wastes) are not stored in the MWMUs, with the exception of AMWTP generated wastes,  
13 which are managed in accumulation areas in accordance with IDAPA 58.01.05.006  
14 (40 CFR 262.34).

15 The AMWTP strategy for treating waste minimizes the handling of incompatible wastes.  
16 Wastes are sequenced to be compatible with preceding and succeeding waste streams. Clean-out  
17 is initiated at changes between incompatible wastes (including unknowns). Clean-out involves  
18 emptying relevant treatment areas (e.g., sumps, containment enclosures, troughs) and removing  
19 visible waste from the area and equipment. Attachment 2 provides further information on the  
20 waste streams that are known to contain constituents that may be incompatible with other waste  
21 streams (e.g., high acidic, caustic, corrosive, unknown, pyrophoric radionuclide metals).  
22 Identification of waste streams with potential incompatibility issues is ongoing; the list is  
23 updated as more information becomes available about the waste (e.g., sample results, RTR  
24 observations, visual inspections).

1 **F-5a Precautions to Prevent Ignition or Reaction of Ignitable or Reactive**  
2 **Waste [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.17(a) and**  
3 **270.14(b)(9)]**

4 Many precautions are taken at the MWMUs that manage ignitable or pyrophoric  
5 radionuclide metals to prevent the accidental reaction or ignition of the waste. The following  
6 precautions are taken to prevent the reaction or ignition of waste managed at the AMWTP:

- 7 • Pyrophoric radionuclide metals are physically separated from the general waste  
8 population while in the MWMUs.
- 9 • Ensuring the integrity of containers identified as pyrophoric radionuclides metals is  
10 such that the container is sufficiently impervious to air and water intrusion. Ensuring  
11 that the outer most container of a pyrophoric radionuclide metal waste stream is  
12 un-vented or has a vent that is sufficiently impervious to water intrusion.
- 13 • Ignitable wastes are segregated in the MWMUs, as described in Section F-6.
- 14 • Most stationary equipment used is grounded, as are the MWMUs, thereby preventing  
15 sparking. Portable electric tools are double-insulated, battery-operated, or have  
16 ground fault interrupter (GFI) circuit protection.
- 17 • Liquids collected from wastes are removed and treated as appropriate (e.g.,  
18 neutralization or absorption for subsequent treatment or disposal). Residual liquids  
19 are cleaned up from a treatment unit (e.g., trough, containment enclosure) before  
20 receiving wastes from an incompatible waste IDC/WG or unknown.
- 21 • Open flame cutting or other similar spark or ignition sources are not allowed inside  
22 the MWMUs unless the open flame or spark source is isolated to the extent feasible  
23 from the waste present in the area. All such work is conducted in accordance with a  
24 specific procedures. Gas hoses for welding are equipped with flashback preventers.
- 25 • All electrical wiring and equipment complies with applicable NFPA codes.
- 26 • Smoking is only allowed outside the MWMUs in designated areas.
- 27 • Welding is allowed for performing treatment (macroencapsulation in stainless steel  
28 containers/liners) inside WMF-610, WMF-628 through WMF-635, WMF-636 Pad 2,  
29 and the AMWTP Outside Storage Area. All equipment is isolated to the extent  
30 feasible from the waste in storage. All such work in conducted in accordance with a  
31 specific procedures. Gas hoses for welding are equipped with flashback preventers.

1 In addition to the general precautions listed above, the following are specific to  
2 containment enclosures located in the WSF and SWEPP.

- 3 • Restricting sizing operations to metal shears, nibblers, and other mechanical  
4 equipment that minimizes the generation of sparks unless evaluation of the waste  
5 present in the area indicates that ignition sources are unlikely to be a safety concern.
- 6 • When processing ignitable or incompatible wastes, treatment areas are visually  
7 inspected and residual waste is cleaned up and removed between incompatible  
8 sequences.
- 9 • Unknown wastes are sequenced through containment enclosures as if they are  
10 incompatible wastes. AMWTP personnel are required to visually inspect and clean  
11 up residues before and after unknowns or incompatibles are handled.

12 In addition to the general precautions listed above, the following are specific to  
13 WMF-676.

#### 14 **Box Lines/Hot Maintenance/Import-Export Glovebox**

- 15 • Restricting sizing operations to metal shears, nibblers, and other mechanical  
16 equipment that minimize the generation of sparks unless evaluation of the waste  
17 present in the area indicates that ignition sources are unlikely to be a safety concern.
- 18 • When processing ignitable or incompatible wastes, sorting areas are visually  
19 inspected and residual waste is cleaned up and removed between incompatible  
20 sequences.
- 21 • When using the overhead power manipulator to cut the lid of a box within one of the  
22 box lines, ignitable uncontainerized waste will not be located within the box line  
23 where the box lid cutting activity is occurring.
- 24 • Unknown wastes are sequenced through the box lines as if they are incompatible  
25 wastes. AMWTP personnel are required to visually inspect and clean up residues  
26 before and after unknowns or incompatibles are handled.
- 27 • Open flame cutting or other similar spark or ignition sources (e.g., plasma torch  
28 cutting) are not allowed inside box lines/hot maintenance area unless the open flame  
29 or spark source is isolated to the extent feasible from the waste present in the area.  
30 All such work is conducted in accordance with a specific procedures. Gas hoses for  
31 welding are equipped with flashback preventers.
- 32 • All waste stored in the import/export glovebox is cleaned up and removed prior to  
33 receiving wastes from a different IDC/WG unless waste characterization or  
34 compatibility determines otherwise.
- 35 • Additional controls, as described in Attachment 1.H.i and Section F-3a(6) of this  
36 Attachment, are implemented during the processing of waste containing potentially  
37 pyrophoric radionuclides.



- 1           • Through similar means, threaten human health or the environment.

2           These practices and design features are intended to separate and protect wastes from  
3 sources of ignition, reaction, or spontaneous ignition, as follows:

- 4           • If incompatible wastes are placed in storage at the MWMUs, they are  
5 segregated/separated as discussed in Section F-6.
- 6           • If additional incompatibilities are identified or data review/waste characterization  
7 eliminates potential incompatibilities, additional precautions are implemented or  
8 certain separation/segregation practices may be relaxed, as warranted.
- 9           • Any leaks or spills that occur during waste processing are detected through the  
10 inspection program or by personnel present during specific operations. Personnel  
11 clean up incidental spills in a timely manner.
- 12           • The presence and oversight of personnel during waste handling and processing  
13 activities ensures quick detection and mitigation of leaks, spills, equipment failure, or  
14 other events that could present a hazardous situation.
- 15           • Alarms and emergency equipment are located throughout the MWMUs to ensure  
16 rapid response to potential problems, such as fires.
- 17           • Should a fire develop that is beyond the incipient stage, then fire  
18 detection/suppression systems are automatically activated and the INL Fire  
19 Department is automatically notified.
- 20           • Ventilation systems in the MWMUs prevent buildup of toxic gases (e.g., CO) from  
21 equipment operation.
- 22           • Malfunctioning equipment is tagged and either locked out or isolated.
- 23           • Unknowns are physically separated from the general waste population while in the  
24 MWMUs.
- 25           • Criticality clean-outs of the MWMU treatment areas provide regular assessment of  
26 waste handling and processing conditions (e.g. leaking containers), thereby providing  
27 early identification of potentially hazardous situations (e.g., co-mingling of  
28 incompatible wastes).
- 29           • Treatment areas are emptied prior to receiving waste from a different IDC/WG,  
30 unless the characterization information or compatibility determinations allow mixing  
31 of wastes.
- 32           • Routine inspections of the storage areas provide regular assessment of storage  
33 conditions and early identification of potentially hazardous situations.



1 as possible, while observing for a possible reaction (e.g., sparks, incandescence, smoke or  
2 flame). The thermal camera and CCTV cameras are used to assist in the determination of a  
3 reaction. In the event of a pyrophoric reaction, the reaction will be allowed to continue without  
4 suppression. The MgO sand fire suppressant staged in the boxlines is used to control the spread  
5 and severity of the reaction as warranted by the conditions. If the reaction is sustained, the shift  
6 supervisor is notified, the ventilation system differential pressures are monitored for the affected  
7 box line, operations in the unaffected box line are stopped, the plant shift manager is notified, the  
8 INL Fire Department is notified, the Project Environmental Lead is notified, and the BROKK is  
9 moved out of the area of the reaction. The CO2 system may be used on combustibles if there is  
10 no evidence of continued pyrophoric reaction.

11 When the pyrophoric reaction has diminished the thermal camera is used to determine if  
12 the residual material is 4°F above the ambient temperature of the trough. If the temperature of  
13 the material is greater than the 4°F above the ambient temperature, additional manipulation of  
14 the waste is performed as warranted. If the material temperature is less than 4°F of the ambient  
15 temperature, the material remains in the trough for a minimum of 15 minutes. After 15 minutes  
16 the thermal camera is used to ensure the material is still less than 4°F above ambient trough  
17 temperature. If the material is not within the 4°F ambient temperature the process of monitoring  
18 in 15 minutes is repeated. When the material is at an acceptable temperature a drop test is  
19 conducted. A small sample of the material is picked up with a BROKK manipulator tool  
20 elevated approximately 3 ft over the trough, then dropped. During the drop the sample is  
21 observed for smoke, flame or incandescence. When the sample settles it is observed for 5  
22 minutes for visible smoke, flame, or incandescence. If these conditions are observed, the  
23 material is processed again as described above. If smoke, flame, or incandescence is not  
24 observed the drop test is repeated a minimum of five additional times with independent samples  
25 until all the tests are successful and the residue will be dispositioned according to procedures.

26 When packaging debris waste containing uranium a minimum of 15 pounds of inert  
27 material (e.g., magnesium oxide) will be added to the container prior to lidding. The inert  
28 material is an added control to displace oxygen and headspace vapor, reduce voids following  
29 supercompaction, and yield sufficient mass to limit heat generation from potential slow oxidation  
30 of uranium.

1 Following processing of the potentially pyrophoric debris waste, any segregated sludge is  
2 thoroughly raked to mix the material to ensure it is exposed to oxygen. The sludge waste is then  
3 held in the trough for a minimum of 24 hours and a thermal camera is used to determine if the  
4 waste temperature is greater than 4°F above the ambient temperature in the trough. If the sludge  
5 waste temperature is greater than 4°F above the ambient trough temperature, the process of  
6 raking and holding the waste in the trough for 24 hours will be repeated until the waste  
7 temperature is less than the 4°F above ambient.

8 In the event of a reaction while processing the potentially pyrophoric waste stream,  
9 operational controls outlined above (e.g., use of magnesium oxide to manage the reaction) will  
10 be implemented per operational procedures to control the reaction until the waste is successfully  
11 processed. Because pyrophoric reactions of this nature are anticipated and controlled, they do  
12 not pose a threat to human health or the environment or the operational integrity of the box line  
13 and will not require activation of the contingency plan. In the event the operational controls are  
14 not successful in readily controlling the reaction, necessitating on-site response of the INL Fire  
15 Department, the contingency plan will be activated. The DEQ will be notified of any identified  
16 reactions regardless of whether the contingency plan is activated.

17 **F-5c Management of Ignitable or Reactive Wastes in Containers**  
18 **[IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.176 and 270.15(c)]**

19 The facility boundary line is defined as the INL boundary. The RWMC is three miles  
20 from the southern INL boundary, which is the closest boundary to the RWMC. Thus, the waste  
21 stored at the MWMUs is more than 50 ft from the INL boundary. Attachment 1, Exhibit B-1  
22 provides a diagram showing the location of the RWMC relative to the INL boundary.

23 **F-5d Management of Incompatible Wastes in Containers [IDAPA 58.01.05.008**  
24 **and 58.01.05.012; 40 CFR 264.177 and 270.15(d)]**

25 AMWTP procedures specify that incompatible wastes are not to be placed in the same  
26 container. Procedures used to ensure that incompatible wastes are not co-mingled in process  
27 areas are listed below.

- 28 • Waste characterization information is reviewed to ensure incompatible wastes are not  
29 placed in the same container during operations;

- 1           • When liquids are encountered in process areas, the liquids are collected in separate  
2           containers and separated/segregated, if required, or absorbed in place;
- 3           • Process areas, from which unknown liquids have been collected and removed, are  
4           cleaned up prior to receipt of additional waste, unless the compatibility  
5           determinations allow mixing of liquids between containers of the same IDC/WG;
- 6           • Waste shall not be placed in an unwashed container that previously held an  
7           incompatible waste or material;
- 8           • Process area sumps and drip trays are emptied prior to receiving waste from  
9           incompatible IDCs/WGs or unknowns; and
- 10          • Unknowns are physically separated from the general waste population while managed  
11          in the MWMU container storage areas, unless the wastes are containerized and are  
12          located in an open SCW transfer container within WMF-676. Unknowns shall not be  
13          managed in the WMF-636 Pad 2 or the AMWTP Outside Storage Area.

## 14   **F-6   Interim Waste Management Strategy for the MWMUs**

### 15   **F-6a    Background**

16           Wastes received in prior years and stored at the MWMUs are managed as if they contain  
17           free liquid, unless it can be documented, other than by historical record, that no free liquids are  
18           present. Some of these wastes are potentially incompatible with other wastes managed at the  
19           MWMUs. To effectively control potential risks associated with incompatible wastes and ensure  
20           safe storage practices, all wastes are managed at the MWMUs in strict accordance with the  
21           special procedures described in Section F-6b.

### 22   **F-6b    Special Procedures**

23           Wastes containing free liquids and/or potential incompatibles are safely managed at the  
24           MWMUs since:

- 25           • All wastes are evaluated for potential incompatibilities using the methodology  
26           presented in the guidance manual “A Method for Determining the Compatibility of  
27           Hazardous Wastes,” EPA-600/2-80-076, April 1980,
- 28           • All wastes are stored in compatible groupings, and

1           • Unknown wastes, wastes with unknown IDCs/WGs following RTR examination or,  
2           wastes with known IDCs/WGs but unknown HWNs, are separated from the general  
3           waste population.

4           • Containers identified as pyrophoric radionuclide metals are separated from the  
5           general waste population.

6           Sections F-6b(1) through F-6b(5) contain procedures used to organize waste inventories  
7           into compatible groups and segregate/separate incompatibles and unknowns.

#### 8   **F-6b(1)   Compatibility Determination**

9           For information on compatibility determinations, see Attachment 2.

#### 10   **F-6b(2)   Waste Segregation on the Basis of Compatibility**

11           Based on the results of the compatibility determinations described in Attachment 2,  
12           wastes are categorized into RGNs. Incompatible binary combinations of RGNs are identified  
13           and requirements for segregating/separating wastes with incompatible RGNs are established. It  
14           must be noted that many IDCs have multiple RGNs. As the compatibility evaluations and  
15           segregation/separation activities progress, with regard to characterization of existing  
16           “unidentified” inventories, and as newly generated wastes are received, additional incompatible  
17           binary RGN combinations may be identified. If additional incompatibilities are identified or data  
18           validation eliminates potential incompatibilities, the number of segregated/separated storage  
19           areas may increase or decrease.

#### 20   **F-6b(3)   Waste Separation on the Basis of Unknowns**

21           Unknown wastes following RTR may be stored in the MWMUs pending further  
22           characterization. These wastes are physically separated from the general waste population.

#### 23   **F-6b(4)   Waste Separation on the Basis of Free Liquids Content**

24           All waste stored in the MWMUs is managed in compliance with HWMA/RCRA  
25           requirements for containers with free liquids (e.g., elevated on pallets in a secondary containment  
26           area/system), unless documented not to contain any free liquids. Containers documented not to  
27           contain any free liquids through means (e.g., RTR visual examination) other than historical

1 knowledge may be stored in a MWMU without a containment system that meets the  
2 requirements of IDAPA 58.01.05.008 [40 CFR 264.175(b)].

3 **F-6b(5) Special Facility Modifications**

4 To meet the requirement for segregated storage areas, movable synthetic spill barriers  
5 developed for the purpose of spill control and liquids containment may be used. These barriers  
6 are compatible with the waste types expected for storage in the MWMUs. The barriers adhere to  
7 the floor surface without the need for any mechanical fasteners, thus protecting the integrity of  
8 the secondary containment system. The barriers are joined together with interlocking fasteners  
9 that are compatible with the wastes managed at the MWMUs. The fasteners are removable,  
10 allowing for the area surrounded by the barriers to be increased or decreased in size according to  
11 operational demands. Portable spill pallets that provide a separate segregation area may also be  
12 used to segregate MW within the MWMUs. In addition, a container holding a MW that is  
13 incompatible with any MW or other material stored nearby may be segregated from the  
14 incompatible MW/material by means of a dike, berm, wall, or other device. Segregation devices  
15 used are compatible with the MW stored within the segregation area and prevent the migration of  
16 MW from the segregation area and/or commingling of incompatible MW/materials in the event  
17 of a release.