AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 6

Section F

PROCEDURES TO PREVENT HAZARDS

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ATTACHMENT 6

PROCEDURES TO PREVENT HAZARDS

F-3 Preparedness and Prevention Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Fire protection in the MWMUs buildings is provided through a combination of smoke detectors, remote and local alarms, automatic fire extinguishing systems (sprinklers), CO_2 Fire Suppression System (located on the arm of the floor-mounted manipulator), portable fire extinguishers, and MgO sand fire suppressant for potential pyrophoric radionuclides management. Manual fire alarm stations are generally located next to personnel access doors. Once a fire is detected, the alarm sounds, the building HVAC system shuts down (except WMF-676), and water is introduced through overhead piping. Once initiated, fire suppression systems are shut-off manually.

AMWTP Waste Characterization Building

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

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

Type II Modules

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

Type I Module

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

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

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

SWEPP

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

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

WMF-636 Pad 2

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

AMWTP Outside Storage Area

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

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

AMWTP Treatment Facility

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

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

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

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

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

dioxide suppression systems. Also, each of the floor-mounted manipulator arms are independent systems. Each of these systems consists of two 100-pound high pressure carbon dioxide bottles, located outside of the box lines. One of these bottles acts as the primary CO_2 source, with the second held in a reserve capacity. The second bottle can be armed by operating a switch in the box line control room. Each system is connected via rigid piping and flexible hose to a dispersion nozzle located on the manipulator arm. A manual switch located at the respective operator's station triggers each system, and the nozzle is aimed by the operator adjusting the arm position. Carbon dioxide suppression systems are designed in accordance with the requirements of NFPA 12, Standard on Carbon Dioxide Extinguishing Systems.

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

The processing of waste containing potentially pyrophoric characteristics that can exhibit spontaneous heating due to a rapid oxidation reaction, requires prevention of water introduction to the box line process environment. Evaluation of the potential impacts of a reaction have been completed for the WMF-676 Box line Fire Detection Systems. Impairment of the sprinkler system occurring only during the processing of waste with greater than 21 kg uranium in the north box line and 12 kg in the south box line will provide the required prevention should a thermal reaction occur. The sprinkler system will be returned to active status upon completion of processing these wastes.

The box line sprinkler system is required by International Building Code and the permit for protection of personnel safety and the environment respectively. Very specific control measures are to be implemented during impairment of these systems to provide the necessary means to detect, then control and suppress any reaction that may be encountered during processing of the potentially pyrophoric and reactive waste.

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

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

Fire water for the MWMUs is supplied by the RWMC fire water system that includes a 250,000-gallon tank (WMF-727) and a 500,000-gallon tank (FW-TK-4301). Makeup water for firewater storage tank WMF-727 is normally supplied from the potable water well/pump system. Makeup water for FW-TK-4301 is normally supplied from WMF-1616 deep well pump house. The fire water distribution system runs throughout the TSA to provide fire water supplies to (or in the immediate vicinity of) the MWMUs. The MWMUs are equipped with automatic sprinklers. Fire hydrants are located in the vicinity of the MWMUs. The RWMC is able to provide water through the fire water supply system at adequate volume, pressure, and duration to supply automatic sprinkler systems and hose streams to successfully fight fires at the MWMUs. Details of the fire water supply system are provided below.

The automatic fire sprinkler system for the WMF-676 box lines will be impaired only during active processing of potentially pyrophoric radionuclides or IDC RF-762 wastes that are potentially pyrophoric and reactive that are known to be in excess of 21 kg in the north and 12 kg in the south box lines, respectively. Upon completion of processing, the fire sprinkler system will be restored.

- A dedicated and continuous manned fire watch consisting of trained personnel will be present at times that the fire sprinkler system is impaired
- A thermal imaging camera will be installed inside the box lines to assist the fire watch in determining if a thermal reaction is occurring
- CCTV cameras used by operators will be used as a secondary means to monitor activities in the box line and assist in identifying thermal reactions
- 30 gallons of MgO sand are staged in the box line at all times
- No material removed from a drum containing potentially pyrophoric radionuclides may remain un-contained during non-operational periods
- Only one drum at a time may be opened and processed when the box line fire sprinkler system is impaired due to processing of potentially pyrophoric radionuclides
- Combustible materials will be removed from the respective troughs prior to processing drums containing potentially pyrophoric radionuclides.

Fire Water Storage Tank

The 250,000-gal fire water storage tank (WMF-727) is the primary RWMC water storage

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

Potable Water Storage Tank

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

Water Storage Tank Feed (Deep Well Pump)

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

Fire Water Distribution System

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

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

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

F-4 Preventive Procedures, Structures, and Equipment

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

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

Unloading operations and container handling operations are described in detail in 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

AMWTP Waste Characterization Building

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

AMWTP Treatment Facility

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

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

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

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

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

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

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

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

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

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

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

The AMWTP strategy for treating waste minimizes the handling of incompatible wastes. Wastes are sequenced to be compatible with preceding and succeeding waste streams. Clean-out is initiated at changes between incompatible wastes (including unknowns). Clean-out involves emptying relevant treatment areas (e.g., sumps, containment enclosures, troughs) and removing visible waste from the area and equipment. Clean-out of the box line troughs and trays is required between containers and bagged waste from inside containers is required for processing the RF-762 potentially pyrophoric and reactive waste. Attachment 2 provides further information on the waste streams that are known to contain constituents that may be incompatible with other waste streams (e.g., high acidic, caustic, corrosive, unknown, pyrophoric radionuclide metals). Identification of waste streams with potential incompatibility issues is ongoing; the list is updated as more information becomes available about the waste (e.g., sample results, RTR observations, visual inspections).

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

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

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

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

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

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

Box Lines/Hot Maintenance/Import-Export Glovebox

- Restricting sizing operations to metal shears, nibblers, and other mechanical equipment that minimize the generation of sparks unless evaluation of the waste present in the area indicates that ignition sources are unlikely to be a safety concern.
- When processing ignitable or incompatible wastes, sorting areas are visually inspected and residual waste is cleaned up and removed between incompatible sequences.
- When using the overhead power manipulator to cut the lid of a box within one of the box lines, ignitable uncontainerized waste will not be located within the box line where the box lid cutting activity is occurring.
- Unknown wastes are sequenced through the box lines as if they are incompatible wastes. AMWTP personnel are required to visually inspect and clean up residues before and after unknowns or incompatibles are handled.

- One drum or bag (i.e., bagged waste inside a drum) of RF-762 IDC waste is processed at a time. Cleanout of the trough and trays is performed between each container or bag processed or after the segregated debris is processed.
- Open flame cutting or other similar spark or ignition sources (e.g., plasma torch cutting) are not allowed inside box lines/hot maintenance area unless the open flame or spark source is isolated to the extent feasible from the waste present in the area. All such work is conducted in accordance with a specific procedures. Gas hoses for welding are equipped with flashback preventers.
- All waste stored in the import/export glovebox is cleaned up and removed prior to receiving wastes from a different IDC/WG unless waste characterization or compatibility determines otherwise.
- Additional controls, as described in Attachment 1.H.i and Section F-3a(6) of this Attachment, are implemented during the processing of waste containing potentially pyrophoric radionuclides.

- Unknown wastes are sequenced through the import/export glovebox as if they are incompatible. Glovebox areas are visually inspected and residues cleaned up (if present) before and after handling unknown wastes.

SCW Glovebox System

- Unknown wastes are sequenced through the SCW glovebox system as if they are incompatible. Glovebox areas are visually inspected and residues cleaned up (if present) before and after handling unknown wastes.
- All waste stored in the SCW gloveboxes is cleaned up and removed prior to receiving wastes from a different IDC/WG unless waste characterization or compatibility determines otherwise.

Supercompactor

- Fire suppression through a water misting system is provided in the supercompactor glovebox to suppress combustion during supercompaction of HWN D001 wastes.
- Any liquids collected in gloveboxes/sump are cleaned up and removed prior to receiving wastes from a different IDC/WG unless characterization information or compatibility determinations conclude otherwise.

Drum Repack System

- Unknown wastes are sequenced through the drum repack system as if they were incompatible. Areas are visually inspected and residues cleaned up (if present) before and after handling unknown wastes.
- All waste stored in the drum repack system is cleaned up and removed prior to receiving wastes from a different IDC/WG unless waste characterization or compatibility determinations conclude otherwise.

F-5b General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.17(b) and 270.14(b)(9)]

The MWMUs design and operating practices provide precautions to prevent reactions which:

- Generate extreme heat or pressure, fire, explosions, or violent reactions;
- Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to pose a risk of fire or explosion or to threaten human health or the environment;
- Damage the structural integrity of the MWMU or secondary containment system; and

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

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

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

- The WSF, SWEPP, and WMF-636 Pad 2 are equipped with CAMs to monitor storage conditions and alarm locally (visible and audible) if materials monitored exceed acceptable levels. This system provides sufficient early warning such that the source problem can be evaluated or personnel evacuated from the building, if necessary.
- Wastes are stored in containers that are kept closed at all times, except when removing or adding waste.
- Routine inspections of the MWMUs provide regular assessment of storage/treatment areas and early identification of potentially hazardous situations.

In addition to the general precautions for handling ignitable or reactive wastes listed above, those specific to WMF-676 are provide below.

Supercompactor

Residual liquids released during the supercompaction process are collected in the puck recovery glovebox sump. The liquid wastes retain the listed HWNs associated with the original waste and are collected in compatible containers and may be transferred to the SCW glovebox system or the DWPG for additional characterization/treatment, if required, or absorbed in place. Additionally, liquid wastes may be absorbed in an area outside the supercompactor gloveboxes, in accordance with IDAPA 58.01.05.006 (40 CFR 262.34) standards.

Boxlines

Processing Potentially Pyrophoric and Reactive Waste Stream. Refer to Section F-3a(6) of this attachment for the controls required during the fire suppression system impairment while processing waste containing greater than 21 kg of potentially pyrophoric radionuclides in the north box line and 12 kg in the south box line.

The potentially pyrophoric waste stream is a debris waste stream that may include sludge waste material. As directed by procedure, sludge material, when present, is segregated from the potentially pyrophoric debris waste in the trough and the debris waste is separated from other combustible material. Because of potentially pyrophoric radionuclides, if the waste is in a form that is not oxidized (for example, metal fines and turnings), a reaction is an expected operational event when processing the debris waste; therefore, the debris waste is processed before the sludge waste.

As directed by operational procedure, the potentially pyrophoric debris waste is processed as follows: The debris waste is manipulated in the box line to reduce the size as much

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

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

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

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

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

Processing IDC RF-762 Potentially Pyrophoric(Ignitable) and Reactive Wastes. Operational controls in place for the box line fire suppression system during processing of the RF-762 waste include the following:

- The automatic fire sprinkler system for the box lines will be impaired only during processing of waste with greater than 21kg uranium in the north box line and greater than 12kg in the south box line to prevent fire suppression system water from being introduced to the box line in the event of a thermal reaction, and if a reaction occurs, to control its duration and severity. Upon completion of processing, the fire sprinkler system will be restored.
- A dedicated and continuous manned fire watch consisting of trained personnel is present at times the fire sprinkler system is impaired.
- A thermal imaging camera inside the box lines assists the fire watch in determining if a thermal reaction is occurring.
- CCTV cameras are used by operators to monitor activities in the box line and assist in identifying thermal reactions.
- 30 gallons of magnesium oxide (MgO) sand are staged in each box line.

Waste trays described previously will be used as necessary to support RF-762 processing in the box lines. EDF-11208 "Operational Chemical Compatibility and Inventory Evaluation" processing constraints for RF-762's include one drum or bag (i.e., bagged waste inside a drum) of RF-762 IDC waste will be processed at a time, and cleanout of the trough and trays will be performed between each container or bag processed or after processing segregated debris.

Drums or bagged waste from inside of a drum will be emptied into the box line trough or into a tray positioned in the bottom of the trough. AK personnel will view the opening of the container to assess if the waste is associated with Rocky Flats, and if the generation process can be determined or if the waste form is indeterminate. Debris and combustibles will be segregated from the waste. Absorbent will be added if there are liquids in the waste matrix or as required by WIPP. Liquids in bottles or liquids from breached bottles may be set aside and evaluated for further treatment and disposition as described in operational procedures. Characterization such as pH testing or oxidizer testing will be performed as necessary and as directed by operational procedures to support final treatment and disposal.

The waste in the trough or in a tray positioned in the trough will be thoroughly raked or manipulated with the Brokk while observing for reactions. After mixing of the waste in the trough or tray to evenly distribute any oxidizing potentially pyrophoric metals, the waste will be held for 24 hours. Trays containing waste may also be placed on the sorting trough platform for the 24-hour hold. Utilizing the trays allow for additional drums or bags to be processed while other waste is held for 24 hours ensuring all waste being processed or held is physically segregated from other in-process waste.

After 24 hours, the temperature of the waste will be determined with a thermal camera. If the temperature is >3.6°F above ambient, the waste will be raked again and held for another 24 hours. For waste in a tray on the platform, the tray will be returned to the trough, using the Brokk, for the additional rake and then placed back on the platform or remain in the trough to be held for another 24 hours. When the temperature of the waste is < 3.6°F above ambient it will be loaded into a processed waste container. This rake and hold process allows for exothermic reactions to occur prior to placing the waste in processed waste containers. After the rake and hold process on all indeterminate waste the pyrophoric metals drop test will be performed as described below.

In the event of a pyrophoric reaction in a box line trough, the reaction will be allowed to continue without suppression. The MgO sand fire suppressant staged in the box lines is used to control the spread and severity of the reaction as warranted by the conditions. If the operational

controls are not successful in readily controlling the reaction, the shift supervisor is notified, the ventilation system differential pressures are monitored for the affected box line, operations in the unaffected box line are stopped, the plant shift manager is notified, the INL Fire Department and AMWTP Project Environmental Lead are notified, and the Brokk is moved out of the area of the reaction. The CO2 system may be used on combustibles if there is no evidence of continued pyrophoric reaction.

When the pyrophoric reaction has diminished the material is thoroughly raked and then held in the trough or in a tray in the trough or on the platform for 24 hours. After 24 hours if the temperature of the waste is greater than 3.6°F above ambient as determined by the thermal camera, the waste is raked and held for another 24 hours. After the 24-hour hold and the waste is less than 3.6°F above ambient, a drop test (Method 1050 "Test Methods to Determine Substances Likely to Spontaneously Combust"-Method A) is conducted to confirm the waste is no longer pyrophoric (ignitable). A small sample of the material is picked up with a Brokk manipulator tool elevated approximately 3 ft over the trough, then dropped. During the drop the sample is observed for smoke, flame, or incandescence. When the sample settles it is observed for 5 minutes for visible smoke, flame, or incandescence. If these conditions are observed, the material is processed again as described above. If smoke, flame, or incandescence is not observed the drop test is repeated a minimum of five additional times with independent samples until all the tests are successful and the processed waste will be placed in a processed waste container. This drop test will be conducted after the rake and hold process on waste that exhibits a pyrophoric reaction in the box line and on any indeterminate waste form.

For waste that contains < 250g of uranium, lids will be placed on processed waste containers and sealed, and containers transferred to the drum import/export glovebox (DIEG) will be placed in an appropriate drum in accordance with the Permit.

Per the requirements of EDF-11208 processed RF-762 waste containers meeting the RPT-TRUW-05 description of RF-762 as specified above and indeterminate uranium-bearing waste with > 250g of uranium will be monitored post-packaging to ensure a secondary reaction does not occur after the drum is lidded. The drums will be loaded, lids placed on the drums but not sealed, and staged in the central conveying corridor for a minimum of 96 hours.

Staged drum lids will be sealed when engineering and operational evaluations determine, based on waste temperature conditions, it is safe to seal a container and transfer it to the DIEG or if additional actions are needed.

Segregated debris remaining in the trough will be processed per Attachment 1.H.i Section D-8a(1)(a) WMF-676 Treatment Operations, Box Lines. The cleanout of the trough and trays between containers or bags discussed above will occur after the segregated debris has been processed.

In the event of a reaction while processing potentially pyrophoric (ignitable) and reactive waste streams in the box lines, controls outlined above (e.g., use of magnesium oxide to manage the reaction) will be implemented until the waste is successfully processed. Because reactions are anticipated and controlled, they do not pose a threat to human health or the environment or the operational integrity of the box line and will not require activation of the contingency plan. If the operational controls are not successful in readily controlling the reaction, necessitating on-site response of the INL Fire Department, the contingency plan will be activated. The contingency plan will also be activated in the event of a fire outside the box line trough. Other potential fires involving combustible material not associated with the waste being treated will be managed in accordance with the Contingency Plan Attachment 7, Section G-3. DEQ will be notified for all identified reactions regardless of whether the contingency plan is activated. Summary information for each reaction for which DEQ is notified will be placed in the operating record.

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

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

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

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

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

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

F-6 Interim Waste Management Strategy for the MWMUs

F-6a Background

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

F-6b Special Procedures

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

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

- Unknown wastes, wastes with unknown IDCs/WGs following RTR examination or, wastes with known IDCs/WGs but unknown HWNs, are separated from the general waste population.
- Containers identified as pyrophoric radionuclide metals are separated from the general waste population.

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

F-6b(1) Compatibility Determination

For information on compatibility determinations, see Attachment 2.

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

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

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

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

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

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

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

F-6b(5) Special Facility Modifications

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