AMWTP HWMA/RCRA Permit

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1

Section B

Facility Description

REVISION DATE: JUNE 2018
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## ATTACHMENT 1

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B. FACILITY DESCRIPTION

B-1 General Description [Idaho Administrative Procedures Act (IDAPA) 58.01.05.012; Title 40 of the Code of Federal Regulations (CFR) 270.14(b)(1)]

The Advanced Mixed Waste Treatment Project (AMWTP) is located at the Radioactive Waste Management Complex (RWMC) on the Idaho National Laboratory (INL) Site. Exhibit B-1 is a map of the INL showing the major area locations and buildings. The Transuranic (TRU) Storage Area (TSA), also located at the RWMC, includes the following mixed waste (MW) management units (MWMUs):

- Seven Type II Modules [Waste Management Facility (WMF) – 628 through WMF-634],
- A Type I Module (commonly known as WMF-635),
- The Stored Waste Examination Pilot Plant (SWEPP) (commonly known as WMF-610),
- The Advanced Mixed Waste Treatment Facility (AMWTF) (commonly known as WMF-676),
- The AMWTP Outside Storage Area located on the north west side of WMF-636, and
- An enclosed asphalt and concrete storage area (commonly known as WMF-636 Pad 2).

WMF-628 through WMF-635 collectively comprise the Waste Storage Facility (WSF). The WSF, SWEPP, and AMWTF are operated by a private entity under contract with the United States (U.S.) Department of Energy-Idaho Operations Office (DOE-ID). The MWMUs’ primary purpose is the storage, characterization, and treatment of MW. AMWTP also produces final waste forms that are certified for disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico or at another waste management unit. The AMWTP is designed to treat primarily alpha low-level waste (αLLW), TRU MW, and radioactive only waste (ROW).

A portion of the waste to be treated may also contain polychlorinated biphenyls (PCBs), which may be regulated by the Toxic Substances Control Act (TSCA). Discussion of TSCA-regulated wastes managed at the MWMUs is for informational purposes only, as PCBs
are not subject to the Hazardous Waste Management Act (HWMA)/Resource Conservation and
Recovery Act (RCRA). Comprehensive Environmental Response Compensation and Liability
Act (CERCLA) waste may be managed in the MWMUs. All CERCLA waste will be managed
in accordance with this document while in the MWMUs, but final disposition of the waste will
be managed under the CERCLA regulations.

Because the HWMA/RCRA-regulated wastes managed at the MWMUs are typically
MW, references to radiological and radiochemical data are made throughout this document.
Information on radiological and radiochemical characteristics is provided for informational
purposes only, as HWMA/RCRA applies only to the hazardous waste constituents of the MW.

Unless otherwise noted, attachments and appendices referenced in this document refer to
attachments and appendices of this document. Appendices are located at the end of this
document. Sections, tables, and exhibits cited herein refer to portions of the attachment in which
they are cited, unless otherwise noted. Drawings (typically referenced using the number format
##-####) and exhibits (typically referenced using the appendix number and a single digit as
follows: ##-#) provide additional information relevant to the MWMUs. Drawings and exhibits
included in an appendix are listed on the appendix title page. Alphanumeric or numeric
identifiers located in parentheses refer to the mechanical data sheets (MDSs) found in appendices
associated with the relevant attachment. MDSs are listed on the appendix title page. Exhibits in
Attachments are listed in the List of Exhibits at the beginning of the applicable Attachment.

Drawings are intended to provide a pictorial representation of a particular building. The
drawings provide information as to how personnel and processes flow from one area of a
building to another. All dimensions are approximate and are provided to give the viewer a scale
of size. The number and location of items depicted (gas bottles, wall mounted units, mobile
equipment, lockers in change rooms, etc.) are not exact.

**AMWTP Process Description**

The TSA stored waste slated for storage, characterization, and treatment in the AMWTP
MWMUs is retrieved from storage, characterized for storage and treatment or direct shipment,
stored in preparation for treatment or shipment, pretreated (if necessary), treated (as required),
then sent for packaging and certification (as required) for shipment to the WIPP or to another waste management unit. Containers are typically transported/transferred to, from, and within the AMWTP MWMUs using forklifts, trucks, trucks with trailers, conveyors, hand trucks, and other transport vehicles/devices. A schematic flow diagram of the processes for the AMWTP is shown in the process flow sheets, Exhibits I-1 and I-2, which are located in Appendix I. The process flow sheets represent the majority of the anticipated processes for the AMWTP and are based on design estimates.

**Preliminary Characterization**

Characterization activities occur within WMF-634, WMF-628, WMF-610, or WMF-635. WMF-634 houses real-time radiography (RTR) units, drum assay units, a box assay unit, a combined drum venting system (DVS) and headspace gas sampling unit, portable headspace gas sampling units, and a drum core sample retrieval system (DCSRS).

RTR is a type of non-destructive testing that uses radiation such as x-rays or gamma rays to produce digital images of a piece of equipment for later examination. Assay or radioassay (assay and radioassay are synonymous as used in this Permit) is used to determine or estimate the amount and isotopic composition of nuclear material (see Attachments 1.A and 2 for more information).

WMF-634 is also a unit for the treatment (via addition of absorbent to containers with liquids, decanting liquids, neutralization of liquids, repackaging of waste, the sizing of waste, macroencapsulation, or the mechanical vibration of waste) and visual examination of containers. Waste may be stored in WMF-634 while awaiting characterization, treatment (as required), and/or transport to the Type I or Type II Modules or the TSA Interim Status (IS) Units [located within the TSA-Retrieval Enclosure (TSA-RE)—designated as TSA Pads 1 and R] for storage, pending disposition. A plan view and equipment layout for WMF-634, Drawing 53-10374, and a typical traffic plan for the AMWTP, Exhibit II-1, are located in Appendix II.

Typically, containers sent to WMF-634 undergo RTR examination to determine physical waste parameters (e.g., metals, cellulosics, rubber, plastics, soil, sludge) and to detect prohibited items (e.g., liquids, elemental mercury). Prohibited, as used in this Permit, means prohibited from downstream AMWTP processes or management in a MWMU, or prohibited for disposal at the identified disposal facility. Prohibited items are described further in Attachment 2, as well as in the Facility Descriptions for the various MWMUs. The visual review of RTR images also
validates existing characterization data, or, in the case of containers with unknown contents, helps to correlate the contents of the container with known waste types. Characterization activities are described in more detail in Attachments 1.A, 1.C, 1.D, 1.E, 1.F, 1.H, and 2.

Storage

After preliminary characterization, containers are taken to the Type I Module, the Type II Modules, WMF-636 Pad 2, or the AMWTP Outside Storage Area where the containers are stored by parameters such as item description code (IDC), container type, and fissile material content. The purpose of this storage is to build up an inventory of waste to facilitate efficient treatment and direct shipment strategies.

Direct Shipment

Once characterized, certain waste containers may be determined suitable for direct shipment to the WIPP [e.g., meets the WIPP waste acceptance criteria (WAC)] or to another waste management unit.

Pretreatment

Waste containers to be treated in WMF-676 are transported from storage to the waste receiving and storage areas of WMF-676. The containers are then transferred within WMF-676 to the box lines, drum repack system, special case waste (SCW) glovebox system, or supercompactor. The primary processes contained within WMF-676 to sort the waste include the box line and the drum repack system.

Treatment

Various methods of treatment are permitted in the MWMUs. These methods of treatment are absorption, decanting, neutralization, repackaging of waste, the sizing of waste, the mechanical vibration of waste, the macroencapsulation of waste, and miscellaneous mechanical processing (e.g., supercompaction, depressurization of containers), which are performed individually or in conjunction with each other to treat the waste in the most effective manner possible. A brief description of the treatment activities is provided below. See Attachments 1.A, 1.H.i, 1.H.ii, 1.H.iii, and 1.H.iv for further information on the treatment methods.

Absorption. Liquid waste is absorbed with a compatible absorbent. Absorption of liquids in containers, sumps, or troughs may occur after decanting (if performed), to absorb any liquids that have not been decanted. Absorption may also occur during decanting by decanting
into a container with absorbent. Absorption of liquids that have previously been decanted (and potentially co-mingled) or neutralized may also occur. Co-mingling only occurs after compatibility of the wastes has been addressed.

**Decanting.** Liquid wastes are decanted from containers, sumps, or troughs into containers. The decanted wastes are then neutralized and/or absorbed. Co-mingling of decanted liquids or absorbed wastes may occur, as applicable, after compatibility of the wastes has been addressed.

**Neutralization.** Corrosive liquids are neutralized either prior to absorption or absorbed with a neutralizing absorbent. Co-mingling of neutralized liquids or the absorbed neutralized liquids may occur, as applicable, after compatibility of the wastes has been addressed.

**Repackaging.** Waste from a container may be repackaged either into another container, or into multiple containers. Waste from multiple containers may be collected in a single container after compatibility of the wastes has been addressed. While repackaging the waste, items that are prohibited for disposal at a waste management unit or prohibited for processing in the various AMWTP waste management units (e.g., supercompactor) may be removed. Repackaging may also be utilized to aid in the characterization of waste (visual examination to confirm container contents, etc.).

**Sizing.** Waste from a container may be sized for repackaging into the original container or into another container. Co-mingling of wastes will occur after the compatibility of the wastes has been addressed. Equipment that may be used for the sizing of waste includes, but is not limited to, shears, nibblers, scrapers, etc.

**Mechanical Vibration.** Containers of waste are mechanically vibrated in an effort to consolidate free liquids located within the void space of solidified waste so that the liquid may be absorbed or decanted. Mechanical vibration is not intended to separate absorbed liquid from the waste matrix. Equipment that may be used for mechanically vibrating waste includes a vibrating table or similar equipment.
Macroencapsulation. The macroencapsulation process for waste debris may be accomplished using any method meeting the macroencapsulation standard of IDAPA 58.01.05.011 (40 CFR 268.45). Below are three methods used at AMWTP:

(1) Containers of waste may be repackaged into a stainless steel container or a container with a stainless steel liner. After loading the stainless steel container/liner with waste, the stainless steel container/liner is welded closed to meet the macroencapsulation standard of IDAPA 58.01.05.011 (40 CFR 268.45).

(2) Containers of waste may be placed in a high-density polyethylene (HDPE) container/liner that is fitted with an HDPE lid. The lid is fused to the HDPE container/line using a low-temperature thermal bonding process to meet the macroencapsulation standard of IDAPA 58.01.05.011 (40 CFR 268.45).

(3) Containers of waste (i.e., drum or metal box) may be placed into a high-modulus polymeric packaging system (HMPPS) to meet the macroencapsulation treatment standards at IDAPA 58.01.05.011 (40 CFR 268.42 or 268.45).

Co-mingling of wastes to be macroencapsulated will occur only after the compatibility of the wastes has been addressed.

Supercompaction. The supercompaction process receives lidded drums of sorted waste from the box line or drum repack system areas or direct feed drums from the waste receiving and storage areas via the material transfer system (MTS). The drums of waste are punctured within a glovebox environment and then compacted by a hydraulic press that controls the shape of the resultant supercompacted puck through the use of a mold. The volume reduction for each drum is dependent on the drum contents and packing fraction, but it averages 80%. Pucks from supercompaction are placed into a puck drum, located in the postcompaction glovebox. Attachment 1.H.iii describes the supercompaction process in more detail.

SCW Glovebox System. SCW includes waste that may require additional characterization and/or pretreatment (e.g., decanting, neutralization, absorption) prior to processing or final treatment prior to disposal. Some examples of SCW that may be managed in the SCW glovebox system are listed below:
• Containers of liquids and pressurized containers removed from the original waste containers;
• Small inner containers (i.e., container removed from another container) of solidified inorganics (SI) or solidified organics (SO);
• Free liquids removed from the original waste containers and containerized prior to treatment;
• Residual liquids accumulated in the waste sort troughs in treatment areas (e.g., box line waste sort troughs, sumps) that are removed and containerized prior to treatment;
• Elementary mercury, in the form of containerized liquid, free liquid, or residual liquid; and
• Waste streams that warrant further evaluation prior to treatment.

**WSF Type II Module Description**

As shown on the RWMC/AMWTP Topographic Map, located in Appendix II, the Type II Modules (WMF-629 through WMF-633) are conveniently located near the TSA-RE (WMF-636) and WMF-676, which avoids moving wastes across public roads for characterization and treatment. Other buildings, such as the Type I Module (WMF-635) and the Waste Aggregation Facility (WAF, WMF-618), are also located near the Type II Modules. Therefore, containers retrieved from the TSA IS Units remain within the boundaries of the TSA until transport for final disposal at the WIPP or another waste management unit. The Type II Modules allow for the visual examination of waste; the repackaging of waste; the absorption, decanting, and neutralization of liquids; the sizing of waste; the mechanical vibration of waste; and the storage of containers.

The Type II Modules are pre-engineered structural steel buildings that rest on concrete foundations with sealed concrete floors. In addition to the main portion of the Type II Module, each unit has an electrical room, fire water riser room, and ventilation system. Drawing 51-9907, located in Appendix III, presents a plan view of a Type II Module. See Attachment 1.B for further information on the Type II Modules.
AMWTP Waste Characterization Facility Description

The Type II Module designated as WMF-634 is a container storage and treatment unit that is also used for waste characterization. Waste characterization operations are performed to certify waste container compliance with the applicable WAC of WMF-676, WIPP, or other waste management unit. Characterization of waste is required prior to treatment in WMF-676 and prior to shipment to the WIPP or to another non-AMWTP waste management unit. In addition to providing a container storage area, WMF-634 accommodates various characterization equipment, associated control rooms, and a drum coring room with vestibule (see Appendix II, Drawings 53-10374 and 53-10375, for additional details). WMF-634 allows for the absorption of liquids in containers by the manual addition of absorbent, the decanting of liquids, and the neutralization of corrosive liquids; it also allows for the repackaging of waste, the sizing of waste, the mechanical vibration of waste, the macroencapsulation of waste, and the visual examination of waste.

WMF-634 is divided into three ventilation confinement zones to minimize the potential for waste to be released to the environment via the air pathway. Air within WMF-634 generally flows from the outside through the clean areas into Zone 1, then into Zone 2, and finally into Zone 3. Exhaust from the Zone 2 ventilation confinement zones is drawn, via exhaust fans, through two stages of high-efficiency particulate air (HEPA) filters, then discharged via the exhaust duct and stack. Likewise, the Zone 3 air supply is drawn from the Zone 2 areas and is exhausted through three stages of HEPA filters prior to being discharged to the main exhaust duct and stack. Under normal operating conditions, uncontained waste is located only in Zone 3 areas, while Zone 1 and 2 areas remain clean (i.e., radiologically uncontaminated) and accessible to workers.

Building egress systems are provided per the National Fire Protection Association (NFPA) 101, wherein a means of egress is a continuous and unobstructed way of exit travel from any point in the building or structure to an exit. Means of egress are provided via the access corridors around and through the building.
WMF-634 is composed of the following areas:

- Personnel Support Areas
  - Personnel Access/Entry Areas
  - RTR Control Room
  - Assay Control Room
  - Drum Core Sampling Vestibule

- Storage Area

- Characterization/Treatment Areas
  - Drum/Box RTR Lines
  - Drum/Box Assay Lines
  - Drum Venting Area
  - Drum Coring Room with Treatment Area
  - Containment Enclosure
  - Macroencapsulation Area

A brief discussion of the above areas follows.

**Personnel Support Areas**

Personnel support areas are located along the north exterior wall of WMF-634. The RTR control room is located in the northwest corner of the building. The assay control room resides in the northeast corner. Additionally, the drum core sampling vestibule is located in the northeast portion of the building. Personnel access into WMF-634 is provided through entry doors located on all sides of the building. See Appendix II, Drawing 53-10374 for additional information.

**Storage Area**

The storage area, located on the south side of WMF-634, receives and stores containerized wastes. From the storage area, containers are transferred within WMF-634 to the appropriate characterization process.
Characterization/Treatment Areas

Waste characterization within WMF-634 occurs primarily in the northern half of the building. The RTR area is located in the northwestern section of the building. Adjacent to the RTR equipment, the conveyor system delivers containers to the drum assay and drum venting units, which are located immediately east of the RTR units. The box assay unit is located in the north central area of the building. The drum coring room is located in the eastern section of WMF-634 and typically receives containers via the conveyor system. Absorption of liquids in containers occurs within the drum coring room in WMF-634, either via direct addition or by the absorption of decanted liquids. Neutralization of decanted liquids also occurs within the drum coring room in WMF-634. Absorption, decanting, and neutralization of liquids; the repackaging of waste; the sizing of waste; and the visual examination of waste may occur in the drum coring room or in a containment enclosure in WMF-634. Mechanical vibration of waste may occur in a containment enclosure or it may also occur outside of a containment enclosure in an area designated for performing the operation. Macroencapsulation of waste may occur in an area designated for performing the treatment operation.

WAF Description

The WAF, commonly known as WMF-618, is a pre-engineered metal structure measuring approximately 80 feet (ft) by 50 ft. The WAF is located northwest of WMF-634. See the RWMC/AMWTP Topographic Map, located in Appendix II, for the location of the WAF at the RWMC. The function of the WAF is to provide a location for the loading of TRU Package Transporter (TRUPACT) casks or other packaging required by WIPP. To facilitate loading and unloading activities, DOT-compliant MW containers that have been certified for shipment to WIPP and are packaged in TDOPs or SWBs may be located in the WAF for up to 30 calendar days. The 30-day time limit for staging of MW in WMF-618 facilitates the normal course of transportation for this waste stream being shipped from the building [45 FR 86966 (December 31, 1980)]. This timeframe provides the necessary time to manage the transportation logistics (e.g., preparation of container assemblies to place into the shipping containers, number of shipments per week, and schedule of shipments) of MW shipments to WIPP, and to adjust to unforeseen delays in the shipping schedules due to periodic inclement weather conditions or interruption of WIPP acceptance of shipments.

The WAF may also be used for unloading TRUPACT cask or other shipping containers received from off-Site waste generators that send MW to the AMWTP for characterization and/or treatment. Off-Site waste, including off-Site waste loaded on a trailer, may only remain
within the WAF for up to 72 hours (hr) from the time the off-Site waste manifest is formally accepted by the AMWTP.

All MW containers located within the WAF, including the TRUPACT casks, are inspected weekly and each working day for leakage. This information is recorded in the Weekly and Daily Non-facility Inspection Form, and corrective actions are initiated as required.

A maximum of 104 55-gallon (gal) drums, or volume equivalent, may be located in the WAF at any given time. The storage configuration of containers is such that emergency equipment is accessible. After the TRUPACT cask or any other approved transport device has been loaded with containers and leak tested, the transport vehicle may be parked inside the WAF for a period of time not to exceed 10 working days.

**TRUPACT Trailer Staging and Storage**

Staging of transport trailers with loaded TRUPACT casks may occur on the asphalt pad to the west of WMF-635 or on the asphalt pad to the west of the TSA-RE. The staging area to the west of WMF-635 is approximately 200 ft by 250 ft, and the staging area to the west of the TSA-RE is approximately 150 ft by 1,200 ft. See the RWMC/AMWTP Topographic Map, located in Appendix II, for the areas designated for the staging of the trailers with TRUPACT casks. TRUPACTs on trailers that are staged, as described above, have completed the loading and leak analysis process necessary for shipment to the WIPP or to another waste management unit. To facilitate shipment activities, any single trailer may be staged for up to a total of 10 working days. Up to a total of 50 trailers may be staged between the two staging areas mentioned above. The staging locations of the trailers are such that access for inspections and emergency response is provided. The trailers and TRUPACT casks are inspected each working day for leakage, and corrective actions are initiated as required. If any leakage is noted, spill response will be completed in accordance with Attachment 7 and the closure of the trailer staging areas will be addressed during closure of the WSF. If no leaks/spills occur, then documentation of the termination of the use of the trailer staging areas will be placed in the Operating Record.

Staging of transport trailers with loaded TRUPACT casks may also occur within and around WMF-602. See the RWMC/AMWTP Topographic Map, located in Appendix II, for the areas designated for the staging of trailers with TRUPACT casks. To facilitate shipment activities, any single trailer may be staged for up to a total of 10 working days. Up to a total of 10 trailers may be staged in the WMF-602 staging areas. The staging locations of the trailers are
such that access for inspections and emergency response is provided. The trailers and
TRUPACT casks are inspected each working day for leakage, and corrective actions are initiated
as required. If any leakage is noted, spill response will be completed in accordance with
Attachment 7 and the closure of the trailer staging areas will be addressed during closure of the
WSF. If no leaks/spills occur, then documentation of the termination of the use of the trailer
staging areas will be placed in the Operating Record.

In the event that conditions arise which would require loaded trailers with TRUPACTs to
remain in any of the TRUPACT trailer staging areas described above for a period of time
longer than 10 calendar days, then the loaded trailers with TRUPACTs will be transferred into
one of the AMWTP waste management units (e.g., Type II Module, Type I Module, AMWTP
Outside Storage Area).

Type I Module Description

A single Type I Module, WMF-635, is located on the north end of the TSA. See the
RWMC/AMWTP Topographic Map in Appendix II. The Type I Module is a container storage
unit, which is also used for waste characterization, treatment, and preparation of containers for
shipment to the WIPP or to another waste management unit. See Appendix IV,
Drawing 51-9912 for a plan view of the Type I Module. WMF-635 also allows for the
absorption, decanting, and neutralization of liquids; the repackaging of waste; the sizing of
waste; the mechanical vibration of waste; the macroencapsulation of waste; and the visual
examination of waste. The Type I Module may also house portable headspace gas
sampling units.

The Type I Module is composed of the following areas:

- Main Storage Area (MSA),
- Payload Assembly and Aspiration Area (PAAA),
- Waste Characterization and Repackaging Area (WCRA), and
- TRUPACT Loading Area (TLA).

A brief discussion of the above areas follows.

Main Storage Area

The MSA is primarily used to receive, store, treat, and weigh containerized waste. From
the storage area, containers are transferred within the Type I Module to the appropriate
characterization process, such as the drum venting facility (DVF). The DVF, located in the
southwest corner of the MSA, is used to vent drums, insert a filter into a vented container, add
absorbent to containers with liquids, decant liquids, neutralize liquids, and perform visual
examination of containers. Drums are delivered to the DVF via a conveyor. From the DVF, the
conveyor transports drums to the PAAA. Containers that do not require venting are typically
transported to the PAAA/WCRA from the MSA, bypassing the DVF. See Appendix IV,
Drawing 51-9912 for additional information. The MSA may also include equipment for
conducting gas generation and headspace gas testing. The MSA is also identified as an area
which may be used for the absorption, decanting, and neutralization of liquids; the repackaging
of waste; the sizing of waste; the mechanical vibration of waste; and the visual examination of
waste in a containment enclosure. The MSA may also have areas for the mechanical vibration of
waste outside of a containment enclosure and for the macroencapsulation of waste.

Payload Assembly and Aspiration Area

The PAAA, located in the south central area of the Type I Module, includes storage areas
and equipment for the management of containers. Containers are typically stored in the PAAA
pending transport to the TLA for assembling and/or loading into the TRUPACT casks or to the
WCRA for gas generation and headspace gas testing. The PAAA is also identified as an area
which may be used for the absorption, decanting, and neutralization of liquids; the repackaging
of waste; the sizing of waste; the mechanical vibration of waste; and the visual examination of
waste in a containment enclosure. The PAAA may also have areas for the mechanical vibration
of waste outside of a containment enclosure and for the macroencapsulation of waste.

Waste Characterization and Repacking Area

The WCRA, located in the southeast corner of the Type I Module, includes storage areas
and equipment for conducting gas generation and headspace gas testing. The WCRA is also
identified as an area that may be used for the absorption, decanting, and neutralization of liquids;
the repackaging of waste; the sizing of waste; the mechanical vibration of waste; and the visual
examination of waste in a containment enclosure. The WCRA may also have areas for the
mechanical vibration of waste outside of a containment enclosure and for the
macroencapsulation of waste.
TRUPACT Loading Area

The TLA, located in the northeast corner of the Type I Module, includes an electrical room, storage area, and an area for assembling and loading containers into TRUPACT casks. TRUPACT casks are assembled in the TLA by retrieving containers from storage in the PAAA/WCRA and placing the containers into a payload assembly, such as a TRUPACT payload assemblage (TPA). A gantry crane is used to assist with container movement.

SWEPP Description

The SWEPP (WMF-610) is a two story building. On the main level are offices, an electrical room, a room for heating and ventilation equipment, a generator room, and a High Bay area. The second level contains personnel support areas. The SWEPP storage area (SSA), located in the SWEPP High Bay, is used to store containers of waste before, during, and pending transfer to other MWMUs. The SSA may also be used as an area for the absorption, decanting, and neutralization of liquids; the repackaging of waste; the sizing of waste; the mechanical vibration of waste; and the visual examination of waste in a containment enclosure. The SSA may also have areas for the mechanical vibration of waste outside of a containment enclosure and for the macroencapsulation of waste. SWEPP contains three assay units [two gamma ray spectrometers and one passive active neutron (PAN) unit] and an RTR unit. The gamma ray spectrometers are located in the western portion of the SSA, and the RTR and PAN assay units are located in the east central area of SWEPP. See Appendix V, Drawing 51-9906 for further information. The north and south ends of SWEPP are used as loading/unloading areas and are enclosed to assist in year-round operations. Up to two mobile units (RTR and/or assay) mounted on trailers may be installed in the loading/unloading areas.

WMF-628 Characterization Facility Description

The Type II Module designated as WMF-628 is a container storage unit that is also used for waste characterization. Waste characterization operations are performed to certify waste container compliance with the applicable WAC of WMF-676, WIPP, or other waste management unit. Up to six mobile characterization units may be located in WMF-628. The mobile units may perform RTR, gamma spectroscopy assay, PAN assay, and/or visual examination.
Additionally, portable headspace gas sampling units and gas generation testing units may be located within WMF-628. See Appendix VI, Drawing 51-10009 for further information. WMF-628 also allows for the absorption, decanting, and neutralization of liquids; the repackaging of waste; the sizing of waste; the mechanical vibration of waste; and the visual examination of waste in a containment enclosure. WMF-628 may also be used for the mechanical vibration of waste outside of a containment enclosure and for the macroencapsulation of waste.

**WMF-636 Pad 2 Description**

The WMF-636 Pad 2 is a container storage unit covered by a pre-engineered structural steel building that rests on a concrete foundation. The WMF-636 Pad 2 storage area utilized for container storage is the asphalted and concreted portions located within the structural steel building. In addition to the main asphalt container storage portion of WMF-636 Pad 2, the unit has two fire riser rooms, an electrical area, personnel support areas, and a ventilation system. Drawing 51-10038, located in Appendix VII, presents a plan view of WMF-636. See Attachment 1.F for further information on WMF-636 Pad 2. WMF-636 Pad 2 may also be used for the macroencapsulation of waste. See Attachment 1.A for additional information.

**AMWTP Outside Storage Area**

As mentioned previously, conditions may arise which would require loaded trailers with TRUPACTs to remain at the AMWTP for a period of time longer than 10 calendar days. Although loaded trailers with TRUPACTs may be stored within the center aisle space of the Type I and Type II Modules, the storage of loaded trailers with TRUPACTs within the center aisle impacts AMWTP operations. The AMWTP Outside Storage Area is located on the north-west side of WMF-636, and is approximately 89 ft by 81 ft. The RWMC/AMWTP Topographic Map in Appendix II and Drawing 51-10040 in Appendix VIII presents a plan view of the AMWTP Outside Storage Area. See Attachment 1.G for further information on the AMWTP Outside Storage Area. The AMWTP Outside Storage Area may also be used for the macroencapsulation of waste. See Attachment 1.A for additional information.
WMF-676 Description

WMF-676 is a two-story industrial structure with a rooftop mechanical penthouse and attached utility room. Overall dimensions for the WMF-676 first (ground) floor are approximately 230 ft by 275 ft (excluding the utility room). The general building height is approximately 44 ft. WMF-676 houses approximately 52,000 square feet (ft²) per floor. The rooftop mechanical penthouse encloses approximately 15,500 ft² of additional space and the roof is approximately 67 ft above ground level. The utility room, attached to the south end of WMF-676, is approximately 64 ft by 114 ft. The main stack, also on the south end of the building, extends above the roof of the utility room. The stack, actually an open, rectangular, steel frame that supports individual flues, is approximately 90 ft high. Further information on the stack can be found in Attachment 1.H.

The process portion of WMF-676 is generally described as having two levels, but many of the spaces are open from the first floor to the roof structure; others have mezzanine levels or intermediate equipment access platforms. AMWTP operations and maintenance personnel may access various work areas via corridor systems. See Appendix IX, Drawings 53-0201, 53-0207, and 53-0212 for additional information.

The ventilation within WMF-676 is managed by confinement zones to minimize the potential for waste to be released to the environment via the air pathway. Air within WMF-676 generally flows from the outside through the clean areas into areas of equal or increasing contamination. Exhaust from the ventilation confinement zones is drawn, via extract fans, through air pollution control equipment, then discharged via the main stack. See Appendix IX, Drawing 53-0624 for additional information.

WMF-676 also includes features and systems that compartmentalize WMF-676 into separate fire zones that comply with applicable Uniform Building Code (UBC) and NFPA standards. Fire compartmentalization is provided to create separate fire zones or areas of fire control within WMF-676 and create a protected means of egress from WMF-676 in the event of a fire.
Although significant portions of the WMF-676 waste management areas are not continuously manned, building egress systems are provided per the Life Safety Code (NFPA 101), wherein a means of egress is a continuous and unobstructed way of exit travel from any point in the building or structure to an exit. Means of egress comprising vertical (stairs) and horizontal travel (corridors), including intervening room spaces, are provided via the access corridors around and through the pretreatment and treatment areas of WMF-676 and stair towers. WMF-676 is composed of the following areas:

- Administrative/Personnel Support Areas
  - Personnel Access/Entry Area
  - Offices/Meeting Room Areas
  - Control Room/Computer Room Areas
  - Men’s/Women’s Clean Change Rooms
  - Backup Monitoring Room
- Subchange Rooms
- Container Import/Export Areas
  - North
    - Drum Storage Areas (A, B, and C)
    - Waste Drum Import/Export
    - Puck Drum Import/Export
  - East
    - Waste Receiving Area
    - Low-level waste (LLW) Container Import/Export Area
  - West
    - Central Conveyor System (CCS), Room 147, Area
    - Drum Assay/Storage
    - North Box Line Drum Conveyor Area
    - South Box Line Drum Conveyor Area
- Box Line Areas
Drum Repack System and SCW Area

Drum Repack System [Drummed Waste Handling Enclosure (DWHE) and Drummed Waste Packaging Glovebox (DWPG)]

SCW Glovebox System

Supercompaction Area

Maintenance Areas

Supplies Receiving Areas

Electrical Rooms

Filter Rooms

Heating, Ventilation, and Air Conditioning (HVAC) Equipment Rooms

Other Waste Storage Areas

Filter Rooms

Filter Maintenance Areas

A discussion of some of the listed areas follows, while other areas are described in Attachments 1.H, 1.H.i, 1.H.ii, 1.H.iii, and 1.H.iv.

Administrative/Personnel Support Areas

The administrative and personnel support areas are located along the south exterior wall on the first and second floor levels and are separated from the waste handling and process areas of the building. The administrative area houses AMWTP operations and shift management personnel and provides open cubicle office space. Design of the administrative portions of WMF-676 includes provisions for the physically impaired as required by American National Standards Institute (ANSI) A117.1 [DOE-ID Architectural Engineering Standards (AES) 0110]. Two main clean change rooms are provided for changing into and from protective clothing and to provide an interface between clean areas and potentially contaminated areas.

The central control room (CCR) is accessible through the administrative area and houses the majority of the WMF-676 control interface equipment. The backup monitoring room, located on the first floor near the south end of WMF-676, houses controls, monitors, and alarms which may be used for limited control and safe shutdown of WMF-676 during an emergency.
Subchange Rooms

Subchange rooms are provided within WMF-676 as a means for AMWTP personnel and supplies to pass from one ventilation zone to another without disrupting the airflow to other ventilation areas. This arrangement helps prevent the release of waste constituents into the environment via the air pathway.

Container Import/Export and Storage Areas

The waste import/export areas are located on the east and north sides of WMF-676, while the storage areas are located throughout WMF-676. The north end of the first floor contains the puck drum import/export area, waste drum import/export area, and various storage areas for containers. The puck drum import/export area consists of four conveyor sections that are used for receiving/storing empty puck drums, storing puck drums containing waste, and exporting puck drums to other MWMUs. See the general arrangement drawings in Appendix IX for further detail.

The waste drum import/export area consists of two conveyor sections that are used for importing waste drums destined for pretreatment/treatment, the storage of containers, and exporting containers from WMF-676. Drums from the import/export glovebox are exported through this area.

Storage areas A, B, and C, located at the north end of the first floor, are used for the storage of drums in the puck drum import/export and waste drum import/export conveyor sections. See the general arrangement drawings in Appendix IX for further detail.

The waste box receiving and storage area, empty drum receiving and storage area, the empty container/LLW export area, and the clean supplies receiving area are located on the east side of WMF-676. The waste box receiving and storage area, located along the central east wall of WMF-676, receives containers destined for treatment in the box lines. The empty drum receiving and storage area, located on the east wall, immediately south of the waste box receiving and storage area, is used for the receipt and storage of empty drums that are used to contain waste from the processes (e.g., box line waste sorting). The empty container/LLW export area, located along the east exterior wall near the south end of the process portion of the
building, receives empty containers used in the WMF-676 processes. In addition, containers containing LLW (sized-reduced empty containers) are stored in this area pending transfer out of WMF-676. The supplies receiving area, directly north of the empty container/LLW import/export area, receives various non-waste supplies needed for WMF-676.

Room 147 is located on the west side of WMF-676. This area consists of a storage area serviced by a drum-handling robot and conveyor sections, which are used for the transfer of waste and empty drums. Waste drums are stored in this storage area pending treatment or assay. Empty drums are stored pending use in the processes.

**Box Line Areas**

Waste sorting within WMF-676 occurs primarily in the box lines. WMF-676 currently contains two box lines, located on the central south side of the second floor of the building. A series of first floor conveyors and elevators feeds empty containers up to the second floor box line sorting areas. The empty containers are filled with waste from the box lines, lowered to the box line/drum conveyor areas, lidded at one of two automated drum lidded stations, and transferred to downstream treatment or to the import/export glovebox (located in Room 126B). Filled containers being transferred to the import/export glovebox are not lidded for up to 72 hr. See Attachment I.H for additional information.

**Drum Repack System and SCW Area**

The drum repack system and SCW area is located on the north end of the second floor and occupies an area approximately of 75 ft by 38 ft. The SCW glovebox system (located on the south side of the room) consists of the following sections: transfer glovebox, treatment glovebox, sampling glovebox, container-in-container glovebox, and bag-out transfer ports. Containers are received into the SCW glovebox system through an airlock and elevator that interfaces with the MTS on the first floor.

The drum repack system consists of a drum waste handling enclosure (i.e., DWHE) and a drum waste packaging glovebox (i.e., DWPG). Containers are received into the DWHE through an airlock door and elevator that interfaces with the MTS on the first floor. The DWHE consists of a container opening station with a ventilation hood, sorting cart(s), container lifting/tipping
equipment, various tools/equipment, an empty container crushing machine, and an area for the storage of waste containers. The DWPG portion of the drum repack system is used for the repackaging of waste into containers. A drum opening hood enclosure (DOHE) is used to further contain activities within the DWHE. A door in the DOHE allows for personnel access between the DWHE and the DOHE, and also provides access for the transfer of equipment and waste. See Attachment 1.H.ii for additional information.

**Supercompaction Area**

The supercompaction area is located on the north side of WMF-676 in an area of the first floor that is open to the second floor. The area consists of a venturi glovebox, the infeed glovebox, the supercompactor glovebox, and the postcompaction glovebox. Containers that are destined for supercompaction are conveyed into the infeed glovebox, where they are prepared (i.e., punctured) for supercompaction. From the infeed glovebox, containers enter the supercompactor, where they are compacted with a hydraulic press. Once compacted, the pucks are transferred to the postcompaction glovebox. The postcompaction glovebox contains a puck storage area and a puck drum loading area. Typically, up to five pucks are loaded from the storage area into a puck drum. Once fully loaded, the puck drums are transferred out of the postcompaction glovebox, via conveyors, to the drum storage areas; from there, the containers are transferred out of WMF-676. See Attachment 1.H.iii for additional information.

**Maintenance Areas**

Areas for maintenance of process equipment are located within WMF-676. The preferred location for performing maintenance activities is within the area where the equipment is located, particularly if the equipment is located in a higher ventilation confinement (e.g., Zone 3) area. An equipment maintenance area (Room 224B), located on the second floor south of the box lines, is provided for performing maintenance on contaminated equipment. Maintenance of equipment that is not contaminated may occur in the Zone 1 maintenance area (Room 115) on the first floor. An electrical and instrumentation maintenance area (Room 161) is also located on the first floor.
**HVAC Equipment Rooms**

The main HVAC equipment rooms for the waste management areas are located in the rooftop penthouse above the central portion of the building. A HEPA filter room is located on the second floor along the east wall of the building. Terminal filter rooms are provided for local process area air filtering. Localized terminal filters are located on the west end of the drum repack and SCW area (Room 236). A terminal filter room is located just south of the supercompactor room (Room 142B), while another is located south of the south box line/drum conveyor area (Room 122A).
Exhibit B-1. Map of the INL Site Showing Major Area Locations
B-2  Topographic Map [IDAPA 58.01.05.012; 40 CFR 270.14(b)(19)]

A topographic map of the RWMC/AMWTP providing the information required by
IDAPA 58.01.05.012 [40 CFR 270.14(b)(19)] is included in Appendix II.

B-3  Location [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.18 and
270.14(b)(11)]

B-3a  Seismic Standard [IDAPA 58.01.05.008 and 58.01.05.012;
40 CFR 264.18(a) and 270.14(b)(11)(i) and (ii)]

The RWMC is located in Butte County, Idaho. Butte County is not listed in
IDAPA 58.01.05.008 (Appendix VI to 40 CFR 264) as a county that requires demonstration of
compliance with IDAPA 58.01.05.008 [40 CFR 264.18(a)].

B-3b  Floodplain Standard [IDAPA 58.01.05.008 and 58.01.05.012;
40 CFR 264.18(b) and 270.14(b)(11)(iii) and (iv)]

A 2001 flood evaluation study (“100-Year Floodplain and 25-Year Runoff Analyses for
the Radioactive Waste Management Complex Area at the Idaho National Engineering and
Environmental Laboratory,” T. Mitchell, S. Mitchell, J. Humphrey, D. Kennedy, and
T. Funderburg, December 2001) analyzed the extent of a 100-year (yr) floodplain. Based on this
analysis, there are no MWMUs located within the 100-yr floodplain at the RWMC. This
document is provided in the Supplemental Information section of the permit application.

A 2005 flood evaluation study (“Big Lost River Flood Hazard Study, Idaho National
Laboratory, Idaho, US Bureau of Reclamation, 2005,” D. A. Ostenaa and D. H. O’Connell,
November 2005) also analyzed floodplain extent and determined the RWMC is out of the 100-
year floodplain. This study is located in Appendix III of the “HWMA/RCRA Part B Permit
Application for the Idaho National Laboratory - Volume 3 General Information for INL Waste

A 2007 storm evaluation study (“25-Year, 24-Hour Storm Evaluation for the Advanced
Mixed Waste Treatment Project,” M. Varvel, April 2007) analyzed the 25-year, 24-hour storm
and determined there were no storm impacts within the AMWTP boundaries. This document is
provided in the Supplemental Information section of the permit application.
B-4  Traffic Information [IDAPA 58.01.05.012; 40 CFR 270.14(b)(10)]

U.S. Route 20/26 is the general access route to the RWMC and the AMWTP. Van Buren Boulevard intersects U.S. 20/26 northeast of the RWMC and the AMWTP and is the direct access road leading to the Experimental Breeder Reactor I (EBR-I). Adams Boulevard intersects Van Buren Boulevard just north of EBR-I and is the direct access road leading to the RWMC and the AMWTP. East of the bridge located on Adams Boulevard is a road that is designated as the primary access road for the AMWTP. This road runs along the outside of the RWMC perimeter fence and is designated as the RWMC North/South Road. Primary access to the AMWTP area is gained via use of this road and one of the gates located on the south end of the TSA. Typically, waste shipments to and from the AMWTP/RWMC travel via Adams Boulevard and Van Buren Boulevard. The heaviest traffic on the roads leading to the RWMC and the AMWTP occurs between 6:00 and 8:30 a.m., and again from 4:00 to 6:30 p.m., Monday through Friday. The morning traffic primarily consists of employees driving to work, as well as passenger buses transporting employees to work. The evening traffic primarily consists of employees leaving work. From Memorial Day until Labor Day, passenger vehicle traffic increases slightly on Van Buren Boulevard as tourists visit EBR-I.

Adams Boulevard is made of asphalt. The local runoff flood channel bridge on Adams Boulevard is designed to be consistent with the Adams Boulevard roadway. The Adams Boulevard roadway total vehicle capacity of the bridge is 78 metric tons; this assumes special overload vehicle axle load combinations of 76,100 pounds (lb) (3 axles at 12,683 lb/wheel), 81,300 lb (2 axles at 20,925 lb/wheel), and 15,000 lb (1 axle at 7,500 lb/wheel). The typical daily volume of vehicles on the TSA access roads is about 125 to 130 vehicles, mainly cars and trucks.

Employee Traffic

All employees enter the AMWTP through a controlled access point near WMF-684 (see Appendix II, AMWTP Traffic Patterns and Frequency and RWMC Traffic Sign Plan, Items 3 and 4). Employee-owned vehicles are not allowed to enter the TSA, unless security has cleared the vehicle to enter. Employees traveling within the TSA either walk or are transported by contractor or federally owned vehicles.
Operations Material Supply Traffic

Typically, supply vehicles that support operations enter the AMWTP area through the south gate, which is dedicated for AMWTP operations. Usually, this traffic travels to the MWMUs buildings on a road located near WMF-676. Vehicles may also enter the AMWTP area through the main RWMC gate at WMF-637.

Traffic Control Signs, Signals, and Procedures

Traffic control procedures within the AMWTP controlled areas support plant operations, maintenance, and on-Site delivery and shipments. These traffic procedures are implemented using standard highway traffic control and informational signs. No traffic signals are required for the AMWTP. The typical sign types that may be used, if required, in the AMWTP area are listed in the following table.

<table>
<thead>
<tr>
<th>SIGN TYPE</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP</td>
<td>Access gates and some plant road intersections, as necessary</td>
</tr>
<tr>
<td>CLEARANCE</td>
<td>Where electrical lines pass over the roadway and restrict traffic</td>
</tr>
<tr>
<td>SPEED LIMIT</td>
<td>Various signs on each roadway, as necessary</td>
</tr>
<tr>
<td>DIRECTIONAL</td>
<td>Various roadways indicating traffic flow direction, as necessary</td>
</tr>
<tr>
<td>INFORMATIONAL</td>
<td>Various roadways indicating facility locations, receiving, loading, unloading, and visitor areas</td>
</tr>
</tbody>
</table>
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.A

Section D

WMF-634 Process Information

Revision Date: October 18, 2019
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ATTACHMENT 1.A

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D. PROCESS INFORMATION

D. WMF-634 Design

WMF-634 is used to store, characterize, and treat ROW and MW. A total of seven Type II Modules currently exist. This attachment covers only one module, WMF-634. Wastes currently in storage, as well as newly generated waste from on- and off-Site generators, may be moved to, stored, characterized, and treated in the WMF-634 Type II Module.

Unless otherwise noted, drawings referenced in this attachment are located in Appendix II.

WMF-634 houses a number of activities, which include:

- Receiving and storing waste containers for characterization;
- Examining containers using RTR;
- Processing drums, as required, through the DVS in which a HEPA filter is inserted to vent radiolytically generated hydrogen (H₂) gas and/or performing headspace gas sampling;
- Radiological surveying of containers;
- Treating liquids in containers, as required, by the addition of absorbent;
- Decanting of liquids from containers, as required, in the DCSRS;
- Neutralization of liquids in a container in the DCSRS;
- Drum coring, as required, and core sample preparation in the DCSRS;
- Repackaging of waste from one container into another container(s);
- Sizing of waste such that the waste may meet size constraints for subsequent waste management activities;
- Mechanical vibration of waste in a container; and
- Macroencapsulation of waste.

The physical layout of the equipment in WMF-634 is shown on the general arrangement drawing (see Drawing 53-10374). The equipment layout matches the sequence of operation in a
west to east flow. Containers are received into WMF-634, and are off-loaded and stored on the south side of the building. As each container is placed into its designated input storage area, the container's barcode label is scanned to update the container's location information maintained in the AMWTP data management system (DMS). Typically, the first characterization operation performed on containers is RTR examination. RTR is used to determine the waste material parameters and detect prohibited items and special conditions. RTR examination is also used to validate existing waste characterization data, or in the case of unidentified waste containers, to correlate the contents of the container with known waste types from generator sites. The RTR equipment can process containers with dimensions up to 58.5” wide by 78” high by 98” long.

Drums identified as requiring venting and/or headspace gas analysis may be transferred to the DVS. If previously vented drums require headspace gas sampling, this can be performed using portable headspace gas sampling units. The WMF-634 DVS system performs an automated process of partially inserting a self-drilling and self-tapping HEPA filter, which penetrates the drum lid and liner (if present). If required, a sample of the internal headspace gas is then drawn through the HEPA filter sample port and directed to analytical equipment. The filter vent is then seated against the container lid. The DVS system is also able to perform an automated process of drilling a hole, which penetrates the lid of a container. A HEPA filter may then be inserted into the hole and seated against the lid of the drum or a HEPA filter with an adhesive surface (e.g., paper HEPA filter) may be placed over the hole in the drum lid. At all times during the operation of fitting the HEPA filter and taking samples of gas, the container is located in a continuously ventilated chamber. The ventilation system of the DVS is HEPA filtered prior to discharge to the WMF-634 main exhaust stack. The filter vent insertion operation is performed within a purged housing that seals against the container lid to minimize the spread of contamination. As required, containers are sampled for potential flammable headspace gases.

Containers are radioassayed to determine the amount of fissile material present in each container. The containers are assayed in order to determine or estimate the amount and isotopic composition of nuclear material, TRU isotope activity, and decay heat. The data are used to implement criticality control throughout the AMWTP waste management units. Containers may be radioassayed either with fixed assay equipment or with portable radioassay equipment, commonly referred to as “fast” assay. Drawing 53-10374 presents a plan view layout of the
fixed radioassay equipment located within WMF-634. The fixed radioassay equipment provides an accurate determination of the amount of isotopic composition of the nuclear material within a container. The “fast” assay equipment provides an estimate of the level of fissile material present in a container by passive means. If performed, “fast” assay results are not used for waste characterization activities, but provide AMWTP personnel with a general idea if a container will characterize as TRU or LLW to allow for the optimization of AMWTP operations. In order to perform “fast” assay, the portable radioassay equipment may be located within the center aisle space of the WMF-634. A minimum of 16 ft center aisle space will be provided in areas where “fast” assay is being conducted.

Drums identified for core sampling, visual examination, and/or treatment are typically diverted to the drum coring room, while all other containers are transferred to the output storage area. The drum is moved to the DCSRS conveyor and transferred into the DCSRS for coring, examination, and/or treatment. Drawing 53-10374 presents a plan view layout of the drum coring room and the DCSRS. Upon completion of the coring, the core sample is transferred to the sample preparation glovebox, and absorbent is added to the container, as required. Waste in containers may also be taken into the DCSRS without performing the coring operation, in order to absorb liquids, decant liquids, neutralize liquids, perform visual examination, repackage waste, and size waste. These containers are typically examined visually prior to treatment. Upon completion of operations in the DCSRS (e.g., treatment, coring), a lid is placed onto the container, and the drum is then removed from the DCSRS and transferred to the output storage area of the building. Sample preparation is performed in the sample preparation glovebox. Samples for volatile organic compound (VOC) analysis of hard sludge material are collected from the core and transferred to suitable, sealed containers as quickly as practicable to reduce the potential for loss of VOCs. All samples are transferred out of the glovebox and packaged appropriately for transport to an independent laboratory for analysis.

Waste treatment in WMF-634 may also be conducted in a containment enclosure (absorption, decanting, neutralization, repackaging, sizing, and mechanical vibration) or outside a containment enclosure (mechanical vibration and macroencapsulation). A containment enclosure is a moveable, non-permanent structure used to provide contamination control during container management. Containment enclosures may be mounted to the floor using anchor bolts,
as necessary. All anchor footing floor penetrations are constructed and sealed such that the integrity of the secondary containment system is maintained. Information on how penetrations are made to a secondary containment coating and how the integrity of the secondary containment coating is maintained is kept as part of the Operating Record. Containment enclosures are divided into at least two sections, one section for providing a radiological contamination buffer area and another section for performing operations. Additional sections may be added to provide for additional radiological contamination control, as required. Air flows from the outside of the enclosure into the various sections of the enclosure (e.g., containment area, operations area). Air from the operating area of the enclosure is vented through a HEPA filter outside of the enclosure. An enclosure may contain a gantry chain area with cranes, inspection/treatment stations, and roller conveyors for moving containers. However, equipment within the enclosure will vary depending upon the type of operation being performed.

**Treatment.** Various methods of treatment are performed in WMF-634: absorption, decanting, and neutralization of liquids; the repackaging of waste; the mechanical vibration of waste; and the macroencapsulation of waste. These methods are performed individually and in conjunction with each other to treat the waste in the most effective manner possible. Treatment operations typically include:

- Repackaging of waste from a container(s) into another container(s);
- Physical sizing of waste from one container such that the waste may meet size constraints for subsequent waste management activities;
- Co-mingling of compatible waste from multiple containers during the repackaging and sizing process;
- Decanting liquids in containers;
- Decanting liquids into containers with absorbent;
- Adding absorbent to liquids;
- Neutralizing liquids in containers;
- Simultaneous absorption and neutralization of liquids by adding a neutralizing absorbent to liquids (either prior to or after the liquid is added);
• Decanting followed by neutralization then absorption;
• Absorption followed by decanting and further absorption;
• Co-mingling of compatible liquids prior to neutralization and/or absorption;
• Co-mingling of compatible absorbed liquids;
• Mechanically vibrating waste so that free liquids may be absorbed and/or decanted;
and
• Placing waste into a stainless steel container/liner or HDPE container liner to meet the macroencapsulation treatment standard specified at IDAPA 58.01.05.011 (40 CFR 268.45); or placing waste into a HMPPS to meet the macroencapsulation treatment standards at IDAPA 58.01.05.011 (40 CFR 268.42 or 268.45).

The methods of treatment are summarized below. When more than one treatment is performed on a waste, the individual operations may be combined.

**Absorption.** The treatment objective of absorption is to select a suitable absorbent material to absorb any free liquid waste. Prior to absorption, the compatibility of the liquid with the absorbent being used is addressed and documented, as required. Compatibility evaluations are typically performed through process knowledge and/or RTR examination. See RPT-ESH-014 which is included in the Supplemental Information section of the permit application, for the compatibility evaluation. Absorbent materials are also checked for compatibility with the waste types, and stored accordingly in the MWMUs. The following are the general steps that are used during the absorption/treatment process:

• The volume of waste to be treated is estimated.
• The amount of appropriate absorbent [selected based upon visual examination, process knowledge, acceptable knowledge, or other appropriate means (e.g., water miscibility)] is estimated.
• The absorbent is added to the liquid.
• The absorbent and waste may be mixed, if required.
• Treated waste is visually inspected for signs of free liquids. If no free liquids are present, the treatment is considered successful.
• If the absorption is not effective, the cause of the process failure is evaluated. If insufficient absorbent was used, the process may be repeated with additional absorbent.
The steps outlined for absorption are repeated no more than three consecutive times. If a treatment is unsuccessful after three attempts, the adequacy of the procedure is analyzed and continued treatment is handled on a case-by-case basis in consultation with the State of Idaho Department of Environmental Quality (DEQ).

Initial testing of absorbents has been conducted to determine an appropriate absorbent material for the types of wastes present in the AMWTP inventory. The criteria for evaluation included stability, pH, sorbent capacity, sorbency rate, curing time, composition of sorbent, sorbent dust production potential, and free liquid/sorbent combination response to temperature extremes (freezing and elevated) similar to those experienced during shipping. Based upon the testing of the performance of absorbents, it has been determined that Aquaset, Aquaset II, and Aquaset IIG may be used for the absorption of aqueous liquids. Additional evaluation indicated that Petroset IIG, also manufactured by Fluid Tech Inc., meets the requirements for the treatment of organic liquids via absorption. For additional information, see “PUREX Waste Solidification,” Savannah River Technology Center, WSRC TR-2001 00526, Revision 1, which is located in the Supplemental Information section of the permit application.

A second supplier of absorbents, Nochar, supplies Petro Bond N990 and Acid Bond A610. Petro Bond has been tested and found to be effective at absorbing oils and organic liquid at a waste:absorbent ratio of approximately 1:1. Acid Bond has been tested and found to be effective at absorbing acidic and basic liquids. Acid Bond is routinely mixed at a waste:absorbent ratio of 8:1 when the waste is neutral to slightly basic, 4:1 when the waste is basic, and approximately 1:2 when the waste is acidic. Actual waste:absorbent ratios are determined using operating instructions. Additionally, Petro Bond and Acid Bond may be combined to absorb liquids with both aqueous and organic components. The results of treatability testing indicate that Nochar’s Petro Bond and Acid Bond meet the requirements for the treatment of liquids via absorption. Based upon the testing and performance of absorbents, it has been determined that Petro Bond N990 and Acid Bond A610 may be used for the absorption of liquids. For additional information, see “Aqueous and Oil/Organic Liquid TRU Waste Solidification Method Test Plan and Report,” Rocky Flats Environmental Technology Site, PRO 1582 PQP/PQR, Revision 0, which is located in the Supplemental Information section of the permit application.
A third supplier of absorbents, Celite, supplies Microcel-E. Microcel-E has been tested and found to be effective at absorbing oils and organic liquid. The results of the treatability testing indicate that Celite’s Microcel-E meets the requirements for the treatment of organic liquids via absorption. For additional information, see “Absorbent Optimization for Advanced Mixed Waste Treatment Project Organic Set-ups Statement of Work,” Resodyn Acoustic Mixers, Revision 1, which is located in the Supplemental Information section of the permit application.

A fourth supplier of absorbents, WaterWorks, supplies SP-400. SP-400 has been tested and found to be effective at absorbing aqueous liquid. The results of the treatability testing indicate that WaterWorks SP-400 meets the requirements for the treatment of aqueous liquids via absorption. For additional information, see “Long Term Stability Testing Results for Savannah River Site Organic and Aqueous Wastestreams,” WM2008 Conference, February 24–28, 2008, Phoenix, AZ, Abstract #8116, which is located in the Supplemental Information section of the permit application.

**Decanting.** The treatment objective of decanting is to remove a sufficient volume of free liquid so that the free liquid remaining in the original container, sump, or trough can be treated through the addition of absorbent, as described above, and/or to transfer the decanted liquid into another container. The primary method for decanting liquids is to use equipment (e.g., disposable pipettes, pumps, ladles, cups, drip pans, drill) to transfer liquid into a container that is located in a drip pan or some other type of liquid containment device. Efforts will be made to minimize the spread of MW contamination during waste transfer using drip pans and other equipment, as described above. The decanted liquid is typically absorbed after selecting a suitable absorbent material to absorb the free liquid. The following are the general steps that are used during the decanting treatment process:

- The volume of liquid waste to be treated is estimated.
- The appropriate container size is estimated.
- The free liquid is decanted from the original container, sump, or trough and placed in a second container. Absorbent is added to the second container either prior to or after the liquid waste is added to the container, if required.
- Additional absorbent is added to the treatment container, sump, or trough, as required, and the absorbent and waste may be mixed, if required.
Any free liquid remaining in the original container, sump, or trough is treated via absorption and/or neutralization.

**Neutralization.** The treatment objective of neutralization is to adjust the pH of liquid waste to a desired range for absorption. The desired pH, which depends on the waste type and determines the specific absorption agent(s) to be used, is established prior to conducting treatment. The following information presents the general treatment steps that are used in neutralizing a liquid waste:

- The weight or volume of the waste is determined and recorded.
- A pH measurement is taken.
- The appropriate types and amounts of neutralizing agents are weighed/measured out and added. The primary acidic neutralizing agents include acids, such as citric acid. The primary basic neutralizing agents include bases, such as calcium carbonate.
- The treatment agents and waste are mixed.
- A pH measurement is taken to verify results against the pH end-point established to confirm treatment effectiveness.
- If the neutralization is not effective, the cause of the process failure shall be evaluated. If insufficient reagents were used, the process may be repeated with additional reagents.

The steps outlined for neutralization are repeated no more than three consecutive times. If a treatment is unsuccessful after three attempts, the adequacy of the procedure is analyzed and continued treatment is handled on a case-by-case basis in consultation with the DEQ.

Once neutralized, the liquid may be mixed with appropriate absorbents, unless the neutralizing agent is also an absorbent.

**Repackaging/Sizing of Containers.** The treatment objective of repackaging and sizing waste will vary upon the waste being managed. For example, typical objectives of repackaging/sizing include:

- Transferring the contents from a container with poor integrity into another container with acceptable integrity.
- Transferring the contents from one container (e.g., box) into different container(s) (e.g., 55-gal drums) in preparation for downstream processing (shipping, headspace gas sampling, etc.).

- Transferring the contents of multiple containers into a single container.

- Transferring the contents of a single container into another container.

- Removing items prohibited from downstream AMWTP processes (e.g., supercompaction) or items prohibited from disposal at the identified disposal facility (e.g., WIPP).

- Physically reducing the size of waste such that the waste is acceptable for subsequent waste management activities.

**Mechanical Vibration.** The treatment objective of mechanical vibration is to consolidate free liquids that are located within the void space of a solidified waste so that the liquid may be treated, as required. Mechanical vibration is not intended to separate solidified liquid waste from a waste matrix. The primary method for consolidating free liquids is to use equipment (e.g., vibrating table) to move liquid from the waste matrix to the sides, bottom, and/or top of the container. This liquid can then either be absorbed or decanted, as required.

Upon completion of the mechanical vibration process, containers will undergo RTR examination to verify that the mechanical vibration was effective in consolidating the free liquids. Other treatment allowed under the AMWTP HWMA/RCRA Permit (e.g., absorption, decanting, repackaging), if required, may be performed prior to RTR examination. If RTR examination indicates that all of the free liquids have not been consolidated, then mechanical vibration may be performed again in an effort to consolidate the remaining free liquids. RTR examination shall be performed after mechanical vibration has been completed to determine the effectiveness of the mechanical vibration.

Mechanical vibration may either be performed in a containment enclosure or in an area with a secondary containment system that is designated for performing mechanical vibration. If mechanical vibration is performed outside of a containment enclosure, then the container will be overpacked prior to performing the treatment. If the mechanical vibration is performed inside a containment enclosure, then overpacking of the container is not required.
Macroencapsulation. The treatment objective of macroencapsulation is to meet the LDR treatment standard for mixed low-level debris waste and radioactive lead solids specified at IDAPA 58.01.05.011 (40 CFR 268.45, 40 CFR 268.42). The LDR treatment standard for mixed low-level debris may be met in any of three ways: 1) using a stainless steel container or container with a stainless steel liner, 2) using an HDPE encapsulation system, or 3) using the HMPPS. The HDPE encapsulation system and the HMPPS also meet the LDR treatment standard for radioactive lead solids. All of these macroencapsulation processes are described in further detail below. Regardless of the method used, the goal of performing macroencapsulation is to completely encapsulate the debris waste/radioactive lead solids and to provide a jacket of inert material that substantially reduces surface exposure to potential media.

Stainless Steel Container or Container with Stainless Steel Liner

The stainless steel container/liner is resistant to degradation by the debris and its contaminants and materials to which it may come into contact after disposal (e.g., leachate, other waste, microbes). All stainless steel containers/liners are continuously welded to ensure complete encapsulation. Liquids are not placed into a stainless steel container/liner. The presence or absence of liquid is confirmed either through RTR or visual examination.

Prior to placing waste into a stainless steel container/liner, the container/liner shall be inspected to ensure the integrity of the stainless steel container/liner. Upon placing waste into a stainless steel container/liner, the stainless steel container/liner will be continuously welded closed. Upon performing the welding of the stainless steel container/liner, the weld will be inspected by a certified welding inspector to ensure proper closure. Precautions to prevent ignition of ignitable waste during the welding process are provided in Attachment 6.

HDPE Container with HDPE Lid

Like the stainless steel container/liner, the HDPE container/lid is resistant to degradation by the debris and its contaminants and materials to which it may come into contact after disposal (e.g., leachate, other waste, microbes). Liquids are not placed into an HDPE container. The presence of liquid, or absence of, is confirmed either through RTR or visual examination.
Prior to placing waste into an HDPE container, the HDPE container/lid shall be inspected to ensure the integrity of the HDPE container/lid. Upon placing waste into an HDPE container, the container is fitted with an HDPE lid. Electrical wires embedded in the lid are connected to a control unit, which controls and monitors electrical heat distribution as the lid is sealed to the container.

**High Modular Polymeric Packaging System**

Like the stainless steel container/liner and the HDPE container/lid, the HMPPS is resistant to degradation by the debris and its contaminants and materials to which it may come in contact after disposal (e.g., leachate, other waste, microbes). Liquids are not placed into an HMPPS container. The presence or absence of liquid is confirmed either through RTR or visual examination.

The HMPPS is a three-component bag system made from high-strength polyethylene, polypropylene, and/or PVC-coated nylon specifically formulated to resist contaminants and leachate. It consists of a zippered, 12-oz. non-woven polypropylene and 3-oz. woven polypropylene inner liner with 700-lb triple wall cardboard inserts to support structural shape and to protect the middle liner from damage. The middle liner is either a 12-mil reinforced polyethylene with a sliding zipper-type seal and tape closure or PVC-coated nylon with a water and gas tight zipper. The outer shell is a 12-oz. non-woven polypropylene and 10-mil coated polyethylene with a zipper closure. The outermost bag protects the middle liner from damage and is a Department of Transportation (DOT) certified package for shipping to treatment, storage, and disposal facilities.

During any macroencapsulation treatment process, all containers will be inspected per the schedule provided in Attachment 4. All containers used for macroencapsulation shall be managed in accordance with Section D-1a(2) when in storage. A list of containers approved for macroencapsulation is provided in Section D-1a(1).
Fill and Grading

The areas on which the Type II Modules are constructed were graded prior to construction. The area between the modules is graded from a high point midway between the modules to provide drainage away from the modules. This drainage is provided via a 2 % slope to the north and south and approximately 1% slope to the east and west from the mid-point between the buildings. The run-off is channeled into drainage ditches or culverts running north-south along the east and west sides of the modules. These ditches/culverts, in turn, slope northward with a 1% slope to provide run-off drainage away from the Type II Modules and into the main RWMC drainage ditch. See Drawing 52-1900 for the WMF-634 grading plan.

The modules are located on the east side of the TSA as shown on the RWMC/AMWTP Topographic Map, located in Appendix II. As the map shows, WMF-634 is the southern-most module, and a road oriented north-south is located on both the east and west sides of the Type II Modules. The roads are paved with asphalt. Backfill compaction is 95% of maximum density. To minimize slab frost heave and to prevent slab cracking, a layer of nonfrost-susceptible granular fill was placed over the graded area prior to placing the foundation. The fill thickness is from 6 inches (in.) to 5 ft.

The fill material used was select pit run gravel available at on-Site gravel pits. Leveling coarse material used was a mixture of crushed gravel, crushed stone, and natural or crushed sand. Backfill material consists of soil material free of: clay, rock, and gravel larger than 3 in.; debris; frozen materials, or vegetable material. All soil materials used comply with the American Association of State Highway Testing Officials (AASHTO) M145 soil classification Groups A-1, A-2-4, A-2-5, and A-3.

Foundations and Floors

The foundation and floor requirements for WMF-634 are the same as those identified in Attachment 1.B for the other Type II Modules addressed in this document. The following additional requirements are specific to WMF-634.

The floor of the coring room is thickened to provide structural support for the coring room walls and elevated slabs. The floor of the coring room is a 14-in.-thick concrete slab,
reinforced with two layers of #5 reinforcing steel spaced at 12-in. increments in each direction in the top and bottom of the concrete slab. The concrete slab was placed directly on the existing structural backfill, as excavated, to accommodate the 14-in. depth of the concrete slab.

Characterization and other equipment are mounted to the floor using anchor bolts and vibration-dampening pads, as necessary. Interior enclosures are attached to the floor using anchors or concrete footings. All anchor and footing floor penetrations are constructed and sealed such that the integrity of the secondary containment system is maintained. A 6-in.-thick by 6-in.-high concrete curb surrounds the open storage area. In addition, a 4-in.-high concrete curb surrounds the drum coring room in WMF-634. Curbing was also placed at the entrance doors to the RTR and assay control room. Ramps at the emergency egress doors in the RTR and assay control rooms slope from the 6-in.-perimeter containment curb to the floor, and they are typically constructed of concrete or steel.

**Structural Parameters**

The structural parameters for WMF-634 are the same as those identified in Attachment 1.B for the other Type II Modules addressed in this document. The following structural parameters are specific to WMF-634. See Drawing 53-10374 for a general arrangement drawing of WMF-634.

WMF-634 interior walls are insulated with a vinyl, vapor-barrier-backed fiberglass insulation. The overhead doors located on the east and west ends of the building, as well as all personnel doors located on the exterior walls, are insulated steel doors.

The RTR and assay control rooms are located along the north wall and sit on the concrete pad that makes up the floor. Both rooms have interior access doors and exterior emergency egress doors and are constructed of steel studs with sheet rock walls. The drum coring room is located toward the northeast central section of WMF-634. It is of block construction and has two personnel access doors, two emergency egress doors, and one roll-up type door for equipment access.
**Heating, Ventilation, and Air Conditioning System**

The HVAC system for WMF-634 conforms to the requirements of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). WMF-634 is heated and ventilated by a once-through air distribution system, which is used to control carbon monoxide (CO) accumulation from equipment and vehicle operations. The ventilation system is only operated as required to maintain CO within acceptable levels. Heat is supplied by four indirect fired propane unit heaters, located inside. Two propane-fired makeup air heaters, located outside, preheat makeup air entering the building. The makeup air heaters are supplied with fans, inlet filters, bird screens, and insulated ducting to direct the preheated makeup air into the module via wall penetrations. See Drawing 53-10374 for the location of heaters.

The control rooms are supplied with independent electric HVAC units, whereas the coring room is heated indirectly by drawing air in from the module. Direct expansion air cooling coils are provided to control the coring room temperature. The control rooms and the coring room are normally air conditioned.

Preheated ventilation air is supplied to the building through associated ductwork and multiple transfer air grilles. The grilles are located along the base of the north and south walls of the building. Manual dampers are provided in the ducting to balance the makeup air flow to each wall penetration. A motorized parallel blade damper is also provided at each wall penetration to isolate makeup air in case of a fire. The building air is exhausted through multiple exhaust grilles and associated ductwork connected to a single ground-mounted exhaust fan and then through a single exhaust stack.

The makeup air heater intakes consist of louvers fitted with a rain hood and bird screen. A filter assembly inside the heater cabinet filters out particulates from the incoming air. Each air intake is designed for an intake of 6,400 cubic feet per minute (cfm). The filters are of nonwoven cotton fabric media and are disposable. The filters are rated by Underwriters Laboratories (UL) as Class II. See Attachment 1 for additional information on the ventilation system in WMF-634.
Electrical Power

The electrical system for WMF-634 complies with the National Electrical Code (NEC), the NFPA, the National Electrical Manufacturers Association (NEMA), and the Occupational Safety and Health Administration (OSHA). See the electrical one-line diagram, Drawing 54-9926, and Site utilities (underground yard piping plan), Drawing 56-1901.

WMF-634 receives electrical power from a nearby 3-phase, 277/480-volt (V), 12.5-kiloVolt (kV) stepdown transformer. Service disconnects are located as close as practicable to the exterior service entrance. The system is grounded and equipped with circuit breakers.

Lighting

The lighting requirements for WMF-634 are the same as those identified in Attachment 1.B for the other Type II Modules.

Operating Record

The AMWTP uses a computerized system for overall data management and recordkeeping. Exhibits X-1 and X-2 in Appendix X show the data management system (DMS) components and interfaces. The DMS, provides the following functions:

- The DMS tracks waste via AMWTP personnel data entry, barcode label readers, and/or close interface with the appropriate control system from the point of waste retrieval and throughout the process until the point of dispatch to the WIPP or to another waste management unit. Product quality information is collated and included in the DMS as waste is processed.

- The DMS maintains a portion of the Operating Record required by applicable regulations, as described below in the Operating Record Maintenance section. The DMS interfaces with computer and database systems, including the integrated control system to sequence waste through the various AMWTP units.

- AMWTP management and operations personnel have a direct interface to on-line operational data that is simple to use, while allowing detailed and comprehensive queries and reports to be generated. Access to the DMS is established through the Information Technology group which provides Log-in and password based upon which portions of the DMS information is required (e.g., Waste Tracking System, Electronic Document Management System, etc.) AMWTP personnel access the DMS through their normal work computers. Information may be downloaded to networked computers; the user is supplied with a number of pre-configured reports, queries, trends, and other specific functions.
The DMS, is used to maintain many other records and supervise system functions, as noted in the process descriptions of the various MWMU systems.

Waste Tracking

Barcode readers at key locations are used to scan the barcode labels of containers. The unique barcode identifies the container, enabling access to some of the stored DMS information that matches the container. As the container progresses through a MWMU, information is appended to the records either automatically (e.g., radiological assay results) or manually (e.g., RTR observations) via local workstations. AMWTP personnel are presented with an electronic form that allows observations to be entered. The workstation also aids AMWTP personnel by supplying information such as container destination routes.

The DMS, maintains positional status of containers and/or waste at all locations within the MWMUs. For example, when a container is moved from position A to position B, the container is recorded in the DMS as being at position B. Documentation is maintained of the locations a waste item and/or container resides. At certain locations, the position of a container within a MWMU is verified by scanning the container barcode label. The Operating Record is used to provide a complete inventory, at any time, of the waste containers held within the MWMUs, and the waste contents, to the extent known.

Operating Record Maintenance

The Operating Record is maintained in accordance with IDAPA 58.01.05.008 (40 CFR 264.73). The DMS contains a portion of the Operating Record, and it is periodically backed up on magnetic tape or similar media. Hard copy and electronic records (e.g., completed inspection log sheets) are maintained in a retrievable manner. The following information is recorded, as it becomes available, and maintained in the Operating Record until closure of a MWMU (unless otherwise specified):

1. A description and the quantity of waste in each container received, and the method(s) and date(s) of its treatment, storage, or export.
2. The location of MW containers within a MWMU and the quantity of waste at each location, including cross-references to specific manifest document numbers, if the waste was accompanied by a manifest.

3. Records and results of analyses and determinations performed, as specified in:

   - IDAPA 58.01.05.008 (40 CFR 264.13) including, but not limited to, the following:
     - Detailed chemical and physical analyses of MW managed at the MWMUs, consisting of actual analytical data and process knowledge records (process knowledge based hazardous waste determinations, waste stream descriptions, descriptions of the generating processes, and any temporal changes to the packaging and generating processes). For existing MW, the process knowledge based waste profiling utilizes existing databases, engineering design files (EDFs), reports, and analytical data.
     - Waste analysis plan (WAP) for the MWMUs (see Attachment 2) and also the individual WAPs prepared for 90-day generator exempt activities (if required), per IDAPA 58.01.05.011 [40 CFR 268.7(a)(5)].
     - Waste analyses received from off-Site generators.

   - Results of ignitability, reactivity, and compatibility evaluations [per IDAPA 58.01.05.008 (40 CFR 264.17, 264.172, 264.176, and 264.177)] based on process knowledge, analytical data, engineering/scientific literature, in-house testing, and Environmental Protection Agency procedures/guidance (e.g., A Method for Determining the Compatibility of Hazardous Wastes, EPA-600/2-80-076).

4. Summary reports and details of incidents that require implementation of the Contingency Plan, such as fire, explosion, or release of MW. Attachment 7 lists the information required in the reports.

5. Records and results of area and equipment inspections, recorded on log sheets. These log sheets are kept per IDAPA 58.01.05.008 (40 CFR 264.73). See Attachment 4 for specific requirements and inspections.

6. Monitoring, testing or analytical data, and corrective action. Results of sampling and analysis of waste to verify that the operating requirements established in this document achieve the performance standards.
7. Written notices sent to off-Site generators stating that the AMWTP has the appropriate permits in place and is accepting their waste {per IDAPA 58.01.05.008 [40 CFR 264.12(b)]}.

8. A certification prepared, at least annually, that the AMWTP has a waste minimization program in place that reduces the volume and toxicity of AMWTP-generated wastes to the extent determined to be economically practicable. The intent of the program is to minimize the present and future threat to human health and the environment.

9. Written one-time notices and LDR certifications, as required, sent by the AMWTP to treatment, storage, and/or disposal (TSD) facilities that are receiving AMWTP-generated wastes {per IDAPA 58.01.05.011 [40 CFR 268.7(a) and (b)]}.

### D-1 Containers

#### D-1a Containers with Free Liquids

The containers stored at the MWMUs generally contain either (1) no free liquids or (2) free liquids at less than 1% of the total container volume. All containers are managed as if they contain free liquids, unless it can be documented, other than by historical record, that no free liquids are present. Incompatible wastes, if present, are segregated into discrete areas within the MWMUs.

The presence of liquid in the containers stored at the MWMUs is determined using any of three methods. The first method involves process knowledge supplied by the waste generators. Process knowledge is substantiated by the waste acceptance process described in Attachment 2. The second method is the use of RTR to remotely examine the waste containers for liquids and other parameters. RTR process description is presented in more detail in Attachments 1 and 2. The third method for identifying free liquids is through the visual examination of waste in the MWMUs.
D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

The containers typically used to store wastes in the MWMUs are listed below. Container labels and markings are also described as follows. All containers used for storing wastes are compatible with the wastes stored in the MWMUs.

1. The 30-gal drum [Department of Transportation (DOT) 7A Type A, or equivalent] is a carbon-steel drum with a removable head, gasket, and bolt ring.

2. The 55-gal drum/90-millimeter (mil) HDPE liner combination (DOT 7A Type A, or equivalent) is a carbon-steel drum with a removable head, gasket, and bolt ring. The liner is constructed of 90-mil molded polyethylene, and has an open head with a sealable positive closure lid.

3. The 83/85-gal overpack drum is a carbon-steel drum with a removable head, gasket, and bolt ring.

4. The DOT 6M, or equivalent, packaging consists of a 55-gal drum or a 100-gal drum with fiberboard centering media and a DOT Specification 2R, or equivalent, inner containment vessel. The drum head, gasket, and bolt ring are removable. DOT 6M, or equivalent, packaging is acceptable for waste storage if the drum has a mechanism for filtered venting of the interior.

5. The DOT 2R, or equivalent, containment vessel is made of stainless or carbon steel per 49 CFR 178.104(3)(b). The height of the polyethylene liner is 7.5 in. less than the inside height of the drum. The maximum inside diameter of the container is 5.25 in. For Bettis Atomic Power Laboratory shipments, 5-in. Schedule 40 piping has been approved for use as a container. The Schedule 40 pipe ends are fitted with a screw-type closure or flanges to provide containment. One or both of the Schedule 40 pipe ends may also be permanently closed by a welded or brazed plate to provide containment.

6. The DOT 7A, or equivalent, steel bin (M series) meets the requirements of 49 CFR 178.350 (DOT 7A, or equivalent). It is a rectangular steel bin made of 12-gauge steel used for shipment of waste or DOT-approved containers of waste. When used as an overpack, it will
hold eight 55-gal drums in two layers of four drums each, or ten 30-gal drums in two layers of five drums each. The bins are nominally 4 ft wide by 5 ft long by 6 ft high, although this series of bins covers a range of sizes and some structural variations. At the time of use, one bin type entitled M-III met the DOT 7A requirements. The M-III bins now meet the DOT requirements for a strong-tight container.

7. The DOT 7A Steel Box, or equivalent, was designed at the Sandia National Laboratory. These boxes come in a range of sizes ranging from 68 to 88 in. long, 48 to 54 in. wide, and 71 to 98 in. high. The container is welded closed, once filled with waste.

8. The DOT 7A Steel Box TX-4, or equivalent, has been developed by the Lawrence Livermore National Laboratory for use in packaging TRU waste. The TX-4 is a mild-steel welded-construction box with a gasketed bolted closure. The container is fabricated from a steel sheet supported by an external framework of four 4-in. by 2-in. square tubing. The container corners are reinforced with 2-in. angle stock, skip welded. Four 3-in. steel channels support the container, allowing standard forklift handling. This box type comes in a range of sizes: 74 to 92 in. long, 46 to 52 in. wide, and 36 to 57 in. high. This type of box may be lined with two 40-mil or one 80-mil polyvinyl chloride (PVC) liners. The top of the liner is folded over the top and outside of the box and secured with duct tape.

9. The TRUPACT II Standard Waste Box (SWB) is a DOT 7A Type A, or equivalent, container, nominally 71 in. long by 55 in. wide by 37 in. high. This box is constructed of steel and has the lid bolted to the box.

10. The DOT 7A Type A Mark III box, or equivalent, is constructed of concrete with an integral polyethylene liner and a lead liner installed if necessary. The container is 96 in. long by 48 in. wide by 48 in. high. The polyethylene liner has a height of 5 in. less than the inside height of the concrete container. The polyethylene liner can be thermally sealed using electric current, and the concrete lid can be bolted down.

11. The steel overpack box may be used for overpacking boxes. This box is constructed of carbon steel supported by an external framework of four pieces of 4-in. by 2-in. square tubing (container corners are reinforced with 2-in. angle stock). Two 2-in. by 1-in. steel
channels support the container for forklift access. The dimensions of this box are 92 in. long
by 56 in. wide by 55 in. high. A variety of other sizes may be used; special sizes are
fabricated to handle a variety of overpack needs.

12. The DOT 7A, or equivalent, 55-gal drum is a carbon-steel drum constructed of 16-gauge
material with a removable lid, gasket, and bolt ring.

13. The wooden boxes are constructed of plywood. At the time of use in the 1970s, these boxes
met the DOT 19A packaging requirements. The boxes come in a range of sizes, but are
generally 7 ft long by 4 ft wide by 2 or 4 ft high. The lids are either nailed or glued shut.
This container is only used for existing wastes.

14. The fiberglass-reinforced plywood (FRP) boxes are constructed in the same manner as the
wooden boxes described above with the same range of dimensions. However, the exterior of
the box is coated with at least 1/8 in. of fiberglass-reinforced polyester. This container is
only used for existing wastes.

15. The UN1A2, or equivalent, 30-gal drum is a carbon-steel drum with a removable head,
gasket, and bolt ring.

16. The UN1A2, or equivalent, 55-gal drum with 90-mil HDPE liner combination is a carbon-
steel drum with a removable head, gasket, and bolt ring. The liner is constructed of 90-mil
molded polyethylene, and has an open head with a sealable positive closure lid.

17. The UN1A2, or equivalent, 55-gal drum is a carbon-steel drum with a removable head,
gasket, and bolt ring.

18. The UN1A2, or equivalent, 83/85-gal overpack drum, that may include a roto-mold liner, is a
carbon-steel drum with a removable head, gasket, and bolt ring.

19. The DOT 7A Type A, or equivalent, 71-gal drum is a square steel drum with one of the
following; a crimp type gasketed cover; removable head with gasket and bolt ring; or fully
removable head with gasket and bolted closure.
20. The 55-gal recycled shielded storage container (RSSC), or equivalent, has stainless-steel inner and outer shells that encapsulate lead shielding with bolt-on end plates and rings. The RSSC is approximately 44.5 in. high by 36.1 in. maximum outside diameter.

21. The DOT 7A Type A, or equivalent, "B" series of filtered and nonfiltered boxes are designed in various sizes, including the B-25 style bin (4.3 ft high by 4 ft wide by 6 ft long) and B-52 style bin (3.5 ft high by 4.5 ft wide by 4.5 ft long).

22. The RH-TRU shielded overpack, or equivalent, is a 30- and 55-gal drum overpack assembly that has a 25-in. inside diameter and 32-in. outside diameter steel cylinder with a bolted steel flange. This overpack design contains no lead, because steel is used to provide shielding.

23. The AMWTP puck drum, or equivalent, is a carbon steel container with a removable lid, gasket, and bolt ring. The drum is approximately 32 in. high with a 31-in. inner diameter. An inner cage consisting of mild steel bars may be utilized to prevent direct contact between the waste and the container. The puck drum has a capacity of approximately 100-gal and meets the WIPP stacking criteria.

24. The ten-drum overpack (TDOP) is a welded-steel, right circular cylinder, with a removable bolt lid on one end. The TDOP may be loaded directly or it may be loaded with ten 55-gal drums, up to six 85-gal drums, or one SWB.

25. The AMWTP LLW export box, or equivalent, is constructed of carbon steel. The container is 96 in. long by 48 in. wide by 48 in. high, and may be reinforced with steel bracing on the inside of the container.

26. The “slim” 55-gal overpack drum is a carbon-steel drum that may be loaded with 55-gal drums. The “slim” 55-gal overpack has dimensions slightly larger than that of a standard 55-gal drum.

27. The DOT Industrial Packaging 1 (IP-1) soft-sided overpack container (SSOP), or equivalent, is constructed of a woven and coated polypropylene fabric that provides contamination control and does not react with hazardous or radioactive waste constituents. The material of construction is compatible with all waste types at AMWTP. Prior to overpacking, the
integrity of the waste box is assessed by Operations personnel in consultation with an AMWTP systems engineer. In the event a waste box lacks sufficient structural integrity, it is reinforced (e.g., plywood sheets joined with Simpson Strong-Ties® system components, or equivalent), and any sharp corners and edges are padded (e.g., with sheets of Herculite®) before it is overpacked. After the SSOP is filled and closed, the closure mechanism (e.g., Velcro strip) is reinforced (e.g., with adhesive tape), if necessary. SSOPs are designated for on-Site use, only, and they are not stored in the Outside Storage Area. In addition, they are not used for waste boxes that are known to contain large amounts of liquids (e.g., a 55-gallon drum of oil).

28. The HMPPS is a three-component bag system made from high-strength polyethylene and polypropylene specifically formulated to resist contaminants and leachate. The outer shell is a 12-oz. non-woven polypropylene and 10-mil coated polyethylene with a zipper closure. The outermost bag protects the middle liner from damage and is a Department of Transportation (DOT) IP rated certified package for shipping to treatment, storage, and disposal facilities.

29. A bag or plastic wrapping material that is secure and leak tight. Bags/plastic wrapping material may be used to store rigid waste (plywood, pallets, etc.) or non-rigid waste (personal protective equipment [PPE], radiological swipes, etc.). Bags/plastic wrapping material may only be used for storing waste that without treatment, the waste is not amenable for storage in any of the containers identified above.

30. The drum overpack box may contain up to six drums of various sizes. The drum overpack box has a flat bottom and all seams within the box other than the lid are sealed with a caulking material. The lid of the box is secured to the box with cargo tape, or equivalent. The drum overpack box is typically used for transporting drums into the box lines of WMF-676 for treatment.

31. TRUPACT packages are right circular cylinders. The dimensions of the TRUPACT-II are approximately 120 inches in height by 96 inches in diameter (see Exhibit D-1). The dimensions of the HalfPACT are approximately 92 inches in height by 96 inches in diameter (see Exhibit D-2). A TRUPACT III package is a rectangular container approximately 98 inches wide by 103 inches in height by 168 inches long (see Exhibit D-3).
32. Any other approved DOT container.

   International cargo containers are also used to hold approved containers of
   existing waste.

   Exceptions to the above-specified containers do occur and are called non-standard waste
   containers. These generally involve variations in dimensions and weight limits. Non-standard
   waste containers may be approved by the appropriate AMWTP personnel on a case-by-case basis
   given that the container meets the requirements of IDAPA 58.01.05.008 (40 CFR 264.171, .172,
   and .177).

   Stainless steel containers or containers with stainless steel liners which are approved for
   storage and macroencapsulation are as follows:

   The Industrial Packaging – 2 (IP-2) cargo shipping container with an inner stainless steel
   liner. The cargo shipping container is constructed of carbon steel. The inner stainless steel liner
   is constructed from continuous welded stainless steel panels covering the sides, top, bottom, and
   back end surfaces. The liner is constructed with a minimum thickness of 12-gauge stainless
   steel.

   HDPE containers that are approved for storage and macroencapsulation are as follows:

   The MacroPack is an HDPE container that may be loaded with AMWTP puck drums. The
   MacroPack consists of a 1/2-in. HDPE container/lid.

   **Container Labels**

   Containers may be labeled with hazardous waste labels, barcodes, appropriate radiation
   labels, and appropriate hazard labels. Exhibit D-4 is an example of a label that may be used on
   containers. Additional labels may be used to indicate the generator of the waste stream, the date
   of generation, the container number, the lot number, or other data. Typical labels that may be
   affixed to containers entering the MWMUs include:

   - Generator’s name,
   - Generator’s address,
   - "Hazardous Waste,"
   - INL Tracking Number,
   - Barcode (required),
   - Awaiting Analysis,
Containers with unknown contents are labeled with the words "Hazardous Waste" and an AMWTP barcode label, at a minimum. AMWTP puck drums that contain off-Site waste are labeled with the words “Off-Site Waste.” Additional labels are affixed to those containers with unknown contents, as new information becomes available. For wastes received at the AMWTP that are subject to LDR requirements, the labels also include the date the wastes were placed into storage at the TSA or the date the container was packaged at the generator’s facility. Other appropriate labels are attached, as required, prior to receipt in the MWMUs.

Labels/signs indicating the hazards of the waste being managed in each AMWTP permitted area will be posted at the entrances to those areas. These labels/signs ensure personnel entering a permitted area are aware of the hazards associated with the waste in accordance with the Hazardous Waste Generator Improvements Rule requirements.

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

Containers are managed and stored in a manner to prevent container rupture or leakage and to minimize exposure of personnel to MW constituents. All containers are kept closed during storage. AMWTP personnel follow procedures and instructions that establish operating practices designed to minimize the probability of accidents, which may result in a release of MW to the environment. Containers are visually inspected for integrity to determine if there are signs of significant corrosion, visible pitting, leaks, or apparent structural defects threatening container integrity. Containers that fail this visual inspection for integrity are either repaired, overpacked, or repackaged, as required. Containers used by the AMWTP are compatible with the types of wastes managed at the AMWTP.

TPAs and TDOPs are separated from the general population of waste. TPAs shall be stored in rows not to exceed one (1) TPA high by one (1) TPA wide by “n” TPAs long, allowing for aisle spacing requirements. TDOPs shall be stored in rows not to exceed one (1) TDOP high by one (1) TDOP wide by “n” TDOPs long, allowing for aisle spacing requirements.
Repaired containers are separated from the general storage population upon removal of the container from the general waste population. Repaired containers are stored in a configuration of no more than two containers wide by two containers high by “n” containers long, allowing for aisle spacing requirements. In the event that a repaired container develops additional leaks/pinholes or the repair fails, the container will be overpacked or repackaged.
Containers that are used for macroencapsulation are separated from the general population upon being designated for treatment via macroencapsulation. The containers are stored in a configuration of no more than two containers wide by two containers high by “n” containers long, allowing for aisle spacing requirements.

Bags and plastic wrapping material used as containers are separated from the general population. Bag/plastic wrap containers with rigid wastes are stored no more than four containers wide by five containers high by “n” containers long, allowing for aisle spacing requirements. A protective sheet (e.g., plywood) will be used in-between each bag/plastic wrap container layer for protective purposes. Bag/plastic wrap containers with non-rigid waste are stored no more than four containers wide by one container high by “n” containers long, allowing for aisle spacing requirements.

Containers identified as pyrophoric radionuclides (e.g., uranium that has not been completely oxidized, commonly known as roaster oxides) are physically separated from the general waste population. Containers identified as pyrophoric radionuclides are stored in a configuration of no more than two containers wide by two containers high by “n” containers long, allowing for aisle spacing requirements. Containers identified as pyrophoric radionuclides that have suspect integrity shall not be repaired; rather, all containers with suspect integrity shall be overpacked. Rows of containers identified as pyrophoric radionuclides shall not be stored adjacent to a row of containers that contains a container made of combustible material (e.g., plywood, cardboard, FRP).

Container loading and unloading activities are conducted in accordance with established procedures for:

- Work control;
- Transfer, storage, handling, and tracking of waste;
- Receipt, inspection, and documentation of waste;
- Logkeeping practices and checklists;
- Truck/trailer waste container unloading; and
- Overpacked drum recovery.
Each container received at WMF-634 has a unique barcode attached. The barcode is used to identify containers before and after any transfers to ensure the proper containers are moved and to identify their new location. This information is used to track the movement via the AMWTP DMS.

Main access within WMF-634 is provided by a 20-ft-wide center aisle (excluding support beams and portable equipment). If “fast” assay is being performed, then only a 16-ft-wide center aisle is required in the area. Three-ft-wide aisles (excluding support beams and portable equipment) are provided between the rows of containers and the walls to allow personnel access. In the event that emergency equipment is needed, access to the containers is provided through the center aisle of the building. Drawing 53-10374 presents a typical waste storage configuration within WMF-634.

WMF-634 waste storage areas can accommodate any container previously listed in D-1a(1) of this section and TPAs. All containers are stored on pallets or risers which are arranged into rows. Containers may be located on the floor while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor. The storage configuration for these areas is based on the placement of containers on these pallets or risers. The storage configuration presented in Drawing 53-10374 represents the configuration for the number of pallets or risers that may be stored while maintaining a minimum 3-ft aisle space (excluding support beams and portable equipment) between the rows and walls and providing a 20-ft center aisle (excluding support beams and portable equipment).

Any combination of container types may be stored in WMF-634 at any given time. Boxes, calculated at a nominal 4 ft by 4 ft by 8 ft, are used to determine the maximum potential waste volume that can be stored in the south half of WMF-634. Calculations for containers other than boxes and 55-gal drums are not provided because the potential maximum waste volumes for other containers are less than the corresponding values for boxes.

A normal pallet may support eight 55-gal drums per layer, up to five drums high, for a total of 40 55-gal drums per pallet. A total of four boxes may be placed on each normal pallet (one box per layer, up to four boxes high).
Calculated maximum capacity in the south half of WMF-634 is based on containers stored in the following configuration. There are up to 21 rows (including two partial rows) of drums. A row is defined as up to four drums wide by up to five drums high by up to 22 drums in length (i.e., depth). The drum storage capacity of the south half of WMF-634 is 9,080 drums. For boxes, the configuration of a row is up to four wide, up to four high, and up to 11 long. In the corners of the building the length of a row is shorter to allow space for access ramps. The box storage capacity in the south half of WMF-634 is 1,128 boxes. TDOPs and TPAs may also be stored in WMF-634; however, TDOPs and TPAs are not typically stored in WMF-634. TPAs are assembled by placing two levels of drums on a circular TRUPACT pallet. Exhibit D-1 shows a typical configuration for a TPA. These storage configurations allow for operational flexibility in utilizing available storage space while minimizing radiation exposure to personnel. Incompatible wastes are segregated from the other waste in accordance with Attachment 6.

Typically only the south half of WMF-634 is used for storage of containers to support routine operations. However, the unoccupied space (i.e., the areas not taken by characterization equipment and control rooms) in the north half of the building may be used to store waste containers, as necessary, to support operations. The secondary containment system capacity is more than sufficient to contain 10% of the volume of the additional containers or the volume of the largest container (whichever is greater). See Appendix XI for additional information on the secondary containment system capacity for WMF-634. In addition to the primary 6-in. containment curb surrounding the interior of WMF-634, a 4-in. curb surrounding the coring room provides additional containment and minimizes the potential of contamination from DCSRS operations.

WMF-634 is a fully enclosed structure. The secondary containment system consists of a concrete floor, concrete sealer, and an epoxy type coating, or equivalent. Additional coating(s) may be placed onto the secondary containment system. This coating(s) is typically used to prevent degradation of or damage to the secondary containment system, by providing protective layers. The secondary containment system is maintained to provide containment that is
sufficiently impervious to leaks, spills, and accumulated precipitation until the collected material is detected and removed.

The secondary containment system is designed to resist frost heave and the types of wastes stored. A secondary containment system is also provided for the coring room. The secondary containment system provides sufficient capacity to hold, at a minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in the storage area(s) in accordance with HWMA/RCRA requirements. Container storage areas holding only wastes that do not contain free liquids do not require a containment system. See Section D-1b for additional information.

**D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008; 40 CFR 264.175(b)(1)]**

The secondary containment system is resistant to a wide range of acids, alkalis, solvents, oxidizers, oils, and grease, as well as radiation. The containment coating(s) is applied per manufacturer's recommendations. The design of the floor and the application of the secondary containment system coating(s) (i.e., concrete sealer and an epoxy type coating, or equivalent), together, are more than sufficient to contain any leaks or spills of waste and prevent migration of spilled contaminants into underlying concrete. As stated above, multiple coatings may be utilized for protective purposes, so long as liquid is contained without allowing contact to the concrete/concrete sealer.

**D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]**

The MWMUs are designed to collect any liquid accumulation resulting from spills or leaks. As described earlier, the wastes stored at the MWMUs are essentially solid in form. There is little likelihood of a spill or leak involving free liquid.

The floor of the Type II Modules is sloped approximately 1 in. in 20 ft from the north and south sides toward the east-west midline of the module. This promotes collection of any snow, ice, or water that may be brought in by trucks entering the building to unload containers and to prevent contact of such material with the containers.
Containers in storage are elevated above the floor slab to preclude container contact with liquids or spills. The pallets or risers may be steel, plastic, wood or other similar type of material; secondary containment-type pallets or pans may also be used. Large steel pallets may be used that are the same as commercially available steel pallets except they are constructed of a heavier gauge steel.

Precipitation is not a factor in the secondary containment system, since the MWMUs are totally enclosed buildings. In addition, the Type II Module entrances are at least 6 in. above grade. The doors of the modules are typically kept closed except when occupied for container handling operations, inspections, maintenance, etc. The area around the MWMUs is graded to promote drainage and run-off away from the module exterior entrances. Run-on and run-off controls are discussed in Section D-1a(3)(d).

The storage areas of the MWMUs are inspected weekly for leaks and spills. In the event that a leak or spill is detected, the spill is removed in accordance with spill response procedures or the Contingency Plan as described in Attachment 7.

**D-1a(3)(c) Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]**

The secondary containment systems for the Type II Modules are sized to contain, at a minimum, 10% of the maximum liquid waste volume or the volume of the largest container (whichever is greater) stored in the area at any given time, if secondary containment is required. Section D-1a(2) describes the storage configuration that is typically used in WMF-634. Table D-1 summarizes the secondary containment capacity calculations for WMF-634. Appendix XI presents the calculations and assumptions used in compiling Table D-1.

**D-1a(3)(d) Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]**

Run-on in the vicinity of the MWMUs is of three types: rainfall, snow, and snowmelt. Meteorological records for the INL indicate that the mean annual total precipitation is slightly less than 9 in. and is well distributed throughout the year. Approximately 0.5 in. falls each month, with 1.2 in. per month during May and June. The maximum historical precipitation experienced in a 24-hr period was 1.6 in. Mean annual precipitation as snow is 27 to 28 in. The
maximum recorded monthly snowfall was 22 in., and the maximum 24-hr snowfall totaled approximately 9 in. Precipitation, in one form or another, occurs (on average) of approximately 28 days each year. Average snow depth during the months of December through March ranges from 2 to 4 in. per month. Snowfall extremes of 6 to 9 in. have occurred during a few 24-hr periods. See Attachment 1 for floodplain information details.

Appendix II contains a topographic map indicating the location of the MWMU buildings and the nearby area. As shown on this map, the RWMC is located in a topographic depression and is bounded by higher ground to the north, west, and south. As a result, run-on and run-off controls are present at the TSA and nearby Subsurface Disposal Area (SDA) that are designed to handle local run-on from surrounding high ground and run-off from the RWMC waste management areas. The RWMC/AMWTP topographic map, as shown in Appendix II, illustrates the drainage ditch system comprising the local run-off control system. As shown in the RWMC/AMWTP topographic map, drainage ditches around the TSA and SDA collect run-off, and the ditches lead to a common ditch running to the northeast along Adams Boulevard. Approximately 2,500 ft northeast along Adams Boulevard, the drainage ditch turns to the north-northeast, runs under the road, and continues northward toward the Big Lost River. Culverts direct run-on within the TSA to the main drainage channel via drains placed in paved areas. Snow around the MWMUs is removed when necessary.

The MWMUs are totally enclosed structures, so run-on is prevented from entering the buildings. To aid in local run-off/drainage, the MWMUs are constructed on prepared surfaces. See Section B-3 in Attachment 1 for more details.

Analysis of a 25-yr, 24-hr storm event at the TSA (“25-year, 24-hour Storm Evaluation for the Advanced Mixed Waste Treatment Project,” Mark Varvel, April 2007) was conducted to evaluate external and internal drainage at the TSA and the adequacy of the RWMC drainage ditch system. The analysis concluded that the external drainage system and the current ditch and culvert system could adequately handle a 25-yr, 24-hr storm event for the MWMUs as required by IDAPA 58.01.05.008 [40 CFR 264.175(b)(4)]. This document is provided in the Supplemental Information section of the permit application.
D-1a(3)(e)  Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 264.175(b)(5) and 40 CFR 270.15(a)(5)]

The MWMUs are inspected for container condition, spills, leaks, and accumulated liquids as described in Attachment 4. Any spills, leaks, or accumulated liquids are cleaned up or otherwise mitigated in a timely manner upon discovery within these areas.

In the event of a leak/spill, AMWTP personnel may implement the Contingency Plan as described in Attachment 7. All equipment and any liquids generated during implementation of the Contingency Plan are managed appropriately, depending on the waste being cleaned up.

D-1b  Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

All containers stored at the MWMUs are managed in compliance with HWMA/RCRA requirements for containers with free liquids, unless documented not to contain any free liquids. Containers documented not to contain any free liquids through means other than historical knowledge (e.g., RTR, visual examination) may be stored in a MWMU without a secondary containment system that meets the requirements of IDAPA 58.01.05.008 [40 CFR 264.175(b)]. If RTR is used to document that a container does not contain any free liquids, then at least two AMWTP personnel will verify that the container does not contain free liquids.

Containers without free liquids shall be stored in an area that is sloped or otherwise designed to drain and remove liquid resulting from precipitation, or the containers without free liquids shall be elevated or otherwise protected from contact with accumulated liquid in accordance with IDAPA 58.01.05.008 [40 CFR 264.175(c)]. Containers received for storage at the MWMUs are handled and stored as described in Section D-1a.
Table D-1.  **WMF-634 Secondary Containment System Capacity Calculations**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Waste Volume Stored</td>
<td>1,231,430 gal</td>
</tr>
<tr>
<td>Maximum Liquid Volume Stored</td>
<td>320,172 gal</td>
</tr>
<tr>
<td>10% of Maximum Liquid Volume&lt;sup&gt;b&lt;/sup&gt;</td>
<td>32,017 gal</td>
</tr>
<tr>
<td>Secondary Containment Capacity</td>
<td>123,143 gal</td>
</tr>
<tr>
<td>Volume Displaced by Containers, Pallets, and Structural Features</td>
<td>43,047 gal</td>
</tr>
<tr>
<td>Available Secondary Containment&lt;sup&gt;c&lt;/sup&gt;</td>
<td>72,541 gal</td>
</tr>
</tbody>
</table>

<sup>a</sup> Calculations supporting these values are provided in Appendix XI. Volumes are for the maximum number of boxes in the typical storage configuration in the storage areas (south half of the building) plus the approximate maximum number of drums in process in the north half of WMF-634.

<sup>b</sup> Minimum secondary containment capacity that must be made available.

<sup>c</sup> Available secondary containment equals secondary containment capacity minus the volume displaced by containers, pallets, equipment, and structural features. Must equal or exceed the 10% of maximum liquid waste volume.
Exhibit D-1. Typical TRU-PACT Assemblage
Exhibit D-2. Typical HalfPACT Assemblage
Exhibit D-3. Typical TRUPACT-III Assemblage
HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

IF FOUND, CONTACT THE NEAREST POLICE, OR
PUBLIC SAFETY AUTHORITY, OR THE
U.S. ENVIRONMENTAL PROTECTION AGENCY

PROPER D.O.T.
SHIPPING NAME __________________________ UN or NA # __________

GENERATOR INFORMATION

NAME ________________________________________________

ADDRESS __________________________________________

CITY___________________________ STATE _______ ZIP _____

EPA ID NO. ___________________________ EPA WASTE NO ______________

ACCUMULATION START DATE _______________ MANIFEST DOCUMENT NO ______________

HANDLE WITH CARE!
CONTAINS HAZARDOUS OR TOXIC WASTES

Exhibit D-4. Example Hazardous Waste Label
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.B

Section D

Type II Modules Design

Revision Date: December 2017
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D. PROCESS INFORMATION

D Type II Modules Design

The Type II Modules are used to store and treat ROW and MW. There are seven Type II Modules. This attachment covers the Type II Modules with the building designations of WMF-629 through WMF-633. The Type II Module designated as WMF-634 is described in Attachment 1.A and the Type II Module designated as WMF-628 is described in Attachment 1.E. Wastes currently in storage, as well as newly generated waste from on- and off-Site generators, may be moved and stored in the Type II Modules.

Unless otherwise noted, drawings for the Type II Modules are located in Appendix III. The Type II Modules house a number of activities, which include:

- Receiving and storing waste containers;
- Performing treatment, via absorption, of liquids;
- Performing treatment, via decanting, of liquids from containers, as required;
- Performing treatment, via neutralization, of liquids in a container;
- Performing visual examination of waste in containers;
- Repackaging of waste;
- Sizing of waste;
- Performing “fast” assay on containers;
- Performing treatment, via mechanical vibration of waste in a container; and
- Performing treatment, via macroencapsulation of waste.

Waste treatment is conducted in a containment enclosure (absorption, decanting, neutralization, repackaging, sizing of waste, and mechanical vibration) or outside a containment enclosure (mechanical vibration and macroencapsulation). See Attachment 1.A for additional information on the containment enclosure requirements and treatment operations.

Fill and Grading

See Attachment 1.A for information on fill and grading requirements for the Type II Modules. See Drawing 52-9501 for additional information on the grading plan for the Type II Modules.
Foundations and Floors

The Type II Module design incorporates reinforced concrete footings. The footing depth is below the maximum frost depth for the RWMC site. The footings are designed to be in conformance with all applicable requirements of the American Concrete Institute (ACI).

The floor of the Type II Modules is comprised of a concrete slab-on-grade, 8 in. thick with #4 bar reinforcement on 12-in. centers, located 3 in. from the top of the floor, placed over 2-in. sand and 4-in. gravel fill. The floor is sloped 1 in. per 20 ft from the north and south sides toward the midline of the building (the midline runs east-west). The floor has been constructed with minimal slope to meet seismic design criteria and to ensure stability of the waste stacks. A 6-in.-thick by 6-in.-high concrete curb surrounds the open storage area.

The concrete reinforcement is in conformance with all applicable requirements of the ACI, the Concrete Reinforcing Steel Institute (CRSI), and the American Society for Testing and Materials (ASTM). The concrete was proportioned in accordance with ACI requirements to have a specified minimum 28-day compressive strength of 4,000 pounds per square inch (psi) for floor slabs and tiltup wall panels, 3,000 psi for building foundation, and 2,000 psi for conduit encasements. Ready-mix concrete used complies with ASTM requirements. Surfaces not exposed to view are rough formed, while those that can be viewed have a smooth form. The exposed floor slabs are cured and sealed, and a floor hardener applied that is compatible with the paint used on the floors.

The base is constructed with a minimum of expansion joints, and all joints are filled. The field construction joint consists of a backer rod and sealant. Floor slab seams are impermeable and chemically resistant to wastes managed in the Type II Modules. The design includes a backer rod, 9-in. neoprene dumbbell-type waterstop, and compressible joint filler.

Ramps are located at the east and west overhead access doors. The ramps are constructed of concrete and have a slope of approximately 1:15. The personnel access doors on the north, south, east, and west walls of the Type II Modules are 6 in. above grade and have concrete landings or stairs. See Drawings 51-9907 and 51-9913 for further information.

Other coatings may be used (e.g., non-slip coating, traffic and zone marking paint, etc.) that is compatible with the floor coating, may be used to mark aisles and a numbered storage grid on the floor, as necessary, to facilitate operations. The concrete curbing and flooring surfaces are
filled with compatible block filler and finished with an epoxy-type coating that is compatible with the wastes stored in the Type II Modules.

**Structural Parameters**

The Type II Modules are pre-engineered structural steel buildings. The primary and secondary framing design for the buildings comply with Project Design Criteria specified in Department of Energy (DOE) Order 6430.1A and the Metal Building Manufacturers Association (MBMA). All of the primary framing connections utilize high-strength bolts conforming to ASTM A325, A490, or equivalent. The buildings are constructed of metal walls and roof panels (prepainted), and a clear-span rigid frame. No interior columns are used in the basic frame. A long-span rigid frame, approximately 240 ft long by 120 ft wide, is used with an eave height of 26 ft. Each Type II Module has an interior floor space of approximately 28,800 ft². The roof slope for the Type II Modules is approximately 1:12. The walls are fastened to the structural girders, which in turn are anchored to the foundation. The building girts and purlins are cold-formed Z- or C-shaped sections. Diagonal bracing rods provide structural bracing for the building.

As shown in Drawing 51-9907, each Type II Module may be accessed through an overhead door located on the east and west sides of each building. The doors are electrically powered and equipped with a manual override. In addition to these doors, there is a metal personnel access door next to each overhead access door; and one on both the north and south sides of the building, approximately mid-way.

The exterior of each Type II Module is clad in ribbed metal siding with a standing seam metal roofing. The roof is of Factory Mutual Class 1 construction. Lightning protection systems in accordance with NFPA requirements are provided.

An electrical room is located along the exterior west wall of each Type II Module midway between the west overhead access door and the southwest corner of the building. This room is a pre-engineered structure that rests on a concrete slab. The metal wall panels are insulated. It has its own exterior personnel access door on the north end of the room. There is a firewall between the electrical room and the module, which is of 2-hr fire-rated construction.
There is a fire sprinkler riser room adjacent to the electrical room. The fire sprinkler riser room houses the fire water riser pipes and connections. This room has its own exterior entrance.

**HVAC System**

The HVAC system of the Type II Modules conforms to the same standards as those for the WMF-634 building, described in Attachment 1.A.

The Type II Modules are not routinely heated or cooled, but are ventilated by a once-through air distribution system to control CO accumulation from equipment and vehicle operations. The ventilation system is only operated as required to maintain CO within acceptable levels. Ventilation air is drawn into the building through eight louvers equipped with filters for dust control. The louvers are located along the base of the north and south walls of the building, four equally spaced on each wall. The building air is exhausted through eight exhaust grilles and associated ductwork connected to a single ground mounted exhaust fan and then through a single exhaust stack.

The air intakes consist of louvers fitted with a bird screen. A motorized parallel blade damper is used to adjust the air intake. A filter assembly on the louver filters out particulates from the incoming air. The air intakes are designed for an intake of 1,800 cfm each.

**Electrical Power**

The Type II Module electrical power system and requirements are the same as those listed for WMF-634. See Attachment 1.A for further information. See Drawings 54-9760, 54-9715, 54-9716, and 54-9717 for the electrical one-line diagram for the Type II Modules. See Drawings 56-1901 in Appendix II and 56-9500 in Appendix III for the Site utilities for the Type II Modules.

**Lighting**

All walkways, entrances, and exits are provided with lighting. Interior building lighting is typically provided by metal halide, light-emitting diode (LED), or fluorescent light fixtures suspended from the ceiling of the building. Exterior lighting is provided along the building exterior and nearby roadways.
Operating Record

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.

D-1 Containers

D-1a Containers with Free Liquids

See Attachment 1.A, Section D-1a for further information on containers with free liquids.

D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

The containers used to store wastes in the Type II Modules are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1).

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following text addresses variations to those practices that are specific to the Type II Modules designated as WMF-629 through WMF-633.

Main access into a Type II Module is provided by a 20-ft wide center aisle (excluding support beams and portable equipment). If “fast” assay is being performed, then only a 16-ft-wide center aisle is required in the area. Three-ft wide aisles (excluding support beams and portable equipment) are provided between the rows of containers and the walls to allow personnel access. All containers are stored on pallets or risers which are arranged into rows. Containers may be located on the floor while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor. In the event that emergency equipment is needed, access to the containers is provided through the center aisle of the building. Drawing 51-9907 presents a typical waste storage configuration within a Type II Module.

Any combination of container types may be stored in the Type II Modules at any given time. Boxes, calculated 4 ft by 4 ft by 8 ft, are used in Appendix XI to determine the maximum potential waste volume that can be stored in a Type II Module.
For maximum capacity, containers are stored in the following configuration. There are up to 42 rows of drums per Type II Module. A row is defined as up to four drums wide by up to five drums high by up to 22 drums in length (i.e., depth). The drum storage capacity in a Type II Module is 18,160 55-gal drums. For boxes, the configuration of a row is up to four wide, up to four high, and up to 11 long. The maximum storage capacity per Type II Module is 2,256 boxes. In the corners of the buildings, the length of a row is shorter to allow space for access ramps. TDOPs and TPAs may also be stored in the Type II Modules as described in Section D-1a(2) of Attachment 1.A.

Incompatible wastes are managed in the Type II Modules in accordance with Attachment 6.

**D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]**

Each Type II Module is a fully enclosed structure. The secondary containment system consists of a concrete floor, concrete sealer, and an epoxy type coating, or equivalent. Additional coating(s) may be placed onto the secondary containment system. This coating(s) is typically used to prevent degradation of or damage to the secondary containment system, by providing protective layers. The secondary containment system is maintained to provide containment that is sufficiently impervious to leaks, spills, and accumulated precipitation until the collected material is detected and removed.

The secondary containment system is designed to resist frost heave and the types of wastes stored. The secondary containment system provides sufficient capacity to hold, at a minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in the storage area(s) in accordance with HWMA/RCRA requirements. Container storage areas holding only wastes that do not contain free liquids do not require a containment system. See Section D-1b for additional information.

**D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008; 40 CFR 264.175(b)(1)]**

The requirements for the base or liner to contain liquids are the same as those described in Section D-1a(3)(a) of Attachment 1.A. A detailed description of the design and materials of
construction of the base and containment curbs is provided above in Section D, in the section titled “Foundations and Floors,” of this attachment.

**D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]**

The containment system drainage requirements are the same as those described in Section D-1a(3)(b) of Attachment 1.A.

**D-1a(3)(c) Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]**

The secondary containment system for the Type II Modules is sized to contain, at a minimum, 10% of the maximum liquid waste volume or the volume of the largest container (whichever is greater) stored in the area at any given time, if secondary containment is required. Section D-1a(2) describes the storage configuration that is used in the Type II Modules. Table D-1 summarizes the secondary containment capacity calculations for the Type II Modules. Appendix XI presents the calculations and assumptions used in compiling Table D-1.

**D-1a(3)(d) Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]**

The requirements for control of run-on are the same as those described in Section D-1a(3)(d) of Attachment 1.A.

**D-1a(3)(e) Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]**

The requirements for the removal of liquids from the containment system are described in Section D-1a(3)(e) in Attachment 1.A.

**D-1b Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]**

Containers without free liquids are managed as described in Section D-1b of Attachment 1.A.
Table D-1. Type II Module Secondary Containment System Capacity Calculations^a

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Waste Volume Stored</td>
<td>2,159,985 gal</td>
</tr>
<tr>
<td>Maximum Liquid Volume Stored</td>
<td>561,596 gal</td>
</tr>
<tr>
<td>10% of Maximum Liquid Volume^b</td>
<td>56,160 gal</td>
</tr>
<tr>
<td>Secondary Containment Capacity</td>
<td>123,143 gal</td>
</tr>
<tr>
<td>Volume Displaced by Containers, Pallets, and Structural Features</td>
<td>40,236 gal</td>
</tr>
<tr>
<td>Available Secondary Containment^c</td>
<td>82,907 gal</td>
</tr>
</tbody>
</table>

^a. Calculations supporting these values are provided in Appendix XI. Volumes are for the maximum number of boxes in the typical storage configuration in the storage areas in a Type II Module.

^b. Minimum secondary containment capacity that must be made available.

^c. Available secondary containment equals secondary containment capacity minus the volume displaced by containers, pallets, and structural features. Must equal or exceed the 10% of maximum liquid volume.
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ATTACHMENT 1.C

WMF-635 Process Information

Revision Date: June 2018
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ATTACHMENT 1.C

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D. PROCESS INFORMATION

D Type I Module Design

The Type I Module is used to store, characterize, treat, and package containers of ROW and MW into TRUPACT casks in preparation for shipment to the WIPP or to another waste management unit.

Unless otherwise noted, drawings for the Type I Module are located in Appendix IV.

The Type I Module houses a number of activities, which include:

- Receiving and storing waste containers for characterization using the DVF and/or the headspace gas sampling equipment;
- Performing treatment, via absorption, of liquids;
- Performing treatment, via decanting, of liquids from containers, as required;
- Performing treatment, via neutralization, of liquids in a container;
- Preparation of containers in the TLA for shipment;
- Performing treatment through the repackaging of waste in containers;
- Performing treatment through the sizing of waste;
- Gas generation testing on containers;
- Performing “fast” assay on containers;
- Performing treatment, via mechanical vibration of waste in a container; and
- Performing treatment, via macroencapsulation of waste.

Waste treatment (absorption, decanting, neutralization, repackaging, sizing, and mechanical vibration) may be conducted in the DVF (WMF-615) and in a containment enclosure, which is typically located in the WCRA in WMF-635, but may also be located in the MSA or PAAA. Waste treatment (mechanical vibration and macroencapsulation) may also be performed outside of a containment enclosure. See Attachment 1.A for additional information on the containment enclosure requirements and treatment operations.
The physical layout of the Type I Module is shown on Drawing 51-9912. Containers are received into the Type I Module, and are off-loaded and stored. As each container is placed into its designated storage area, the container’s barcode label is scanned to update the container’s location information maintained in the AMWTP Operating Record.

The MSA is used to receive, store, treat, and weigh containers, as appropriate. Drums identified as requiring venting may be sent to the DVF, where the drums are loaded onto a conveyor. Once on the conveyor, drums are moved into the DVF, where the lid and liners, if present, are punctured and a filter is inserted. The DVF is equipped with three ventilation systems to dissipate concentrations of hydrogen to below the lower explosive limit (LEL) during drum venting operations. These include (a) a sweep system for hydrogen dilution, (b) a vapor recovery system to pull gas from a drum, dilute it with air, and discharge to the exhaust system, and (c) a drum vent exhaust system (main DVF ventilation system) to provide at least four air volume changes per hour and maintain a negative pressure with respect to the outside atmosphere. All three ventilation systems contain nine inline HEPA filters to trap any radioactive particulates released during drum venting. After venting, containers are then transferred to storage via equipment or the headspace gas may be sampled using portable headspace gas sampling equipment. Portable headspace gas sampling equipment may be located in either the MSA, PAAA, or the WCRA. The sample is collected by drawing the sample through the existing filter or through a sampling port specifically designed for sampling through a drum lid.

Equipment consisting of a portable gantry crane, vented fume hood, and radiological containment systems (for personnel access) is available in the DVF/MSA to facilitate treatment activities. Once a container requiring treatment is inside the DVF silo, the container is positioned under the fume hood, which is vented to the DVF HEPA exhaust system. Following placement of the container under the fume hood, the drum lid is removed and any free liquids may be absorbed in place by the addition of absorbent to the container. Containers with liquids requiring absorption are treated as described in Section D of Attachment 1.A.

Drums identified for gas generation testing are transferred to the gas generation testing units, and are stored within the Type I Module while testing is performed. Up to 100 gas generation testing units may be located within the Type I Module. See Drawing 51-9912 for further information. The gas generation testing units consist of a gas test canister, which is a closed canister (shell and base plate) that can hold a drum and retain all gases released from the
drum until the canister is sampled at the end of the test. A mobile analytical system is used to
sample and analyze the gas in each canister.

TRUPACT cask assembly is conducted in the TLA by retrieving containers from storage in
the PAAA/WCRA. The containers are typically assembled into either TDOPs, TPAs, or SWBs,
which are subsequently packaged into a TRUPACT cask. TPA stabilization may be provided by
wrapping individual levels of drums with a clear plastic stretch-wrap material under tension. TPAs
are assembled on the stretch wrapper by placing two levels of drums on a circular TRUPACT
pallet. Each level consists of multiple drums arranged in a circular manner. See Exhibit D-2 in
Attachment 1.A for an example of a TPA in a TRUPACT cask. A single level of the TPA consists
of a maximum of seven 55-gal drums or three 100-gal drums. The pallet and inter-level
reinforcing plate have slip sheets installed between the drums and metallic support surfaces, to
stabilize the TPAs during handling operations.

Once the containers are assembled into TDOPs, TPAs, or SWBs, they may be stored in the
TLA pending loading into a TRUPACT cask. If free liquids are present in a container, then the
container will be stored on a spill pallet, or equivalent, in accordance with Section D-1a(3).
Assembled TPAs, two SWBs, or one TDOP may be loaded into a TRUPACT cask, using an
overhead crane system in the TLA. After loading, TRUPACT casks may either be loaded directly
onto a truck for shipment to the WIPP or to another waste management unit, or are placed into
storage, typically within the TLA of the Type I Module. See Drawing 51-9912 for TRUPACT
cask storage areas located in the TLA.

**Fill and Grading**

The area on which the Type I Module is built was graded prior to construction. A
minimum slope of 1% has been provided to ensure adequate drainage away from the
Type I Module. See Drawing 52-9500 for further information on the grading plan.

Backfill compaction requirements and fill material for the Type I Module are the same as
those identified in Attachment 1.A.

**Foundations and Floors**

The Type I Module design uses concrete pedestals supported by footings. The footing
depth is below the maximum frost depth for the RWMC site. The footings are designed to be in
conformance with all applicable requirements of the ACI.
The concrete floors of the MSA and TLA are 8 in. thick with #5 bar reinforcement on 15-in. centers, placed 2 in. from top, over a 6 in. gravel fill. The TRUPACT cask storage room floors in the TLA are 8-in.-thick concrete. The PAAA/WCRA floor is 12 in. thick, constructed with #6 bar reinforcement on 15-in. centers. Secondary containment is provided by a 6-in.-thick by 6-in.-high curb installed around the MSA and PAAA/WCRA and where column piers and pipes penetrate the floor.

The concrete reinforcement is in conformance with all applicable requirements of the ACI, the CRSI, and the ASTM. The concrete was proportioned in accordance with ACI requirements to have a specified minimum 28-day compressive strength of 4,000 psi for floor slabs and tiltup wall panels, 3,000 psi for building foundation, and 2,000 psi for conduit encasements. Ready-mix concrete used complies with ASTM requirements. Surfaces not exposed to view are rough formed, while those that can be viewed have a smooth form. The exposed floor slabs are cured and sealed, and a floor hardener applied that is compatible with the paint used on the floors.

The base is constructed with a minimum of expansion joints, and all joints are filled. Floor slab seams are impermeable and chemically resistant to wastes managed in the Type I Module. The design includes a stainless steel plate at floor elevation, backer rod, 9-in. neoprene dumbbell-type waterstop, and compressible joint filler.

A depression is located in the interior of the Type I Module from one access door to the other. The depression runs east-west, 252 ft long by 12 ft wide, and is sloped to the midline from the north and south edges. The slope is 1/8 in. per ft; therefore, the east-west midline is about 3/4 in. below grade. This depression collects any water, snow, or ice that may be tracked in with equipment or containers entering the building, thereby precluding contact of the containers with such material. The floors of the MSA and TLA are sloped approximately 1 in. in 20 ft. The PAAA/WCRA floor is flat to meet seismic design criteria and ensure stability of the equipment and containers during storage.

Ramps are located at the east and west access doors, between the MSA and TLA, and at the west and north interior entrances to the PAAA/WCRA. Ramps are also located on the north, south, east, and west personnel doors. Additional ramps are located at the north and west
PAAA/WCRA doors. See Drawing 51-9912 for further information. All the ramps are constructed of concrete, with a slope of approximately 5%. All personnel access doors are elevated approximately 6 in. above grade. There is no ramp in the doorway between the PAAA and WCRA.

Other coatings may be used (e.g., non-slip coating, traffic and zone marking paint, etc.) that is compatible with the floor coating, may be used to mark aisles and a numbered storage grid on the floor, as necessary, to facilitate operations. The concrete curbing and flooring surfaces in the MSA, PAAA, and WCRA are filled with compatible block filler, finished with two coats of an epoxy-type coating, or equivalent, that is compatible with the wastes stored in the Type I Module. The TLA may be coated with an epoxy-type coating, or equivalent, that is compatible with the wastes stored in the Type I Module.

**Structural Parameters**

The Type I Module is a pre-engineered structural-steel building. The primary and secondary framing design for the pre-engineered building complies with Project Design Criteria specified in DOE Order 6430.1A and the MBMA. The framing consists of a clear-span rigid frame with a gabled roof and building width extensions. The roof has a slope of approximately 1:12. All of the primary framing connections utilize high-strength bolts conforming to ASTM A325, A490, or equivalent. The roof and wall coverings are preformed metal siding and roofing. The roof and walls of the Type I Module are insulated with glass fiber insulation, which is partially covered with metal liner panels. The walls are fastened to the structural girders, which in turn are anchored to the foundation. The wall separating the PAAA and WCRA is fastened to 6 in. metal studs, which are fastened to the bottom runners of the metal wall anchored directly to the concrete floor. The building girts and purlins are cold-formed Z- or C-shaped sections. Diagonal bracing rods provide structural bracing for the building. See Drawings 51-9926 and 51-9919 for further information.

The Type I Module is designed to withstand a 50-year, 80-miles-per-hour wind at a 33-ft elevation. A snow load of 30 lb per ft$^2$ is used for roof design, with the effects of drifting snow added, in accordance with ANSI standards.
The Type I Module is clad in ribbed metal siding with a standing seam metal roof. The
roof is Factory Mutual Class 1 construction. The Type I Module has a long-span rigid frame,
approximately 254 ft long by 160 ft wide, with a 26-ft eave height. This provides an interior
space of approximately 40,745 ft². Lightning protection systems, in accordance with NFPA
requirements, are provided. See Drawing 51-9919 for further information.

Exposed exterior concrete walls are coated with a washable enamel painted finish, or
equivalent. Insulation is provided throughout the Type I Module on the roof, foundation
perimeter, exterior doors, and door frames. Interior partitions are metal panels or concrete
masonry units covered with metal panels. The partitions are coated in a washable enamel finish.
An 8-in.-thick concrete firewall, 4-hr-rated, is located between WMF-617 (located on the
southeast exterior of the Type I Module) and the Type I Module. A 2-hr rated firewall separates
the electrical room from the rest of the building.

As shown in Drawing 51-9912, there are two waste access doorways, one on the east side
and one on the west side of the building. These doorways are equipped with overhead doors
approximately 12 ft wide by 16 ft high. Internal doorways providing access to the PAAA and
WCRA are equipped with overhead doors approximately 10 ft wide by 16 ft high. The doors are
horizontal sectional or coil type, electrically operated with manual override.

Metal personnel entrance/egress doors are located on the west, north, south, and east side
of the building. Metal personnel doors are also located near the internal west PAAA and north
WCRA access doors.

As described previously, the interior of the Type I Module is divided into three storage
areas: the MSA, TLA, and PAAA/WCRA. The north portion of the MSA measures
approximately 82 ft by 72 ft and the south portion, by the DVF, measures approximately 84 ft by
84 ft. The TLA measures approximately 169 ft by 72 ft. Five storage rooms are located along
the north wall of the TLA. These storage areas may be removed from the TLA, based upon
operational needs. Three of the storage rooms are approximately 11 ft wide by 10 ft long, and
two of the storage rooms are approximately 15 ft wide by 10 ft long. All five storage rooms are
approximately 12 ft high.
The electrical room, located along the north wall of the TLA, is approximately 16 ft wide by 10 ft long. The PAAA is approximately 86 ft by 113 ft, and is located in the south central part of the building. The WCRA, approximately 86 ft by 56 ft, is located in the southeast portion of the building adjacent to the PAAA. The interior wall separating the WCRA and the PAAA is constructed of heavy gauge metal studs, covered with metal corrugated siding similar to the other walls of the PAAA/WCRA. The wall extends from floor to the ceiling and is built directly on the concrete floor slab.

**HVAC System**

The HVAC system conforms with the requirements of ASHRAE. The Type I Module is heated and ventilated to control CO accumulation from equipment and vehicle operations. The ventilation system is only operated as required to maintain CO within acceptable levels. The fire protection and electrical room in the northwest corner of the MSA is heated to prevent freezing. All heaters are equipped with safety controls to disconnect the heater in the event normal operating temperatures are exceeded.

Ventilation air is drawn into the building through multiple louvers. The intakes are fitted with interlocked dampers and are equipped with filters for dust control. A total of six roof-mounted intakes are located in the PAAA/WCRA. Air is exhausted through two louvers into the central exhaust duct. Approximately 5,800 cfm is exhausted via an electrically powered fan through the building stack.

**Electrical Power**

The Type I Module electrical system complies with the NEC, NFPA, NEMA, and OSHA requirements. The Type I Module is equipped with a 12.5-kV primary stepdown transformer exclusive to the building. The transformer is located outside the building, providing 480-V three-phase distribution within the building. 120-V nominal, single-phase power is also provided. In addition, the Type I Module has an exclusive 480-V main service distribution panel board, 480- to 120/208-V transformer, and 208/120-V power panels. See Drawings 54-9721, 54-9722, and 54-10380 for further information. See the Site utilities, Drawing 56-9500 in
Appendix III for further information. The system is grounded and equipped with circuit breakers.

**Lighting**

All walkways, entrances, and exits are provided with lighting. Interior building lighting is typically provided by metal halide or fluorescent light fixtures from the ceiling of the building. Exterior lighting is provided along the building exterior and nearby roadways.

**Operating Record**

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.

**D-1 Containers**

**D-1a Containers with Free Liquids**

See Attachment 1.A, Section D-1a for further information on containers with free liquids.

**D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]**

The containers used to store wastes in the Type I Module are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1).

**D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]**

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following addresses variations to those practices that are specific to the Type I Module.

The storage configuration in the MSA, PAAA, and WCRA areas is based on the placement of containers on pallets or risers. All containers are stored on pallets or risers, which are arranged into rows. Containers may be located on the floor while in transition (e.g.,
loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor. The storage configuration presented in Drawing 51-9912, represents the number of pallets or risers that are stored while maintaining a minimum 3-ft aisle space (excluding support beams and portable equipment) between the rows and walls and providing a 10-ft access aisle (excluding support beams and portable equipment) in the PAAA/WCRA. Storage of containers in the TLA is on spill pallets/pans, or equivalent, if free liquids are present. The TLA floor may also be coated with an epoxy-type coating that is compatible with the types of waste stored.

Any combination of container types may be stored in the Type I Module at any given time. Boxes, calculated at 4 ft by 4 ft by 8 ft, are used in Appendix XI to determine the maximum potential waste volume that could be stored. Calculations for containers other than boxes and 55-gal drums have not been provided for the MSA and PAAA/WCRA because the potential maximum waste volumes for other containers are less than the corresponding values for boxes. Calculations related to volumes of waste stored in the TLA are based on the volumes of the TPA and SWB containers.

For maximum capacity in the PAAA/WCRA, containers are stored in the following configuration:

- six 60-ft rows (90 pallets),
- two 24-ft rows (12 pallets)
- one 32-ft row (8 pallets), and
- three 36-ft rows (27 pallets).

This maximum storage configuration, as shown in Drawing 51-9912, allows the placement of 137 individual pallets within the PAAA/WCRA. Each pallet may support eight 55-gal drums per layer (four wide by two long), up to five drums high for a total of 40, 55-gal drums per pallet. The drum storage capacity of the PAAA/WCRA is 5,160 drums. A total of four boxes may be placed on each pallet (one box layer, up to four boxes high). The box storage capacity is 516 boxes.
All containers stored in the MSA are arranged on pallets or risers, as described for the PAAA/WCRA. Based on the storage configuration shown in Drawing 51-9912, the storage capacity for the MSA is as follows:

- one 56-ft-long by 8-ft-wide row (14 pallets),
- one 16-ft-long by 8-ft-wide row (4 pallets), and
- four 24-ft-long by 8-ft-wide rows (24 pallets).

This configuration allows the placement of 42 individual pallets within the MSA. Based upon this, the drum storage capacity is 1,680 55-gal drums, and the box storage capacity is 168 boxes.

Containers stored in the TLA are typically TPAs, TDOPs, SWBs, or TRUPACT casks on spill pallets/pans, or equivalent. There are 17 locations identified for storage of these containers in the TLA:

- five along the north wall,
- four to the east of the electrical room along the north wall, and
- eight between the TLA platforms used for TRUPACT cask loading/unloading.

See Drawing 51-9912, for the storage locations. The maximum storage capacity in the TLA is when all 17 locations are occupied by TPAs in TRUPACT casks or on spill pallets/pans. Based upon this, the drum storage configuration is 238 55-gal drums, and the box storage configuration is 34 boxes.

Incompatible wastes are managed in the Type I Module in accordance with Attachment 6.

**D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]**

The PAAA/WCRA and MSA are fully-enclosed structures. The secondary containment system consists of a concrete floor, concrete sealer, and an epoxy type coating, or equivalent. Additional coating(s) may be placed onto the secondary containment system. This coating(s) is typically used to prevent degradation of or damage to the secondary containment system, by providing protective layers. The secondary containment system is maintained to provide
containment that is sufficiently impervious to leaks, spills, and accumulated precipitation until
the collected material is detected and removed.

The secondary containment system is designed to resist frost heave and the types of
wastes stored. The secondary containment system provides sufficient capacity to hold, at a
minimum, 10% of the maximum liquid volume stored or the volume of the largest container
(whichever is greater) in the storage area(s) in accordance with HWMA/RCRA requirements.

Secondary containment, as required, in the TLA is provided by the TRUPACT casks,
spill pallets, containment pans, or equivalent. Secondary containment in the TLA may also be
provided by a secondary containment system, as described for the PAAA/WCRA and MSA,
designed to resist the types of waste stored. These secondary containment systems provide
sufficient capacity to hold, at a minimum, 10% of the maximum liquid volume or the volume of
the largest container (whichever is greater) stored on them. During the loading process of
TDOPs within the TLA, secondary containment is not provided as the TDOP provides the
secondary containment for containers being loaded into the TDOP. After the lid of the TDOP
has been secured, secondary containment will be provided, as required. Container storage areas
with containers that do not contain free liquids do not require a containment system. See Section
D-1b of Attachment 1.A for additional information.

D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008;
40 CFR 264.175(b)(1)]

A detailed description of the design and materials of construction of the base and
containment curbs is provided in Section D. The concrete base is free of significant cracks and
gaps. The base is constructed with a minimum of expansion joints, and all joints are filled. All
expansion joints are equipped with dumbbell-type neoprene waterstops, except for the expansion
joint in the ramp between the TLA and MSA.

The MSA and PAAA/WCRA secondary containment systems are resistant to a wide
range of acids, alkalis, solvents, oxidizers, oils, and greases, as well as radiation. The
containment coating(s) is applied per manufacturer's recommendations. The design of the floor
and the application of the secondary containment system coating(s) (i.e., concrete sealer and an
epoxy type coating, or equivalent), together, are more than sufficient to contain any leaks or
spills of waste and prevent migration of spilled contaminants into underlying concrete. As stated above, multiple coatings may be utilized for protective purposes, so long as liquid is contained without allowing contact to the concrete/concrete sealer.

D-1a(3)(b)  Containment System Drainage [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]

The MSA and PAAA/WCRA are designed to collect any liquid accumulation from spills or leaks. As described earlier, the wastes stored at the Type I Module are essentially solid in form. There is little likelihood of a spill or leak involving free liquids. Nevertheless, containers stored in the Type I Module are placed on pallets or risers to ensure spill drainage away from the containers.

The Type I Module is an enclosed building. The external pavement is sloped to promote run-off away from the building exterior and entrances. The doors of the building are typically kept closed except when occupied for container handling operations, inspections, maintenance, etc. Run-on controls are discussed in Section D-1a(3)(d).

The storage areas of the Type I Module are inspected weekly for leaks and spills. In the event that a leak or spill is detected, the spill is removed in accordance with spill response procedures or the Contingency Plan, as described in Attachment 7.

D-1a(3)(c)  Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]

The secondary containment system for the Type I Module is sized to contain, at a minimum, 10% of the maximum liquid volume or the volume of the largest container (whichever is greater) stored in the area at any given time, if secondary containment is required. Section D-1a(2) describes the storage configuration that is typically used in the Type I Module. Table D-1 summarizes the secondary containment capacity calculations for the Type I Module. Appendix XI presents the calculations and assumption used in compiling Table D-1.
D-1a(3)(d) Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]

The control of run-on requirements are the same as those described in Section D-1a(3)(d) of Attachment 1.A.

D-1a(3)(e) Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]

The requirements for the removal of liquids from the containment system are described in Section D-1a(3)(e) of Attachment 1.A.

D-1b Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

Containers without free liquids are managed as described in Section D-1b of Attachment 1.A.
Table D-1. Type I Module Secondary Containment Capacity Estimate

<table>
<thead>
<tr>
<th>Storage Area</th>
<th>Maximum Waste Volume Stored (gal)</th>
<th>Maximum Liquid Volume Stored (gal)</th>
<th>10% Of Maximum Liquid Volume&lt;sup&gt;b&lt;/sup&gt; (gal)</th>
<th>Volume Displaced By Containers, Pallets, and Structural Features (gal)</th>
<th>Secondary Containment Capacity (gal)</th>
<th>Available Secondary Containment&lt;sup&gt;c&lt;/sup&gt; (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSA&lt;sup&gt;f&lt;/sup&gt;</td>
<td>160,850 (boxes)</td>
<td>41,821</td>
<td>4,182</td>
<td>15,456</td>
<td>48,775</td>
<td>33,319</td>
</tr>
<tr>
<td>PAAA/WCRA</td>
<td>494,039 (boxes)</td>
<td>128,450</td>
<td>12,845</td>
<td>12,066</td>
<td>52,528</td>
<td>40,462</td>
</tr>
<tr>
<td>TLA</td>
<td>13,090 (17 TPAs)</td>
<td>200 [in 1 TPA (14 drums)]</td>
<td>20</td>
<td>N/A&lt;sup&gt;d&lt;/sup&gt;</td>
<td>85&lt;sup&gt;e&lt;/sup&gt;</td>
<td>85</td>
</tr>
<tr>
<td>Totals</td>
<td>667,979</td>
<td>170,471</td>
<td>17,047</td>
<td>24,380</td>
<td>101,388</td>
<td>77,010</td>
</tr>
</tbody>
</table>

a. Calculations supporting these values are provided in Appendix XI. Volumes are for the maximum number of boxes in the typical storage configuration in the storage areas.

b. Minimum secondary containment capacity that must be made available.

c. Available secondary containment equals secondary containment capacity minus the volume displaced by containers, pallets, and structural features. Must equal or exceed the minimum capacity.

d. TPAs stored in the TLA are on spill pallets, pans, TRUPACT cask, or equivalent or the concrete floor is coated with an epoxy-type coating that is resistant to the types of waste managed.

e. Minimum available secondary containment system capacity associated with using spill pans.

f. MSA includes the Drum Repack Enclosure that covers an area approximately 35’ x 24’. Consistent with the calculations in EDF-0270, the containment enclosure reduces the secondary containment capacity by 3,124 gallons ([35’ x 24’ x 0.5’] x 7.48 gallons/ft<sup>3</sup>) of that reported in EDF-0270. The MSA, including the Drum Repack Enclosure meets the secondary containment capacity requirements for the storage area of 4,182 gallons.
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FOR THE

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ATTACHMENT 1.D

SWEPP Design Process Information

Revision Date: December 2017
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D. SWEPP Design

The SWEPP, commonly known as WMF-610, is used to store and characterize ROW and MW. Wastes currently in storage, as well as newly-generated waste from on- and off-Site generators, may be moved, stored, and characterized in SWEPP.

Unless otherwise noted, drawings for SWEPP are located in Appendix V.

SWEPP houses a number of activities, which include:

- Receiving and storing of waste containers;
- Staging of containers;
- Performing nondestructive assay;
- Examining containers using RTR;
- Performing treatment, via absorption, of liquids;
- Performing treatment, via decanting, of liquids from containers, as required;
- Performing treatment, via neutralization, of liquids in a container;
- Performing visual examination of waste in containers;
- Repackaging of waste;
- Sizing of waste;
- Performing “fast” assay on containers;
- Performing treatment, via mechanical vibration of waste in a container; and
- Performing treatment, via macroencapsulation of waste in containers.

Waste treatment is conducted in a containment enclosure (absorption, decanting, neutralization, repackaging, sizing, and mechanical vibration) or outside a containment enclosure (mechanical vibration and macroencapsulation). See Attachment 1.A for additional information on the containment enclosure requirements and treatment operations.

The physical layout of the equipment in SWEPP is shown on the general arrangement drawing (see Drawing 51-9906). As shown on the general arrangement drawing, the SSA is
located on the south end of the building. The storage area is used to store containers before, during, and after examination (e.g., assay, RTR), pending transfer to another waste management unit. The container staging areas, designated as Staging Areas 1 and 2, are located in the SWEPP High Bay. Additional staging areas are located in the north and south loading/unloading areas.

Loading and unloading areas are located on the north and south ends of SWEPP. These areas are steel framed, fabric-covered buildings, which are constructed on asphalt pads. See Drawing 51-9906 for the location of the north and south loading/unloading areas. Up to two trailer characterization units (RTR and/or assay unit) may be connected to or located within the loading/unloading areas of SWEPP. A conveyor system may be located within the loading/unloading areas to assist in transporting containers.

As each container is placed into its designated storage area, the container’s barcode label is scanned to update the container’s location information maintained in the AMWTP Operating Record. One characterization operation performed on containers is RTR examination. See Attachments 1.A and 2 for further information on RTR examination. Containers may then be assayed to determine the amount of fissile material present in each container. At this point, containers are stored in preparation for shipment to another waste management unit.

**Fill and Grading**

The area on which SWEPP is constructed was graded prior to the construction of the building. The area was excavated and a subbase was placed under the building foundation. Six-in. layers of drainage fill material (crushed stone or gravel) was placed on the subbase and compacted up to the level of the building slabs (up to 4.4 ft in places). The fill was graded as appropriate to obtain a level base, compacted, and overlain by 4 in. of gravel. See Drawing 52-9500 in Appendix IV for further information on the grading plan.

The area around the SWEPP building is paved with concrete and/or asphalt, and the areas are sloped to promote drainage away from the building. A 6-in.-thick, 10-ft-wide concrete pad runs along the entire length of the west side of SWEPP. This concrete area has a slope of approximately 0.5%. Adjoining the concrete area is 3-in.-thick asphalt paving. The asphalt
paving is underlain by 2 in. of crushed gravel and 6 in. of pit run gravel base. A 38-ft-wide concrete grout paved area runs along the entire length of the east side of SWEPP.

Prior to placement of the pit run gravel base for the asphalt paving, the existing area was stripped of all vegetation, brought to the optimum moisture content, and compacted to at least 90% maximum density as determined by AASHTO requirements. Pit run gravel was then added to make grade. Each layer of pit run gravel was uniformly compacted to 95% of maximum density as determined in accordance with AASHTO requirements. A 3.5-in.-thick crushed gravel base was then spread and compacted for its full width. This base was then covered with an asphalt layer approximately 2.5 in. thick. The asphalt surface is finished with approximately a 2% grade from the centerline to allow for drainage.

Foundations and Floorings

The foundation of the SWEPP building is constructed of reinforced concrete, and is designed in accordance with applicable ACI requirements. The concrete has a minimum specified 28-day compressive strength of 4,000 psi. Reinforcing steel conforms to ASTM requirements.

An 8-in.-wide by 3-ft-deep concrete frost wall, reinforced by steel, extends around the perimeter of the SWEPP building. The concrete slab-on-grade at the SSA is 6 in. thick, reinforced with 6-in. by 6-in. welded wire fabric. The floor slab was poured in 20-ft by 20-ft sections. Individual pours were joined by notching or overlapping sections. The entire floor slab is coated with an epoxy coating, or equivalent. The floor has a load-bearing capacity of 250 lb per ft². Specific floor areas have been reinforced to support heavier system components.

The floor for the SWEPP High Bay slopes approximately 0.5% toward the north. On the east side of the SSA, the floor is sloped from the south side toward the north at approximately 0.4%. The floor on the west side of the SSA is sloped from the northwest corner to the east at approximately 0.6%.
**Structural Parameters**

SWEPP is a pre-engineered structural steel building which measures approximately 162 ft 8 in. by 60 ft. The roof framing for the SWEPP High Bay is supported by 8-in.-wide steel frames, which form the columns, located on 20-ft centers. Interior surfaces of the columns are furred with 3.5-in. metal girts and wrapped in gypsum board. Exterior metal wall panels are attached to the metal girts. The interior wall surfaces are metal liner panels. A standing seam metal roof is attached to 8-in. roof purlins. The finished surface of the ceiling consists of metal liner panels. See Drawing 51-9914 for additional information.

SWEPP is designed to meet the 1982 edition of the UBC. The building is designed to withstand a snow load of 30 lb per ft² and a wind load of 20 lb per ft².

All interior walls, except office area walls, are constructed of reinforced concrete block. The interior wall surfaces of the south, west, and east sides of the SSA are metal liner panels finished with factory paint. The north wall on the west side is concrete block finished with masonry paint.

Curbing has been installed around the outer portions of the SSA other than by the access ramp located in the center of the building and around certain building columns. Columns without curbing have flashing installed around them, approximately 6 in. above floor level. The flashing is 6 in. by 4 in. by 5/16 in. angle iron fastened to the floor with slotted sleeve anchor bolts. Joints between the flashing, floor, and wall are sealed with caulking. The SSA concrete curbing is 6.5 in. high and ranges from 6.5 in. to 8 in. wide, and is sealed with an epoxy coating. Flashing is also coated with epoxy, or equivalent. The sloped area on each side of the ramp, located on the north end of the SSA, is approximately 8.5 ft long, with a level area approximately 2 ft long at the ramp center. The ramp is approximately 22 ft wide, with curbing installed on each side. The 3.5-in. high center of the ramp is the north central boundary of the SSA. A second ramp is located under the 16-ft-wide overhead door on the south end of the SSA. This ramp is 3 ft wide and extends 0.5 in. above the adjoining floor. The ramps are concrete or steel and are sealed with an epoxy coating, or equivalent.
As shown in Drawing 51-9906, personnel doors provide access to the High Bay area of SWEPP from the building exterior. One personnel door, with a raised threshold of 2 in., is located on the west wall of the SSA. The other personnel door is located on the east wall north of the SSA. Two 16-ft-wide by 12-ft-high roll-up doors, with adjacent personnel doors, are located on the north and south ends of the High Bay area. These doors provide access to the north and south SWEPP loading/unloading areas. The south door is part of the storage boundary. This door has a raised threshold that is approximately 1/2 in. high by 36 in. wide, and is ramped on both sides to allow equipment access. The adjacent personnel door has a raised threshold of 1-3/8 in.

A bridge crane is located over the southwest portion of the SSA. The bridge portion is approximately 20 ft wide in the east-west direction, running north-south on parallel rails approximately 41 ft long. The crane rails are suspended from the building rigid frame, approximately 13 ft above the floor.

An L-shaped monorail crane rail runs north-south along the east wall, and east-west along the south end of the SSA. The monorail originates north of the SSA, runs parallel to the east wall, makes a 90 degree turn adjacent to the southwest wall of the SSA, and ends 5 ft from the west wall of the SSA.

**HVAC System**

The SWEPP is ventilated by a once-through air distribution system to control CO accumulation from equipment and vehicle operations. The ventilation system is only operated as required to maintain CO within acceptable levels. Ventilation air is drawn into the SWEPP High Bay through a louver on the west wall of Room 103 (HVAC equipment room). Air intake is controlled by a motor-operated damper. The air is distributed by air ducts throughout the High Bay area. A louver is located on the south wall of Room 103 to provide inside air return. Airflow through this louver is controlled by a motor-operated damper. The capacity of each of the louvers described above is approximately 7,500 cfm.
Air is exhausted from the High Bay area through three roof mounted power ventilators spaced equally along the length of the building. The ventilators provide a total exhaust rate of 8,500 cfm.

Heat is provided by a propane-fired furnace located in Room 103. The furnace heats the incoming ventilation air. Cooling is provided by circulation of incoming air. There is no provision for air conditioning.

**Electrical Power**

The electrical system for SWEPP complies with the standards listed in Attachment 1.A. The electrical one-line diagram is presented in Drawing 54-9759. The Site utilities are presented in Drawing 56-9500 in Appendix III.

Commercial electrical power is transmitted to the SWEPP building via a 12.5-kV, 3-phase power line that connects to a 500-kV, 12.5-kV-480-V/277-V pad-mounted transformer. The transformer is located 30 ft west of the building. The transformer supplies power to SWEPP via the electrical room (Room 104). The 480-V service connects to two main power panels and one standby power panel in the electrical room. Grounding is provided by a main conductor grounding grid beneath the building connecting to grounding wires within the building walls.

**Lighting**

All walkways, entrances, and exits provided with lighting. Interior building lighting is provided by overhead lighting fixtures. Exterior lighting is provided along the building and nearby roadways.

**Operating Record**

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.
D-1 Containers

D-1a Containers with Free Liquids

See Attachment 1.A, Section D-1a for further information on containers with free liquids.

D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

The containers used to store wastes in SWEPP are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1).

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following text addresses variations to those practices that are specific to SWEPP.

Containers of MW are processed through the SWEPP for characterization (e.g., RTR, assay). Characterization activities may take up to 30 calendar days. During this period, containers are staged in two areas within SWEPP, as described below.

Staging Areas 1 and 2 are designated for containers awaiting characterization. The containers are staged such that a row of containers is no more than three containers wide, six containers long, and one container high. Aisles are maintained with a minimum 3-ft aisle space (excluding support beams and portable equipment) between any other row of containers and between all interior and exterior walls for these staging areas. All containers located in Staging Areas 1 and 2 are stored on pallets or risers which are arranged into rows. Containers may be located on the floor while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor. Drawing 51-9906 shows the location of the areas used for staging containers pending characterization.


Staging Area 1 is located next to the north SWEPP loading/unloading area door and Staging Area 2 is located north of the access ramp. Container configurations which may be used in Staging Areas 1 and 2 are as follows:

- Eighteen (18) drums, or
- One (1) box.

Containers may be located in the north and/or south SWEPP loading/unloading areas on transport devices, pallets, or risers for up to 10 working days. The maximum storage capacity for the north and south loading/unloading areas is 10,056 gallons per loading/unloading area. Containers staged within the loading/unloading areas that are not located on a transport trailer are stored in the following manner:

- A row of containers is no more than two wide and two high, and
- Aisles (excluding support beams and portable equipment) are 3 ft wide, minimum, between rows of containers, and between rows of containers and the interior/exterior walls.

Containers located in Staging Areas 1 and 2 and the loading/unloading areas are inspected each working day for leakage and corrective action is initiated, as required.

Any combination of containers may be stored in the SSA at any given time. Containers in the SSA are stored in the following configuration:

- A row of containers is no more than four wide and three high, and
- Aisles (excluding support beams and portable equipment) are 3 ft wide, minimum, between rows of containers, and 2 ft wide, minimum, between rows of containers and the interior/exterior walls.

The storage configuration as described above is depicted in Drawing 51-9906 for 55-gal drums. All containers located within the SSA are stored on pallets or risers which are arranged into rows. Containers may be located on the floor while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor.
The maximum storage capacity for the SWEPP is approximately 28,380 gal, which is based on the assumption that only 55-gal drums are stored in the SWEPP area. See Appendix XI for specific calculations.

Incompatible wastes are managed in the SWEPP in accordance with Attachment 6.

**D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]**

The secondary containment system for the SSA consists of a concrete floor, concrete sealer, and an epoxy type coating, or equivalent. Additional coating(s) may be placed onto the secondary containment system. This coating(s) is typically used to prevent degradation of or damage to the secondary containment system, by providing protective layers. The secondary containment system is maintained to provide containment that is sufficiently impervious to leaks, spills, and accumulated precipitation until the collected material is detected and removed.

The secondary containment system is designed to resist frost heave and the types of wastes stored. The secondary containment system provides sufficient capacity to hold, at a minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in the storage area(s) in accordance with HWMA/RCRA requirements. Container storage areas holding only wastes that do not contain free liquids do not require a containment system. See Section D-1b for additional information.

**D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008; 40 CFR 264.175(b)(1)]**

A detailed description of the design and materials of construction of the base and containment curbs is provided in Section D. The concrete base is free of significant cracks and gaps.

The SSA secondary containment system is resistant to a wide range of acids, alkalis, solvents, oxidizers, oils, and greases, as well as radiation. The containment coating(s) is applied per manufacturer’s recommendations. The design of the floor and the application of the secondary containment system coating(s) (i.e., concrete sealer and an epoxy type coating, or equivalent), together, are more than sufficient to contain any leaks or spills of waste and prevent
migration of spilled contaminants into underlying concrete. As stated above, multiple coatings may be utilized for protective purposes, so long as liquid is contained without allowing contact to the concrete/concrete sealer.

D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]

The SSA containment system is designed to collect any liquid accumulation resulting from spills or leaks and all containers in storage are elevated.

Precipitation is not a factor regarding the secondary containment system for the SSA because the storage area is an enclosed structure. In addition, paving in the vicinity of SWEPP is sloped to direct run-off away from the building. The doors of the building are typically kept closed except when occupied for container handling operations, inspections, maintenance, etc.

Run-on controls are discussed in Section D-1a(3)(d).

The containers located in the SSA are inspected weekly for leaks and spills. In the event that a leak or spill is detected, it is removed as described in Attachment 7.

D-1a(3)(c) Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]

The secondary containment system for the SSA is sized to contain, at a minimum, 10% of the maximum liquid volume or the volume of the largest container (whichever is greater) stored in the area at any given time, if secondary containment is required. Section D-1a(2) describes the storage configuration that is used in the SSA. Table D-1 summarizes the secondary containment capacity calculations for the SSA. Appendix XI presents the calculations and assumptions used in compiling Table D-1.

D-1a(3)(d) Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]

The control of run-on requirements are the same as those described in Section D-1a(3)(d) of Attachment 1.A.
D-1a(3)(e) Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]

The requirements for the removal of liquids from the containment system are described in Section D-1a(3)(e) in Attachment 1.A.

D-1b Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

Containers without free liquids are managed as described in Section D-1b of Attachment 1.A.
Table D-1. SWEPP Storage Area Secondary Containment Capacity Estimate

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Waste Volume Stored</td>
<td>28,380 gal</td>
</tr>
<tr>
<td>10% of Maximum Liquid Volume⁵</td>
<td>2,838 gal</td>
</tr>
<tr>
<td>Secondary Containment Capacity</td>
<td>4,003 gal</td>
</tr>
<tr>
<td>Volume Displaced by Containers, Pallets, and Structural Features</td>
<td>709 gal</td>
</tr>
<tr>
<td>Available Secondary Containment</td>
<td>3,294 gal</td>
</tr>
</tbody>
</table>

a. Calculations supporting these values are provided in Appendix XI. Volumes are for the maximum number of drums in the storage configuration in the SSA.
b. Minimum secondary containment capacity that must be made available.
c. Available secondary containment equals secondary containment capacity minus the volume displaced by containers, pallets, and structural features. Must equal or exceed the minimum capacity.
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Section D

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D. WMF-628 Design

The Type II Module WMF-628 is used to characterize, store, and treat ROW and MW. There are a total of seven Type II Modules. This attachment covers the Type II Module with the building designation of WMF-628. The Type II Module designated as WMF-634 is described in Attachment 1.A and the Type II Modules designated as WMF-629 through WMF-633 are described in Attachment 1.B. Wastes currently in storage, as well as newly generated waste from on- and off-Site generators, may be moved and stored in WMF-628.

Unless otherwise noted, drawings for WMF-628 are located in Appendix VI. WMF-628 houses a number of activities, which include:

- Receiving and storing waste containers for characterization;
- Examining containers using RTR;
- Performing visual examination of waste in containers;
- Performing headspace gas sampling on drums, as required;
- Performing gas generation testing;
- Radiological surveying of containers;
- Performing treatment, via absorption, of liquids;
- Performing treatment, via decanting, of liquids from containers, as required;
- Performing treatment, via neutralization, of liquids in a container;
- Repackaging of waste;
- Sizing of waste;
- Performing “fast” assay on containers;
- Performing treatment, via mechanical vibration of waste in a container; and
- Performing treatment, via macroencapsulation of waste.

Waste treatment is conducted in a containment enclosure (absorption, decanting, neutralization, repackaging, sizing, and mechanical vibration) or outside a containment enclosure (mechanical vibration and macroencapsulation). See Attachment 1.A for additional information on the containment enclosure requirements and treatment operations.
Drawing 51-10009 presents a plan view layout of WMF-628. Containers are received into WMF-628 and are off-loaded and stored. As each container is placed into a storage area, the container's barcode label is scanned to update the container's location information maintained in the AMWTP Operating Record.

Typically, the first characterization operation performed on containers is RTR examination. RTR is used to determine the waste material parameters and detect prohibited items and special conditions. RTR examination is also used to validate existing waste characterization data, or in the case of unidentified waste containers, to correlate the contents of the container with known waste types from generator sites. The containers are assayed in order to determine the amount and isotopic composition of nuclear material, TRU isotope activity, and decay heat. The data are used to implement criticality control throughout the AMWTP waste management units. Up to six mobile characterization units (e.g., RTR, assay unit, etc.) may be located in WMF-628. Drums identified as requiring headspace gas analysis may be transferred to portable headspace gas sampling units. See Attachment 1.A for additional information on RTR, assay, and headspace gas sampling operations.

**Fill and Grading**

See Attachment 1.B for information on fill and grading requirements for WMF-628.

**Foundations and Floors**

See Attachment 1.B for information on foundation and floor requirements for WMF-628.

**Structural Parameters**

See Attachment 1.B for information on structural parameter requirements for WMF-628.

See Drawing 51-10010 for additional information on WMF-628.

**HVAC System**

WMF-628 is heated and ventilated by a once-through air distribution system, which is used to control CO accumulation from equipment and vehicle operations. The ventilation system is only operated as required to maintain CO within acceptable levels. Two propane fired makeup air heaters, located outside, preheat makeup air entering the building. The makeup air heaters are
supplied with fans, inlet filters, and bird screens to direct the preheated makeup air into the module via wall penetrations.

**Electrical Power**

See Attachment 1.B for information on electrical power requirements for WMF-628. See Drawing 54-10442 for the WMF-628 electrical one-line diagram. See Drawings 56-1901 in Appendix II and 56-9500 in Appendix III for the information on the Site utilities for WMF-628.

**Lighting**

See Attachment 1.B for information on lighting requirements for WMF-628.

**Operating Record**

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.

**D-1 Containers**

**D-1a Containers with Free Liquids**

See Attachment 1.A, Section D-1a for further information on containers with free liquids.

**D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]**

The containers used to store wastes in WMF-628 are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1).

**D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]**

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following text addresses variations to those practices that are specific to WMF-628.

Main access into WMF-628 is provided by a 20-ft wide center aisle (excluding support beams and portable equipment). If “fast” assay is being performed, then only a 16-ft wide center aisle is required in the area. Three-ft wide aisles (excluding support beams and portable equipment) are provided between the rows of containers and the interior/exterior walls to allow
personnel access. All containers are stored on pallets or risers which are arranged into rows.
Containers may be located on the floor while in transition (e.g., loading/unloading trailers or
other equipment) for a period of time not to exceed the end of the work shift in which the
container was placed onto the floor. In the event that emergency equipment is needed, access to
the containers is provided through the center aisle of the building. Drawing 51-10009 presents a
typical waste storage configuration within WMF-628.

Any combination of container types may be stored in WMF-628 at any given time.
Boxes, calculated 4 ft by 4 ft by 8 ft, are used to determine the maximum potential waste volume
that can be stored in WMF-628. See Appendix XI for specific calculations. Calculations for
containers other than boxes and 55-gal drums are not provided because the potential maximum
waste volumes for other containers are less than the corresponding values for boxes.

For maximum capacity, containers are stored in the following configuration. There are
up to 42 rows of drums in WMF-628. A row is defined as up to four drums wide by up to five
drums high by up to 22 drums in length (i.e., depth). The drum storage capacity in WMF-628 is
18,160 55-gal drums. For boxes, the configuration of a row is up to four wide, up to four high,
and up to 11 long. The maximum storage capacity in WMF-628 is 2,256 boxes. In the corners
of the buildings, the length of a row is shorter to allow space for access ramps. TDOPs and
TPAs may also be stored in WMF-628 as described in Section D-1a(2) of Attachment 1.A.

Incompatible wastes are managed in WMF-628 in accordance with Attachment 6.

**D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008
and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]**

WMF-628 is an enclosed structure. The secondary containment system consists of a
concrete floor, concrete sealer, and an epoxy type coating, or equivalent. Additional coating(s)
may be placed onto the secondary containment system. This coating(s) is typically used to
prevent degradation of or damage to the secondary containment system, by providing protective
layers. The secondary containment system is maintained to provide containment that is
sufficiently impervious to leaks, spills, and accumulated precipitation until the collected material
is detected and removed.

The secondary containment system is designed to resist frost heave and the types of
wastes stored. The secondary containment system provides sufficient capacity to hold, at a
minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in the storage area(s) in accordance with HWMA/RCRA requirements. Container storage areas holding only wastes that do not contain free liquids do not require a containment system. See Section D-1b for additional information.

D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008; 40 CFR 264.175(b)(1)]

The requirements for the base or liner to contain liquids are the same as those described in Section D-1a(3)(a) of Attachment 1.A. A detailed description of the design and materials of construction of the base and containment curbs is provided in Section D of this attachment.

D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]

The containment system drainage requirements are the same as those described in Section D-1a(3)(b) of Attachment 1.A.

D-1a(3)(c) Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]

The secondary containment system for WMF-628 is sized to contain, at a minimum, 10% of the maximum liquid volume or the volume of the largest container (whichever is greater) stored in the area at any given time, if secondary containment is required. Section D-1a(2) describes the storage configuration that is used in WMF-628. Table D-1 summarizes the secondary containment capacity calculations for WMF-628. Appendix XI presents the calculations and assumptions used in compiling Table D-1.

D-1a(3)(d) Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]

The requirements for control of run-on are the same as those described in Section D-1a(3)(d) of Attachment 1.A.

D-1a(3)(e) Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]

The requirements for the removal of liquids from the containment system are described in Section D-1a(3)(e) in Attachment 1.A.
D-1b Containers without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

Containers without free liquids are managed as described in Section D-1b of Attachment 1.A.
### Table D-1. WMF-628 Secondary Containment System Capacity Calculations\(^a\)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Waste Volume Stored</td>
<td>1,214,304 gal</td>
</tr>
<tr>
<td>Maximum Liquid Volume Stored</td>
<td>331,222 gal</td>
</tr>
<tr>
<td>10% of Maximum Liquid Volume(^b)</td>
<td>33,122 gal</td>
</tr>
<tr>
<td>Secondary Containment Capacity</td>
<td>123,143 gal</td>
</tr>
<tr>
<td>Volume Displaced by Containers, Pallets, and Structural Features</td>
<td>45,215 gal</td>
</tr>
<tr>
<td>Available Secondary Containment(^c)</td>
<td>77,928 gal</td>
</tr>
</tbody>
</table>

\(^a\) Calculations supporting these values are provided in Appendix XI. Volumes are for the maximum number of boxes in the typical storage configuration in the storage areas plus the approximate maximum number of containers in process in WMF-628.

\(^b\) Minimum secondary containment capacity that must be made available.

\(^c\) Available secondary containment equals secondary containment capacity minus the volume displaced by containers, pallets, and structural features. Must equal or exceed the 10% of maximum liquid volume.
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ATTACHMENT 1.F

WMF-636 Process Information

Revision Date: June 2018
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D. PROCESS INFORMATION

D. WMF-636 Pad 2 Design

WMF-636 Pad 2 is used to store and treat ROW and MW. Wastes currently in storage (i.e., existing AMWTP waste), as well as AMWTP newly generated waste from on- and off-Site generators, may be moved, stored, and treated in the WMF-636 Pad 2 building.

Unless otherwise noted, drawings for WMF-636 Pad 2 are located in Appendix VII. WMF-636 Pad 2 houses a number of activities, which include:

- Receiving and storing waste containers;
- Performing treatment, via macroencapsulation of waste; and
- Performing “fast” assay on containers.

The physical layout of the storage areas for WMF-636 Pad 2 is shown on the general arrangement drawing (see Drawing 51-10038). See Attachment 1.A for additional information on the macroencapsulation treatment operations.

Originally, WMF-636 Pad 2 was built in the late 1960’s for the long term storage of MW containers in storage cells. A total of four waste storage cells existed on WMF-636 Pad 2, three of which are still in use today (i.e., Cell 1, Cell 1A, and Cell 2) and one (i.e., Cell 3) which was closed under HWMA/RCRA in 1999. Initial waste storage consisted of drums stacked vertically on asphalt pads with sheets of wood between layers of drums in order to stabilize the stacking surface and increase overall stack rigidity. Waste boxes were used to outline the sides of the cell. Side burden soil was placed along the sides of each cell and between adjacent cells.

In the 1990’s the DOE built the TSA-RE building, which enclosed all of the asphalt pads (i.e., Pad 1, Pad R, and Pad 2) and soil surrounding the outer portion of the asphalt pads. The purpose of the TSA-RE building was to provide a weather enclosure to assist in future retrieval operations. Per agreement between the State of Idaho DEQ and the DOE, all of the asphalt pads were to be regulated under the HWMA/RCRA Interim Status regulations found at IDAPA 58.01.05.009 (40 CFR 265) and all waste stored on the asphalt pads were to be retrieved and placed into a compliant storage configuration by December 31, 2018. The TSA-RE building and the soil surrounding the asphalt pads was not originally considered to be part of the HWMA/RCRA Interim Status units. In the late 1990’s, the DOE commissioned the AMWTP to start the retrieval of the waste from the asphalt pads within the TSA-RE building and place the waste into HWMA/RCRA compliant storage configuration either on the Interim Status asphalt pads or in the other AMWTP MWMUs.
Since the inception of the AMWTP, a few modifications have been made to the soil areas surrounding the original WMF-636 Pad 2 asphalt. In 2004, a concrete pad of approximately 38 ft by 32 ft was poured on the soil area south of the original WMF-636 Pad 2 asphalt pad. The purpose of this concrete pad was for the storage of non HWMA/RCRA-regulated containers and operational equipment. Additionally, in 2007 and 2008 the majority of the soil south of WMF-636 Pad 2 was asphalted. In 2008 and 2009, the majority of the soil located to the east, north, and west of the original WMF-636 Pad 2 was asphalted. See Drawing 51-10038 for additional information on the locations of soil areas remaining within the portion of the TSA-RE building covering WMF-636 Pad 2.

Building Structure

The TSA-RE is a “T” shaped, engineered metal building covering an area of about 313,000 ft². The primary structure, which is oriented north-south, encloses Pad 1 and Pad R which are regulated as Interim Status Units under IDAPA 58.01.05.009 (40 CFR 265). A secondary structure encloses the WMF-636 Pad 2 area, which is approximately 185 ft wide by 430 ft long. The eave height of the structure over WMF-636 Pad 2 is approximately 33.5 ft. The primary and secondary framing design for the TSA-RE building complies with Project Design Criteria specified in DOE Order 6430.1A. More detailed information on the building over WMF-636 Pad 2 is provided below.

WMF-636 Pad 2 Base

Prior to construction, grading was performed on the areas where the original asphalt pad, new asphalt pads, and concrete pad of WMF-636 Pad 2 were constructed. The original asphalt pad consists of 4 in. of asphalt over 3 in. of crushed gravel. The original asphalt pad slopes toward the north-south center-line at a grade of approximately 1%. The original asphalt pad then slopes toward the north. The newly installed asphalt pads consist of 4 in. of asphalt over 6 in. of crushed gravel. The newly installed asphalt pads slope to the north-south center and then slope either to the north or south at a grade of approximately 1%. The concrete pad consists of 6 in. of concrete reinforced with rebar over 4 in. of crushed gravel. The concrete pad slopes to the south at approximately 1%. The slopes of the original asphalt pad, newly installed asphalt pad, and concrete pad helps prevent water from accumulating around the stored waste. See
Drawings 51-10038, 52-0241 Sheet 1 of 2, and 52-0241 Sheet 2 of 2 for additional information on the grading plan for WMF-636 Pad 2.

**WMF-636 Building Walls and Ceiling over Pad 2**

The building over the WMF-636 Pad 2 container storage area is constructed of metal siding and roofing installed over a steel frame. The building is insulated. A continuous sheet metal liner is affixed to the interior of the steel girts for the wall sections and to the underside of the purlins that span between the bottom chords of the roof trusses for the ceiling. The structural steel columns are framed and enclosed with a sheet metal liner. See Drawings 51-10039 and 51-10037 for additional information on the construction of the walls and ceiling and section views of the WMF-636 building located over WMF-636 Pad 2.

As shown in Drawing 51-10038, WMF-636 Pad 2 may be accessed through overhead doors located on the east and south sides of the building. The doors are electrically powered and equipped with a manual override. In addition to these doors, there are five personnel access doors; two on the south wall and three on the east wall of the building. There are two fire sprinkler riser rooms along the east wall of the building. The fire sprinkler riser rooms house the fire water riser pipes and connections. These rooms have their own exterior entrance.

**HVAC System**

No general ventilation of the TSA-RE building is provided. No general space heating is provided for WMF-636 Pad 2. Portable heating equipment may be provided during colder weather seasons for AMWTP personnel, if deemed necessary. The two fire riser rooms are provided with space heaters.

**Electrical Power**

The WMF-636 Pad 2 electrical power system complies with NEC, NFPA, NEMA, and OSHA. See the electrical one-line diagrams, Drawings 54-0701, 54-9787, and 54-9788 for additional information on the WMF-636 Pad 2 electrical power system. The WMF-636 Pad 2 electrical power system is grounded and equipped with circuit breakers.
Lighting

Walkways, entrances, and exits are provided with lighting, as required. Interior building lighting is typically provided by light fixtures suspended from the ceiling of the TSA-RE building. Exterior lighting is provided along the building exterior and nearby roadways.

Fire Water Collection

Fire water collection for WMF-636 Pad 2 is provided by a drainage system located on the north and east sides of the WMF-636 building. Cast-in-place concrete drainage troughs lead to a collection basin, which is connected to a 12-in.-diameter drainage pipe that ends in a fire water collection tank. The collection tank is a 20,000-gal double-walled tank located underground outside of the TSA-RE building. The drainage troughs are covered with metal grating over the full length, except at entrance doors, where fabricated steel or pre-cast concrete covers protect the troughs. Water collected in this tank from a fire event is characterized for control and disposition in accordance with HWMA/RCRA requirements.

Operating Record

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.

D-1 Containers

D-1a Containers with Free Liquids

In general, only containers with no free liquids are stored within WMF-636 Pad 2. The presence of (or absence of) liquid in the containers stored within WMF-636 Pad 2 is determined using either of three methods. The first method involves process knowledge supplied by the waste generators. Process knowledge is substantiated by the waste acceptance process described in Attachment 2. The second method is the use of RTR to remotely examine the waste containers for liquids and other parameters. The RTR process description is presented in more detail in Attachments 1 and 2. The third method for identifying free liquids is through the visual examination of waste in the various AMWTP MWMUs. Incompatible wastes, if present, are segregated into discrete areas within WMF-636 Pad 2.
If containers with free liquids are managed within WMF-636 Pad 2, then secondary containment shall be provided through the use of portable spill pallets/panns and/or bermed areas of HDPE. See Section D-1a(3) for additional information on the use of secondary containment within WMF-636 Pad 2.

**D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]**

The containers used to store wastes in the WMF-636 Pad 2 are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1).

**D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]**

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following text addresses variations to those practices that are specific to WMF-636 Pad 2. Containers are stored on pallets.

Main access into WMF-636 Pad 2 is provided by a 20-ft-wide center aisle (excluding support beams and portable equipment) that runs north to south from the overhead access door on the south side of the building. An additional 20-ft-wide aisle (excluding support beams and portable equipment) is provided from the overhead access door on the east side of the building to the center aisle space that runs north-south. See Drawing 51-10038 for additional information. If “fast” assay is being performed, then only a 16-ft-wide center aisle is required in the area where “fast” assay is being performed. Three-ft-wide aisles (excluding support beams and portable equipment) are provided between the rows of containers and all interior/exterior walls to allow personnel access. All containers are stored on pallets or risers which are arranged into rows. See Appendix XII for additional information on the storage requirements of containers on pallets and risers on WMF-636 Pad 2. Containers will be stored either on the asphalt or concrete pads. Containers will not be stored over any of the soil areas remaining around WMF-636 Pad 2.

Containers may be located on the floor while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the floor. In the event that emergency equipment is needed, access to the containers is provided through the center aisles of the building. Uncharacterized waste may be stored on WMF-636 Pad 2. All uncharacterized waste will be stored on spill pallets/panns within WMF-636 Pad 2.
Any combination of container types may be stored in WMF-636 Pad 2 at any given time. Boxes, calculated 4 ft by 4 ft by 8 ft, are used in Appendix XI to determine the maximum potential waste volume that can be stored in WMF-636 Pad 2. The calculations performed in Appendix XI for determining the maximum drum and box storage capacity assume that all soil areas located within the WMF-636 Pad 2 building are either asphalted or concreted. See Appendix XI for additional information.

For determining the drum maximum storage capacity, containers are stored in the following configuration. There are up to 35 rows of drums which are 4 wide by 5 high by up to 34 drums in length on the east side of WMF-636 Pad 2. There are up to 36 rows of drums which are 4 wide by 5 high by up to 40 drums in length on the west side of WMF-636 Pad 2. The maximum drum storage capacity in WMF-636 Pad 2 is 52,600 55-gal drums, which corresponds to a waste storage capacity of 2,893,000 gal.

For determining the box maximum storage capacity, containers are stored in the following configuration. There are up to 11 rows of boxes which are 4 wide by 4 high by up to 17 boxes in length on the east side of WMF-636 Pad 2. There are up to 11.375 rows of boxes which are 4 wide by 4 high by up to 20 boxes in length on the west side of WMF-636 Pad 2. The maximum box storage capacity in WMF-636 Pad 2 is 6,632 boxes, which corresponds to a waste storage capacity of 6,350,140 gal.

Incompatible wastes are managed in WMF-636 Pad 2 in accordance with Attachment 6.

**D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]**

WMF-636 Pad 2 is a fully enclosed structure. WMF-636 Pad 2 does not have a secondary containment system. If free liquids are stored on WMF-636 Pad 2, then secondary containment will be provided by portable spill pallets/pans and/or bermed areas of HDPE. Additionally, if uncharacterized waste is stored in WMF-636 Pad 2, then the uncharacterized waste shall be stored on spill pallets/pans. The spill pallets/pans and bermed areas used to provide secondary containment will provide, at a minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in accordance with HWMA/RCRA requirements.
A bermed area has been and is used on Pad 2, of WMF-636, to control potential liquid waste spillage from waste containers that have not been verified to be free of liquids. The area will be roped off and have signage identifying hazards associated with waste types, if required.

The bermed area is comprised of a liner system consisting of two separate layers of synthetic membrane, laying one on top the other. The top layer is an HDPE impermeable membrane, and the bottom layer is a heavy duty ground mat which will cushion the membrane. The overall dimensions of the liner system are 45 feet by 46 feet. A perimeter berm was established by propping the outer edge of the liner system up onto kick boards.

The perimeter berm kick boards are light weight portable sections which can be temporarily removed, thus allowing access onto the area with heavy equipment. Waste containers will be placed in the area using forklifts or cranes. After the waste container(s) are moved on/off the liner system, the berm will be re-established using the kick boards. The containment berm will always be intact if free liquids are on the top of the membrane or waste is being stored in the area.

**D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008; 40 CFR 264.175(b)(1)]**

All portable spill pallets/pans used for providing secondary containment system are resistant to a wide range of acids, alkalis, solvents, oxidizers, oils, and grease. The use of spill pallets/pans is more than sufficient to contain any leaks or spills of waste and prevent the migration of spilled contaminants until the spill is detected and removed.

**D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012; 40 CFR 264.175(b)(2) and 270.15(a)(2)]**

All containers with free liquids stored within WMF-636 Pad 2 are elevated on the spill pallets/pans above the area used for providing secondary containment. Additionally, all containers in storage within WMF-636 Pad 2 are elevated on pallets or risers. This prevents containers from coming into contact with spills and accumulated liquids.
D-1a(3)(c)  Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(3) and 270.15(a)(3)]

The spill pallets/pans used to provide secondary containment will provide at a minimum, 10% of the maximum liquid volume stored or the volume of the largest container (whichever is greater) in accordance with HWMA/RCRA requirements.

D-1a(3)(d)  Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]

The requirements for control of run-on are the same as those described in Section D-1a(3)(d) of Attachment 1.A.

D-1a(3)(e)  Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]

The requirements for the removal of liquids from the containment system (i.e., spill pallets/pans) are described in Section D-1a(3)(c) in Attachment 1.A.

D-1b  Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

All containers stored in WMF-636 Pad 2 are managed in compliance with HWMA/RCRA requirements for containers with free liquids, unless documented not to contain any free liquids. Containers documented not to contain any free liquids through means other than historical knowledge (e.g., RTR, visual examination, process knowledge, etc.) may be stored without a secondary containment system that meets the requirements of IDAPA 58.01.05.008 [40 CFR 264.175(b)]. If RTR is used to document that a container does not contain any free liquids, then at least two AMWTP personnel will verify that the container does not contain free liquids.

Containers without free liquids shall be stored in an area that is sloped or otherwise designed to drain and remove liquid resulting from precipitation or the containers without free liquids shall be elevated or otherwise protected from contact with accumulated liquid in accordance with IDAPA 58.01.05.008 [40 CFR 264.175(c)].
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ATTACHMENT 1.G

Section D

AMWTP Outside Storage Area Design

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D AMWTP Outside Storage Area Design

The AMWTP Outside Storage Area is an asphalted area used to store and treat MW and store ROW. Wastes currently in storage, as well as newly generated waste from on- and off-Site generators, may be moved to, stored, and treated in the AMWTP Outside Storage Area.

Unless otherwise noted, drawings for the AMWTP Outside Storage Area are located in Appendix VIII. The AMWTP Outside Storage Area is used for the receiving and storing of waste containers, transport trailers loaded with containers, and treating containers via macroencapsulation. See Attachment 1.A for additional information on the macroencapsulation treatment operations. The physical layout of the AMWTP Outside Storage Area is shown on the general arrangement drawing (see Drawing 51-10040).

AMWTP Outside Storage Area Base

The area on which the AMWTP Outside Storage Area asphalt pad is built was graded prior to installation of the asphalt pad. The asphalt pad consists of 4 in. of asphalt over 3 in. of crushed gravel. Minor areas were improved in 2012 as a result of adjacent asphalt maintenance, which consisted of a 3 in. layer of asphalt over 5 in. of crushed base, with 10 in. of aggregate sub-base over a geotextile fabric layer. The asphalt pad slopes towards the north at a grade of approximately 1%. See Drawings 51-10040 in Appendix VIII and 52-0241 Sheet 2 of 2 in Appendix VII for additional information on the grading plan for the AMWTP Outside Storage Area.

Electrical Power

There is no electrical power provided specifically for the AMWTP Outside Storage Area. If electrical power is needed, then portable generators may be used.

Lighting

Walkways near the AMWTP Outside Storage Area are provided with lighting, as required. Exterior lighting is provided along the TSA-RE building exterior to the east of the AMWTP Outside Storage Area and nearby roadways to the north and west.
Operating Record

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.

D-1 Containers

D-1a Containers with Free Liquids

Containers with free liquids are not managed in the AMWTP Outside Storage Area, unless the containers are located within a TRUPACT container. Containers located within a TRUPACT container are allowed to contain up to 1% free liquids by volume. See Section D-1b for information on the storage of containers without free liquids.

D-1b Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

As mentioned above, only containers without free liquids, unless stored within a TRUPACT container, will be stored in the AMWTP Outside Storage Area. TRUPACT containers are allowed to contain containers with up to 1% free liquids by volume. Containers are documented not to contain any free liquids through means other than historical knowledge (e.g., RTR, visual examination, direct process knowledge, etc.). If RTR is used to document that a container does not contain any free liquids, then at least two AMWTP personnel will verify that the container does not contain free liquids. Containers without free liquids stored in the AMWTP Outside Storage Area shall be elevated on pallets, risers, or trailers such that the containers are protected from contact with accumulated liquids in accordance with IDAPA 58.01.05.008 [40 CFR 264.175(c)].

D-1b(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

The containers used to store wastes in the AMWTP Outside Storage Area are the same as those described in Attachment 1.A, Section D-1a(1). Soft-sided overpack containers (SSOP) are not allowed in the Outside Storage Areas. Container labels and markings are also described in Attachment 1.A, Section D-1a(1).
D-1b(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following text addresses variations to those practices that are specific to the AMTWP Outside Storage Area.

Repaired containers, bags and plastic wrapping material used as containers, SSOPs, and containers identified as pyrophoric radionuclides are not stored in the AMWTP Outside Storage Area. A 50-ft access aisle running north-south is provided between the west wall of the TSA-RE building and rows of containers or trailers loaded within containers. A 5-ft access aisle running east-west is provided between rows of containers or trailers loaded within containers and the bollards surrounding the fire hydrant/valve. A 20-ft perimeter access road for operational and emergency equipment is provided along the west and north sides of the AMWTP Outside Storage Area. See Drawing 51-10040 for additional information. Aisles that are 3 ft wide (excluding support beams and portable equipment) are provided between the rows of containers and trailers loaded with containers to allow for personnel access. All containers are stored on pallets, risers, or trailers which are arranged into rows.

Containers may be located on the asphalt in and around the AMWTP Outside Storage Area while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to exceed the end of the work shift in which the container was placed onto the asphalt. In the event that emergency equipment is needed, access to the containers is provided through the perimeter access road. Drawing 51-10040 presents a typical waste storage configuration for boxes and trailers loaded with containers.

Any combination of container types (e.g., drums, boxes, loaded trailers) may be stored in the AMWTP Outside Storage Area at any given time. Boxes, calculated 4 ft by 4 ft by 8 ft, are used in Appendix XI to determine the maximum potential waste volume that can be stored in the AMWTP Outside Storage Area. For box maximum capacity, containers are stored in the following configuration. There are up to 5 rows of boxes that are 2 boxes wide by 3 boxes high, each with a different length given aisle spacing requirements. Moving east to west, row 1 is 19 boxes in length, row 2 is 18 boxes in length, row 3 is 16.5 boxes in length, row 4 is 13 boxes in length, and row 5 is 8 boxes in length. The maximum box storage capacity is 447 boxes, which corresponds to a waste storage capacity of 404,997 gal. The maximum trailer storage
configuration is six trailers loaded within containers. See Drawing 51-10040 for additional information.

Incompatible wastes are managed in the AMWTP Outside Storage Area in accordance with Attachment 6.
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.H

WMF-676 Process Information

Revision Date: June 2018
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D.  PROCESS INFORMATION

D.  WMF-676 Design

WMF-676 is designed with many features that control MW on its path through the building. This section describes the systems that route and control emissions from WMF-676 activities, the general building structures that provide containment, the system that tracks and manages the flow of waste containers through designated treatment paths, and the areas designated to store containers while in transit through WMF-676.

Section D-8, which presents process information for the miscellaneous treatment units at WMF-676, is provided in Attachments 1.H.i, 1.H.ii, 1.H.iii, and 1.H.iv. Unless otherwise noted, drawings for WMF-676 are located in Appendix IX.

Emissions Control

Exhaust from process areas and ventilation zones is conveyed to the atmosphere in individual flues of varying sizes, surrounded structurally by an open, rectangular steel frame (the flues, along with the support frame, comprise the main WMF-676 stack). Table D-1 lists each of the extract flues along with the emissions area(s) each flue serves, and Exhibit D-1 illustrates the arrangement of the individual extract flues. Exhaust is transported to the main stack via horizontal ducts located in the upper level of WMF-676. The ducts extend horizontally from the penthouse before reaching the stack enclosure. Once the ducts transition to vertical flues, the diameter of each is reduced such that the design discharge velocity of each extract flue is approximately 4,000 ft/minute (fpm). The stack height (approximately 90 ft) is sufficient to ensure that the emissions do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures, or nearby terrain features and prevent exhaust air discharged from the stack from returning into the building via the HVAC air intakes.

Ventilation Systems

Engineered ventilation systems control gaseous emissions in WMF-676. WMF-676 is divided into clean areas and ventilation confinement zones. Areas of the process are re-designated between the ventilation confinement zones as operational needs and contamination levels dictate.
Clean Areas. Exhaust from clean areas, such as administrative and support areas, is primarily drawn through other clean areas or to areas with a higher potential for radiological contamination, although some will exhaust via a vent in the second floor roof.

Zone 1 and 2 Areas. The design of WMF-676 has a single-stage bank of HEPA filters that serves the Zone 1 area exhaust. Likewise, the design of WMF-676 has Zone 2 area extracts with two stages of HEPA filtration. Based on contamination levels and operational needs, Zone 1 and Zone 2 areas may be re-designated between Zone 1 and Zone 2 areas, and potentially Zone 3 areas or clean areas, as necessary. If a Zone 1 or 2 area is designated as a Zone 3 area, then the newly designated Zone 3 area may not have three stages of HEPA filters, as stated below. However, all re-designations of contamination areas will be done such that particulate and radiological constituents are maintained within the limits specified in the INL Sitewide Permit to Construct and Facility Emission Cap, Permit Number P-2015.0023.

Zone 3 Areas. The design of WMF-676 has three stages of HEPA filters that serve a Zone 3 area extract. The first stage filter banks are positioned locally near the areas served, then the local ducts combine to form the Zone 3 extract system. The exhaust then passes through the second and third HEPA filter banks before being exhausted through the main stack. Exhibit D-2 is a simple schematic of the ventilation extract system for the Zone 3 areas. Areas typically operated as Zone 3 areas may be re-designated as lower zone areas based upon contamination levels and operational needs, such as during times of personnel entry into the areas. As previously described, areas re-designated as a Zone 3 area may not have three stages of HEPA filters.

Gloveboxes. The glovebox extract system serves gloveboxes, typically in Zone 3 environments, and is similar to the Zone 3 extract system, except that the flow rate requirements are much lower. This system also has first stage HEPA banks, followed by second and third stage HEPA filter banks. Exhibit D-3 shows a simple schematic of the glovebox ventilation extract system. The gloveboxes may be re-designated as lower zone areas based upon contamination levels and operational needs, such as during times of opening or personnel entry into the areas.
Other Emission Control Systems

Filter Systems. A local dust extraction unit is provided in the box opening area. The unit is designed to extract material (e.g., sawdust) from the box lid cutting tool(s) and discharge it into a container. The extract unit is fitted with a fire detection/suppression system for the collection container. The box shredder may also have a fire detection/suppression system and/or a dust control system.

Monitoring

HEPA Filter Monitoring. The efficiency of each HEPA filter or HEPA filter bank, as applicable, is routinely tested according to the American Society of Mechanical Engineers (ASME) N510-1989, Section 10 standards. In addition, the differential pressure across each HEPA filter bank is monitored. Any significant loss of pressure differential across HEPA filters will be evaluated for filter failure.

Recordkeeping and Reporting. Measurements and data correspondence relating to sampling or monitoring systems, performance testing measurements, equipment calibration checks, and maintenance performed on the equipment are kept in accordance with the AMWTP quality assurance program and are part of the Operating Record. A remedy schedule is provided in Appendix XIII that describes the response and consequences of ventilation equipment failure.

Building Structure

Exterior Walls

The exterior walls of the building are clad with prefinished metal siding over steel girts mounted on steel columns. The interior face of the siding system includes a prefinished metal liner panel to minimize air transfer and afford a smooth finished surface. The exterior walls are insulated for thermal protection.

Floors

The ground floor of the process portion of WMF-676 is composed of an approximately 36-in.-thick steel reinforced concrete mat, thickened at the edges to provide about 5 ft below grade for frost depth. Integral to the design of the floor slabs are spill containment systems, where required, composed of specially coated concrete slabs with perimeter walls coated to a
height required by secondary containment system calculations. Elevated floors are cast-in-place reinforced concrete or concrete on steel decking/framing.

**Interior Walls**

Interior wall construction is primarily reinforced concrete block, cast-in-place concrete, or drywall. Primarily cast-in-place reinforced concrete walls are used around the waste management areas to isolate critical ventilation confinement areas. Concrete cast-in-place walls are designed with steel reinforcing to meet seismic design criteria. Concrete walls are finished to a smooth surface.

Reinforced concrete block walls are used elsewhere throughout the interior of the waste management areas where cast-in-place concrete is not required for structural support. Block walls are nominally 8 in. or 12 in. thick with vertical and horizontal steel reinforcing for structural integrity. Concrete block walls are primarily used to enclose the access corridors, various process areas, and AMWTP personnel corridors throughout WMF-676.

In areas requiring fire resistive construction, concrete block, drywall construction, and spray-on fire resistive material are utilized in accordance with approved UL listings, and UBC and NFPA requirements for fire-rated construction.

**Ceilings**

 Typically, acoustic lay-in ceiling systems are used in the administrative office area, suspended gypsum board systems in change rooms/toilet areas, and cast-in-place reinforced concrete or concrete on steel decking in process areas. In non-critical process and utility areas of WMF-676, the ceiling may be left open to the exposed structure above.

In critical process areas, such as the CCS area, the conveyor/storage areas on the first floor, and the box line areas on the second floor, the ceilings are constructed of cast-in-place reinforced concrete or concrete on steel decking. These ceilings/floors are reinforced to meet equipment loading and seismic design requirements. Suspended gypsum board or similar ceiling systems may be utilized in the change rooms, subchange rooms, and toilet and shower areas.
Roof

The roof structure is framed with steel girders and beams, and supporting steel roof decking. An insulated membrane roof system is applied over the steel deck. The roof slopes to the east and west walls over the process portion of the building and to the south over the administrative portion of the building. An enclosure may be constructed over the waste drum import/export area, which is located on the north end of WMF-676.

Specialty Coatings

Protective coatings are applied to surfaces throughout WMF-676 at varying levels and qualities depending upon exposure conditions and types of surfaces. The technical specifications for WMF-676 HWMA/RCRA secondary containment coating systems, included as Appendix XIV, contain information identifying the coatings applied to the various process areas in WMF-676. These coating systems are specifically selected to maintain surfaces within WMF-676 at acceptable levels of serviceability and decontamination ease, and for floors, walls, and curbing in secondary containment areas are selected to provide chemical resistance, durability, and compatibility with substrate conditions.

For areas providing secondary containment of spills and leaks (except where steel is used), floors, walls, and curbing are sealed with a coating system that is applied in a seamless manner, or equivalent. See Appendix XIV for additional information on coating systems used throughout WMF-676.

In the box line sorting cells, uncontainerized waste is sorted using manipulators; consequently, areas of the wall and floor surfaces are exposed to abrasion and highly contaminated conditions. Typically, where floor-mounted manipulators are positioned, steel guards (fastened to embedded steel plate) are provided to protect the portion of the walls that are reachable by the manipulator arm mechanism. The concrete floors, ceilings, and walls around the steel platforms and embedded plate are coated.

Operating Record

Typically, the AMWTP computerized system is used for overall data management, recordkeeping, and waste tracking. See Attachment 1.A for further information on the Operating Record requirements.
Treatment

Treatment by sorting and segregating is performed in the box line and drum repack system, and described in Attachments 1.H.i and 1.H.iv. Treatment in the SCW glovebox system is described in Attachment 1.H.ii and treatment by supercompaction in the supercompactor is described in Attachment 1.H.iii.

Additional methods of treatment permitted in WMF-676 are: absorption, decanting, and neutralization of liquids. See Attachment 1.A for additional information. These methods are performed individually and in conjunction with each other to treat the waste in the most effective manner possible.
Exhibit D-1. Main Stack Exhaust Flue Arrangement
Exhibit D-2. Zone 3 Ventilation Extract System Simplified Schematic
Exhibit D-3. Simplified Schematic of the Glovebox Ventilation Extract System
Table D-1. WMF-676 Exhaust Flues and Emission Areas Served

<table>
<thead>
<tr>
<th>Exhaust Flue*</th>
<th>Areas and/or Systems Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Area Zone 1/2 Extract</td>
<td>Areas designated Zone 1 or 2</td>
</tr>
<tr>
<td>Process Area Zone 3 Extract</td>
<td>Areas designated Zone 3 including emission sources:</td>
</tr>
<tr>
<td></td>
<td>Box lines</td>
</tr>
<tr>
<td></td>
<td>Room 147</td>
</tr>
<tr>
<td></td>
<td>DWHE ventilation hood</td>
</tr>
<tr>
<td></td>
<td>Zone 3 drum storage areas</td>
</tr>
<tr>
<td>Process Area Glovebox Extract</td>
<td>Areas designated Zone 3 gloveboxes including emission sources:</td>
</tr>
<tr>
<td></td>
<td>SCW glovebox system</td>
</tr>
<tr>
<td></td>
<td>DWPG</td>
</tr>
<tr>
<td></td>
<td>Supercompaction glovebox</td>
</tr>
</tbody>
</table>

* The Zone designation may change (e.g., decontamination from a Zone 3 to Zone 2) to facilitate efficient operations.
D-1 Containers

Container Storage Areas

Portions of WMF-676 are permitted for HWMA/RCRA container treatment and storage. Table D-2 lists the treatment and storage areas, the number of containers stored, the maximum waste volume, the containment area net dimensions, the maximum secondary containment volume, and the minimum curb height for each area. The secondary containment information is described in Section D-1a(3).

D-1a Containers with Free Liquids

The containers stored at WMF-676 generally contain either (1) no free liquids or (2) free liquids at less than 1% of the total container volume. All containers are managed as if they contain free liquids, unless it can be documented, other than by historical record, that no free liquids are present. Containers with no free liquids are managed in accordance with Section D-1b. Typically, the determination of the presence of free liquids is performed at WMF-634, WMF-628, or WMF-610 through RTR and/or process knowledge, prior to receipt at WMF-676. Additionally, liquids may be identified through visual examination in the pretreatment areas of WMF-676, or through process knowledge for newly generated waste.

D-1a(1) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

The containers used to store wastes in WMF-676 are the same as those described in Attachment 1.A, Section D-1a(1). Container labels and markings are also described in Attachment 1.A, Section D-1a(1). Labels may be placed on HWMA/RCRA empty containers in WMF-676 prior to waste being placed into the container.

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

Details on container management practices are described in Section D-1a(2) of Attachment 1.A. The following addresses variations to those practices that are specific to WMF-676.

Typically, drums containing waste are received at the waste drum import and export area (located along the north wall of the first floor), while boxes containing waste and empty containers are received at the waste receiving and storage area (located along the east wall of the first floor). Non-debris waste containers may also exit through the empty container receipt area.
located on the east wall of the first floor. This area is also used to import containers for filling
with waste from the box lines before supercompaction. Containers will be stored on devices
which are used to raise the container off of the floor. Containers may be located on the floor
while in transition (e.g., loading/unloading trailers or other equipment) for a period of time not to
exceed the end of the work shift in which the container was placed onto the floor. The following
storage configuration will be maintained for containers stored in WMF-676:

- Containers of MW shall not be stored in rows more than two containers wide by two
containers high given that no container within the row resides against a wall of the
building.
- Containers of MW shall not be stored in rows more than one container wide by two
containers high given that one side of a container resides against a wall of the
building.
- A minimum of two ft of aisle space (excluding support beams and portable
equipment) shall be maintained between all rows of containers.

Incompatible wastes are managed in WMF-676 in accordance with Attachment 6.

D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.008
and 58.01.05.012; 40 CFR 264.175(a) and (d), and 270.15(a)(1)]

WMF-676 is an enclosed building. Secondary containment is provided by a curbed,
sealed, concrete floor designed to resist frost heave and the types of wastes stored in WMF-676
or portable secondary containment devices that meet all HWMA/RCRA requirements. Container
storage areas holding only wastes that do not contain free liquids do not require a containment
system. See Section D-1b for additional information.

D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids [IDAPA 58.01.05.008;
40 CFR 264.175(b)(1)]

Each of the treatment and storage areas listed in Table D-2 are provided with containment
features or equipment (e.g., spill pans, pallets, etc.) to capture possible MW spills or leaks from
containers, if secondary containment is required. Appendix XI contains a copy of the spill
containment analysis developed to calculate minimum curb heights. A curb at WMF-676 is
defined as the portion of a wall or barrier sealed with the appropriate coating from the floor up to
the required containment height specified by the spill containment analysis (Appendix XI).

WMF-676 treatment and storage areas are constructed with sealed, reinforced concrete
floors. The floor (base) of each storage area is free of significant cracks and gaps that may
comprise the integrity of the containment, if secondary containment is required. A detailed
description of the design and materials of construction of these areas is provided in
Attachment 1.H.

The specialty coatings are applied per the manufacturer’s recommendations to the area
surface, curbs, ramps, floor and wall joints, and walls up to an elevation equal to or above the
minimum calculated curb height, as required. The design of the floors, walls, and curbs and the
application of the specialty coating, together, are such that the area is sufficiently impervious to
contain leaks, spills, and accumulated precipitation until the leak, spill, or accumulated
precipitation is detected and removed. In some areas, equipment (e.g., spill pans, pallets, etc.)
may be used in lieu of specialty coatings or curbs.

D-1a(3)(b) Containment System Drainage [IDAPA 58.00.05.008 and 58.01.05.012;
40 CFR 264.175(b)(2) and 270.15(a)(2)]

The treatment and storage areas within WMF-676 are not equipped with drainage
capabilities. If a leak or spill is detected in one of the areas, corrective actions are initiated in a
timely manner. The response time to mitigate a spill is dependent upon the setup time for
AMTWP spill response personnel. Response times vary depending on the ventilation
confinement zone.

D-1a(3)(c) Containment System Capacity [IDAPA 58.01.05.008 and 58.01.05.012;
40 CFR 264.175(b)(3) and 270.15(a)(3)]

All treatment and storage areas utilize equipment (e.g., spill pans, pallets, etc.) or are
bound by a curb of sufficient height to contain at least 10% of the maximum volume of
containers, or the volume of the largest container (whichever is greater) stored in the area at any
given time, if secondary containment is required. Conservatively, the assumption has been made
that each waste container is filled with liquid for those areas where secondary containment is
required. Table D-2 presents the maximum secondary containment volume for each treatment
and storage area for those areas where secondary containment is required, as well as the
minimum curb height, considering the maximum number of containers that may be stored in
each area at any given time.
D-1a(3)(d)  Control of Run-On [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(4) and 270.15(a)(4)]

The requirements for control of run-on are the same as those described in Section D-1a(3)(d) of Attachment 1.A.

D-1a(3)(e)  Removal of Liquids from Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(b)(5) and 270.15(a)(5)]

WMF-676 is inspected for container condition, spills, leaks, and accumulated liquids as described in Attachment 4. Any spills, leaks, or accumulated liquids are cleaned up or otherwise mitigated in a timely manner upon discovery within these areas. In the event of a leak/spill, AMWTP personnel may implement the Contingency Plan as described in Attachment 7. All equipment and any liquids generated during implementation of the Contingency Plan are placed in containers, labeled, and managed appropriately depending on the waste being cleaned up.

D-1b  Containers Without Free Liquids [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.175(c) and 270.15(b)]

Containers without free liquids are managed as described in Section D-1b of Attachment 1.A.
Table D-2. WMF-676 Secondary Containment Summary

<table>
<thead>
<tr>
<th>Secondary Containment Area(^b) (Room/Area No.)</th>
<th>Number of Containers of MW(^c)</th>
<th>Maximum Waste Volume(^d), gal</th>
<th>Containment Area Net Dimensions, ft(^2)</th>
<th>Secondary Containment Volume, gal</th>
<th>Maximum Waste Volume to Contain, gal</th>
<th>Min. Curb Height, in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCS Feed Area/Maintenance Area (147/147D)</td>
<td>150 drums (55-gal)</td>
<td>8,250</td>
<td>2,418</td>
<td>904</td>
<td>825</td>
<td>0.6</td>
</tr>
<tr>
<td>South Box Line/Drum Conveyor Area/North Box Line/Drum Conveyor Area/Drum Assay Conveyors (124B/125B/126C)</td>
<td>86 drums(^e)</td>
<td>4,730</td>
<td>2,789</td>
<td>522</td>
<td>473</td>
<td>0.3</td>
</tr>
<tr>
<td>Waste Receiving and Storage (134)</td>
<td>4 boxes and 20 drums (55-gal)</td>
<td>6,616</td>
<td>1,023</td>
<td>1,403</td>
<td>1,379</td>
<td>2.2</td>
</tr>
<tr>
<td>Box Elevator (009)(^f)</td>
<td>1 box</td>
<td>1,379</td>
<td>132</td>
<td>987</td>
<td>1,379</td>
<td>12</td>
</tr>
<tr>
<td>Supercompaction/Waste Drum Venturi/Filter/Drum Storage Area 'B'/Vestibule (141B/146A/146B/141)</td>
<td>71 drums(^g)</td>
<td>5,795</td>
<td>2,510</td>
<td>626</td>
<td>580</td>
<td>0.4</td>
</tr>
<tr>
<td>Drum Storage Area 'C' (143)</td>
<td>35 drums(^h)</td>
<td>3,200</td>
<td>1,301</td>
<td>324</td>
<td>320</td>
<td>0.4</td>
</tr>
<tr>
<td>Drum Storage Area 'A'/Corridor (146/145)</td>
<td>50 drums(^i)</td>
<td>4,550</td>
<td>630</td>
<td>471</td>
<td>455</td>
<td>1.2</td>
</tr>
<tr>
<td>Drum Venturi Airlock (127A)</td>
<td>6 drums (55-gal)</td>
<td>330</td>
<td>313</td>
<td>59</td>
<td>55</td>
<td>0.3</td>
</tr>
<tr>
<td>Transfer Conveyor (131)</td>
<td>146 drums (55-gal)</td>
<td>8,030</td>
<td>962</td>
<td>840</td>
<td>803</td>
<td>1.4</td>
</tr>
<tr>
<td>Vestibule Airlock (127B)</td>
<td>4 drums (55-gal)</td>
<td>220</td>
<td>90.4</td>
<td>56</td>
<td>55</td>
<td>1</td>
</tr>
<tr>
<td>LLW Box Fill/Vestibule (128A/128)(^j)</td>
<td>3 boxes and 8 drums (85-gal)</td>
<td>4,817</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Secondary Waste Room (128B)(^j)</td>
<td>3 boxes and 8 drums (85-gal)</td>
<td>4,817</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Empty Container/LLW Export (128C)(^j)</td>
<td>2 boxes and 8 drums (85-gal)</td>
<td>3,438</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Drum Assay Area (126B)</td>
<td>3 drums (55-gal)</td>
<td>165</td>
<td>184.4</td>
<td>57</td>
<td>55</td>
<td>0.5</td>
</tr>
<tr>
<td>Vestibule (126)(^j)</td>
<td>2 drums (55-gal)</td>
<td>110</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
### Table D-2. WMF-676 Secondary Containment Summary (continued)\(^{a}\)

<table>
<thead>
<tr>
<th>Secondary Containment Area(^{b}) (Room/Area No.)</th>
<th>Number of Containers of MW(^{c})</th>
<th>Maximum Waste Volume(^{d}), gal</th>
<th>Containment Area Net Dimensions, ft(^{2})</th>
<th>Secondary Containment Volume, gal</th>
<th>Maximum Waste Volume to Contain, gal</th>
<th>Min. Curb Height, in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Filter Room (122A)(^{j})</td>
<td>60 drums (55-gal)</td>
<td>3,300</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Terminal Filter Room (142B)(^{j})</td>
<td>20 drums (55-gal)</td>
<td>1,100</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SCW Treatment (236)</td>
<td>24 drums (85-gal)</td>
<td>2,040</td>
<td>2,556</td>
<td>319</td>
<td>204</td>
<td>0.2</td>
</tr>
<tr>
<td>Variable Geometry (VG) Door Airlock/Suitchange (217C/217B)</td>
<td>1 boxes</td>
<td>1,379</td>
<td>295</td>
<td>1,379</td>
<td>1,379</td>
<td>7.5</td>
</tr>
<tr>
<td>Box Conveyor Area (226)</td>
<td>2 boxes</td>
<td>2,758</td>
<td>370</td>
<td>1,384</td>
<td>1,379</td>
<td>6.0</td>
</tr>
<tr>
<td>North Box Line/VG Door Airlock/Suitchange (229B/220C/220B)</td>
<td>6 boxes(^{k})</td>
<td>8,274</td>
<td>1,643</td>
<td>1,434</td>
<td>1,379</td>
<td>1.4</td>
</tr>
<tr>
<td>South Box Line (228B)</td>
<td>4 boxes</td>
<td>5,516</td>
<td>908</td>
<td>1,415</td>
<td>1,379</td>
<td>2.5</td>
</tr>
<tr>
<td>Operations Area/Access Corridor (232B/232H)</td>
<td>60 drums (55-gal)</td>
<td>3,300</td>
<td>1003</td>
<td>375</td>
<td>330</td>
<td>0.6</td>
</tr>
<tr>
<td>Hot Maintenance/Box Size Reduction Area (224B/225A)</td>
<td>1 box and 48 drums (55-gal)</td>
<td>4,019</td>
<td>1,803</td>
<td>1,461</td>
<td>1,379</td>
<td>1.3</td>
</tr>
<tr>
<td>Area 300 HEPA Filter Room (214A)(^{j})</td>
<td>20 drums (55-gal)</td>
<td>1,100</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Filter Maintenance Area (212C)(^{j})</td>
<td>8 drums (55-gal)</td>
<td>440</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Filter Maintenance Area (212F)(^{j})</td>
<td>16 drums (55-gal)</td>
<td>880</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Filter Maintenance Area (212H)(^{j})</td>
<td>8 drums (55-gal)</td>
<td>440</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Hydraulic Room (224C)(^{j})</td>
<td>10 drums (55-gal)</td>
<td>550</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

---

\(^{a}\) See Table D-3 for additional information on storage and treatment area locations in WMF-676.

\(^{b}\) Maximum waste volume and secondary containment capacity values for elevators are included in the calculations for those areas where elevators are located.

\(^{c}\) The types of containers indicated are for calculation purposes only. Any type and size of container may be managed with the specified areas as long as the maximum volume is not exceeded.

\(^{d}\) The maximum waste volume is based on the conservative assumption that the maximum number of containers with potential liquids are stored in the area and that each container is full of liquid. The volume for each drum is either 55-gal or 85-gal, as noted. A volume of 1,379-gal was used for each box. The containment system must contain 10% of the total volume of the containers or the volume of the largest container, whichever is greater [IDAPA 58.01.05.008 (40 CFR 264.175)].

\(^{e}\) The 86 drums in this area are made up of the following:

- South Box Line/Drum Conveyor Area – 28 drums (55-gal)
- North Box Line/Drum Conveyor Area – 28 drums (55-gal)
- Drum Assay Conveyor – 30 drums (55-gal)
f. Boxes located in this area are considered to be “in-process.” All in-process boxes will be removed from the elevator prior to the end of the shift in which the box was placed into the elevator. If a box is not removed from the elevator prior to the end of the work shift, then the box shall be considered to be in storage and must meet the secondary containment requirements (i.e., the largest box which may be stored in the elevator is 987 gal).

g. The 71 drums in this area are made up of the following:
   - Supercompaction – 11 drums (55-gal) and 20 drums (100-gal)
   - Waste Venturi/Filter – 6 drums (85-gal), 16 drums (55-gal), and 6 drums (100-gal)
   - Drum Storage Area ‘B’ – 12 drums (100-gal)

h. The 35 drums in this area are made up of the following: 20 drums (85-gal) and 15 drums (100-gal).

i. The 50 drums in this area are made up of the following: 30 drums (85-gal) and 20 drums (100-gal).

j. Typically, no wastes containing free liquids are managed in this area per administrative controls; therefore, no secondary containment system is provided in this area. If liquids are managed in the area, then secondary containment will be provided by portable spill containment equipment (e.g., spill pans, pallets, etc.).

k. The 6 boxes in this area are made up of the following:
   - North Box Line – 5 boxes
   - VG Door Airlock – 1 box
Table D-3. Summary of WMF-676 Treatment/Storage Areas

<table>
<thead>
<tr>
<th>Area (Room/Area No.)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum Storage Area ‘A’/Corridor (146/145)</td>
<td>Storage</td>
</tr>
<tr>
<td>Drum Storage Area ‘B’/Vestibule (146B/141)</td>
<td>Storage</td>
</tr>
<tr>
<td>Drum Storage Area ‘C’ (143)</td>
<td>Storage</td>
</tr>
<tr>
<td>Supercompaction (141B)</td>
<td>All containers located outside of the supercompactor glovebox system are considered to be in storage. Containers and uncontainerized waste are considered to be in treatment from the time a container is placed into the supercompactor glovebox system, until the waste is removed from the supercompactor glovebox system. Containers and sumps are considered to be in treatment during absorption, decanting, and neutralization.</td>
</tr>
<tr>
<td>Waste Drum Venturi/Filter (146A)</td>
<td>All containers outside of the venturi are considered to be in storage. Containers inside the venturi are considered to be in treatment.</td>
</tr>
<tr>
<td>Terminal Filter Room (142B)</td>
<td>Storage</td>
</tr>
<tr>
<td>Waste Receiving and Storage (134)</td>
<td>Storage</td>
</tr>
<tr>
<td>Box Elevator (009)</td>
<td>Storage</td>
</tr>
<tr>
<td>Transfer Conveyor (131)</td>
<td>Storage</td>
</tr>
<tr>
<td>Vestibule Airlock (127B)</td>
<td>Storage</td>
</tr>
<tr>
<td>Drum Venturi Airlock (127A)</td>
<td>Storage</td>
</tr>
<tr>
<td>CCS Feed Area/Maintenance Area (147/147D)</td>
<td>Storage. Six types of containers may be located in rooms 147 and 147D at any given time. These containers are: 1) containers with lids, 2) empty containers with or without lids, 3) unlidled SCW transfer containers containing containerized waste, 4) unlidled SCW transfer containers containing uncontainerized waste, 5) containers with poor integrity originating from the box lines, and 6) unlidled non-debris transfer containers. Unlidled SCW transfer containers and unlidled non-debris transfer containers, which contain uncontainerized waste, may be located in the CCS Feed Area/Maintenance Area for up to 72 hours. For example, the 72 hour time period would start from the time the unlidled container(s), with uncontainerized waste, is removed from room 125B or 124B of WMF-676 until the unlidled container is received at the SCW glovebox system, other treatment area within WMF-676, or the container is lidded with either a temporary or permanent lid. Containers with poor integrity originating from the box lines may be located in the CCS Feed Area/Maintenance Area for up to 7 calendar days.</td>
</tr>
<tr>
<td>LLW Box Fill Station/Vestibule (128A/128)</td>
<td>Storage</td>
</tr>
<tr>
<td>Secondary Waste Room (128B)</td>
<td>Storage</td>
</tr>
</tbody>
</table>
### Table D-3. Summary of WMF-676 Treatment/Storage Areas (continued)

<table>
<thead>
<tr>
<th>Area (Room/Area No.)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty Container/LLW Export (128C)</td>
<td>Storage</td>
</tr>
<tr>
<td>Terminal Filter Room (122A)</td>
<td>Storage</td>
</tr>
<tr>
<td>Vestibule (126)</td>
<td>Storage</td>
</tr>
<tr>
<td>Drum Assay Area (126B)</td>
<td>All containers located outside of the import/export glovebox are considered to be in storage. Containers and uncontainerized waste in non-debris transfer containers are considered to be in treatment at all times when attached to the import/export glovebox.</td>
</tr>
<tr>
<td>Drum Assay Conveyors (126C)</td>
<td>Storage. Six types of containers may be located in room 126C at any given time. These containers are: 1) containers with lids, 2) empty containers with or without lids, 3) unlidded SCW transfer containers containing containerized waste, 4) unlidded SCW transfer containers containing uncontainerized waste, 5) containers with poor integrity originating from the box lines, and 6) unlidded non-debris transfer containers. Unlidded SCW transfer containers and unlidded non-debris transfer containers, which contain uncontainerized waste, may be located in the Drum Assay Conveyor area for up to 72 hours. For example, the 72 hour time period would start from the time the unlidded container(s), with uncontainerized waste, is removed from room 125B or 124B of WMF-676 until the unlidded container is received at the SCW glovebox system, other treatment area within WMF-676, or the container is lidded with either a temporary or permanent lid. Containers with poor integrity originating from the box lines may be located in the Drum Assay Conveyor area for up to 7 calendar days.</td>
</tr>
<tr>
<td>North Box Line/Drum Conveyor Area (125B)</td>
<td>Treatment</td>
</tr>
<tr>
<td>South Box Line/Drum Conveyor Area (124B)</td>
<td>Treatment</td>
</tr>
<tr>
<td>Filter Maintenance Area (212C)</td>
<td>Storage</td>
</tr>
<tr>
<td>Filter Maintenance Area (212F)</td>
<td>Storage</td>
</tr>
<tr>
<td>Filter Maintenance Area (212H)</td>
<td>Storage</td>
</tr>
<tr>
<td>Hydraulic Room (224C)</td>
<td>Storage</td>
</tr>
<tr>
<td>SCW Treatment (236)</td>
<td>All containers located outside of the DWHE, DWPG, and the SCW glovebox system are considered to be in storage. Containers and uncontainerized waste are considered to be in treatment at all times in the DWHE, DWPG, or the SCW glovebox system. Containers and sumps, in all locations in this area, are considered to be in treatment during absorption, decanting, and neutralization.</td>
</tr>
<tr>
<td>Box Conveyor Area (226)</td>
<td>Storage</td>
</tr>
<tr>
<td>Variable Geometry Door Airlock (217C)</td>
<td>Treatment</td>
</tr>
<tr>
<td>Switchchange (217B)</td>
<td>Storage</td>
</tr>
</tbody>
</table>
Table D-3. Summary of WMF-676 Treatment/Storage Areas (continued)

<table>
<thead>
<tr>
<th>Area (Room/Area No.)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Corridor (232H)</td>
<td>Storage</td>
</tr>
<tr>
<td>Operations Area (232B)</td>
<td>Storage</td>
</tr>
<tr>
<td>Variable Geometry Door Airlock (220C)</td>
<td>Treatment</td>
</tr>
<tr>
<td>Switchgate (220B)</td>
<td>Storage</td>
</tr>
<tr>
<td>North Box Line (229B)</td>
<td>Treatment and Storage. Uncontainerized waste is considered to be in treatment. All waste within a lidded container is considered to be in storage.</td>
</tr>
<tr>
<td>South Box Line (228B)</td>
<td>Treatment and Storage. Uncontainerized waste is considered to be in treatment. All waste within a lidded container is considered to be in storage.</td>
</tr>
<tr>
<td>Hot Maintenance (224B)</td>
<td>Treatment and Storage. Uncontainerized waste is considered to be in treatment. All waste within a lidded container is considered to be in storage.</td>
</tr>
<tr>
<td>Box Size Reduction Area (225A)</td>
<td>Storage</td>
</tr>
<tr>
<td>Area 300 HEPA Filter Room (214A)</td>
<td>Storage</td>
</tr>
</tbody>
</table>
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.H.i

Section D

WMF-676 Box Line Process Information

Revision Date: October 18, 2019
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ATTACHMENT 1.H.I

WMF-676 BOX LINE PROCESS INFORMATION

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D. PROCESS INFORMATION

D-8  Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23]

The box lines do not meet the definition of container, tank, surface impoundment, waste pile, land treatment, incinerator, boiler, industrial furnace, or underground injection well. Therefore, the unit is categorized as a miscellaneous treatment unit under HWMA/RCRA. These box lines are used to open, sort, separate/segregate, size-reduce, sample, depressurize fire extinguishers and aerosol canisters, treat liquids, and repackage waste prior to downstream treatment, as required. Additionally, liquids may be treated via decanting, absorption, or neutralization in the box lines as described in Attachment 1.A, and further defined in Section D-8a(1)(a) of this Attachment. Drawings 53-0208 and 53-0209 in Appendix XV are general arrangement drawings of the box lines. A brief discussion of the MTS, which is not a miscellaneous treatment unit, is provided below as further information, since the system is important to operations, as well as to the treatment processes at WMF-676. Drawings for the box lines are located in Appendix XV, and box line MDSs can be found in Appendix XVI.

MTS

The MTS, including the CCS (in Room 147), is used to convey containers around WMF-676 in a safe and efficient manner. This overall system consists of the following systems:

- Waste box receiving and processing system: Consists of waste box import conveyor (northeast first floor), the box elevator, and the box conveyor on the second floor.
- LLW box import/export: Consists of the LLW container import/export conveyor (southeast first floor), and the LLW elevator.
- Waste drum receiving and storage system: Consists of dual, waste drum entry conveyors on the northwest end of the building, airlocks, the waste drum entry venturi, and the drum elevator to the second floor DWHE.
- CCS: Consists of a drum-handling robot, drum conveyors, and drum storage areas on the west side of the building in Room 147 and, at the north end, a drum elevator to the second floor SCW glovebox system.
- Waste drum assay system: Consists of the drum assay conveyors and a drum-handling robot (on the west central first floor).

- Waste drum fill system: Consists of drum elevators, drum-handling robots, and conveyors on the first floor underneath the box lines (placing lids onto drums containing waste, and sealing lids on drums containing waste).

- Empty drum receiving and storage system: Consists of empty-drum import conveyors (on the northeast) that feed into Room 147 via airlocks and a venturi glovebox. Non-debris waste containers may also exit through the empty container receipt area.

- Puck drum import and export system: Consists of two sets of dual, puck drum import/export conveyors in the clean areas on the northwest end of the building (drum storage area C), a single set of dual conveyors in drum storage areas A and B, and lifts associated with the puck drum transfer ports in the post-compaction glovebox.

Generally, all container movements are controlled by software sequences initiated from the CCR. Container movements are tracked in the Operating Record through barcode readers strategically located throughout WMF-676. Software and mechanical interlocks ensure that containers are correctly routed throughout WMF-676. Container routing (waste drum receiving and storage, direct-feed drums for supercompaction, drums requiring treatment, empty containers for waste filling, and drum storage areas) prior to treatment is described below. Box routing is discussed in Section D-8a(1)(a).

**Waste Drum Receiving and Storage.** Drums containing waste are normally delivered through an isolation door to the parallel conveyors of the waste drum receiving and storage system at the north end of the building. At this position, a barcode reader is used to automatically record the drum identification, enabling the drum to be tracked in the Operating Record. Then, automatic control sequences initiated from the CCR begin to import the drums, which pass through another isolation door and then through an airlock. At this point, drums identified for the drum repack system and SCW, and drums for direct supercompaction are transported to their next destination via separate routes.

**Direct-feed drums for supercompaction.** Direct-feed drums are suitable for supercompaction without additional treatment. Direct-feed drums on the drum entry conveyor are transferred into a ventilation confinement area via the waste drum entry venturi glovebox (DZ310200 located in Appendix XVII). The outer vertical seal door of the venturi glovebox is
opened, and a lidded drum is moved into the venturi airlock glovebox. The venturi airlock glovebox will hold a maximum of four drums. When the venturi airlock glovebox has four drums present, one is driven out by opening the inner seal door and conveying it into the north end of the supercompactor infeed glovebox. From the infeed glovebox, the drum is conveyed into the suite of supercompactor gloveboxes for treatment. After compaction, pucks are loaded into puck drums at the export end of the post compaction glovebox and exported via the puck drum export conveyor. See Attachment 1.H.iii for further information on the supercompactor process.

Waste drums requiring pretreatment. Drums requiring treatment in the drum repack system or visual examinations are transferred to an elevator, which lifts the drum up through an airlock to the drum repack system for processing. See Attachment 1.H.iv for a discussion of drum repack system operations. Lidded containers containing waste are transported from the drum repack system back to the first floor via an elevator. These containers are then typically directed into Room 147 (via the venturi airlock glovebox and supercompactor infeed glovebox) for transfer to the drum assay system, and subsequent transfer to the supercompactor for treatment. Non-reusable waste drums and overpack drums may be crushed in the drum repack system and exported from WMF-676.

Empty containers for waste filling. Empty containers are typically delivered to the empty drum receiving and storage system through an isolation door on the east side of the building. The drums are placed onto the empty drum receiving and storage system parallel conveyors, where a barcode reader is used to automatically record the drum identification, enabling the drum to be tracked in the Operating Record. Then, automatic control sequences initiated from the CCR begin to import the drums through another isolation door. The parallel conveyor system merges into a single conveyor line. This single conveyor transports containers through a vestibule airlock and then through the empty drum venturi airlock glovebox to Room 147. When needed, the drum is conveyed to one of two lid pick-and-place stations beneath the box lines. Here, a lid pick-and-place actuator removes the lid and sets it down onto the lid placement station. The lids are interchangeable so there is no need to track the lids or reunite them with the originating drum. When the lid is removed, a waste handling robot transfers the drum to an elevator that raises the drum to one of the import/export ports where it can be filled (DZ340299 located in Appendix XVII and DZ340324).
Import/export glovebox. Drums requiring treatment, typically non-debris drums, due to the presence of liquids are transferred to the box lines for processing as described above. Once treated, the waste is placed into a non-debris transfer container that has a removable liner within the container. These containers are then directed into the import/export glovebox located in Room 126B. Within the glovebox, the liner has an upper ring that allows for the liner to be removed from the non-debris transfer container and placed into another container (typically a 55-gal drum) that is docked to the underside of the import/export glovebox (Z-390-200 located in Appendix XVII). Once the container has been filled and undocked from the import/export glovebox, the container is manually moved to the empty drum receiving and storage conveyor system. Once on the conveyor system, the containers are transported out of WMF-676. This glovebox may also be used to export prohibited items or other debris items from the box lines.

CCS. The CCS uses a drum handling robot (DW370006 located in Appendix XVII) to transfer containers, as follows:

- Empty containers from the empty container receiving and storage system to the waste container fill and transfer area,
- SCW transfer containers from the waste container fill area to an elevator for transfer to the second floor SCW glovebox system,
- Non-debris transfer containers from the waste container fill area to the import/export glovebox, and
- Assayed containers of waste to the supercompactor.

Six types of containers may be transported by the MTS. These containers are:

1) containers with lids, 2) empty containers with or without lids, 3) unlidded SCW transfer containers containing containerized waste, 4) unlidded SCW transfer containers containing uncontainerized waste, 5) containers with poor integrity originating from the box lines, and 6) unlidded non-debris transfer containers. As described in greater detail in Section D-1a(3) of Attachment 1.H, waste management areas are provided with specialty-coated curbs and floors, or equipment (e.g., spill pans, pallets) designed for secondary containment.
D-8a Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and 270.23(a)(2)]

Two box lines are provided to meet the process limit of 10,475 gallons per day. Boxes are the primary container type processed in the box lines; however, drums may also be processed within the box lines. Drums processed through the box lines are configured such that the material handling equipment within the box lines can handle the drums. For example, drums may be loaded into a box or drums may be banded/strapped to a pallet for processing in the box lines. All containers entering WMF-676 have barcode labels to facilitate tracking in the Operating Record. Information (coded to the labels) required for identifying, tracking, and processing the waste is recorded in the Operating Record. The information typically recorded in the Operating Record includes: IDC/waste group (WG), EPA hazardous waste numbers (HWNs), characterization information, storage and retrieval records, targeted processes, and SCW items and prohibited items (as defined in this section), if present.

Waste containers enter the box lines via a variable geometry door and airlock system. Containers are opened in the box opening area; and the contents sorted, separated/segregated, and/or size-reduced in the north or south box line using manipulators with various tools. Treatment of liquids, depressurization of aerosol canisters, and depressurization of fire extinguishers is also performed within the box lines. The box lines are equipped with sampling capabilities for the rare occasions when sampling is required.

In the course of processing containers of waste, small quantities of SCW may be placed into barcode labeled transfer containers and removed from the box lines, typically in baskets within the transfer containers. Small quantities of SCW can also exit the box line via the bagging transfer port for manual transfer to the SCW glovebox system. Only known compatible wastes (from existing characterization information) are placed together into a transfer container for delivery to the SCW glovebox system or to the DWPG. Whatever information is recorded in the Operating Record for the waste container(s) from which the SCW is extracted is applied to the SCW (i.e., the SCW is always linked to the original waste container, including its associated HWNs). Once the SCW information is entered into the Operating Record, the SCW is
transferred to the appropriate SCW glovebox or to the DWPG. Liquids (containerized and free) may be absorbed within the box lines.

After waste management in the box lines, the waste is placed into containers and transferred to the lidding process area, and eventually to the assay cell prior to transfer to the supercompactor or for exporting via the import/export glovebox. Containers may be managed at any of the drum storage areas before or after assay to optimize process flow. Containers are tracked to the original containers using barcode labels and the information in the Operating Record. The required information recorded in the Operating Record for containers includes, but is not limited to: the identification of the original container(s) and related characterization information, quantity of waste removed from each waste container, applicable HWNs, analytical results and any additional waste characterization information obtained prior to treatment, and targeted treatment processes. Generally, containers are compacted along with the waste they contain and are not reused. The following section presents typical WMF-676 operations, including box line pretreatment operations, in greater detail.

D-8a(1) WMF-676 Treatment Operations [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]

Waste in WMF-676 may be managed remotely within cells or gloveboxes to minimize exposure of AMWTP personnel to waste constituents. Containers within WMF-676 are managed in a manner to prevent container rupture or leakage (except during the supercompaction process, see Attachment 1.H.iii) and to minimize exposure of AMWTP personnel. The following provides a summary of the operating standards used in conducting waste activities in WMF-676:

- Wastes are identified by IDCs/WG, generator-supplied information, and RTR examination. Wastes are reviewed for IDCs/WG and hazardous constituents prior to processing at WMF-676 and at individual units within WMF-676 to ensure incompatible wastes are not co-mingled.
- All waste processing activities are performed by AMWTP personnel trained to safely conduct these activities and to respond to emergency situations.
- All waste processing activities are conducted under supervisory control and according to specific procedures.
• The containers enter WMF-676 units through a combination of elevators, conveyors, and airlocks. Containers typically remain closed until they enter the process areas. Containers for supercompaction and filled puck drums are lidded before further processing.

• No reactive (HWN D003) wastes are received at WMF-676. Waste streams potentially containing ignitable (HWN D001) wastes are processed in a manner to minimize the potential of ignition.

• The ventilation air is ultimately fed to banks of HEPA filters prior to exhausting through the main stack.

• Typically, secondary waste streams generated in WMF-676 process areas are treated within WMF-676.

These operating standards are used to prevent releases of waste constituents, which may have adverse effects on human health or the environment. An overview of typical box line operations is provided below.

**D-8a(1)(a) Box Lines**

Waste containers are delivered to the box lines on the second floor via the box elevator. The design of the box lines, including the box entry airlocks and the empty box size-reduction area, is provided in Drawings 53-0208 and 53-0209. Containers located within the elevator are considered to be in-process. All in-process containers will be removed from the elevator prior to the end of the shift in which the containers were placed into the elevator. If a container is not removed from the elevator prior to the end of the work shift, then the container shall be considered to be in storage. On the second floor, containers are transferred directly from the box elevator onto the box transfer conveyor where a barcode reader verifies the identity of the container(s). The box transfer conveyor then transfers the containers up to the first box entry airlock.

Automatic control sequences from the CCR initiate the movement of containers into the box line cells using barcode confirmation that the containers are the ones expected. To import a waste container, the first set of variable geometry doors (DZ320227, located in Appendix XVI) at the entry of the first airlock is opened to a size just greater than the waste container, which is transferred via the box entry conveyor into the first box entry airlock. The first set of doors is closed and the second set of variable geometry doors is opened, allowing transfer of the box into
the second box entry airlock via the box entry conveyor. Within the first airlock room (Room 217C), bolts, rings, or clips are removed from certain container types, as required.

Within the second box entry airlock, the lids of boxes are cut open, as required, using cutting tools deployed from an overhead gantry system (DM-320-200, located in Appendix XVI). The cutting tool deployment system provides the versatility to make different cutting patterns (depending on the needs for a particular box) that result in the formation of a removable lid, which is retained in position on the box. Alternatively, the lid of a box may be cut with the overhead power manipulator (DQ340201, located in Appendix XVI), which is located in the box lines, using various tools. The tools utilized for cutting the lid of a box are chosen depending upon the particular needs of a given box. Tools utilized with the overhead power manipulator (DQ340201) may be equipped with a fire detection/suppression system as required by NFPA standards.

With the second set of doors closed and the third set of variable geometry doors opened, the container (with retained lid) is conveyed from the second box entry airlock to the lid removal area, and then to either the south or the north box line. A sufficient air velocity is maintained between the variable geometry doors and the waste container to control back diffusion. The three sets of doors are interlocked to maintain ventilation containment. Depending on characterization data (e.g., RTR), the container is transferred to either the north box line (typically, for routine management) or the south box line (for routine or specialized management).

The lid is removed at the lid removal station located within the north box line area. Alternatively, the lid can be removed within the north or south box line using a manipulator. The lid is lowered onto the conveyor for transfer to the box size-reduction area, or it is temporarily placed within the north or south box lines (e.g., park position, trough) for later transfer to the box size-reduction area. Any box lid that is placed within the north or south box lines must undergo a hazardous waste determination before being sent to the box shredder. A conveyor transfer device conveys the de-lidded container off the box transfer conveyor onto a tipping carriage, parked in a box clamping frame (DQ340240, located in Appendix XVI). With the de-lidded container in position within the tipping carriage, actuators power the clamping
frame mechanism, securing the container within the carriage. The waste handling crane
(DQ340206, located in Appendix XVI), complete with a modified ramshorn hook and carriage
lifting fixture, lifts the tipping carriage/de-lidded container, and transfers it to the designated
tipping station. Two tipping stations are located in each box line. Trunnions, cylindrical
projections for pivot points, located on each side of the tipping frame, engage the rotation drive
shafts that are located on hydraulically powered tipping yokes (stands). Powered actuators tip
the container toward the waste sort trough, allowing the contents to fall into the waste sort
trough. The clamping frame/tipping carriage is remotely operated from control stations outside
the box lines by AMWTP personnel viewing directly through windows or via the closed circuit
television (CCTV) system.

AMWTP personnel can observe the inside of the container(s) from an elevated local
control station above the manipulator tool change station or by the CCTV system. When empty,
the container(s) in the carriage is raised clear of the tipping yokes and returned to the clamping
station. The two actuators then reverse the clamp beam, freeing the “HWMA/RCRA-empty
container(s)” [per IDAPA 58.01.05.005 (40 CFR 261.7)] for return to the box entry conveyor via
the box conveyor transfer device. Here, a container may be reunited with its lid and then
transferred via the entry conveyor to the box size-reduction area for breakdown and export as
LLW (Drawing 53-0209). The box shredder may also have a fire detection/suppression system
and/or a dust control system.

In the box lines, waste sorting, separating/segregating, depressurization of aerosol
kanisters, depressurization of fire extinguishers, treatment of liquids, and size-reduction activities
are achieved remotely using various manipulators (i.e., overhead power manipulator, master
slave manipulator, floor mounted hydraulic manipulator) and various tools. Typically, the floor
mounted manipulator is used to sort and size waste and to load waste into containers docked at
the waste export port doors that are set into the floor of the trough (i.e., waste export stations).
The edges of the port doors are beveled, allowing waste to be loaded into docked drums while
serving to contain at least 55 gal of liquid in the trough. The south box line is equipped with a
guillotine (DQ340220, located in Appendix XVI) for special size-reduction tasks. A filter
crushing machine (DQ330221, located in Appendix XVI) and drum shredder located within the
box lines are optional tools that may be installed for size-reduction.
During the processing of waste within the box line troughs, there is a potential for a flame or thermal event to occur. If a fire occurs while processing waste in the box line troughs, the box line Operator will attempt to extinguish the fire using a CO₂ Fire Suppression System, located on the arm of the floor mounted manipulator (see Exhibit D-1 and Appendix XV), or any other fire suppression mechanism authorized by procedure or take other action in accordance with the provisions of the Contingency Plan.

The waste export stations are used for filling containers. Empty containers are routed to drum elevators on the first floor directly below the waste export stations. Elevators lift the containers to the underside of the waste export stations. At the sort tables and off-line waste processing station, size-reduced/sorted waste items are transferred from the waste container/tables into the containers using manipulators. Filled drums cannot be removed unless the port door is closed.

The port door control system prevents the transfer of an overfilled container; thus, preventing uncontainerized items from entering the drum transfer areas below the box lines. See the MDSs for an enlarged view of transfer drum location. When filled, the containers are lowered and routed by the MTS to downstream treatment processes, including a lidding station.

Free liquids or containerized liquids may be treated and/or managed within the box line troughs or the off-line box processing station. In the case where free liquid is present in a sort trough, it is collected using a portable sump pump (DP340201, located in Appendix XVI) or cleaned up using other means, such as the addition of an absorbent. Liquid collected by the sump pump is transferred into an appropriately labeled container and deposited into a SCW transfer container at an export station or is bagged-out at the bag-out port. Containers of liquid may be treated via absorption, decanting (pouring of liquid into the trough or another container), and/or neutralization. See Attachment 1.A for additional information on the types of absorbents and neutralizing agents that may be used. Containerized liquid may also be transferred to the SCW glovebox system or to the DWPG for further treatment, as required.

AMWTP personnel control the primary size-reduction tool, the floor mounted hydraulic manipulator, from an elevated local control station above the manipulator tool change station. From this location the manipulator operator has maximum visibility of the process areas through observation windows and the CCTV system.
Direct visual observation and/or a CCTV camera positioned above the waste sort trough are used to view the contents of the trough and to identify items with special removal and/or management requirements (sheet materials, heavy items, glass bottles with liquids). Depending on the type and size of waste in the trough, the following operations are performed in the box lines. See Drawings 53-0208 and 53-0209 for additional views of the box lines.

**Suitable size/weight items.** Waste items with a suitable size and weight to fit into containers are transferred by manipulators directly into a container via a waste export station port [DZ340299 (located in Appendix XVII) and DZ340322]. A waste precompaction mechanism (DZ340335, located in Appendix XVI), in addition to manipulators with various tools, may be one of the items used to increase the waste packing efficiency of sorted waste inside containers destined for supercompaction. Baskets of SCW are either placed directly into a docked transfer container, or are located in the sort trough and later placed into a transfer container at an available export station port. The baskets can also be left in the transfer container, and the SCW placed into the basket while it is in the transfer container.

**Waste drums.** Drums in a box, undergoing processing in a box line, may be tipped out into the sort trough and opened using manipulators and tools, and the waste sorted and separated as described above. Drums may also be clamped/strapped in an appropriate transfer device (e.g., pallet, box) such that the waste is transferred to the waste sort troughs and the drum remains attached to the transfer device. The “HWMA/RCRA-empty drums” can then be transferred to the box-size reduction area for breakdown and export as LLW. If a drum enters a waste sort trough, then the drum shall be processed as MW. Drums can also be transferred via the south box line through the drum import/export port door (DZ340299 located in Appendix XVII) to be assayed or processed in the drum repack system, followed by either supercompaction or export from WMF-676.

**Drums with liquids.** Drums with liquids (free or containerized) may be processed within the box lines in order to access the liquid such that the liquid can be adequately treated. The liquid may not be accessible due to the nature of the waste stream (e.g., liquid within a solidified waste matrix, liquid at bottom of waste container). These drums are processed within the box lines using various tools (manipulators, shears, etc.) in order to break apart the waste.
matrix to access the liquid. Absorbent is then added in order to treat the liquid. Once the liquids have been absorbed, the waste is placed into a transfer container that has a liner located within the container. The transfer container is then lowered from the box line export port and transferred via the MTS to the import/export glovebox. Once inside the import/export glovebox, the liner is removed from the transfer container and placed into a drum that is docked to the import/export glovebox.

During the transfer period between the box line export port and the import/export glovebox, the transfer container is unlidded. Under normal operations, the transfer container will not be unlidded for a period of more than 72 hr. If the transfer container cannot be transferred to the import/export glovebox within 72 hr, then a lid shall be placed onto the transfer container and stored appropriately. Once a lid is placed onto a transfer container, the lid shall not be removed until the transfer container is received at the import/export glovebox. If a spill occurs, then documentation of the spill and any cleanup measures taken are placed into the Operating Record.

**Bulky waste items.** Bulky items, such as sheet materials, piping, or filters are size-reduced. Depending on their size and shape, waste items are either size-reduced, using a manipulator and tools, a filter crushing machine (DQ330221, located in Appendix XVI), which may be located in the north box line, or other appropriate size reducing equipment. Heavy-gauge, long, items may be size-reduced using a guillotine (DQ340220, located in Appendix XVI) located in the south box line. The guillotine is located next to the south box line waste sort trough, which receives the size-reduced items and is within reach of various manipulators. Size-reduced waste is then transferred into an appropriate waste export port/container using a manipulator.

**Heavy waste items.** Heavy items too large to fit into a container are size-reduced and placed into containers docked at one of the waste export station ports. The exceptionally heavy items may be size reduced remotely using various types of equipment or manually, as determined on a case-by-case basis.

**Sorted waste in containers.** Sorted waste within containers is visually checked to monitor the container fill level. When a container is determined to be adequately filled, the cover is put in place. If the drum is overfilled, excess waste may be removed by a manipulator,
or the precompaction mechanism (DZ340335, located in Appendix XVI) or a manipulator with various tools may be used to reduce the waste volume enough to allow the cover to be put in place. When filled with the desired amount of waste, the container is lowered to the first floor to receive a lid. The drum/lid is then conveyed to the drum lidding station where the lid is sealed onto the drum (W-345-011, located in Appendix XVI). From there, the drum is routed by the MTS to the drum assay cell or to a storage area.

**Specialty items.** If RTR or other information indicates a container contains waste requiring special handling, the container is typically processed at the off-line box processing station in the west part of the south box line. Examples of waste requiring special handling include some SCW, prohibited waste, waste deemed unsuitable for tipping into the sort troughs, or waste deemed unsuitable for handling by the floor mounted hydraulic manipulator (fragile items which may be damaged by tipping, etc.). At the off-line station, the box tipping carriage is positioned in yokes and inclined towards the operating window, in view of AMWTP personnel. With the assistance of manipulators and appropriate tools, AMWTP personnel process the waste as needed and transfer it to a drum docked at one of the two export ports at the waste export table. After removal of the specialty waste, the container and carriage can be repositioned at the waste sort trough and tipped for normal processing.

**Depressurization of fire extinguishers.** Pressurized fire extinguishers recovered from the drum repack system and the box line may be depressurized within the box line areas. A pressurized fire extinguisher is visually inspected for identification of the type of fire extinguisher, the type of extinguishing media contained within the extinguisher, and to assess the physical integrity of the fire extinguisher. Hazardous fire extinguishers, such as ones with carbon tetrachloride are not treated within the box lines. Using this information, a determination is made as to whether or not the fire extinguisher may be safely depressurized. A pressurized fire extinguisher identified as treatable is depressurized using standard industry practices for a controlled release (e.g., releasing pressure by slowly opening the valve, depressing the manual release valve). Non-standard industry practices (e.g., drilling, crushing, cutting) shall not be performed on a fire extinguisher. Any liquids generated during the venting of a pressurized fire extinguisher are collected and treated appropriately.
The contents of a particular fire extinguisher may not be known based upon visual examination of the fire extinguisher. However, the contents of all types of fire extinguishers that may be in existing AMWTP waste are known. Based upon this, the venting of fire extinguishers will not cause any limits specified in the “INL Sitewide Permit to Construct and Facility Emission Cap,” Permit Number P-2015.0023, to be exceeded. If a fire extinguisher is unable to be depressurized using standard industry practices (e.g., lack of valve), then the fire extinguisher is identified as “prohibited” and returned to an appropriate MWMU. If a “prohibited” pressurized container is to be stored in a MWMU, then the “prohibited” pressurized container shall be placed into a container listed in Section D-1a(1) of Attachment 1.A.

Depressurization of aerosol canisters. Pressurized aerosol canisters recovered from the drum repack system and the box line may be depressurized within the box line areas. Equipment (e.g., floor mounted hydraulic manipulator) within the box lines may be used to process the pressurized aerosol canister in order vent the pressure. Any liquids generated during the venting of pressurized aerosol canisters are collected and treated appropriately. Waste streams potentially containing ignitable (HWN D001) wastes are processed in a manner to minimize the potential of ignition. See Attachment 6 for additional information.

The contents of a particular aerosol canister may not be known based upon visual examination of the aerosol canister. However, the contents of all types of aerosol canisters that may be in existing AMWTP waste are known based upon characterization information. Based upon this, the venting of aerosol canisters will not cause any limits specified in the “INL Sitewide Permit to Construct and Facility Emission Cap,” Permit Number P-2015.0023, to be exceeded.

Dissimilar Items. In the course of processing containers of waste, waste items may be encountered that are operationally desirable to separate from the waste being placed into the drums located under the box lines. These dissimilar items may be set aside in the troughs or in un-lidded containers until AMWTP personnel determine that the item(s) may re-enter processing. These items will be removed from the box line, at a minimum of every 30 calendar days, typically when a criticality clean out occurs. If the dissimilar item cannot be processed
within the 30 calendar days or containerized, then continued management is handled on a case-by-case basis in consultation with the DEQ. If processing of the dissimilar items is not going to occur within the 30 calendar day limit, then the dissimilar items may be placed into a lidded container and stored within the box lines and removed for treatment at a later date. Once a dissimilar item is placed into a lidded container for storage after being staged within the box lines, then the item shall only be removed from the storage container when the dissimilar item can be processed within the box lines or sent to another AMTWP waste management unit for treatment/storage.

In general, dissimilar items would be from a WG other than the primary WG being retrieved from a container. For example, if a piece of metal is found while processing PPE, the metal may be set aside until additional waste is found which can be processed along with the metal. Waste items are not mixed unless compatibility determinations or process knowledge indicate that the items are compatible.

**Oversized Items.** In the course of processing containers of waste, waste items may be encountered that cannot be easily treated with the existing box line equipment without undue potential of damage to the equipment. Oversized items may either be items that are physically too large to be treated with the existing equipment located in the box lines, or have physical characteristics (density, hardness, etc.) that are outside of the design specifications for the existing equipment located within the box lines. Examples of oversized items include hardened metals, milling tables, large diameter solid bars, etc. In order to efficiently manage these types of waste, the waste may either be transferred to the Hot Maintenance area for physical sizing, as discussed later, or the waste may be exported out of WMF-676. One way that oversized items may be exported from WMF-676 is through the box shredder export port.

Once an oversized item is designated for export through the box shredder export port, a visual examination is performed to ensure that no free liquids are present on or within the oversized item. Previous RTR data may be reviewed to verify that free liquids are not contained within an oversized item. AMWTP personnel then place the oversized item into a transfer bag (e.g., polyethylene bag, tightly woven bag) or container in preparation for exporting. The transfer bag is identified in Item 29 of the containers list in Attachment 1.A. The transfer bags used in the box lines are an interim RCRA container (not a DOT-approved container) until the
bag and its contents are placed into a LLW Export Box. The oversized item may be placed into the transfer bag/container either within the box lines, the box size reduction area, or the Hot Maintenance area. The transfer bag/container is secured such that any loose contamination is contained within the transfer bag/container during the exporting process. Prior to placing the oversized item into a transfer bag/container, the oversized item may be staged in the box lines for a maximum of 30 calendar days. If the oversized item cannot be processed within the 30 calendar days or containerized, then continued management is handled on a case-by-case basis in consultation with the DEQ. If processing of the oversized item is not going to occur within the 30 calendar day limit, then the oversized item may be placed into a lidded container and stored within the box lines and removed for treatment at a later date. Once an oversized item is placed into a lidded container for storage after being staged within the box lines, then the item shall only be removed from the storage container when the oversized item can be processed within the box lines or sent to another AMWTP waste management unit for treatment/storage.

Once the oversized item has been secured within a transfer bag/container, the oversized item is moved to the box shredder export port, where slings/rigging materials are attached to the oversized item. AMWTP personnel perform a visual examination to ensure that there are no breaches/tears in the transfer bag/container, and that there is no visual evidence (e.g., staining) of MW contamination on the outside of the transfer bag/container. The box shredder export port cover is then removed, and the oversized item is lowered through the export port via a crane into a LLW export box located in the LLW container import/export area below the box size reduction area. The box shredder export port cover is then replaced onto the export port.

Prior to loading the oversized item into a LLW export box, an empty container is typically shredded and placed into the LLW export box. Prior to disengaging a LLW export box with an oversized item from the box shredder export port, additional empty containers may be shredded and added to the LLW export box to fill the void space of the LLW export box. Once a LLW export box with an oversized item is adequately filled with shredded material, the LLW export box is disengaged from the box shredder export box and a lid is secured to the LLW export box. All LLW export boxes with oversized items are managed as MW, and are labeled with a hazardous waste label.
Box Line Operational Generated Waste. Box line waste generated during operations (e.g., PPE, waste tools, failed equipment) may be exported from WMF-676 through the box shredder export port, as described above. The box line operational generated waste will be exported through the use of a transfer bag (e.g., polyethylene bag, tightly woven bag). Visual examination or RTR information is used to ensure that no free liquids are present on or within the box line operational generated waste.

Prohibited Waste. Prohibited waste (e.g., DOT Class 1 Explosives, see WMF-676 and Box Line WAC in Attachment 2) is identified either in the waste characterization records or through prior RTR analysis and is not knowingly accepted into WMF-676. Any prohibited items that are unknowingly received in WMF-676 are segregated, packaged for removal, and returned to the generator, DOE, or other MWMU as appropriate.

Items Requiring Attention. Waste containers containing unknown waste items (compressed gas cylinders, small inner containers, etc.) that can potentially be treated within WMF-676 are handled on a case-by-case basis. Waste items that cannot be treated in WMF-676, but are acceptable for receipt and sorting are retrieved from waste containers and transferred to containers/baskets pre-labeled with barcodes. Further information regarding the disposition of the prohibited waste is provided in Attachment 1.H.ii.

Pyrophoric Radionuclide Containers. Containers in the existing inventory of waste are known to potentially contain pyrophoric radionuclides in a form (i.e., metal fines, turnings, and particulates) that if not oxidized, could result in a reaction. A pyrophoric reaction during processing of this waste stream is an expected operational event. To ensure that the facility is operated in a manner that minimizes the possibility of a fire, appropriate measures will be employed for all containers, which at a minimum include the following:

- If potentially pyrophoric radionuclide drums are included in overpacks with other IDCs, they will be processed first or last
- Elimination or segregation of unnecessary combustibles during potentially pyrophoric radionuclides waste processing
- Only opening and processing one drum containing potentially pyrophoric radionuclides waste at a time
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 will continue to be staged in the box line and will be present during processing of drums suspected of containing potentially pyrophoric radionuclides.

No material removed from a drum containing potentially pyrophoric radionuclides may remain un-contained during non-operational periods.

Additional controls are being implemented for waste containing greater than 21 kg of potentially pyrophoric radionuclides in the north boxline and 12 kg in the south boxline to prevent fire suppression system water from being introduced to the box line environment in the event of thermal reaction, and in the event that a reaction occurs, control its duration and severity while preventing combustibles present in these waste streams from becoming involved in such a reaction event.

The automatic fire sprinkler system for the box lines will be impaired only during active processing of potentially pyrophoric radionuclide waste that is 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, and the facility will return to compliance with International Building Code requirements.

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.

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 a reaction is an expected event when processing the debris waste, the debris waste is processed before 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. In the event 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 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
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 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 pyrophoric 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 boxline trough. Other potential fires involving
combustible material not associated with the potential pyrophoric waste being treated will be
managed in accordance with the contingency plan Attachment 7, Section G-3. DEQ will be
notified for any identified reactions regardless of whether the contingency plan is activated.
Summary information will also be included in the Permit Condition I.U. Report.
**Empty Containers.** Visual observation via windows and/or a CCTV system is used to determine if a container meets the requirements of a “HWMA/RCRA empty container” as stipulated in IDAPA 58.01.05.005 (40 CFR 261.7). Containers which have been determined to be “HWMA/RCRA empty” are transferred to the box size reduction area for export from WMF-676. Containers which do not meet the HWMA/RCRA-empty container requirements will be managed as MW.

If a container contains an acute HWN, then the container will be processed as MW, unless the container has a liner which can be removed. If a container does contain a liner, then the liner may be removed and processed as MW such that the container meets the definition of a “HWMA/RCRA empty” container as defined by IDAPA 58.01.05.005 (40 CFR 261.7).

When visual observation through windows and/or the CCTV system shows that all wastes that can be reasonably removed have been removed, the container is classified as an “empty container” in accordance with HWMA/RCRA (IDAPA 58.01.05.005, 40 CFR 261.7) and is transferred to the box size-reduction area for export from WMF-676.

**Waste Sort Trough Decontamination.** Between waste campaigns, it may be desirable to decontaminate a waste sort trough and its associated equipment, such that EPA HWNs are not carried over from one waste stream to the next. In order to achieve decontamination of a waste sort trough and any associated equipment, AMWTP personnel shall clean the waste sort trough and the appropriate equipment to meet the clean debris surface standard specified at IDAPA 58.01.05.011 (40 CFR 268.45). A clean debris surface means that the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area. Typical methods used to clean a waste sort trough and its associated equipment includes washing, rinsing, and spraying technologies. Inspections to determine if the surfaces of the waste sort trough and the associated equipment meet the clean debris surface standard will not be performed remotely or by video camera. Liners (e.g., polyethylene liners) may be installed within a trough that is being used for processing containers with liquids (typically non-debris waste streams) in order to assist in decontamination of the
trough. Prior to cleaning of the trough, the liner is removed and processed as MW. The trough is then cleaned as described above. Trough decontamination performed due to PCBs will be performed in accordance with 40 CFR 761.

**Physical Sizing in Hot Maintenance.** In the course of processing various waste streams in the box lines, various waste items may be encountered that are operationally undesirable to process with the box line equipment. Examples of such waste items include hardened metals, waste items that are physically too large for the box line equipment, and waste items that cause excessive wear and tear on the box line equipment during treatment. In order to treat these waste items, the waste may be transferred to Hot Maintenance (room 224B) for physical sizing. The Hot Maintenance area contains portable equipment (e.g., plasma torch, nibblers, saws) to physically size waste items such that the waste may be processed in the supercompactor or exported from WMF-676. Waste items may be uncontainerized in the Hot Maintenance area for a total of 45 calendar days. If physical sizing of waste within the Hot Maintenance area cannot be accomplished within the 45 calendar days of entrance into the Hot Maintenance area, then continued treatment is handled on a case-by-case basis in consultation with the DEQ or the item may be containerized. If physical sizing of an item is not going to occur within the 45 calendar day limit, then the item scheduled to be sized may be placed into a lidded container and stored within the Hot Maintenance area, and removed for treatment at a later date. Once an item requiring physical sizing in the Hot Maintenance area is placed into a lidded container for storage after being staged within the Hot Maintenance area for treatment, then the item shall only be removed from the storage container when the item can be physically sized within the Hot Maintenance area or sent to another AMTWP waste management unit for treatment/storage.

**D-8a(2) Physical Characteristics [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]**

**Location of Box Lines**

Handling of boxed waste within WMF-676 occurs in the box lines. The box line areas are located centrally on the second floor of the building; above the drum transfer areas on the first floor (Appendix IX, Drawing 53-0201). Each box line occupies an area of approximately 70 ft by 20 ft.

**Description of Construction Materials**

In areas such as the material transfer areas on the first floor and the box line areas on the second floor, the floors, ceilings, and walls are typically constructed of cast-in-place steel-
reinforced concrete to meet equipment loading and seismic design requirements. The walls and floors are typically finished to a smooth surface with specialty coatings applied to prevent the migration of contaminants and facilitate decontamination.

**D-8a(2)(a) Box Lines**

The box opening area has specialty-coated curbs and floors to provide secondary containment. The concrete floors, ceilings, and walls are coated with the specialty coatings described in Appendix XIV. On the first floor, the box line areas include the import conveyor, the import/export glovebox, and box elevator. On the second floor, box line areas include the box entry airlock, the box opening area airlock, box line cells, manipulator operations corridors, and the empty box size-reduction area. Drawing 53-0209 provides a detailed view of the second floor areas of both box lines. Major items are described below, with the dimensions and materials of construction provided for primary components.

**Box tipping carriage with integral clamping frame (DQ340240).** The box tipping carriage with integral frame supports and transfers waste boxes during box emptying activities. The tipping carriage and clamping frame units are constructed of primarily stainless steel with some painted carbon steel and neoprene rubber. Its overall dimensions are approximately 12 ft long by 6 ft wide.

**Waste size-reduction area (DZ340322).** In the waste sort troughs, waste items are size-reduced and transferred into containers docked at one of the waste export station ports. The area is capable of withstanding impact loading, and the export ports in the waste troughs are beveled, allowing waste to be loaded into docked drums while serving to contain at least 55 gal of liquid in the trough. The waste sort troughs are constructed of heavy gauge stainless steel plate. Roughly L-shaped (from the top), the largest horizontal and vertical dimensions of the sort troughs are approximately 17 ft 10 in. long by 17 ft 5 in. wide. The troughs are about 2 ft 6 in. deep to limit migration of debris into the rest of the cell. Each trough contains two export ports.

**Waste export stations (DZ340203, DZ340324).** There are five waste export stations, with a total of 12 waste export ports. Three of the stations are associated with the waste sort troughs (six ports); two stations in the south box line are associated with waste export tables (four ports); a single-port station is located in the north box line west, and another single port is sited at the drum import/export station in the south box line. These two single port stations are generally used to export SCW.
The other waste export stations can accept either SCW (typically in baskets) or waste destined for supercompaction. The stations are fabricated from stainless steel and painted carbon steel. The approximate dimensions for the waste export stations, are approximately 11 ft long by 4 ft wide (east waste export table) and approximately 12 ft long by 4 ft wide (west waste export table). In addition, the drum import/export port door (DZ340299 located in Appendix XVII) in the south box line allows 55-gal drums to be lowered through the port for delivery by the MTS below.

**Import/export glovebox (Z-390-200).** This glovebox is a high integrity glovebox designed to import/export drums. The glovebox is manufactured primarily from stainless steel and is approximately 16 ft long by 3 ft wide by 13 ft high. It consists of receipt, ports, and exporting areas. Additionally, barcode readers, scissor lift, and equipment for the removal of liners from non-debris transfer containers are available for use.

**Tool Change Stations.** Tool change stations are provided to allow cutting tools to be changed and maintained via gloveports. Each station also includes a bagging port, which allows new tools to be imported into each box line cell and various tools to be exported for maintenance in the hot maintenance area (Appendix IX, Drawing 53-0207). Waste tools and bagging material are fed into the appropriate waste stream.

**D-8a(3) Maintenance**

Standardized maintenance procedures are utilized for WMF-676 equipment, cells, and gloveboxes. Modular units (such as manipulators) are typically maintained/repaired in designated areas near where they are used, or they can be removed from the area on failure and taken to the contaminated maintenance cell for repair. Any failed or uneconomical-to-repair components originating from within the higher contamination areas (e.g., waste tools used in box lines or gloveboxes) are exported from WMF-676 by addition to the appropriate waste stream. Replacement tools are imported through bagging ports or directly in a container. Maintenance and testing is performed on all equipment in accordance with Attachment 4. All WMF-676 process areas are maintained in a manner to minimize the accumulation of waste. For example, process areas are visually inspected and routinely cleaned using the manipulators and cleaning tools/wipes, at a minimum, between incompatible waste treatment sequences. If compatibility assessments show incompatibilities exist between IDCs from consecutive waste sequences, the process areas are visually inspected and cleaned before introducing the incompatible waste stream. All cleaning activities, including any clean up/removal of liquid spills, are recorded in
the operating log. Routine decontamination requiring AMWTP personnel to enter cells is kept to
a minimum (for example, most areas within cells are accessible by the manipulators).

D-8a(3)(a) 2016 Infrastructure Improvements

In 2016, an infrastructure improvement project was approved to include the following
Treatment Facility maintenance activities: (1) manipulator replacement, (2) conveyor lift
replacement, (3) camera installation over Port 27, and (4) box opening gantry robot (BOGR)
replacement.

Specifically, these maintenance projects provided increased assurance that the treatment
facility’s waste processing capability will be maintained to complete its current mission to meet
the Idaho Settlement Agreement.

Floor Mounted Hydraulic Manipulator Replacement. The manipulators are critical to
meeting production goals in the treatment facility. The Brokk 330 units installed in the treatment
facility were obsolete and repair parts are increasingly difficult to find. The Brokks have three
common failures modes: solenoid/hydraulic failures, quick hitch failure, and arm failure.

All three Brokks installed in the Treatment Facility have a modification installed for the
Hydraulic return line to minimize back pressure. This modification entailed installation of a
second return line. The north boxline (NBL) east trough and south boxline (SBL) Brokks were
replaced with new pedestal mounted Brokk model 400 units and associated control systems. The
northwest Brokk 330 had the hydraulic lines rerouted to a more optimal maintenance
configuration.

A full suite of spares (as determined with the vendor) have been procured for the Brokk
400 units. Disassembled Brokk 330 arms and critical components have been stored in the
boxlines as ready spares for the northwest Brokk. All three Brokks installed in the Treatment
Facility have a modification installed for the Hydraulic return line to minimize back pressure.

Conveyor Lifts. The conveyor system design was intended for boxes to be automatically
conveyed into the boxlines, but over time components have become worn and do not function
as designed.

The project replaced the existing quad-lift conveyors (four for each boxline) for improved
operability. The lift tables contain modified cylinders to stop the raised height consistently (in
lieu of the mechanical stop block previously used). A quick disconnect was added to make
changing the cylinder easier and the existing hydraulic power units for the lifts are to be reused.  
Up/Down travel indication are via proximity switches, instead of limit switches and use separate  
programmable logic controller (PLC) inputs, instead of being wired in series.  
The project scope also included replacement of the lift tables (two for each boxline) for  
the big-lift conveyor that are based upon original design. The lift tables utilize an up-stop valve  
to adjust the raised height to match adjacent conveyors. Hydraulic power units for the lifts were  
existing units. Up/Down travel indication are via proximity switches instead of limit switches  
and remain as separate PLC inputs.  

**Port 27 Camera.** As part of the visual examination (VE) process, the VE operator is  
required to verify that drums are empty before waste is loaded into them. Prior to installation of  
the Port 27 camera, this could be done for all ports in the boxline using available wall-mounted  
cameras except Port 27. Port 27 could only be verified empty using the cameras on the PaR  
gantry, which is a time-consuming process.  
The scope included the installation of a camera onto the ceiling of the south box line,  
focused on Port 27. This camera does not have pan, tilt, or zoom capability, nor does it have a  
lowering device for maintenance. The camera is accessible from the facility CCTV system.  

**Box Opening Gantry Robot Replacement.** The box opening gantry robot (BOGR) was  
designed and built by PaR Systems to support the initial construction of the AMWTF. Many of  
the components are obsolete and no longer available. The work replaced the motors, cables and  
the control system. It also replaced a non-functioning blade change system, which allows the  
BOGR to automatically change blades without requiring a cell entry.  

**D-8a(4) Monitoring**  
Radiological monitoring is conducted at WMF-676 using both radiological monitoring  
equipment with alarms and routine radiological surveys.  
AMWTP personnel visually monitor waste management operations continually through  
observer windows or the CCTV system. In addition, AMWTP personnel are required to  
record, in logbooks, unusual events that occur during their shift in accordance with operational  
procedures.
The differential pressure across the HEPA filters is monitored as an indication of HEPA filter integrity and particulate loading. See Section D of Attachment 1.H for a discussion of the WMF-676 ventilation system.

D-8a(5) Inspection

Attachment 4 contains the inspection requirements and schedules for the box lines.

D-8a(6) Closure

Closure of the pretreatment lines is addressed in Attachment 8.G.

D-8a(7) Mitigative Design and Operating Standards

The waste management areas and associated equipment are designed and operated in a manner to reduce the risk of releasing waste to the environment. Penetrations to cells and gloveboxes are maintained by engineered controls, such as airlocks, bagless transfer mechanisms, and bag ports. Specific design features that reduce the risk of exposure to AMWTP personnel and the environment are explained below.

Containers provide primary containment until opened in WMF-676. Within WMF-676, the cell structures (including the waste sort troughs, opened box/box transfer carriage, and secondary containment system) provide various levels of containment for uncontainerized waste. Typically, these items are fabricated from stainless steel and/or painted carbon steel and also include liquid containment considerations (e.g., beveled edges on export ports), as discussed previously.

The cells surrounding WMF-676 equipment provide additional containment for waste handling activities. See Section D-8b(2) for details on containment systems. As discussed in Attachment 1.H, various process areas are operated at lower pressures than surrounding areas to prevent the spread of airborne contamination between zones.

Venturi Airlock Glovebox

A venturi airlock system is used for drum feed into the supercompaction process area and Room 147 on the first floor. A second venturi system, provided mainly for empty drum entry,
feeds drums to Room 147. Air velocities and extract air volumes are maintained to minimize air movement (contamination) across the venturi airlock/drum transfer cell boundary.

MTS

The MTS is used to deliver containers to various locations within WMF-676. Typically, containers containing waste are unlidded only while en route to the lidding area. Liquids collected in various areas of WMF-676 are placed into containers or treated in the box lines. The containers are then lidded and placed into transfer containers before they are delivered to the SCW glovebox system or DWPG by the MTS. These transfer containers are typically not lidded, as they function as secondary containment, during transport, while the lidded waste container, within the transfer container, is the primary containment (see Table D-3 Room 126C in Attachment 1.H for additional information). The MTS cells provide spill containment via specialty-coated walls and flooring. See Section D-8b(2) for details on containment systems.

Box Line Specific Mitigative Design and Operating Standards

The box line airlock system consists of two sections (Drawing 53-0208). This system controls air movement between the ventilation confinement areas. Variable geometry doors minimize air movements during box entry by opening just enough to allow a waste container to pass through into a box pretreatment cell. Sufficient air velocity is maintained between the variable geometry doors and the waste container to control back diffusion.

The waste filling ports at the waste export stations in the box lines provide ventilation restrictions between the box line cells above and the drum transfer cells below. Open containers are lifted by elevators in the drum transfer cell on the first floor and dock against the underside of the waste export stations of the box lines on the second floor. [MDS DQ340202 shows the Master Slave Manipulator. MDSs DZ340203 and DZ340324 show the waste export tables. MDS DZ340299 (located in Appendix XVII) shows the drum import/export port door.] The drums are lidded unless waste is being added or removed. Although sorted waste without liquids is the only waste (except for small quantities of SCW) typically transferred via this route, the specialty-coated walls and floors of the drum transfer cells below (on the first floor) provide spill containment.
The bag transfer port at the tool change station is used for transferring tools into, and may be used for exporting small prohibited waste items out of the box line, via a sealed container (bag), while maintaining contamination control.

D-8b Environmental Performance Standards for Miscellaneous Units

[IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)]

The WMF-676 miscellaneous units are located, designed, and operated in a manner to preclude the release of waste constituents that may have adverse effects on human health or the environment. The following sections describe the potential pathways for release of waste; the potential impact of such releases; the design features that minimize potential risks; and the design and operating procedures at the miscellaneous units that minimize the potential for a release of wastes during pretreatment.

D-8b(1) Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), (b)(1), (c)(1), and 264 Subpart I through O and AA]

The wastes that are handled inside the miscellaneous units of WMF-676 are addressed in Attachment 2.

This section identifies the secondary MWs that are generated during WMF-676 operations and outlines the strategy for managing liquid and solid MW generated at WMF-676.

Waste Minimization

The design and operational intent of WMF-676 is to minimize waste generation, consistent with safe and effective operations. This operation is achieved primarily by maximizing the modular design of equipment to aid the reuse of items, as appropriate, and minimizing the use of swabs and rags for cleanup operations to avoid generating wastes.

Secondary Waste Categories from Pretreatment and Treatment Areas

Secondary MWs are generated during the normal operation of the pretreatment and treatment areas, and include:

• Contaminated sampling equipment,
• HEPA filters and local (box opening area) air extraction system filter bags/dust,
• Rags and swabs used to clean and decontaminate equipment that directly contact waste,
• Contaminated PPE, and
• Waste tools and failed equipment that directly contact waste.

A description of the secondary MW generated from waste management activities has been developed, and is provided in Table D-1.

D-8b(2) Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)]

WMF-676 is a completely enclosed waste treatment and storage plant designed for radiological and hazardous constituent containment. Only containment systems for hazardous constituents are addressed in this section. WMF-676 waste management areas are located inside designated ventilation confinement areas, which preclude the introduction of precipitation and any resultant run-on or run-off. See Section D of Attachment 1.H and Appendices XI and XIV for a description of building structures, including walls, floors, specialty coatings, and secondary containment analysis and drawings. See Section D-1a(3) of Attachment 1.H for further information on the secondary containment system.

Box Line Specific Containment System

The box lines contain special features to provide MW containment. The waste sort troughs, constructed of heavy gauge stainless steel plate, are about 2.5 ft deep to limit migration of debris into the rest of the cell. Liquid collection devices [such as sloped curbed areas, portable sump pumps (DP340201, located in Appendix XVI), and beveled port openings] are provided at the waste sort troughs and the waste export tables (DZ340203, DZ340322, and DZ340324, located in Appendix XVI).

Filter Systems. A local dust extraction unit is provided in the box opening area. The unit is designed to extract material (e.g., sawdust) from the box lid cutting tool(s) and discharge it into a container. The extract unit is fitted with a fire detection/suppression system for the collection container.
D-8b(3)  Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5) and 270.23(a)(2)]

Topographic, meteorological, and atmospheric conditions around WMF-676 and the impact of WMF-676 emissions on the environment are addressed in the “INL Sitewide Permit to Construct and Facility Emission Cap,” Permit Number P-2015.0023.

D-8b(4)  Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)]

When waste containers are pretreated (opened, sorted, separated/segregated, and size-reduced), stored, transported, and treated in the WMF-676 miscellaneous units, there is a potential for the release of particulate matter and organic chemical or mercury vapors into the cell. Particulate, gaseous, or aerosol emissions to the atmosphere are mitigated by the ventilation control system. Emissions from the waste management areas flow through HEPA filtration prior to being released to the atmosphere via the main stack, as discussed in Attachment 1.H.

D-8b(5)  Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)]

Air emissions from the WMF-676 waste management units occur as part of normal operations. These emissions are controlled by the ventilation control system described in Section D of Attachment 1.H. Section D-8a(4) discusses the monitoring that is performed. Section D-8a(7) describes the procedures and design features that are used to reduce the potential of a spill or other problems.

D-8b(6)  Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)]

The release of MW from the WMF-676 waste management units into subsurface physical structures, the environment, or the root zone of food chain crops is not expected to occur. Should a leak or spill occur, the released waste would be contained inside the containment cells and WMF-676. The released waste would be prevented from coming in contact with soil, thus precluding migration of wastes into the subsurface or groundwater.
**D-8b(7) Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]**

The waste management units are located within WMF-676, a fully enclosed building. There are no discharges or releases of MW to the soil, surface water, or groundwater. The building is constructed to ensure containment of any solid or liquid waste spills. Any leaks that might occur are contained within the containment cells and WMF-676. Furthermore, MW in the pretreatment lines is transferred to other areas for treatment, and the resultant final waste forms are ultimately transported out of WMF-676.

In summary, the WMF-676 waste management processes have been designed to ensure compliance with the requirements of HWMA/RCRA regulations. No adverse impacts to human health or the environment are projected to be associated with the release of waste to the atmosphere from WMF-676. Additional evaluations of risk to humans and the environment are provided in the “INL Sitewide Permit to Construct and Facility Emission Cap,” Permit Number P-2015.0023.
### Table D-1. Secondary MW Generation

<table>
<thead>
<tr>
<th>Waste Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rags and swabs</td>
<td>Used to decontaminate the equipment that contacts waste</td>
</tr>
<tr>
<td>Waste tools, failed items, used gloves, sampling equipment, PPE</td>
<td>Failed cutting tools, failed equipment, glovebox gloves, and sampling equipment that contacts waste</td>
</tr>
<tr>
<td>HEPA filters</td>
<td>Zone 3 air extraction system</td>
</tr>
<tr>
<td>Liquids</td>
<td>From supercompaction</td>
</tr>
<tr>
<td>Local extraction unit dust</td>
<td>Local dust extraction unit in the box opening area</td>
</tr>
</tbody>
</table>

DRS = drum repack system  
SC = supercompaction  
SCW = Special Case Waste
Exhibit D-1. Brokk CO₂ Fire Suppression System.
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.H.ii

WMF-676 Special Case Waste Process Information

Revision Date: June 2018
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ATTACHMENT 1.H.ii

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D. PROCESS INFORMATION

D-8 Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23]

The SCW glovebox system (i.e., transfer glovebox, treatment glovebox, sampling glovebox, and container-in-container glovebox) does not meet the definition of container, tank, surface impoundment, waste pile, land treatment, incinerator, boiler, industrial furnace, or underground injection well. Therefore, this unit is categorized as a miscellaneous treatment unit under HWMA/RCRA. See Appendix IX, Drawings 53-0201 and 53-0207 for the general arrangements of the first and second floors of WMF-676. Drawings/Exhibits for the SCW glovebox system are located in Appendix XVIII and SCW glovebox system MDSs can be found in Appendix XIX.

D-8a Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and 270.23(a)(2)]

This section describes the SCW glovebox system located at WMF-676.

SCW Glovebox System

The SCW glovebox system provides the capabilities to treat SCW items, on a case-by-case basis.

D-8a(1) Treatment Operations [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]

See Section D-8a(1) of Attachment 1.H.i for a discussion of operating standards used in conducting treatment activities at WMF-676.

D-8a(1)(a) SCW Glovebox System Process Description

The SCW glovebox system is located in Room 236 of WMF-676 (Drawing 53-9744) in close proximity to the drum repack system. See Attachment 1.H.iv for further information on the drum repack system. The SCW glovebox system is composed of four gloveboxes: the transfer glovebox, treatment glovebox, sampling glovebox, and the container-in-container glovebox. See
Appendix XVIII drawings/exhibits for more information on the location and design of the SCW glovebox system. See Drawing 53-0207 in Appendix IX for a general arrangement of the SCW/drum repack system area.

**SCW.** The SCW glovebox system is designed for the sampling and treating of SCW from waste containers and residual liquids recovered from the box lines, drum repack system, and the supercompactor. Liquids may also be treated within the box lines. The gloveboxes are also designed for sampling container-in-container (i.e., small container originating from a larger container) waste. Waste streams that may require processing in the SCW gloveboxes on an irregular basis may include pressurized containers requiring venting, elemental mercury, and miscellaneous items (e.g., wet cell batteries, valves, pumps, and similar fluid-containing devices). Additionally, some waste may be delivered to the SCW glovebox system that does not meet the WAC for the SCW glovebox system. Unknown waste may also be received at the SCW glovebox system. Unknown waste will be managed as described in Attachment 6.

**SCW Receipt/Transfer.** Waste enters the SCW glovebox system from three primary locations: the box line area, the supercompactor (recovered liquids), and the drum repack system. SCW items removed from waste containers in the box lines are either labeled with barcodes or placed into barcode-labeled containers. Whatever information is recorded in the Operating Record for the waste container(s) present during the extraction of SCW items is applied to the SCW items. The type of information entered into the Operating Record includes: the identification of the original waste container(s) and waste characterization information, IDCs/WGs, approximate quantity of SCW removed from each waste container, applicable HWNs, additional characterization or process knowledge obtained prior to treatment, and targeted treatment processes. SCW items are typically transferred into the SCW glovebox system in transfer baskets (placed inside transfer containers) via the MTS/Room 147 and elevator, which interfaces with the SCW transfer glovebox. From the elevator enclosure, containers are moved into the transfer glovebox through an airlock. At this point, a hoist is used to retrieve the transfer basket from the transfer container and move it to a set down area, where individual SCW items can be removed and identified.
Liquid from the supercompactor, box lines, and drum repack system may be absorbed in the process areas or may be transferred to the SCW glovebox system by first placing the liquid into a labeled container and then manually transferring the container to the appropriate glovebox (e.g., treatment glovebox, sampling glovebox) and importing it via a bag port. SCW items from the box lines may be manually transferred to the SCW glovebox system via bag ports (depending on size and quantities); however, the typical route is via transfer containers and the MTS/CCS. SCW items removed from the drum repack system are manually transferred to the SCW glovebox system and imported via a bag port. During the transfer, a barcode label is attached to the item, if required.

Once inside the glovebox, SCW items are first identified using the barcode label. Barcode identities are assigned to SCW items not previously labeled in the box lines, if necessary. For example, barcode-labeled transfer containers from the box lines may contain unlabeled SCW items from a single IDC/WG or container. The barcoded transfer container is used for tracking the SCW items only until received at the SCW glovebox system. At the SCW glovebox system, the individual items are unloaded from the transfer container and placed (as is) into individual, barcoded trays. These trays are used for tracking within the SCW glovebox system. After all containers/items have been identified and assigned a barcode (if required), the exterior of the items are visually examined for clues verifying or identifying their contents. This is especially critical for containers containing unknown wastes. SCW items (in their trays) are then transferred to the various gloveboxes that constitute the SCW glovebox system where further characterization, sampling, and treatment activities may be performed. A description of each type of waste, its sampling/treatment schedule, and the general waste flow is described below.

**Liquids.** Containerized liquids may be sampled and treated within the SCW glovebox system. However, containerized liquid may also be treated within the box lines. See Attachment 1.H.i for additional information. These liquids may come from other WMF-676 processing areas (e.g., supercompactor), but may also be WMF-676 generated secondary waste (e.g., cleaning liquids, supercompactor hydraulic fluids, etc.). Wastes with liquids are initially moved to the sampling glovebox for appropriate sampling and determination of appropriate treatment techniques. The treatment available for liquids includes decanting, neutralization, or absorption.
as described in Section D of Attachment 1.A. In addition to the decanting process described in Section D of Attachment 1.A, treatment of liquids in the SCW gloveboxes or the box lines may occur. Pouring of liquids may occur to separate multiple-phase waste, transfer waste into a different container, or absorb the liquid prior to downstream treatment.

Additionally, treatment of SCW containers of elemental mercury or sludges [i.e., SI/SO/salt waste (SW)] is available. In these cases, the liquids are separated from the mercury or sludge by decanting. The separated components are then treated according to the waste type. See Appendix XVIII for process flow diagrams for liquids.

Liquids may be analyzed or sampled in the sampling glovebox. The samples are placed into barcoded sample containers. Waste containers may be stored within the SCW glovebox system while awaiting sample analysis results. The sample containers are removed from the sampling glovebox via the bag port.

Once removed from the sampling glovebox, sample containers are sent to an on- or off-Site laboratory for analysis. Samples may be analyzed for corrosivity, VOCs, semi-volatile organic compounds (SVOCs), metals, PCBs, waste characterization for IDC/WG verification, and treatment method, as required. Based upon process knowledge and/or the sampling results, an appropriate treatment plan is selected. The following presents specific information on the treatment processes for liquids that may be conducted in the SCW treatment glovebox.

**Mercury.** Containers of mercury that show evidence of a second phase are first decanted in order to separate the liquid from the mercury. The mercury portion is then treated by absorption, and the non-mercury phase liquid is sampled, if necessary, and treated as described previously. Containers of mercury that show no evidence of a second phase, either initially or after decanting, are mixed with the appropriate absorbent in accordance with approved procedures. Examples of absorbent include zinc or sulfur with a small amount of surfactant. The general steps that are used in the mercury absorption/treatment process are:

- The volume of waste to be treated is measured.
- The amount of appropriate absorbent is measured.
- The absorbent is added to the elemental mercury.
1. The absorbent and elemental mercury are mixed.

2. Treated elemental mercury is visually inspected for signs of free liquid. If no free liquid is present, the treatment is considered successful.

3. If the absorption is not effective, an evaluation is conducted. If insufficient absorbent was used, the process may be repeated with additional absorbent.

The steps outlined in the treatment procedures listed above are repeated no more than three consecutive times for any given batch of elemental mercury. If a treatment is unsuccessful after three attempts, the adequacy of the procedure is analyzed and continued treatment is handled on a case-by-case basis in consultation with the State of Idaho DEQ.

Once treated, containers of mercury are transferred through the glovebox bag port to the SCW collection area. The SCW collection area is located at the end of the SCW glovebox system and used for the collection of SCW items. See Drawing 53-9744 for the location of the SCW collection area.

**Pressurized Containers.** Pressurized containers recovered from the drum repack system and the box line may be transferred to the SCW glovebox system for venting. As described in Attachment 1.H.i, pressurized containers may also be depressurized in the box lines. Pressurized containers that enter the SCW glovebox system are typically aerosol canisters, gas cylinders, or fire extinguishers; which may have an attached valve to facilitate venting. After receipt, a pressurized container is visually inspected for identification of container contents and to assess the physical integrity of the container, and a determination is made as to whether or not the container may be vented. Aerosol canisters are depressurized in an aerosol can puncturing device or by depressing the manual release. Only pressurized containers with known constituents that upon venting will not cause the limits specified in the “INL Sitewide Permit to Construct and Facility Emission Cap,” Permit Number P2015.0023, to be exceeded may be vented in the SCW glovebox system. If the contents are unidentifiable or do not meet the WMF-676 WAC, the pressurized container is identified as “prohibited” and transferred to an appropriate MWMU. If a “prohibited” pressurized container is to be stored in a MWMU, then the “prohibited” pressurized container shall be placed into a container listed in Section D-1a(1) of Attachment 1.A.
Examples of prohibited pressurized containers include those with unidentifiable contents, WMF-676 untreatable contents, or unsafe containers; for example, high pressure containers >2,500 psi. The treatment/venting procedures for the two types of pressurized containers are described below. See Appendix XVIII for the process flow diagrams.

Small pressurized containers identified as treatable are evacuated by an engineered venting device or using standard industry practices (e.g., releasing pressure by slowly opening the valve, depressing the manual release valve, etc.). Any liquids generated during the venting of a pressurized container are collected and treated as appropriate. Small pressurized containers identified as treatable may also be evacuated by depressing the manual relief, if present.

If a pressurized container is too large to be vented via the engineered venting device located in the SCW glovebox system or if it cannot be vented manually, then it may be vented in the box lines or it is removed from WMF-676 and placed into storage in another waste management unit, typically the WSF.

**Container-in-Containers.** A portion of the waste received in the SCW glovebox system consists of small containers retrieved from a larger container. It is expected that the small containers are typically sludges or containers with excess liquid from debris drums. Typically, these smaller containers range in size from 1 liter (L) to 5 gal and are expected to be metal canisters, cardboard cartons, or polyethylene jars. Container-in-container waste is received in the sampling glovebox from the box lines and the drum repack system through the MTS/CCS and/or bag ports. Once in the sampling glovebox, samples are taken using various tools and methods in accordance with the methods specified in the EPA manual for “Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,” current edition (SW-846), as appropriate for the physical nature of the waste.

A limited number of the containers may have contents that are monolithic. In order to obtain a representative sample of such waste, containers with monolithic waste are typically transferred to the container-in-container glovebox, where the sample is obtained using appropriate hand tools and SW-846 methods, as appropriate for the physical nature of the waste.
**Miscellaneous Items.** On occasion, there may be a small number of items (e.g., wet cell batteries, valves, pumps, and similar fluid-containing items) that require inspection to determine the presence of liquid. To accomplish this task, miscellaneous waste items are moved into the treatment glovebox and examined for liquid content. If no liquid is found, then the items are transferred to the SCW collection area. If liquid is found, it is drained for sampling and treatment, as required. The amount of liquid present varies on a case-by-case basis. Additionally, the item may require disassembly for removal of the liquid. Hand tools and a vise to secure the item are provided in the treatment glovebox to facilitate liquid removal. After miscellaneous items have been drained, the item is removed to the SCW collection area.

**Unit Specific WAC Prohibited Waste.** Waste that does not meet a WMF-676 MWMU WAC may be transferred to the SCW glovebox system. These items are treated and/or stored in the SCW area until transferred to downstream treatment or to another waste management unit.

**WMF-676 WAC Prohibited Waste.** Waste that does not meet the WMF-676 WAC may be inadvertently received in WMF-676. This waste may then be transferred to the SCW glovebox system. Storage of prohibited waste may occur in the SCW glovebox system, drum repack system, or Room 236 (SCW collection area) until transferred out of WMF-676. Storage of the prohibited items occurs until prohibited items are accumulated (in the event that additional containers may contain similar prohibited items) and arrangements are made to transfer the waste out of WMF-676. In the event that prohibited items present a significant safety hazard, the items are removed from WMF-676 as soon as possible after AMWTP safety personnel identify the appropriate safety precautions. Additionally, the State of Idaho DEQ will be informed within 24 hr upon the discovery of such items presenting significant safety hazards. Some examples of prohibited wastes are:

- Reactive metals,
- Wastes exhibiting the characteristics of HWN D003,
- Explosives, and/or
- Pressurized containers with unknown contents that cannot be vented safely.

**Waste Collection and Disposal.** All processed SCW and secondary wastes are bagged out of the SCW glovebox system and collected in containers located in the SCW collection area.
These wastes are tracked by barcode as they are collected. When a drum contains the appropriate amount of waste, based on volume or radiological criteria, or between incompatible waste types, the lidded waste containers are typically removed from WMF-676 or transferred to downstream treatment processes.

D-8a(2) Physical Characteristics [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]

Location of SCW Unit

The SCW glovebox system is located at the north end of the second floor of WMF-676, next to the drum repack system. See Appendix IX, Drawings 53-0201 and 53-0207 for general arrangement drawings of WMF-676. Collectively, the SCW glovebox system and the drum repack system make up Room 236 of WMF-676. The SCW glovebox system is approximately 40 ft long by 4 ft wide. The SCW transfer glovebox interfaces with Room 147 on the first floor of WMF-676 via an elevator.

Description of Construction Materials

Details of the construction materials for Room 236, which contains the SCW glovebox system and drum repack system, are provided in Attachment 1.H.

SCW treatment is performed within the gloveboxes. The SCW gloveboxes are manufactured primarily from stainless steel to resist corrosion and facilitate routine decontamination. Glovebox components have surface finishes that can be readily decontaminated. Internal corners are rounded and welds are smoothed and polished, as required, to achieve the desired surface finish. Gloveboxes include appropriately designed and conveniently located gloveports and observation windows, and strategically located CCTV system components. Glovebox floors are designed to provide containment and collection of liquids, should liquids be released in the glovebox interior. See Section D-1a(3) of Attachment 1.H for a more detailed discussion of WMF-676 containment systems.

D-8a(2)(a) SCW Glovebox System Physical Characteristics

The SCW glovebox system consists of four separate gloveboxes: the transfer glovebox, treatment glovebox, sampling glovebox, and container-in-container glovebox. See
Drawing 53-9744 for the general arrangement of the SCW glovebox system. A brief description of each separate SCW glovebox is provided below, including glovebox dimensions and materials of construction.

**SCW Transfer Glovebox.** This glovebox is a high integrity glovebox designed to import/export SCW items into the SCW glovebox system. The glovebox is manufactured primarily from stainless steel and is approximately 11 ft long by 4 ft wide by 10 ft 10 in. high. It consists of receipt, sorting, and exporting areas. Additionally, the transfer glovebox contains conveyor, airlock doors, a bag port, a barcode reader, and a hoist that is used for transferring SCW transfer baskets.

**SCW Treatment Glovebox.** The treatment glovebox is similar in design and construction to the transfer glovebox. The treatment glovebox is approximately 8 ft long by 3 ft 7 in. wide by 6 ft 9 in. high. The glovebox is used for venting gases and draining/collecting liquids from pressurized containers and miscellaneous items, treating and absorbing liquids, and absorbing mercury. The glovebox equipment consists of a jar mill, scale, vise, pressurized container gas venting/liquid collecting devices, various hand tools, stir plate, barcode reader, pH meter, and a bag port.

**SCW Sampling Glovebox.** The sampling glovebox portion of the SCW glovebox system is constructed primarily of stainless steel and is approximately 8 ft long by 3 ft 7 in. wide by 6 ft 9 in. high. This glovebox is used for sampling liquids and solids. Equipment located in the sampling glovebox typically consists of a barcode reader, tray, pipette, scale, hand press, hand tools, and a bag port.

**SCW Container-in-Container Glovebox.** The container-in-container glovebox is similar in construction to the other portions of the SCW glovebox system and is approximately 8 ft long by 3 ft 7 in. wide by 6 ft 9 in. high. The glovebox is used for sampling monolithic wastes. Equipment consists of various hand tools (such as, sampling scoops or augers) and a bag port.

**D-8a(3) Maintenance**

For the information pertaining to maintenance, see Section D-8a(3) of Attachment 1.H.i.
D-8a(4) Monitoring

For the information pertaining to monitoring, see Section D-8a(4) of Attachment 1.H.i.

D-8a(5) Inspection

Attachment 4 contains the inspection requirements and schedules for the SCW glovebox system.

D-8a(6) Closure

Closure of the SCW glovebox system and all associated equipment is addressed in Attachment 8.G.

D-8a(7) Mitigative Design and Operating Standards

For the information pertaining to mitigative design and operating standards, see Section D-8a(7) of Attachment 1.H.i.

D-8b Environmental Performance Standards for Miscellaneous Units

[IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)]

For the information pertaining to environmental performance standards, see Section D-8b of Attachment 1.H.i.

D-8b(1) Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), 264.601(b)(1), and 264.601(c)(1)]

The wastes that are treated inside the SCW unit are addressed in Attachment 2. For the information pertaining to miscellaneous unit wastes, see Section D-8b(1) of Attachment 1.H.i.

D-8b(2) Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)]

For the information pertaining to containment systems, see Section D-1a(3) of Attachment 1.H.
D-8b(3) Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5), and 270.23(a)(2)]

For the information pertaining to site air conditions, see Section D-8b(3) of Attachment 1.H.i.

D-8b(4) Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)]

For the information pertaining to the prevention of air emissions, see Section D-8b(4) of Attachment 1.H.i.

D-8b(5) Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)]

Air emissions from the WMF-676 SCW glovebox system occur as part of normal operations. These emissions are controlled by the WMF-676 ventilation control system described in Attachment 1.H.

D-8b(11) Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)]

For the information pertaining to the migration of waste constituents, see Section D-8b(6) of Attachment 1.H.i.

D-8b(12) Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]

For the information pertaining to the evaluation of risk to human health and the environment, see Section D-8b(7) of Attachment 1.H.i.
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D. PROCESS INFORMATION

D-8  Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23]

The supercompactor does not meet the definition of container, tank, surface impoundment, waste pile, land treatment, incinerator, boiler, industrial furnace, or underground injection well. Therefore, this unit is categorized as a miscellaneous treatment unit under HWMA/RCRA. See Appendix IX, Drawings 53-0201 and 53-0207 for the general arrangements of the first and second floors of WMF-676. Drawings/Exhibits for the supercompaction system are located in Appendix XX, and supercompaction system MDSs can be found in Appendix XXI.

D-8a  Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and 270.23(a)(2)]

This section describes the supercompactor unit located at WMF-676.

Supercompactor

The supercompactor is used to efficiently size-reduce nominal 55-gal drums or drums approximately the same dimensions as a 55-gal drum (e.g., “slim” 55-gal drum overpack) containing debris MW. It is sufficiently sized to process a throughput of 10,312 gal per day. Drums are delivered to the supercompactor from three primary sources: the direct-feed line, the box lines, or the drum repack system. Direct-feed drums (assessed through characterization and RTR examination as not requiring pretreatment, as described in Attachments 1 and 2) are transferred directly to the supercompaction area via the MTS. Containerized waste requiring pretreatment is processed through the box lines or the drum repack system prior to supercompaction. When appropriately repackaged into containers, these wastes are transferred via the MTS to the supercompaction area. During the supercompaction process, drums are managed and compacted within gloveboxes. Pucks resulting from the supercompaction of waste drums are loaded directly into a puck drum or are held in the puck storage area, commonly known as the puck staging area, of the postcompaction glovebox awaiting loading into puck drums. See Drawing 53-0201 in Appendix IX for an overhead view and general arrangement of the supercompaction area. A more detailed description of the supercompactor follows in Sections D-8a(1) and D-8a(2).
D-8a(1)  **Treatment Operations [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]**

See Section D-8a(1) of Attachment 1.H.i for a discussion of operating standards used in conducting treatment activities at WMF-676.

D-8a(1)(a)  **Supercompactor**

The direct-feed waste drums or containers from the box line and drum repack system areas are routed to the supercompactor via the MTS. Only drums containing compatible wastes are compacted in series without an intervening clean-out of the supercompactor gloveboxes. Barcode readers and the Operating Record are used to identify and control drums of incompatible waste from entering the compaction gloveboxes until the gloveboxes have been emptied, visually inspected, and cleaned (if required). To maximize the size-reduction process, the DMS incorporates an optimization algorithm that automates the waste drum selection for puck drum filling to achieve maximum packing densities. The DMS is used to optimize puck drum filling based on fissile content, weight, and/or puck height. Automatic control sequences to retrieve, deliver, compact, and deposit the waste drum/puck into the puck drum are initiated from the CCR.

Just prior to the piercing station, a barcode reader identifies the waste drums before they are transferred, via conveyor, through an airlock and into the supercompactor infeed glovebox.

There are four stations within the infeed glovebox: a turntable station that can receive drums from the north end of the infeed glovebox via the venturi glovebox and direct them to either the supercompactor or to Room 147; a drum piercing station; a drum handling station; and a supercompaction trolley load station. Drums for compaction are conveyed from the turntable station to the drum piercing station, where the drum is pierced. When pierced, the drum is conveyed onto the drum handling station. The drum handler lifts the drum, transports it to the supercompactor trolley loading station, and lowers the drum onto the compaction trolley. The trolley moves the drum into the supercompactor glovebox to a position beneath the supercompactor.

With the drum and trolley in position, the mold is lowered around the drum and engaged onto the trolley. The lower press plate of the supercompactor is mounted on the top of the trolley and acts as a guide for the mold, which controls the puck diameter during the compaction cycle. The compaction process proceeds in two phases. First, the main ram is lowered, initially powered by a
low-force ram, which forces the air out of the top section of the drum. After the first compaction
phase, high-pressure fluid is supplied to the main high-force compaction ram and is maintained at a
higher pressure until the final pressure or maximum travel distance is attained. Both rams are fed
from a hydraulic power pack situated outside the glovebox. The resultant force reduces the puck
height (on average) to one-fifth of the original drum height. On completion of the compaction cycle
the mold and ram are raised and the compaction trolley transfers the puck to the puck
recovery glovebox.

Prior to supercompaction, those drums requiring pre-treatment will receive pre-treatment in
accordance with this Permit (e.g., drum repack system, box lines, containment enclosure, etc.).
When liquids are released during compaction, they are handled on a case-by-case basis. Sloped
glovebox floors and a sump are provided to collect any liquids produced during the compaction
process. The leak-tight base of the glovebox containment has sufficient capacity to hold a
worst-case leak of 55 gal. The sump has a capacity of approximately 2.5 gal and is equipped with a
sensor to detect liquid level. The sensor alarms when the sump is 90% full.

Liquids in the supercompactor may be treated via absorption, decanting, or neutralization, as
described in Section D of Attachment 1.A. Liquid in the sump is removed in a timely manner using
a pump, or other decanting means, located in the puck recovery glovebox or absorbent may be
added. The liquid is pumped into a container located inside the puck recovery glovebox, or the
liquid may be pumped into a collection container located outside of the supercompactor gloveboxes.
Liquids are visually inspected, and a sample may be collected in a barcode-labeled container and
transferred to the SCW glovebox system, DWPG, or to an analytical laboratory for characterization,
as required. Containerized liquid may be stored in the puck recovery glovebox until transferred to
another MWMU. Small containers with absorbed liquid may be stored in larger containers until
transfer out of WMF-676. Only known compatible wastes are placed together into a container. The
characterization information for wastes placed in the collection containers is, in part, derived from
the characterization information assigned to the original waste containers prior to supercompaction.

In the event that large amounts of liquid are released during the compaction cycle and the
sump capacity (2.5 gal) is filled, the compaction cycle is completed per normal procedures. After
the ram is disengaged, the liquid in the sump is managed as described above. If the next drum
contains incompatible waste, the glovebox surfaces are visually inspected and any liquids remaining are removed and the area cleaned, as required.

If after compaction the puck is unsuitable for direct deposit into a puck drum, it is diverted to the puck storage area and a more suitable puck is retrieved. The puck storage area, which stores up to six (6) pucks, allows for the pucks to be temporarily stored in the post compaction glovebox, if required. Only pucks from a compatible waste treatment sequence are stored in this area at any one time. All surfaces of the puck storage area are visually inspected and cleaned, if required, between incompatible waste sequences. If residual liquids leak from the pucks, the sloped floor of the puck storage area directs the liquid into the puck recovery glovebox sump where the liquids are removed and containerized as previously discussed. The puck handler transfers the pucks from the puck recovery glovebox into the postcompaction glovebox where the pucks are subsequently transferred into puck drums.

From the CCR, AMWTP personnel continue to feed waste drums to the supercompactor until the puck drum is full. CCR-initiated control sequences also allow the importing of empty puck drums into the area as required. Barcode readers are employed at appropriate locations in the supercompaction area for waste tracking purposes. Software based interlocks stop the process if an out-of-sequence drum is detected. Extensive use of a CCTV system is employed to allow the CCR-based AMWTP personnel to complete their tasks.

Prior to compaction of a drum containing waste incompatible with previous drums (when changing incompatible waste treatment sequences), all drums in the compaction gloveboxes are compacted, and all pucks are loaded into puck drums. When the compaction gloveboxes are empty, all potentially-contaminated surfaces are visually inspected through observation windows and CCTV system, the sump is emptied (if needed), and surfaces are cleaned (as needed) before accepting drums containing waste incompatible with the previous sequence.

**D-8a(1)(b) Puck Drum Loading**

Prior to puck drum loading, empty puck drums with the outer lid and bolt ring removed are fed into the supercompaction cell from the empty drum feed route by a conveyor. The drum is identified by a barcode reader and conveyed under the post compaction glovebox. A bagless transfer
system is used to allow drum inner lid removal while maintaining glovebox containment. The puck drum is then positioned centrally onto a drum positioning machine and raised into position at one of the two bagless transfer mechanisms. The bagless transfer port is opened with the inner drum lid attached (held in position by a vacuum pump).

Information contained in the Operating Record is used to decide if a puck can be loaded directly into the puck drum or if it requires storage in one of the six positions at the puck storage area. Pucks are loaded automatically into the puck drum using the puck handler. Recovery equipment is available within the puck recovery glovebox, along with various tools, to deal with abnormal pucks that do not fit into the puck drum. Waste that escapes from pucks is manually collected through gloveports and placed into a suitable container.

When puck loading is complete, the bagless transfer port is closed, refitting the puck drum inner lid and hydraulically swaging it in place. The filled puck drum is then lowered from the postcompaction glovebox. The puck drum is transferred from the bagless transfer area to the swabbing area by a conveyor. The puck drum is monitored to check that the exterior of the drum is free from radiological contamination and suitable for export. Puck drums are then identified by a barcode and conveyed to the puck drum lidding area, where the outer lid and bolt ring are manually fitted onto the puck drum. The puck drum is then transferred by conveyor through an airlock into the puck drum export area.

D-8a(2) Physical Characteristics [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]

Location of Supercompaction Unit

The supercompaction treatment area is located at the north end of the first floor of WMF-676 and occupies an area of approximately 30 ft by 65 ft. See Appendix IX, Drawings 53-0201 and 53-0207, for additional information. The supercompaction process equipment is mostly contained in three connected gloveboxes within the supercompaction cell: the infeed glovebox, the supercompactor glovebox, and the postcompaction glovebox. Puck drums containing waste are transferred from the puck drum filling station in the postcompaction glovebox to the adjacent drum export area, which occupies approximately 55 ft by 25 ft on the first floor directly beneath the SCW treatment area.
Description of Construction Materials

Details of the construction materials for the supercompactor cell are provided in Section D of Attachment 1.H.

The supercompactor gloveboxes are manufactured primarily from stainless steel to eliminate corrosion and facilitate routine decontamination. Glovebox components typically have surface finishes that can be readily decontaminated. Internal corners are rounded and all welds are smoothed and polished, as required, to achieve the desired surface finish. Gloveboxes include appropriately designed and conveniently located gloveports and observation windows, and strategically located CCTV cameras. Glovebox floors are inclined to allow liquid to flow to a sump. The sump is sufficiently sized and has appropriate provisions for allowing liquid removal.

D-8a(2)(a) Supercompactor

Major components of the supercompactor system are described below, with the dimensions and materials of construction provided for critical components. All drum handling equipment bearing the full weight of the waste containers have a load bearing capacity of approximately 1,000 lb.

Supercompactor Infeed Glovebox. The infeed glovebox is a high-integrity sealed glovebox (as described above) that contains outer and inner airlock doors, the infeed conveyor, drum turntable, drum handling station, drum piercing machine, and supercompaction trolley. It is constructed primarily of stainless steel and has approximate dimensions of 18 ft long by 4 ft wide by 13 ft high. The glovebox interfaces with the MTS and the supercompactor glovebox. For more details, including locations of gloveports and observation windows, see Exhibit XX-1A, –1B, and –1C.

Supercompactor. The supercompactor is a four-column press with a base connected to an upper frame by the four columns. The main high-force compaction ram and cylinder are contained within the upper frame. In addition, a low-force cylinder is mounted on top of the press connected to the main ram. A mold slides up and down the four columns to surround drums during compaction. The supercompactor is constructed primarily of carbon steel. The rams, mold, and columns are located within the supercompactor glovebox, which has dimensions of approximately 10 ft long by 8 ft wide by 23 ft high. The cylinder bodies and the hydraulic power pack pump are located outside...
the supercompactor glovebox, but within the supercompaction area. The floor of the
supercompactor glovebox is sloped and allows liquid waste, generated during compaction, to flow to
the sump located in the puck recovery glovebox, which is described below. The supercompactor
interfaces with the supercompaction trolley, infeed glovebox, puck recovery glovebox, and the
hydraulic power pack pump.

**Puck recovery glovebox.** The puck recovery glovebox is a high-integrity sealed glovebox
that contains a puck transfer plate, a safety screen, a recovery/maintenance hoist, a liquid collection
sump, equipment used for containerizing liquids, and various tools to aid reworking of pucks, if
required. The glovebox is constructed primarily of stainless steel and has approximate dimensions
of 4 ft 6 in. long by 3 ft 4 in. wide by 7 ft high. The glovebox interfaces with the supercompactor
glovebox and the postcompaction glovebox.

**Postcompaction glovebox.** The postcompaction glovebox includes a maintenance access
port, puck handler and gripper, puck staging area, puck drum bagless transfer mechanism, and a
recovery/maintenance hoist and block. It is made primarily from stainless steel and has approximate
dimensions of 28 ft long by 5 ft wide by 29 ft high. The glovebox interfaces with the
supercompactor glovebox and the puck recovery glovebox.

**Puck drum filling station.** The puck drum filling station is located within the
postcompaction glovebox and consists of two puck drum bagless transfer systems (i.e., two drum-
filling ports) that interface with two drum positioning machines located outside of the glovebox.
The materials of construction and dimensions of the postcompaction glovebox were described
previously. The drum positioning machines each have a table with roller conveyor, elevator,
rotational frame, and centering arms. A positioning machine/elevator is used to lower and raise puck
drums to the bagless transfer systems/postcompaction glovebox.

**Drum export area.** The drum export area is where puck drums loaded with pucks are
placed on conveyors for export. Before puck drums enter the drum export area, they are transferred
to the swab and monitor station. The materials of construction for the area are described in
Attachment 1.H. The conveying equipment is constructed primarily of carbon steel with stainless
steel rollers.
D-8a(3) Maintenance

For the information pertaining to maintenance, see Section D-8a(3) of Attachment 1.H.i.

D-8a(4) Monitoring

For the information pertaining to monitoring, see Section D-8a(4) of Attachment 1.H.i.

D-8a(5) Inspection

Attachment 4 contains the inspection requirements and schedules for the supercompactor unit.

D-8a(6) Closure

Closure of the supercompactor and associated equipment is addressed in Attachment 8.G.

D-8a(7) Mitigative Design and Operating Standards

For the information pertaining to mitigative design and operating standards, see Section D-8a(7) of Attachment 1.H.i.

Supercompactor-Specific Mitigative Design and Operating Standards

In the postcompaction glovebox, a bagless transfer system is used as the system interface for puck drum access. An empty puck drum is placed onto the drum positioning machine/elevator. The drum is raised using the elevator and a seal is provided between the top of the drum and the bagless transfer system. The inner lid is sealed to the bottom of the transfer system door and is removed simultaneously with the opening of the port. Once open, the inside of the drum becomes part of the postcompaction glovebox. When the puck drum is full the inner lid is hydraulically swaged onto the drum, the door is closed, and the seal between the bagless transfer door and the puck drum is released. The drum is lowered, and AMWTP personnel check the outside of the container for contamination (and provide decontamination if needed) prior to fitting the outer drum lid and bolt ring onto the drum.
D-8b  Environmental Performance Standards for Miscellaneous Units
[IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)]

For the information pertaining to environmental performance standards, see Section D-8b of Attachment 1.H.i.

D-8b(1)  Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), 264.601(b)(1), and 264.601(c)(1)]

The wastes that are treated by the supercompactor are addressed in Attachment 2. For the secondary waste information pertaining to miscellaneous unit waste, see Section D-8b(1) of Attachment 1.H.i.

D-8b(2)  Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)]

For the information pertaining to containment system, see Section D-1a(3) of Attachment 1.H.

D-8b(3)  Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5), and 270.23(a)(2)]

For the information pertaining to site air conditions, see Section D-8b(3) of Attachment 1.H.i.

D-8b(4)  Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)]

For the information pertaining to the prevention of air emissions, see Section D-8b(4) of Attachment 1.H.i.

D-8b(5)  Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)]

Air emissions from the supercompactor unit occur as part of normal operations. These emissions are controlled by the ventilation control system as described in Attachment 1.H.
D-8b(11)  Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)]

For the information pertaining to the migration of waste constituents, see Section D-8b(6) of Attachment 1.H.i.

D-8b(12)  Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]

For the information pertaining to the evaluation of risk to human health and the environment, see Section D-8b(7) of Attachment 1.H.i.
AMWTP HWMA/RCRA PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

ATTACHMENT 1.H.iv

WMF-676 Drum Repack System Process Information

Revision Date: June 2018
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ATTACHMENT 1.H.iv

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D. PROCESS INFORMATION

D-8  Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23]

The drum repack system (i.e., DWHE/DWPG) does not meet the definition of a container, tank, surface impoundment, waste pile, land treatment, incinerator, boiler, industrial furnace, or underground injection well. Therefore, this unit is categorized as a miscellaneous treatment unit under HWMA/RCRA. The drum repack system is used to open, visually inspect, sort, segregate or separate, repackage waste, decant liquids, absorb liquids, and neutralize liquids prior to transfer to downstream treatment processes. Drawings and exhibits for the drum repack system are located in Appendix XVIII, and drum repack system MDSs can be found in Appendix XXII.

D-8a  Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and 270.23(a)(2)]

This section describes the DWHE and DWPG units. The DWHE and DWPG are designed to process up to 2,956 gal per day.

DWHE

The DWHE is used for drum operations including: drum opening, waste sorting, visual examination, retrieval of waste packages, repackaging of waste into containers etc., and provides a containment area for repackageing of waste containers with minimal radiological contamination. The DOHE is within the DWHE, and provides additional contamination control. The enclosure is equipped for the receiving, storing, movement, and processing of drums. Processing can include drum opening, waste sorting, and visual examination. The un-overpacking of drums is also conducted in the DWHE and described in Section D-8a(1)(a) on page 3 under the heading Debris Drum Containers in Overpacks. Equipment located within the DWHE is listed in Section D-8a(2)(a). Drawing 53-9744 shows the general arrangement of the drum repack system and SCW glovebox system.
The DWPG is designed to provide containment for repackaging operations for drums/waste that are not acceptable for processing in the DWHE/DOHE. The DWPG is also used for absorbing, decanting, and neutralizing liquid. The glovebox incorporates a receipt, sorting, preparation and exporting area within the glovebox, and has a platform around the perimeter of the glovebox for AMWTP personnel access. Equipment associated with the DWPG is listed in Section D-8a(2)(a). See Drawing 53-9744 for further information.

D-8a(1) Waste Management Operations

See Section D-8a(1) of Attachment 1.H.i for a discussion of operating standards used in conducting waste management activities at WMF-676, including activities in the drum repack system.

Treatment via decanting, neutralization, and absorption is performed, as described in Section D of Attachment 1.A.

D-8a(1)(a) DWHE

Containers enter the DWHE via an elevator, which receives containers via the MTS. Once on the elevator, drums are raised and transferred through an airlock (via a conveyor) into the storage area. See SCW and drum repack system general arrangement Drawing 53-9744 for drum storage area locations. The drum storage area is enclosed on all sides by walls and doors. From the storage area, drums are manually transferred to the drum opening hood located within the handling enclosure. The drum opening hood is designed to provide air flow conditions away from AMWTP personnel and over/around the containers during opening and repackaging operations. This ventilation is accomplished by a dedicated exhaust provided by the drum opening hood. The DWHE and fume hood are routed to dedicated filter banks. Containers within the drum opening hood are opened and repacked as discussed below. See Exhibit XVIII-10 for a block flow diagram of the drum repack system.

Debris Drum Containers. Debris drum containers are received at the drum opening station for opening, visual examination, and removal of SCW items. After the drum is opened, the inner waste packages/items are removed from the drum and visually examined, as required.
SCW and prohibited items are transferred out of the DWHE/DOHE for further management. After the contents of the drum have been removed, visually examined, sorted, and the relevant information has been entered into the Operating Record, the drum is repackaged with the appropriate waste (i.e., not SCW and prohibited waste). Once repackaged, the drum lid, clamp band, and bolt/nut are replaced onto the drum. The drum is then removed from the drum opening hood and placed into a storage area for transfer to downstream processes.

All drum and waste components are checked for radiological contamination at each step in the operation. If unacceptable levels of loose radiological contamination are found at any point, then the drum and the drum contents are bagged and transferred to the DWPG.

**Debris Drum Containers in Overpacks.** Drum containers in overpacks are delivered to the DWHE and handled within the enclosure in the same manner as drums without overpacks (see description above), except that after the overpacked drum is placed at the drum opening station, a drum lifting hoist is attached to the drum, and the drum is lifted from the overpack. The empty overpack may be moved to the drum crusher, where it is crushed, bagged, and loaded onto a pallet for transfer to the LLW export station. Once the overpacked drum has been removed and inspected, it may be determined that the drum has sufficient integrity and characterization information (lacks prohibited items) to be transferred to the supercompactor for treatment in lieu of being opened and its contents repackaged. If the overpacked drum does not have sufficient integrity to be transferred to the supercompactor, it is placed back into the overpack container and transferred out of DWHE to be processed in the box lines or other MWMU. Similar to the process for non-overpacked debris drums, all container (overpack, drum, liner, lid, and lid fastening hardware) and waste components are checked for radiological contamination at each step in the operation. If high levels of radiological contamination are found at any point, the container and waste items are bagged and transferred to the DWPG.

**Container-In-Container Drums.** A portion of the drums received in the DWHE contain smaller waste containers. It is expected that these smaller containers are packaged in soft metal cans or polyethylene jars, ranging in size from 1 L to 5 gal. The opening and unloading of container-in-container drums is handled in the same manner as debris drums, as described earlier. Overpacked container-in-containers are also expected, and are handled in the same manner as described for overpacked debris containers. After the small, inner containers are removed from the container, they are transferred to the SCW glovebox system for visual examination, inspection, and/or sampling, as required. Alternatively, inner containers identified only for
inspection may be transferred to the DWPG, where the container is opened and examined to verify that the contents match the container IDC/WG.

**Prohibited Waste.** Any prohibited wastes (e.g., aerosol canisters, lab gas cylinders, fire extinguishers) retrieved in the DWHE/DOHE are transferred to the SCW glovebox system, the box lines, or are exported out of WMF-676. See Attachments 1.H.i and 1.H.ii for additional information. See Attachment 2 for further information on prohibited waste.

**D-8a(1)(b) DWPG**

Drums that are found to be significantly contaminated during processing at the DWHE are transferred to the DWPG using the drum lifting/tipping equipment. The drum lifting/tipping device is used to present the drum in a horizontal position to the glovebox drum port, where the bag is mated to the glovebox, providing containment during import of the drum contents into the glovebox. At this point, the drum lift/tipper is secured to prevent movement of the drum.

Once the contents of the drum are exposed to the inside of the glovebox, items can be removed using a variety of tools, or with a chain hoist provided in the glovebox for moving heavy items. Each item is placed onto a transport tray, located on the floor of the glovebox, as it is removed from the drum. The transport tray is used for moving items to different work stations in the DWPG. Spills occurring during unloading of the drum are absorbed using various materials. After the contents of a drum have been removed and it is deemed HWMA/RCRA empty, the drum is removed from the DWPG and reused, if appropriate. If a container contains an acute HWN, then the container will be processed as MW, unless the container has a liner which can be removed. If a container does contain a liner, then the liner may be removed and processed as MW such that the container meets the definition of “HWMA/RCRA empty” as defined by IDAPA 58.01.05.005 (40 CFR 261.7). If the drum is not reusable, it may be transferred to the drum crusher in the DWHE, where it is crushed, bagged, and placed on a pallet.

Packages of waste unloaded onto the transport tray are subject to viewing by the CCTV system and visual examination by AMWTP personnel. After examination, debris waste is loaded into drum containers using two load-out ports on the floor of the glovebox. Repackaged drums are bagged and lowered from the DWPG, moved to the material transfer airlock (i.e., door to DWHE), and stored prior to transfer to downstream processes. SCW items are bagged out, transferred to local assay, and relocated to the SCW glovebox system. See Drawing 53-9744 for
further information. Container-in-container items removed from drums are opened and
examined to verify that the waste inside the container matches the IDC/WG on the drum. The
containers are either transferred to a repackaging drum or to the SCW glovebox system.

D-8a(2) Physical Characteristics [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1)]

Location of Drum Repack System

Pretreatment and visual examination of drums within WMF-676 occur in the drum repack
system. The drum repack system is located in the north central area of the second floor of
WMF-676. It is located above an elevator, which connects to the first floor MTS. See
Appendix IX, Drawings 53-0201 and 53-0207 for further information on the general
arrangement of equipment in WMF-676. The DWHE occupies an area in the north end of
Room 236, while the DWPG is directly east of the DWHE.

Description of Construction Materials

Details of the construction materials for the drum repack system containment area
(Room 236) are provided in Section D of Attachment 1.H. The curbs and floor of Room 236
(i.e., SCW/drum repack system area) are typically finished to a smooth surface with specialty
coatings to prevent the migration of contaminants and to facilitate decontamination. The
containment area is constructed to minimize air in-leakage and ensure adequate ventilation
cascade flow rates through engineered inlets and openings.

D-8a(2)(a) Drum Repack System

Spill containment for the drum repack system, along with the SCW glovebox system, is
provided by Room 236. Drawing 53-9744 illustrates the general arrangement of the drum repack
system. A brief description of the materials of construction for the DWHE and DWPG is
presented below.

DWHE. The enclosure is primarily constructed of steel clad walls and is approximately
45 ft long by 22 ft wide. Equipment within the DWHE includes a drum opening exhaust hood,
hoists, barcode readers, DMS workstations, CCTV system, various tools, drum storage area,
glovebox loading/bagging platform, drum conveyor, elevator enclosure, drum crusher, drum
lif/tipper, and breathing air supplies. The DOHE is constructed of prefabricated stainless steel with carbon steel support steelwork. The DOHE is located against the North and East walls of the DWHE area as shown on Drawing 53-9744.

**DWPG.** The DWPG is a high-integrity glovebox designed to receive, process, and export waste that cannot be processed in the DWHE. The DWPG is also used for treating and absorbing liquids. The glovebox is primarily manufactured from stainless steel to minimize corrosion and facilitate routine decontamination and is approximately 15 ft long by 3 ft 6 in. wide by 11 ft 6 in. high. It consists of a receipt/sort and preparation/export area and incorporates a platform around the perimeter for AMWTP personnel access. Equipment associated with the DWPG includes a chain hoist for handling heavy items, barcode readers, mobile drum lifts and turntables, CCTV system, scale, various hand tools, pH meter, and a fire suppression system.

Glovebox components typically have surface finishes that are readily decontaminated. Internal corners are rounded and welds are smoothed and polished, as required, to achieve the desired surface finish. The DWPG includes appropriately designed and conveniently located gloveports, observation windows, and CCTV system.

**D-8a(3) Maintenance**

For the information pertaining to maintenance, see Section D-8a(3) of Attachment 1.H.i.

**D-8a(4) Monitoring**

For the information pertaining to monitoring, see Section D-8a(4) of Attachment 1.H.i.

**D-8a(5) Inspection**

Attachment 4 contains the inspection requirements and schedules for the drum repack system units.

**D-8a(6) Closure**

Closure of the drum repack system and all associated equipment is addressed in Attachment 8.G.
D-8a(7) Mitigative Design and Operating Standards

For the information pertaining to mitigative design and operating standards, see Section D-8a(7) of Attachment 1.H.i.

D-8b Environmental Performance Standards for Miscellaneous Units

[IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)]

For the information pertaining to environmental performance standards, see Section D-8b of Attachment 1.H.i.

D-8b(1) Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), 264.601(b)(1), and 264.601(c)(1)]

The wastes that are treated inside the drum repack system are identified in Attachment 2. For the secondary waste information pertaining to miscellaneous unit waste see Section D-8b(1) of Attachment 1.H.i.

D-8b(2) Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)]

For the information pertaining to drum repack system containment system, see Section D-1a(3) of Attachment 1.H.

D-8b(3) Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5), 270.23(a)(2)]

For the information pertaining to site air conditions, see Section D-8b(3) of Attachment 1.H.i.

D-8b(4) Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)]

For the information pertaining to the prevention of air emissions, see Section D-8b(4) of Attachment 1.H.i.
D-8b(5) Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)]

Air emissions from the drum repack system occur as part of normal operations. These emissions are controlled by the ventilation control system described in Attachment 1.H.

D-8b(11) Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)]

For the information pertaining to the migration of waste constituents, see Section D-8b(6) of Attachment 1.H.i.

D-8b(12) Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]

For the information pertaining to the evaluation of risk to human health and the environment, see Section D-8b(7) of Attachment 1.H.i.