

**Chemical Munitions Igloos  
for the  
Container Storage of  
Wastes Generated from the Maintenance  
of the  
Chemical Munitions Stockpile  
Attachment D.2.**

**Containers with Free Liquids**

The stockpile of chemical munitions stored at TEAD(S) (which included the M-55 rockets before they were declared obsolete, and became a hazardous waste) requires continual maintenance. These maintenance activities generate wastes, examples of which are:

- The valves and plugs used on ton containers used to store bulk chemical agent are changed out on a periodic basis, the valves and plugs that are removed are decontaminated, containerized, and managed as a hazardous waste. Wastes of this type would typically carry waste numbers F999 and/or P999, in addition to other waste numbers where applicable.
- Discarded protective clothing (including suits, boots, gloves, canister to personnel breathing apparatus, etc.) is containerized and managed as a hazardous waste.

Certain types of impregnated carbon have been found to contain chromium and silver in leachable quantities exceeding the TCLP criteria for hazardous waste. In such cases, EPA Waste Numbers D007 and D011 would be assigned to these wastes in addition to any other applicable hazardous waste numbers.

- Any indoor area where chemical agents, or agent filled munitions are stored has the potential to be ventilated. The air removed from the area passes through a bed of activated carbon before being released to the atmosphere. When the activated charcoal is changed out, the "spent" carbon is containerized, and managed as a hazardous waste.

Certain types of impregnated carbon have been found to contain chromium and silver in leachable quantities exceeding the TCLP criteria for hazardous waste. In such cases, EPA Waste Numbers D007 and D011 would be assigned to these wastes in addition to any other applicable hazardous waste numbers.

- Solutions used to decontaminate chemical agents are absorbed, with the resulting material being containerized and managed as a hazardous waste. Wastes of this type would typically carry waste numbers D002, F999, and/or P999, in addition to other waste numbers where applicable.
- Spent solutions and related wastes are generated from the use of air monitoring equipment and also during agent-related laboratory operations. Various types of solvents and other chemicals employed in these operations create wastes with various combinations of the following waste constituents and associated waste numbers (in addition to other applicable waste codes as described herein):

- D001 (Ignitibility)
- D002 (Corrosivity)

- D004 (Arsenic)
- D007 (Chromium)
- D008 (Lead)
- D009 (Mercury)
- D011 (Silver)
- D018 (Benzene)
- D019 (Carbon Tetrachloride)
- D022 (Chloroform)
- D030 (2,4-Dinitrotoluene)
- D035 (Methyl Ethyl Ketone)
- F001 (Solvent Listings)
- F002 (Solvent Listings)
- F003 (Solvent Listings)
- F005 (Solvent Listings)

Chemical surety waste items generated from RCRA and CERCLA corrective actions generated both on and off-site, this includes chemical munitions unearthed or discovered during these corrective actions.

The majority of this material is presently stored in the container type referred to as a PIG. When these items were unearthed or discovered, they were assigned a waste code of P999 placed into storage. At the time of their discovery, safety concerns and other factors prohibited a complete investigation of their contents until such time when an adequate plan outlining an investigation/identification process for the PIGs could be developed.

During a recent identification test of these PIGs, Tooele Army Depot has become aware that chemical agent related hazardous wastes are commingled in these PIGS with items which are non-chemical agent related hazardous wastes. These wastes, and associated EPA Waste Numbers include:

- D003; P030 (Cyanides)
- D022; U044 (Chloroform)
- P033 (Cyanogen Chloride)
- P095 (Phosgene)

The solid and liquid wastes generated from the maintenance of the chemical munitions stockpile stored at TEAD(S), and the operation and maintenance of the Chemical Agent Munitions Disposal System (CAMDS), and the Tooele Chemical Disposal Facility (TOCDF) are stored in 7 chemical munition storage igloos located inside Area 10 which are in addition to the 27 igloos storing the M-55 rockets.

Wastes stored in 6 of these igloos can be described by the Utah Division of Solid and Hazardous Waste (UDSHW) codes F999 (residue from the demilitarization of chemical agents), and P999 (chemical warfare agents), and the EPA waste codes D002, and D003. In addition, other waste codes may be assigned, as described in the examples given above. One igloo is used to store pure chemical warfare agent that was generated from the draining of M55 rockets (P999). This agent is stored in ton containers.

NOTE: The location and igloo ID numbers of these 7 igloos is proprietary information and can be found in Attachment P.

Description of Containers: [ 40 CFR 264.171, 264.172]

The following types of container are used to hold hazardous wastes that are stored in the igloos under discussion:

- 8, 55, 90, and 120 gallon steel drums with removable heads
- 8, 55, 90, and 120 gallon polyethylene drums without removable heads
- 85, 90, and 120 gallon steel drums with removable heads (overpack drums)
- 85 and 90 gallon polyethylene drums with removable heads (overpack drums)
- 8 and 15 gallon polyethylene drums without removable heads
- 70, 56, 42 gallon boxes
- 479, 143, 166, 96, 78, 21, and 5 gallon crates
- 2 gallon M2A1 can
- 8 gallon prop charge can
- 11 gallon M548 can
- 10 gallon polyethylene bottle

In addition three type of containers designed specifically for chemical agent munitions are used, which are:

- 340 gallon Single Pallet Only Rocket Transporter (SPORT)
- 5, 9, and 9.25 gallon PIG
- 170 gallon Ton Container

Liquid wastes are stored in drums without removable heads, while solid wastes are stored in drums with removable heads.

Drawings of containers unique to the U.S. Army, and the label used to designate containers of hazardous waste can be found in Appendix D.1.

NOTE: When stored as hazardous waste, some filter units use the filter media support (i.e. the canister, or filter element) as the container for the spent carbon.

Container Management Practices: [ 40 CFR 264.173]

Wastes are segregated depending on what agent type generated them. All wastes generated from the treatment, or maintenance of munitions filled with nerve agent GB are stored in the same igloo, VX related wastes in another, the vesicant agents L, H, and HD in another, the forth igloo stores spent Real Time Monitoring solution used to monitor agent GB, and the fifth igloo is used to store pure nerve agents in ton containers.

NOTE: The five igloos discussed in the previous paragraph were permitted under interim status and appear on the TEAD(S) Part A Permit. The sixth and seventh igloos are being permitted through this permit application, and the determination of what type of wastes will be stored in these two igloos has not yet been made, however wastes stored in these two igloos will be managed in the same manner as stated above, that is, wastes will be segregated and stored based on which chemical agent they are contaminated with.

This waste management practice is used not because there is any danger of a reaction occurring if different types of chemical agents are mixed together (i.e. compatibility), but because the segregation of agent contaminated wastes and chemical munitions based on agent type allows for greater ease in monitoring and decontamination since monitoring devices, and the decontamination chemical used are agent specific.

In addition, both the CAMDS and the TOCDF process chemical agents and related hazardous wastes based on agent type (i.e. all chemical munitions filled with and wastes derived from a particular chemical agent are treated during the same demilitarization process run).

At the time wastes are generated, no analysis is done to determine whether or not chemical agent can be detected. Therefore once the container is closed, it is assumed that the void space inside the container is saturated with agent. No attempt is made to open any sealed container of agent related hazardous waste, unless samples are required. When containers are opened, Standard Operating Procedures are developed that include monitoring requirements, personal protective equipment requirements, and step by step material handling procedures. Because of the unknown potential hazard of active agent being inside the containers, if there is a need to open a closed container, the container is opened in an enclosed area equipped with a ventilation system that exhausts to the outside atmosphere through an activated charcoal filter.

All containers are transported to the storage igloos using open and closed bed trucks. Container moved by forklifts are first placed on pallets, and banded together if more than three 55 gallon drums (or equivalent volume) are placed on a single pallet. 55 gallon drums are stored on pallets. The SPORT's have integral skids (i.e. the skids are part of the design and welded to the bottom of the SPORT) and lifting fork slots as part of their design. These features keep the container body from contacting the storage base and provide added security during material handling.

Residues from the demilitarization, treatment and testing of chemical warfare agents are listed hazardous wastes in the State of Utah and are described by the UDSHW waste code F999.

A code used within the Army used to describe differing degrees of decontamination is the multiple X code. This code differentiates between varying levels of decontamination of wastes contaminated with chemical agent residue and is based on; 1) user knowledge, 2) monitoring results, and processes used for decontamination. The multiple X chemical decontamination designation code used by the Army and the hazardous waste code (F999) used by the UDSHW are unrelated. Regardless of what chemical decontamination designation assigned by the Army, if a residue (i.e. waste) is generated from the demilitarization, treatment, and/or testing of chemical warfare agents, that residue (or waste) is a F999 listed waste in the State of Utah (the only exception being when a waste has a chemical decontamination designation of 0X). Because the multiple X decontamination designation code is used throughout the text contained in Attachments D, the following definitions are provided:

A chemical decontamination designation of 0X (Zero X) means the waste or material in question never came in contact with chemical agent, and is assigned through user knowledge. Since the waste never came in contact with chemical agent, the UDSHW waste code F999 does not apply.

A chemical decontamination designation of XXX (3X) means the surface of the waste or material in question was monitored for chemical agent contamination through the analysis of air samples taken from inside the waste container, and the results of the analysis showed that no agent was detected at the time of monitoring. The detection limits used to determine the XXX decontamination designation for the various agents are; GB =  $0.0001 \text{ mg/m}^3$ ; VX =  $0.00001 \text{ mg/m}^3$ ; and mustard =  $.003 \text{ mg/m}^3$ . The UDSHW waste code F999 does apply to waste with a chemical decontamination designation of XXX. Wastes or material designated XXX cannot leave government control unless approval (on a case by case basis) is granted by the Army Materiel Command Field Safety Office, and that approval allows only for the waste to be further treated (if treatment is required to comply with Land Disposal Restrictions) and disposed of at a

hazardous waste Treatment Storage and Disposal Facility (TSDF). It is not Army Policy to dispose of waste having a XXX chemical decontamination designation at off-site TSDF's, this method of managing F999 hazardous waste is only an option.

A chemical decontamination designation of XXXXX (5X) means the waste or material in question has been heat treated to a temperature of 1000°F for a minimum of 15 minutes. Even though a waste has undergone the XXXXX procedure, the waste is still a listed waste in Utah and the UDSHW waste code F999 still applies. Wastes with a XXXXX chemical decontamination designation can leave government control, however since wastes of this type are still a F999 listed hazardous waste in the State of Utah, waste streams that cannot be recycled will be further treated and disposed of at off-site hazardous waste TSDF's. The only waste stream that can be recycled is the one composed of metal munitions casing and other previously contaminated metal parts that are heat treated using the XXXXX process, and this waste stream cannot be recycled until the verification test results demonstrating the effectiveness of the XXXXX process are accepted by the Executive Secretary of the Utah Solid and Hazardous Waste Committee and only when the Executive Secretary has notified TEAD in writing.

Secondary containment is provided for hazardous wastes containing free liquids by use of drip pans. The drip pans used conform to the secondary containment volume requirements found in 40 CFR 264.175. Drip pans will be used to store all wastes with free liquids that are stored in drums. Drip pans will not be used as secondary containment for M-55 rockets, ton containers, SPORT's, PIG's, or SRC's. M-55 rockets use the M441 shipping/firing tube and monitoring procedures in lieu of secondary containment. The storage arrangement for ton containers prevent them from being stored in drip pans (see note below), and SPORTS, PIGS, and SRC's are used as overpacks and serve as secondary containment for any waste that they store.

The storage configuration used in the 6 chemical munition igloos (not including the igloo storing P999 pure agent hazardous waste in ton containers) storing hazardous wastes from the maintenance of the chemical stockpile is as follows:

- Containers will be stored on pallets, unless the design of the container incorporates skids to elevate it off the storage base or the containers that may be stacked upon.
- Each pallet will have no more than 4, 55 gallon drums, or the equivalent volume of 4, 55 gallon drums.
- 55 gallon drums will be stacked no more than 2 high, SPORTS will be stacked 3 high, however compliance to storage capacity is based on equivalent volumes for containers that are not 55 gallon drums.
- The maximum number of rows per igloo side is 12 ( i.e. 24 rows per igloo).
- The maximum number of pallets per row is 4 (2 stacks, each 2 pallets high), and the maximum number of 55 gallon containers per row is 16, or the equivalent volume of 16, 55 gallon drums if containers with different volumes are used.
- Containers of hazardous wastes with free liquids will be placed in secondary containment drip pans, if the container is the primary container for the waste. This includes at a minimum all 55 gallon drums without removable heads.

- SPORT's, SRC's, PIG's, and 85 gallon drums used to overpack wastes with free liquids that are held in a primary container will not be placed in secondary containment drip pans, since the SPORT, SRC, PIG, or 85 gallon drum is being used to provide secondary containment.
- Ton containers with pure chemical agent (P999) stored in the same igloo as usable product will not use drip pans as secondary containment. These containers will be stored in the same storage arrangement as other ton containers storing usable product. All other ton containers storing hazardous waste other than that which can be described by UDSHW waste code P999 will be provided with secondary containment, either by drip pans, or storage base design.
- No more than 16, 55 gallon drum will be stored in each drip pan (i.e. one drip pan per row).

Maximum storage capacity = 16 drums/row X 24 rows X 55 gallons/drum = 21,120 gallons

Stored as 384, 55 gallon drums, or the equivalent volume of 384, 55 gallon drums if other containers are used.

NOTE: Ton containers holding hazardous waste (P999, pure agent drained from M-55 rockets) are stored in the same configuration (i.e. along with) as ton containers holding usable product. One reason for this is because, the only difference between the two is that the ton container labeled as hazardous waste holds nerve agent that was drained from M-55 Rockets (which are defined as hazardous waste). Whether a ton container is labeled hazardous waste, or is considered product, there is no difference between the containers or the contents (i.e. the containers are the same, the nerve agents they hold are the same, and the purity of the agents is comparable).

Another reason is that the maintenance of ton containers requires specialized tools and material handling equipment. Having all like containers holding like agents stored in a central location insures that the equipment and tools will be available when maintenance on ton containers is performed (i.e. valve and plug change out) and that no container will be overlooked.

Although nerve agent drained from M-55 rockets is considered hazardous waste, and the ton containers holding this agent are containers with free liquids, no secondary containment is provided for any ton containers. The reasons for this are: 1) ton containers are stored with usable product using wooden spacers to allow for level stacking, and the insertion of a catch basin for some containers would disturb the stacking arrangement, 2) regardless of whether a ton container holds agent that it was filled with originally, or down loaded from an M-55 rocket, the containers are maintained the same and monitored at the same frequency, and 3) the containment ability of a ton container strong enough to hold compressed gases that is used to hold a nerve agent that is a liquid at atmospheric pressure is more than adequate in comparison to the types of containers that could be used when comparing the materials of construction and the container wall thicknesses.

A ton container holding organophosphate nerve agents that are liquid at atmospheric pressure offers superior containment to a thin skinned container (i.e. 55 gallon drum) placed inside a secondary containment area.

**Building 4536  
for the  
Container Storage of  
Wastes Generated from the Maintenance  
of the Chemical Munitions Stockpile  
Attachment D.3.**

**Containers Without Free Liquids**

Building 4536 is used to store containers holding wastes that are: 1) generated from the maintenance of the chemical munitions stockpile; 2) classified as 3X for chemical and/or explosive contamination; and 3) do not contain free liquids.

Examples of wastes generated from the maintenance of the chemical munition stockpile include munition components (e.g. empty warheads, empty rocket motors, resonance rods), ton container valves and plugs, M441 shipping/firing tubes, unused decontamination chemicals (powdered sodium hydroxide, and sodium and calcium carbonate), and solid lab waste from CAMDS. They can be described by the Utah Solid and Hazardous Waste code F999 and the EPA codes, D003 (explosive residue only), D004 through D011, and D037.

Items having come in contact with, or suspected of having come in contact with chemical agent or explosive receive a multiple X designation. In some instances, an item could have two X designations, one for chemical agent, and one for explosive.

The 3X designation for explosive contamination means that no explosive residue can be seen on exposed surfaces. Wastes classified as 3X for explosive contamination are described by the EPA waste code D003, not because the waste itself is explosive reactive, but because the waste is contaminated with explosive residue. Wastes classified as 3X for explosive contamination are not allowed to leave government control until they are designated 5X (explained below).

The 3X designation for chemical agent contamination means the item has been monitored for chemical agent, and at the time of monitoring no agent was detected. Although the 3X designation show that no agent was detected, since the item was at one time solid debris contaminated with chemical agent, the waste is still described by the Utah Division of Solid and Hazardous Waste code F999 (residue from the demilitarization of chemical agents) and may be disposed of in a hazardous waste landfill, provided that the Army Materiel Field Safety Office has approved the waste (on a case by case basis) for disposal, and that Land Disposal Restrictions are complied with.

The 5X designation for chemical agent and explosive contamination means that the waste (solid debris contaminated with agent and/or explosive residue) has been treated to destroy all residual contamination by subjecting the debris to a temperature of 1000 °F for at least 15 minutes. As explained in Attachment D.1., assigning a decontamination designation of 5X to a waste does not preclude a waste/residue from being a F999 listed waste in the State of Utah.

The multiple X decontamination codes used by the Army only specifies the level of decontamination and what type of decontamination process was used. This information is used to define the Army protocol which determines who has authority to allow the wastes/residues to leave TEAD(S) for off-site disposal at a hazardous waste TSDF.

Wastes/residues that are x'd require authorization from the Army Materiel Command Field Safety Office (on a case by case basis) prior to disposal at an off-site TSDF, while wastes/residues that are 5X'd may be disposed of at an off-site TSDF without authorization from the Army Materiel Command Field Safety Office. In either case, 3X or 5X, residues from the treatment, testing, and/or demilitarization of chemical warfare agents are F999 listed wastes in the State of Utah.

**Test for Free Liquids: [ 40 CFR 270.15(b)(1)]**

Types of wastes stored in Building 4536 are:

- Inert metal munition components, and casings that have been emptied of their reactive filler (i.e. chemical agent, explosive, and propellant charge). Components having contacted chemical agent must have a minimum decontamination designation of 3X (no chemical agent detected at the time of monitoring and no visible explosive).
- Discarded valves and plugs from ton containers that have a minimum decontamination designation of 3X.
- Spent activated charcoal, either in granular form, or packaged in the manufacturer's filter canisters used for the filtration of gases only.
- Discarded dry granular/powder decontamination chemicals.
- Discarded process equipment fabricated from metal, fiberglass, or plastic that have a minimum decontamination designation of 3X.
- Solid debris that has a minimum decontamination designation of 3X.
- Unused chemical warfare detector kits that contain chemically treated wipes and sample tubes, but do not contain any chemical agents (i.e. ID kits).
- Solid waste that was once used to package chemical agent munitions made of wood, metal, or plastic (i.e. dunnage) that has a minimum decontamination designation of 3X.
- Solid lab waste, glassware, rubber tubing, paper, that contains no liquids, and has a minimum decontamination designation of 3X.

Of the wastes listed above, the paint filter test (SW 846, method 9095) would only be applicable to activated charcoal (that was not in a filter canister) and discarded decontamination chemicals. Activated charcoal is used only as a filter medium for vapor phase contaminants, therefore it cannot contain free liquids. Visual inspection of the decontamination chemical readily verifies that they are unused (since they are mixed with water before use), and dry.

The Paint Filter Test (SW-846, Method 9095) must be performed on any waste to be stored in Building 4536 that is not found in the above list.

**Description of Containers [40 CFR 264.171, 264.272]**

Hazardous wastes are offered for transportation to off-site Treatment Storage and Disposal Facilities, in containers conforming to Department of Transportation specifications.



5. Any wastes stored in Building 4536 that are F999 listed wastes have previously been monitored prior to being placed into storage and the monitoring results have shown that no agent was detected (hence the XXX decontamination designation).
6. Building 4536 has been used to store wastes without free liquid for the last 10 years with no upgrade to the storage base.
7. The closure plan for Building 4536 will identify any contamination resulting from spills.
8. The regulations (both federal and state) require only that containers of hazardous waste without free liquids be elevated above the storage base to prevent them from contacting any accumulated liquid. All containers stored in Building 4536 are elevated above the storage base, either by pallets or by being stacked upon other containers. Liquids are prevented from accumulating on the storage base as previously stated in items 1, 3 and 4.

In consideration of the above, it is the position of TEAD that the present dirt floor storage base of Building 4536 is adequate.

Building 4104  
for the  
Container & Waste Pile Storage  
of  
Wastes Generated from the  
Maintenance and Operation  
of  
CAMDS  
Attachment D.4.

Building 4104 is used to store wastes generated from the operation and maintenance of the Chemical Agent Munition Disposal System (CAMDS). The building is also used to store components of process equipment that are removed from CAMDS, but will be used again. All items (wastes and stored equipment) stored in building 4104 have a minimum decontamination designation of 3X (no agent detected at the time of monitoring). These wastes can be described by the following EPA waste codes:

- D001 (Ignitibility)
- D002 (Corrosivity)
- D004 (Arsenic)
- D005 (Barium)
- D006 (Cadmium)
- D007 (Chromium)
- D008 (Lead)
- D009 (Arsenic)
- D010 (Selenium)
- D011 (Silver)
- D018 (Benzene)
- D019 (Carbon Tetrachloride)
- D022 (Chloroform)
- D035 (Methyl Ethyl Ketone)
- F001 (Spent Solvent Listings)
- F002 (Spent Solvent Listings)
- F003 (Spent Solvent Listings)
- F005 (Spent Solvent Listings)
- F999 (Residue from Demilitarization of Chemical Agents)

The base of Building 4104 is divided into 4 sections for the purposes of waste management. One section is used to store drums of waste containing free liquids. Two of the sections are used to store waste piles of solid waste that is designated hazardous waste because it is residue from the treatment of chemical warfare agents (Utah Division of Solid and Hazardous Waste code F999). The waste piles are made of wastes having shapes that do not lend themselves to containerization without crushing, shredding, disassembling or compacting. As an example, the metal that will be generated from the operation of the Deactivation Furnace, the Metal Parts Furnace and the Toxic Dunnage Incinerator will be placed in a waste pile until such time that it can be recycled as scrap metal (this is pending the determination by the Executive Secretary of the Utah Solid and Hazardous Waste Committee on a report yet to be prepared documenting the effectiveness of the 5X process (heat treatment of wastes contaminated with chemical agent at a temperature of 1000°F for a period of at least 15 minutes)). Waste piles are used to store wastes that are awkward to containerize.

The remaining section is used to store process equipment (e.g. ducting, conveyor systems, electric motors, etc.) that have been removed from the CAMDS but are intended to be reused.

**Building 4105 -  
for the  
Container Storage  
of  
Wastes Generated from the  
Maintenance and Operation  
of  
CAMDS  
Attachment D.5.**

Building 4105 is identical in design to Building 4104 and is also used to store wastes generated from the operation and maintenance of the Chemical Agent Munition Disposal System (CAMDS). All items (wastes and stored equipment) stored in building 4105 have a minimum decontamination designation of 3X (no agent detected at the time of monitoring). Only hazardous wastes that do not contain free liquids are stored in Building 4105. These wastes can be described by the following EPA and Utah waste codes:

- D004 (Arsenic)
- D005 (Barium)
- D006 (Cadmium)
- D007 (Chromium)
- D008 (Lead)
- D009 (Arsenic)
- D010 (Selenium)
- D011 (Silver)
- D018 (Benzene)
- D019 (Carbon Tetrachloride)
- D022 (Chloroform)
- D035 (Methyl Ethyl Ketone)
- F001 (Spent Solvent Listings)
- F002 (Spent Solvent Listings)
- F003 (Spent Solvent Listings)
- F005 (Spent Solvent Listings)
- F999 (Residue from Demilitarization of Chemical Agents)

**Containers Without Free Liquids**

**Test for Free Liquids: [ 40 CFR 270.15(b)(1) ]**

Hazardous wastes that are generated through a process that give the waste a possibility of containing free liquids will be analyzed using the Paint Filter Test (SW 846, Method 9095). The only waste falling into this category that is generated on a regular basis and is stored in Building 4105 are Brine Dryer Salts. The process which they are generated from (the drying of spent scrubber brine solutions) could cause the brines to contain free liquids, therefore brine dryer salts will be analyzed for free liquids as they are generated on a weekly basis.

Waste generated on an infrequent basis that will be stored in Building 4105 are those generated from the cleanup of hazardous substance spills. Contaminated soil will also be analyzed for the presence of free liquids

## Hazardous Waste Chemical Munitions

Chemical agent munitions do not become hazardous waste until reconfigured in such a way that the initial intended use (i.e. weapon of war) has changed, and the munition is not repairable. The only chemical agent munitions designated as hazardous waste are M-55 rockets. All other chemical munitions are regulated by Army policy and not considered hazardous waste.

## Facility Aisle Space Requirements

A site plan of the Chemical Agent Munitions Disposal System (CAMDS) facility can be found in Appendix B of Attachment G of this permit application. All areas of the facility are accessible via the fully paved road system. This road system is capable of permitting the unobstructed movement of personnel and the movement of fire protection, spill control, and decontamination equipment to any operating area within the facility. Facility operating procedures prohibit the obstruction of roadway areas. The Army meets the aisle space requirements in 40 CFR 264.35 at the CAMDS facility since the road system can be used for the required aisle space.

Within the buildings, all hallways are short and provide immediate access to the exit doors. Aisle space in the storage areas for drums and containers provides ample access for personnel, forklifts where applicable, fire protection equipment, and spill control equipment. In the event of a spill, the spilled material would be neutralized and the munitions in the area would be decontaminated with decontamination solution. The munitions would then be removed before the final cleanup of spill residues. In the event of a fire which involves explosives at the Munitions Holding Area (MHA), personnel would be evacuated from the MHA, and the fire would be allowed to burn out.

The following are examples of waste streams which may be stored in any of the CAMDS storage facilities:

### WASTE STREAM

Agent (GB, VX, GA, L, and Mustard)  
Explosives/Propellant  
Munitions  
Spent Decon  
Scrubber Brine  
Salts  
Ash  
HEPA Filters, Prefilters, and Charcoal Filters  
Cyclone Residue  
Contaminated Soil  
Non-Agent Related Waste  
Miscellaneous Solid Waste  
Metal Scrap  
Laboratory/Monitoring Waste  
Demister Packing/Saddles  
Miscellaneous Liquid Waste

These and other waste streams requiring storage at CAMDS are likely to contain various combinations of the following waste constituents and associated waste numbers:

- D001 (Ignitibility)
- D002 (Corrosivity)
- D003 (Reactivity)

- D004 (Arsenic)
- D005 (Barium)
- D006 (Cadmium)
- D007 (Chromium)
- D008 (Lead)
- D009 (Mercury)
- D010 (Selenium)
- D011 (Silver)
- D018 (Benzene)
- D019 (Carbon Tetrachloride)
- D022 (Chloroform)
- D030 (2,4-Dinitrotoluene)
- D035 (Methyl Ethyl Ketone)
- F001 (Solvent Listings)
- F002 (Solvent Listings)
- F003 (Solvent Listings)
- F005 (Solvent Listings)
- F999 (Residue from Demilitarization of Chemical Agent)
- P999 (Chemical Warfare Agent)

If other waste streams occur that are not covered by any of the previously listed waste stream examples, they will be evaluated for storage suitability. If found acceptable, these wastes will then be placed in approved, storage areas. Hazardous waste compatibility will be based on CAMDS knowledge of standard waste streams and Material Safety Data Sheets for any substance that becomes hazardous waste. Generation of other hazardous waste that is not characterized will be analyzed to determine compatibility. The analysis may include reactivity, pH, oxidation potential, flammability, etc.. Munitions will only be stored in the ETF, MHA and SEG/ECC1 Unpack Areas which have been designed for this purpose. Two different munition types will not normally be stored in the same area unless specific testing is required.

#### Use and Management of Containers (S01)

#### Description of Containers [40 CFR 264.171, 264.172]

Hazardous waste generated at CAMDS, and the hazardous wastes received from the Tooele Army Depot South Area that are awaiting demilitarization and disposal technology development at the CAMDS pilot plant may be stored at the ETF, MHA, MPF Area, RSA, SEG/ECC1 Unpack Area, TDI Building, and the TMF in compatible containers. Hazardous waste munitions with a listed code of P999 will be placed in specially designed and sealed containers.

The following containers or equivalents, serve as overpacks and secondary containment containers for containers with free liquids:

Single Pallet Only Rocket Transporter (SPORT). Steel box with gasketed lid; overall size approximately 100 in. long, 40 in. wide, 38 in. high

Single Round Container (SRC), for M-55 rocket. Steel cylinder with gasketed end cap or sections, overall size is approximately 6 in. diameter, 85 in. long

Propellant Charge Can, for projectiles, cartridges, and warheads. Steel cylinder with gasketed end cap, overall size varies up to approximately 10 in. diameter and 70 in. long

Salvage drum, steel drum with removable head, 49 CFR Sec. 173.3, as an overpack for non-leaking container up through 55 gallons

- Residual Storage Area (RSA) - Container storage of wastes with free liquids
- Segregator/Explosive Containment Cubicle #1 (SEG/ECC #1) - Container storage of wastes with free liquids
- Toxic Dunnage Incinerator (TDI) - Container storage of wastes with free liquids
- Toxic Maintenance Facility (TMF) - Container storage of wastes with free liquids.

### III.B. PERMITTED AND PROHIBITED WASTE IDENTIFICATION

- III.B.1. The Permittee may store the following hazardous wastes, as listed by EPA hazardous waste code, in containers at the Facility subject to the terms of this Permit:

D001, D002, D003, D004, D005, D006, D007, D008, D009, D011, D037, F001, F002, F003, F004, F005, F999, P999

- III.B.2. The Permittee is prohibited from storing hazardous waste that is not identified in Permit Condition III.B.1. Any addition of hazardous waste codes to Condition III.B.1 requires modification of the permit as specified in R315-3-15 and 40 CFR 270.42.

### III.C. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the Permittee shall transfer the hazardous waste, or the container itself, to a Department of Transportation (DOT) approved container in accordance with R315-8-9.2 as soon as possible but not later than 24 hours from the time the problem was discovered.

### III.D. COMPATIBILITY OF WASTE WITH CONTAINERS

The Permittee shall assure that the waste is compatible with the containers as required by R315-8-9.3. The types of containers to be used for storage are indicated in Attachment 12.

## MODULE IV - WASTE PILES

### IV.A. APPLICABILITY

The requirements of this module shall apply to the storage of all hazardous waste in waste piles at the Facility. The Permittee shall comply with R315-8-12 and all conditions of this Module.

- IV.A.1. The designated hazardous waste pile storage areas are listed below. Attachment 6 presents the layout of the waste pile storage areas.

#### Area 2 Storage

- Building 4104 - Storage of wastes in waste piles

#### CAMDS Storage

- Equipment Test Facility (ETF) - Storage of wastes in waste piles
- Metal Parts Furnace Area (MPF) - Storage of wastes in waste piles
- Residual Storage Area (RSA) - Storage of wastes in waste piles
- Segregator/Explosive Containment Cubicle #1 (SEG/ECC #1) - Storage of wastes in waste piles
- Toxic Dunnage Incinerator (TDI) - Storage of wastes in waste piles
- Toxic Maintenance Facility (TMF) - Storage of wastes in waste piles.

### IV.B. PERMITTED AND PROHIBITED WASTE IDENTIFICATION

- IV.B.1. The Permittee may store the following hazardous wastes, as listed by EPA hazardous waste code, in waste piles at the Facility subject to the terms of this Permit and as described below:

### AREA CAPACITY

<u>Waste Pile Designation</u>	<u>Capacity (cubic yards)</u>	<u>Description of Hazardous Waste</u>	<u>Hazardous WasteNo.</u>
Bldg. 4104	385 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Munitions Casings and Components	F999
Equipment Test Facility (ETF)	120 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999
Residual Storage Area (RSA)	50 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999
Segregator/Explosive Containment Cubicle #1 (SEG/ECC #1)	7 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999
Toxic Dunnage Incinerator (TDI)	25 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999
Metal Parts Furnace Area Building (MPF)	50 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999
Toxic Maintenance Facility (TMF)	25 yd <sup>3</sup>	Decontaminated Chemical Agent Process Equipment and Scrap Materials	F999

IV.B.2. The Permittee is prohibited from storing hazardous waste that is not identified in Permit Condition IV.B.1. Any addition of hazardous waste codes to Condition IV.B.1 requires modification of this permit as specified in R315-3-15 and 40 CFR 270.42.

### IV.C. CONDITION OF WASTE PILES

IV.C.1. The Permittee shall maintain each hazardous waste pile inside or under a structure that prevents contact with precipitation so that neither run-off nor leachate is generated.



IV.C.2. The Permittee shall not place hazardous waste with liquids or materials containing free liquids in any waste pile.

IV.C.3. The Permittee shall protect waste piles from surface water run-on.

**IV.D. SPECIAL WASTE PILE PROVISIONS FOR IGNITABLE OR REACTIVE WASTE**

The Permittee shall not place ignitable or reactive waste in waste piles unless the procedures specified R315-8-12.4 are followed.

**IV.E. COMPATIBILITY OF WASTE PILES**

The Permittee shall not place incompatible wastes, or incompatible wastes and materials in the same waste pile, unless the procedures described in R315-8-12.5 are followed.

**IV.F. MANAGEMENT OF WASTE PILES**

IV.F.1. The Permittee shall elevate all waste piles containing F999 hazardous wastes designated 3X above the floor surface to allow inspection for free liquids and leachate.

IV.F.2. The Permittee shall maintain a minimum 24-inch aisle space for each waste pile as required by R315-8-3.6.

IV.F.3. The Permittee shall not store wastes in piles higher than specified in Attachment 13.

IV.F.4. The Permittee shall not store F999 hazardous wastes designated 3X and F999 hazardous wastes designated 5X in the same waste pile.

IV.F.5. The Permittee shall attach decontamination designation tags to all F999 hazardous wastes stored in waste piles to differentiate 3X and 5X designations.

**IV.G. INSPECTION SCHEDULES AND PROCEDURES**

IV.G.1. The Permittee shall inspect each waste pile and storage area at least weekly and in accordance with the Inspection Schedule in Attachment 2 as specified in R315-8-12.3.

- IV.G.2. Each waste pile and storage area shall be inspected immediately upon completion of the loading or unloading activities.

**IV.H. RECORDKEEPING**

- IV.H.1. The Permittee shall record and maintain in the operating record for this Permit all monitoring and inspection data compiled under the requirements of this permit module. The Permittee shall maintain compliance with Condition II.F. as it provides the basis for correcting problems identified during inspections of waste piles.
- IV.H.2. The Permittee shall record the weight of waste added to or removed from each waste pile upon completion of the loading or unloading activities. The Permittee shall maintain a record of the total weight of waste stored in each waste pile in the operating record for this Permit.
- IV.H.3. The Permittee shall record and maintain in the operating record the decontamination verification monitoring results for F999 hazardous wastes designated 3X. The monitoring results shall be documented in the operating record such that it may be audited by the Executive Secretary for any hazardous waste designated 3X.
- IV.H.4. The Permittee shall record and maintain in the operating record the incinerator operating records, including operating parameters, for F999 hazardous wastes designated 5X. The monitoring results shall be documented in the operating record such that it may be audited by the Executive Secretary for any hazardous waste designated 5X.

**IV.I. CLOSURE**

At closure of the waste pile area, the Permittee shall remove all hazardous waste and hazardous waste residues from the containment system, including the waste pile and storage areas, in accordance with the procedures in the Closure Plan, Attachment 5 and as specified in R315-8-7 and R315-8-12.6.

Waste Stream Subcategories (Table 2)

Waste Stream	Waste Stream Designation Codes	Waste Stream Synonyms
M55 Rockets (Chemical Agents GB, VX), and explosives (PEP))	S64 S63	M55 VX Rocket Tube
M55 Rocket Components	S64 E36 F10 F11 F36	M55 VX M441 Rocket Tube M55 Rocket Component M67 Rocket Components M55 Resonance Rods
Decontamination Chemicals	S01 S02 S03 S04	Decon GB Decon VX Decon L Decon H
Brine Dryer Salts	S65 S18 S19 S10 S11 S12 S13 S14 S15	INC Salt LIC Brine LIC Salt Salt PAS GB Salt PAS VX Salt PAS GA Salt PAS L Salt PAS H Salt UNK
Ash (DFS/MPF/TDD)	S46 S54 S22 S53 S31 S35 S42 S49 S47 S16 S40 S36 S56	Agent Ash Bag Dust Char Ash Cryo ash Dem Pac Ash DPE Ash Dunnage Ash Elect Ash Filter Ash Incin Ash M55 Ash Rubb Ash Surogate Ash

Waste Stream Subcategories (Table 2)

Waste Stream	Waste Stream Designation Codes	Waste Stream Synonyms
HEPA Filters, Prefilters, and Charcoal Filters	S20 S57 S83 A14	Char Solid Agent Related Char Non Agent Filter Charcoal Filter (HVAC)
Whetlerite Charcoal	S21 A15 A25	IMP Char Sol Charcoal Filters (respirators) M10 Filter Cartridges
DFS Cyclone residue	S17	Ash Cyclone
Metal Scrap from DFS, MPF and TDI		
Laboratory Wastes (Monitor Support)	S24 S25 G36	541 lab SAF Lab CAMDS solid lab waste
Demisters Packing	S30	Dem Pac Sol
Micellaneous Liquid Wastes	S50 S28 S52 S27 S43 * S85 *A20 A23 A17	ADS liquid Fuel/Oil Ground Water Hydraulic Fluid Unknown Liquid Surrogate Surrogate Blend #1 Hydraulic Oil Supplecam Waste
Dunnage	S34 S84 S82 D10 G10 G20 A51	DPE Solid Dunnage Rubber TAP Rubber Clothing Cleanup Materials (leakers) Cleanup Materials (sampling) Impregnated clothing
F999 Wastes (solids)	S67 A16 E10 M18 J36	Elect Sarin Refrigerator Ton Container Valves & Plugs M18 Detector Kits Plastic Drum liners

\* Surrogates are not generally addressed as hazardous waste. This material under most conditions is reusable.

Waste Stream Subcategories (Table 2)

Waste Stream

Waste Stream  
Designation Codes

Waste Stream  
Synonyms

F999 Wastes (liquids)

A26  
C10  
A24

M8 Buffer Solution  
RTM Waste  
Diethyl Phthalate

Spent Decontamination Solutions - The spent decontamination solutions are hazardous waste by definition as a residue from the treatment of agent and will not be tested (Appendix B). Specific decon solutions of known composition and concentration are used for specific chemical agents. The user has knowledge of both the composition and concentration of the decon solution being used, and the type of agent being neutralized. In addition, chemical compounds resulting from neutralization are already known. The spent decontamination solutions contain mostly water (10:1 dilution), and at most would contain agent concentrations in the ppb range. Further characterization of this waste stream would provide no additional useful information to the operator for the proper selection of a compatible container or storage location.

Surface decontamination is accomplished with materials specifically selected for each chemical agent. For GB, a dilute solution of (eighteen percent) sodium hydroxide (NaOH) is used for decon. VX, L, GA, and mustard contamination is treated with sodium hypochlorite (NaOCl). These solutions are diluted (about ten times) immediately following application, with clear rinse water.

Decontamination of GB with NaOH produces NaF, H<sub>2</sub>O, and monosodium salt of isopropyl methyl phosphonic acid. The expected and required level of residual agent in the spent decontamination solution is less than 20 ppb of GB or GA. VX neutralized with NaOCl produces sodium o-ethyl methyl phosphonate, diisopropylamine, Na<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>CO<sub>3</sub>, NaCl, and H<sub>2</sub>O. Sodium o-ethyl methyl phosphonate has properties similar to the monosodium salt of isopropyl methyl phosphonic acid. The expected and required level of residual agent in the spent decontamination solution is less than 20 ppb of VX. The chemical neutralization of mustard with NaOCl produces Na<sub>2</sub>SO<sub>4</sub>, NaCl, CO<sub>2</sub>, and H<sub>2</sub>O. The expected and required level of residual agent in the spent decontamination solution is less than 200 ppb of mustard. The chemical neutralization of Lewisite produces NaCl and various compounds containing arsenic. The expected and required level of residual L in spent decontamination solutions is less than 2,000 ppb.

After the 10X dilution, the resulting spent decontamination solutions are neither reactive (does not evolve hazardous vapors, fumes, or gases) nor corrosive (pH is less than 12.5), although the latter could be affected by the rinse procedure. The normal rinse procedure calls for rinsing with an excess of water.

Brine Dryer Salts - Brine dryer salts are the solids remaining from the drying of scrubber brines generated from operation of the pollution abatement system of the Metal Parts Furnaces/Liquid Incinerators, Toxic Dunnage Incinerators, and Deactivation Furnaces of CAMDS and the TOCDF. In addition, brines generated from the flushing of the Liquid Incinerators at both facilities also contribute to this waste stream. Before the brine slurry is treated in the dryer, it is analyzed for the presence of the specific agent being processed, pH, and TCLP metals. This allows for the proper operation of the brine dryers.

The Brine Dryer Salts are managed as a hazardous waste in 90 day storage areas, and are shipped off-site in two 26 cubic yard, and one 20 cubic yard gondolas to a permitted hazardous waste landfill. The waste analysis parameters are reactivity (sulfide/cyanide), TCLP metals, and free liquids. Laboratory analyses for reactivity and TCLP will be performed by a Utah certified laboratory. The approximate compositions of the brine dryer salts and the pollution abatement brines are given in Appendix E.

Free liquids and species tested for by the TCLP are restricted from landfills, therefore the presence or absence of these parameters must be determined to insure proper hazardous waste

## CHARACTERIZATION OF M55 ROCKETS

The basic components of the M55 rocket (as depicted in Figures C-1 and C-2) include the burster, propellant, and chemical agent. The M55 rockets are considered reactive (D003) waste because:

- (1) The explosives and propellants are, or contain, class A explosives and are therefore reactive [40 CFR 261.23(a)(8)], and
- (2) The chemical agents they contain are considered reactive ( see figure C-3).

The composition of the explosives and propellants in the M55 rockets are presented in Table C-1. The physical and chemical characteristics of the chemical agents are presented in Table C-2. The M55 rocket identification markings are detailed in Figures C-4 and C-5.