D-1 CONTAINERS [6 CCR 1007-3 § 100.41(b)(1) and § 264 Subpart I]

There will be one permitted hazardous waste container storage unit at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) Explosive Destruction System (EDS) site, known as the Container Storage Unit (CSU). The CSU, Igloo H-1102, will be located within the fenced area of the PCAPP EDS site. A photograph depicting the CSU exterior is provided in **Attachment B-1** of this permit modification.

The CSU will be used to store overpacked munitions, Department of Transportation (DOT) cylinders,[1] and other miscellaneous items (ignition cartridges, propellant, contaminated bursters) that contain or are contaminated with mustard chemical agents (distilled sulfur mustard [HD]/mustard-T mixture [HT]) pending treatment in the EDS units. **Figure D-1-1**[2] shows an exterior schematic view of the CSU; **Figure D-1-2** shows an interior storage configuration.

The CSU is an existing earth-covered concrete storage igloo comprised of concrete and measuring approximately 25 feet wide by 80 feet long by 12 feet 9 inches high (at center point). The arched ceiling is constructed of #0 copper arch cables spaced approximately 20 feet apart. The igloo is covered with an asphalt coating, an earth fill, and a final gravel layer that stabilizes the fill. There is one metal entry door with a fire damper control arm. There are two open-air vents, one located in the entry door for air intake, the other on the roof for air exhaust.

The CSU floor slopes 1 inch every 15 feet toward the front of the igloo to drain liquids away from containment pallets used to store the munitions. For added environmental protection, the CSU concrete floor will be coated with a polyurea material. Due to maintenance concerns of the polyurea coating, the Joint Project Manager Elimination (Provisional) (JPM E (P)) will use containment spill pallets for secondary containment.

One plug will be fitted with sampling line connections that will allow personnel to monitor the interior airspace from outside the igloo.

The CSU will have an attached carbon filtration system known as the Igloo Containment System. The Igloo Containment System consists of a front filter, a rear filter, controller for the igloo door air-inlet bypass damper, and seals for the igloo door, fire dampers, and drains. The system allows the natural flow

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[1] DOT cylinders may or may not be placed in overpacks.
[2] All figures are located at the end of this section.

of air through the igloo to carry agent vapors in the event of a leak from inside the igloo, to carbon panel adsorbers, where the vapors are contained—if dampers are open. The system is equipped with a manual airflow bypass damper that is opened only if agent is detected in the igloo and a Mobile Igloo Filter (MIF) system is deployed.

Igloo Front Door Filter

The front filter unit, containing two carbon 1x2-foot adsorber panels and one 1x2-foot prefilter, will be mounted on the inside of the igloo door as shown in **Figure D-1-3.** Conservatively, based on filter performance calculations for chemical agent sarin (GB), the most volatile and toxic of the three chemical agents contained in the JPM E (P) stockpile, the adsorbers have a combined capacity to contain approximately one-half of a liter of mustard agent. Only mustard agent is stored at Pueblo Chemical Depot (PCD) and will be treated at the PCAPP EDS site. The prefilter protects the adsorbers from fine particles that may pass through the insect screen located at the inlet vent and into the filter housing.

The filter unit was designed to allow in-place testing of the adsorbers from outside the igloo with the igloo door closed. Threaded couplings welded to the door exterior provide a means to connect challenge gas injection and sampling lines. Stainless steel piping extends from the various injection and sampling locations inside the filter housing to these couplings.

The filter unit adsorbers and prefilter may be bypassed by opening a bypass damper that has been integrated into the filter housing unit. Engaging an actuator handle into a female coupler at the door exterior and rotating, causes a damper shaft to rotate, thereby opening the bypass damper. In the event a chemical release occurs inside the igloo, a mobile 1,000 cubic feet per minute (cfm) carbon filter system (MIF) is connected to the rear fire damper maintenance access door opening located in the rear stack and operated to remove volatilized agent from the igloo prior to entering to conduct remedial operations. The opened bypass damper allows makeup air to be delivered to the filter exhaust unit at a higher airflow rate than would otherwise be possible.

Igloo Rear Filter Unit

The rear filter unit is mounted on the rear stack of the igloo as shown in **Figure D-1-4**, with a rubber gasket placed between the unit and the stack. The unit contains two carbon adsorbers and one high efficiency particulate air (HEPA) filter. For the same reason provided previously for the front door filter, based on calculations, the adsorbers have a combined capacity to capture 2 liters of mustard agent.

The HEPA filter protects the adsorbers from debris that may enter the igloo and travel upward to the rear filter unit. As the rear carbon adsorbers are larger and more costly to replace than those contained in the front filter unit, a HEPA filter was integrated into the rear filter unit to provide an added level of protection to the adsorbers.

The rear filters are fully accessible and may be tested by connecting to threaded couplings located on the exterior surface of the filter housing.

D-1a Containers with Free Liquids [6 CCR 1007-3 § 264.175(a) and (b)]

Containers storing free liquids must be placed within secondary containment per 6 CCR 1007-3 § 264.175. Although both solid and liquid wastes will be stored in the CSU, the CSU will be managed as if all waste containers stored within contain liquid wastes. All waste containers will be placed on secondary containment pallets. In lieu of a secondary containment system, all waste containers, including those holding solid wastes, will be placed on secondary containment pallets. A description of the secondary containment pallet is provided in Section D-1a(3).

D-1a(1) Description of Containers [6 CCR 1007-3 § 264.171 and 264.172]

The CSU will be used to store chemical agent munitions in overpacks, DOT 3A cylinders, and other miscellaneous items contained in ammunition boxes (for example, propellant, ignition cartridges) containing mustard agent (HD/HT) pending treatment in an EDS unit. DOT cylinders may or may not be placed into overpacks. The overpacks will either be high density polyethylene (HDPE) containers known as universal munition storage containers (UMSCs) that are heat-sealed at both ends and are slightly larger than the munitions they contain or other containers approved for use at PCD. The overpacks are compatible with the munition contained within and the chemical fill contents and are a safety feature designed to add protection to the worker during handling. One munition will be contained in a single overpack, which is specifically sized for each munition. **Table D-1-1**[3] identifies the types of overpacks used for each munition type/item to be stored.

A DOT 3A cylinder is a seamless steel cylinder with a water capacity not over 1,000 pounds and a service filling pressure of at least 150 pounds per square inch gauge (psig). The cylinder is approximately

[3] All tables are located at the end of this section.

25 inches high and approximately 7 inches in diameter. The bottle neck is 1-5/8 inch in diameter. The bottle weight, with chemical agent, is approximately 64 pounds.

D-1a(2) Container Management Practices [6 CCR 1007-3 § 264.173]

Practices will be in place to ensure that the containers will always be kept closed during storage, and will not be opened, handled, or stored in a manner that may cause the containers to rupture or leak. All containers will be placed on polyethylene secondary containment pans and will be stored single stacked. The universal munition storage containers cannot be opened.

The CSU will receive wastes on a periodic basis and may store up to 300 munitions/items or DOT cylinders to ensure uninterrupted treatment. Any combination of munition, DOT cylinder, or miscellaneous item and chemical agent may be present at any time at the CSU.

Up to nine munitions or DOT cylinders may be stored on a containment pan inside the CSU. The containment pans will be single stacked within the CSU and adequate space will be provided to allow for inspection and movement of emergency equipment and personnel.

At a minimum, waste containers or pallets or area signs will be labeled with the following:

- The words “Hazardous Waste”
- Waste codes
- Nomenclature
- Accumulation start date.

The CSU will be inspected on a weekly basis; a waste inventory will be maintained; and the wastes will be tracked from receipt to treatment/destruction in an EDS unit.

An approximate 10-foot wide minimum main aisle space will be maintained inside the igloo to facilitate material handling equipment, inspections, and space for personnel to move around stacks. This main aisle will allow unrestricted movement of fire protection and decontamination equipment in case of emergencies. A 3-foot aisle space will be maintained between the igloo walls and palletized waste.

D-1a(3) Secondary Containment System Design and Operation [6 CCR 1007-3 § 264.175(a) and (b)]

D-1a(3)(a) Requirements for Base or Liner to Contain Liquids [6 CCR 1007-3 § 264.175(b)(1) and (2)]

Secondary containment will be provided by commercially available polyethylene secondary containment pans with grating (see **Figure D-1-5**). Containers will be placed atop the pan grating. Each pan has a capacity of 43 gallons.

D-1a(3)(b) Containment System Drainage [6 CCR 1007-3 § 100.41; § 264.175(b)(2) and 264.175(c)(1)]

The containers will be stored atop grated secondary containment pans, thus will not come into direct contact with any liquids that might accumulate.

D-1a(3)(c) Containment System Capacity [6 CCR 1007-3 § 264.175(b)(3)]

The containment pallets that will be used to store liquid waste containers will have sufficient capacity to contain 10 percent of the total volume of containers or the volume (100 percent) of the largest container, whichever is greater. The largest munition, a 155mm projectile, contains 11.7 pounds of mustard agent. At most there will be nine overpacked munitions on each pallet:

9×11.7 pounds = 105.3 pounds

The density of mustard agent HD is 1.2685 grams per milliliter (g/mL). The total gallons of mustard agent HD per containment pan is expressed by:

Gallons of mustard = (105.3 pounds × 453.592 grams per pound [g/lb])/(1.2685 g/mL × 3,785.412 milliliters per gallon [mL/gal]) = 9.95 gallons

10% of Total Volume = 1 gallon.

The DOT cylinder may contain up to 26 pounds of mustard agent. At most there will be nine DOT bottles on each pallet:

9×26 pounds = 234 pounds

The density of mustard agent HD is 1.2685 g/mL. The total gallons of mustard agent HD per containment pan is expressed by:

Gallons of mustard = (234 pounds × 453.592 g/lb)/(1.2685 g/mL × 3,785.412 mL/gal) = 22.1 gallons

10% of Total Volume = 2.2 gallons.

As each containment pallet has a capacity of 43 gallons, the secondary containment requirements are met. Additionally, the load-bearing capacity of the 43-gallon containment pallets is 6,000 pounds (see **Figure D-1-6**).

D-1a(3)(d) Control of Run-On [6 CCR 1007-3 § 264.175(b)(4)]

To prevent run-on from entering the CSU, the existing exterior drainage openings will be filled with concrete and sealed. Additionally, grading enables drainage to flow away from the CSU.

D-1a(3)(e) Removal of Liquids from Containment System [6 CCR 1007-3 § 264.175(b)(5)]

Any liquid material collected in a containment pallet will be removed from the pallet within 24 hours of detection. Routine inspection of the secondary containment pallets in the storage unit will aid in detecting and implementing the timely removal of any collected material. Collected liquids will be removed using absorbent pillows, socks or pads, or by a portable pump; collected contents will be placed in containers, characterized, and then stored in the PCAPP EDS site less than 90-day waste storage area pending further management.

D-1b Containers Without Free Liquids [6 CCR 1007-3 § 264.175(c)]

The CSU will be operated as a liquid waste storage unit as all waste containers (including those with solid wastes) will be placed atop secondary containment pallets. Liquids from any condensation and/or spills will be observed and removed within 24 hours of detection.

D-1c Special Requirements for Ignitable or Reactive Waste [6 CCR 1007-3 § 264.176]

The CSU will contain reactive (energetic) wastes and will be located more than 15 meters (50 feet) from the PCD property line.

D-1d Incompatible Waste Storage [6 CCR 1007-3 § 264.177(a) through (c)]

Stored containers are compatible with the waste materials contained within; and all wastes stored are compatible with each other.

D-1e Air Emission Control Equipment [6 CCR 1007-3 § 264.179]

Applicability of the Subpart CC Resource Conservation and Recovery Act (RCRA) requirements for air emission control for containers and the control measures that will be employed at the CSU is described in **Attachment D-3**, PCAPP EDS Site Subpart BB and CC Compliance Strategy.

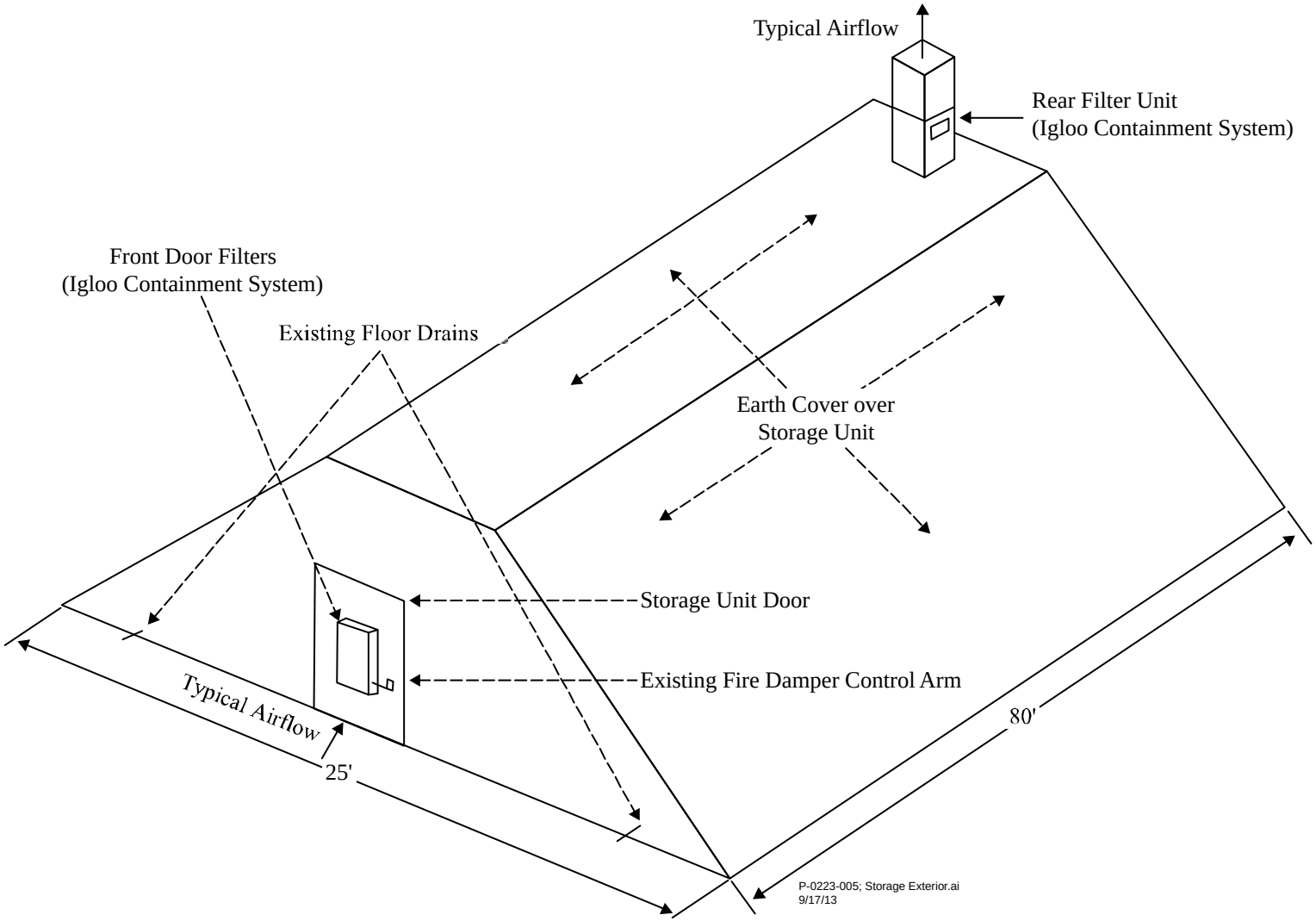

Figure D-1-1. CSU Exterior View (not to scale)

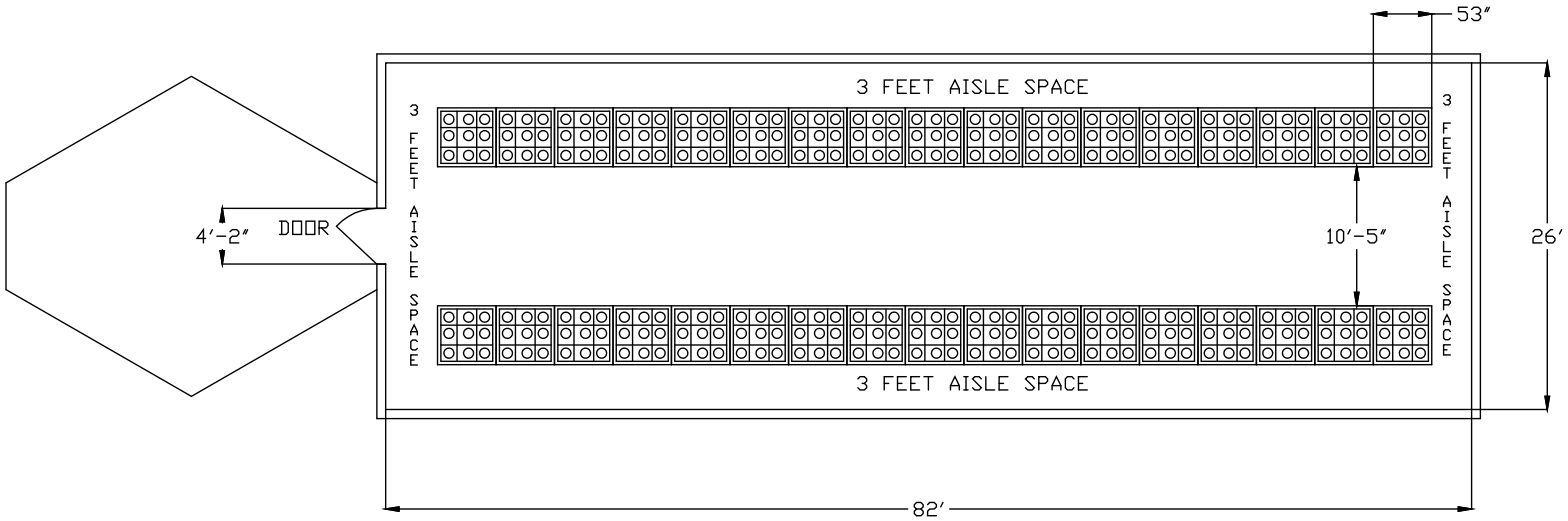

Figure D-1-2. CSU General Arrangement Example

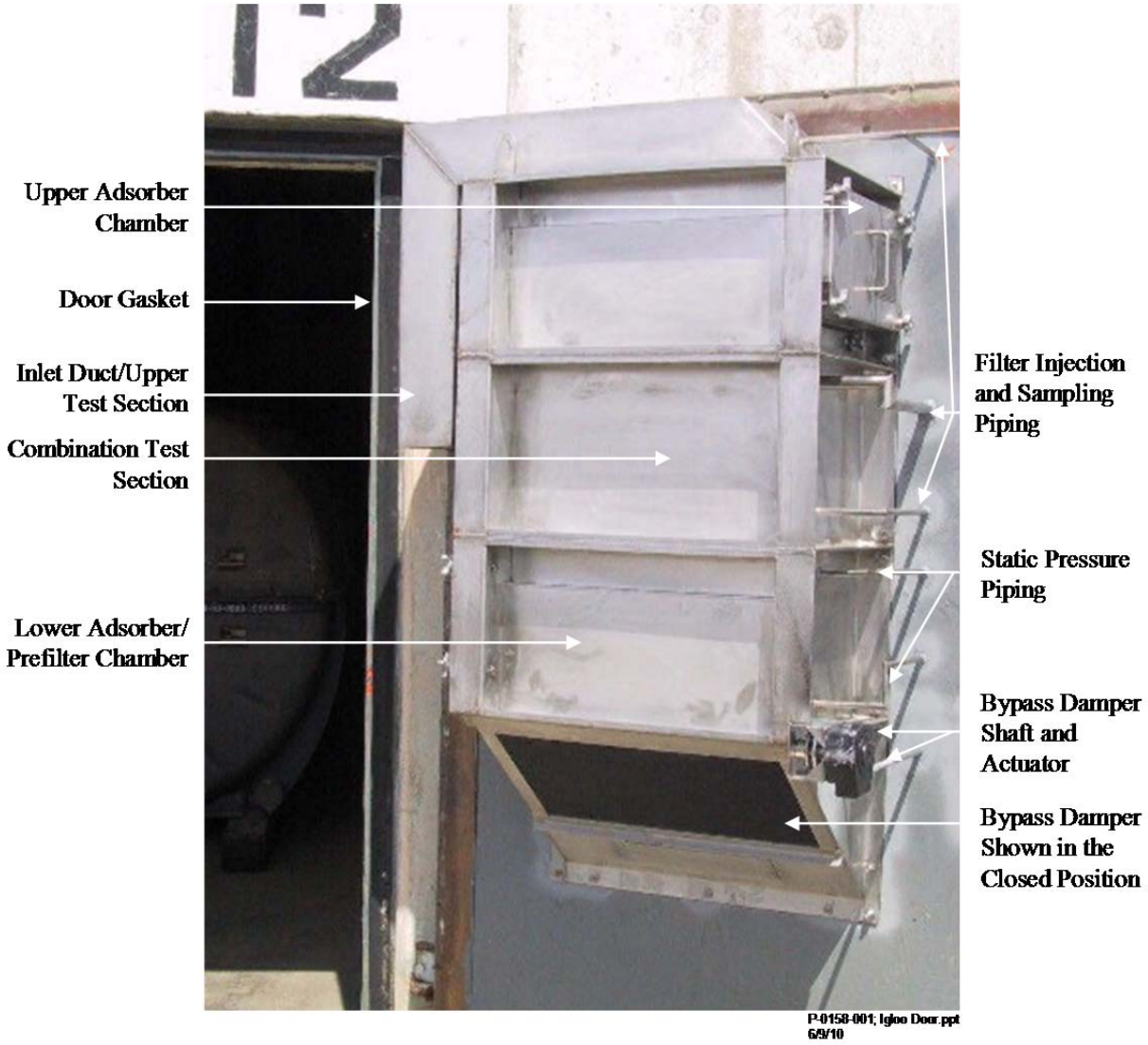

Figure D-1-3. CSU Door with Filter System Installed

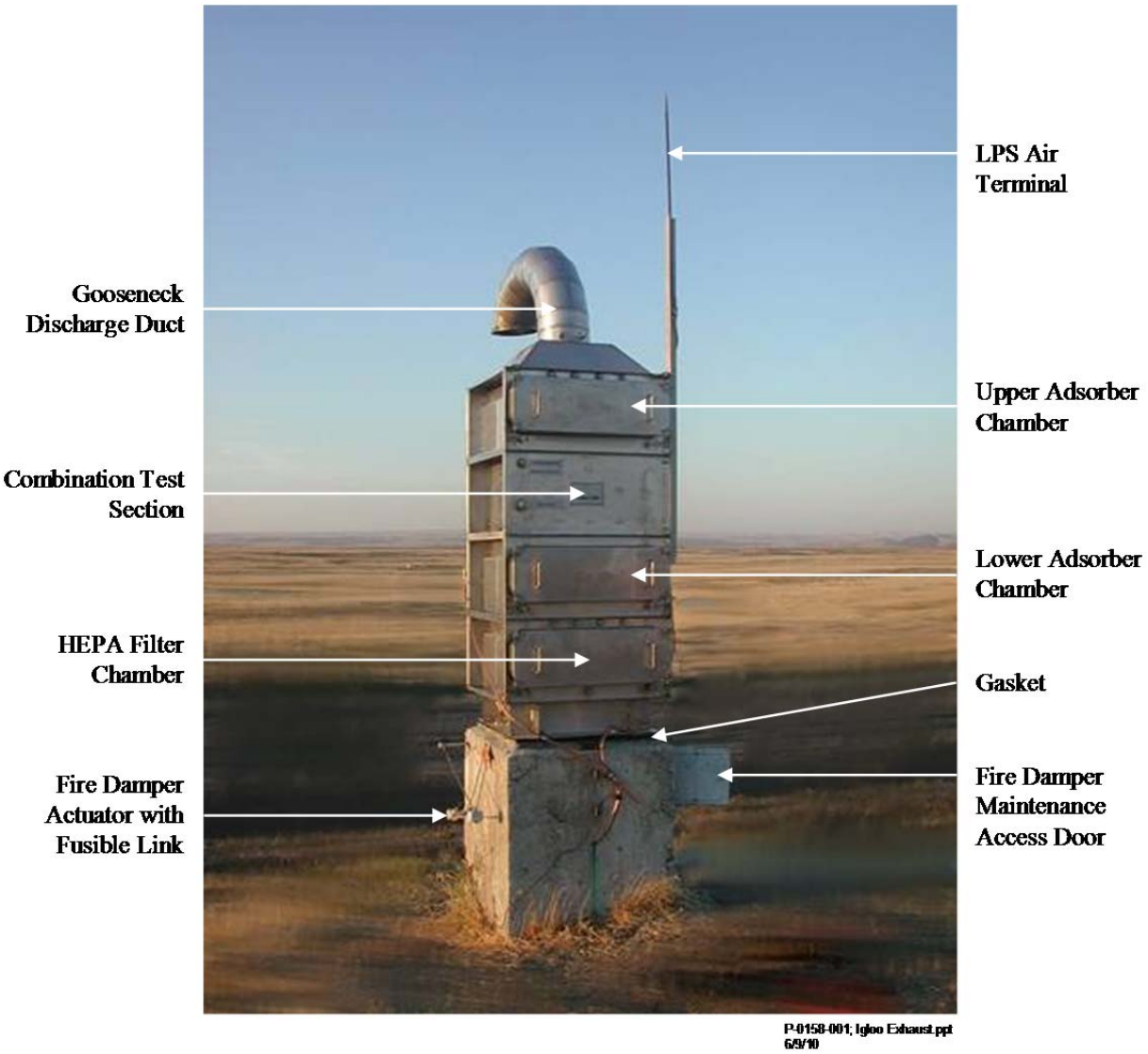

Figure D-1-4. CSU Exhaust Stack with Filter System Installed

Figure D-1-5. Example of the Secondary Containment Pallet

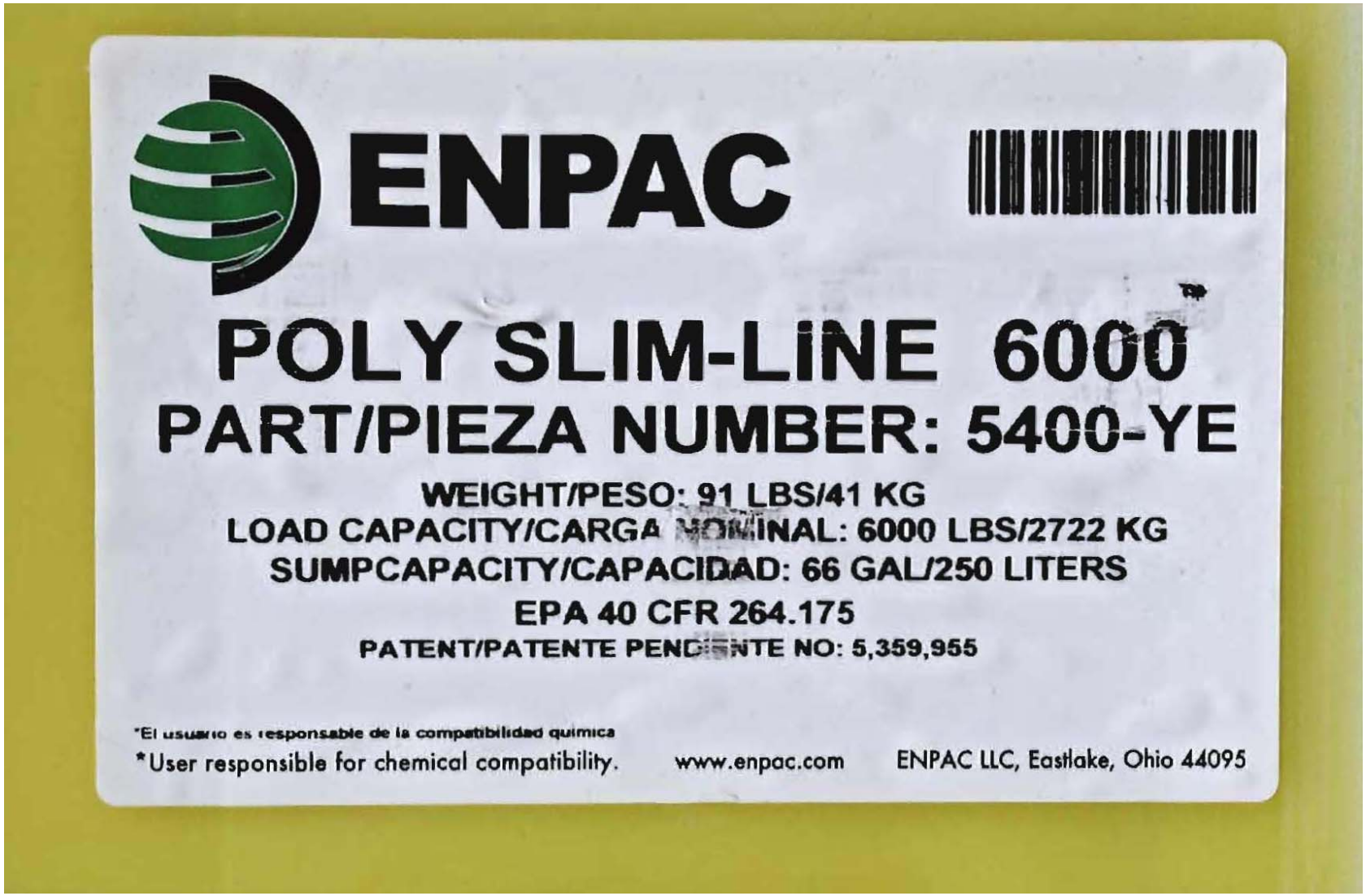

Figure D-1-6. Load Capacity of Secondary Containment Pallet

Table D-1-1. Overpack/Container Types

Item	Overpack Material/Type	Overpack/Container Dimensions
155mm Projectiles	HDPE/UMSC	8" diameter x 30" long[a]
	9x41 SRC P/N ACV00655	9" diameter x 41" long
105mm Projectiles	HDPE/UMSC	8" diameter x 34" long[a]
	Retrofit M55 SRC	5.4" diameter x 36" long
4.2-inch Mortars	HDPE/UMSC	6" diameter x 24" long[a]
	7x27 SRC P/N S727001	7" diameter x 27" long
	Retrofit M55 SRC	5.4" diameter x 36" long
DOT Cylinders 3A	N/A	Approx. 7" diameter x 25" long
Miscellaneous Items	N/A	M2A1 Ammunition Box

Notes:

[a] The length of the UMSC overpack is an approximation and may vary as a result of being field cut.

DOT = Department of Transportation
HDPE = high density polyethylene
N/A = not applicable
SRC = single round container
UMSC = universal munition storage container

D-2 TANK SYSTEMS [6 CCR 1007-3 § 100.41(b)(2) and § 264 Subpart J]

There will be no hazardous waste tank systems located at the PCAPP EDS site; therefore, this section is not applicable.

D-3 SURFACE IMPOUNDMENTS [6 CCR 1007-3 § 100.41(b)(3) and § 264 Subpart K]

There will be no surface impoundments at the PCAPP EDS site; therefore, this section is not applicable.

D-4 WASTE PILES [6 CCR 1007-3 § 100.41(b)(4) and § 264 Subpart L]

There will be no waste piles at the PCAPP EDS site; therefore, this section is not applicable.

D-5 INCINERATORS, BOILERS, OR INDUSTRIAL FURNACES [6 CCR 1007-3 § 100.41(b)(5) and § 265 Subpart O]

There will be no incinerators, boilers, or industrial furnaces at the PCAPP EDS site; therefore, this section is not applicable.

D-6 LAND TREATMENT [6 CCR 1007-3 § 100.41(b)(6) and § 264 Subpart M]

Land treatment will not be conducted at the PCAPP EDS site; therefore, this section is not applicable.

D-7 LANDFILLS [6 CCR 1007-3 § 100.41(b)(7) and § 264 Subpart N]

The PCAPP EDS site will not have a landfill; therefore, this section is not applicable.

D-8 EXPOSURE INFORMATION [6 CCR 1007-3 § 100.41(b)(8)]

The PCAPP EDS site will not have a surface impoundment or landfill; therefore, this section is not applicable.

D-9 DRIP PADS [6 CCR 1007-3 § 100.41(b)(9) and § 264 Subpart W]

The PCAPP EDS site will not have drip pads; therefore, this section is not applicable.

D-10 PROCESS VENTS [6 CCR 1007-3 § 100.41(11) and § 264 Subpart AA]

The PCAPP EDS site will not have process vents; therefore, this section is not applicable.