

APPENDIX 4-A

STORAGE OF MERCURY

- 1. Description-** Mercury, also called quicksilver, is a metal that is liquid at ordinary temperatures. It has a silvery-white color and a high luster.
 - 2. Packaging-** Mercury is packed in cast iron or steel flasks securely stoppered with a screw plug to prevent leakage. Flasks may vary considerably in size and shape but each flask normally contains 76 pounds net of mercury. Mercury may also be packaged in stainless steel, one metric ton (1,000 KG) containers.
 - 3. Marking-** Prior to receipt, each flask will be stenciled or will have a non-ferrous metal tag firmly wired to its neck showing Government contract number, lot, container number, country of origin, and the gross, tare, and net weights. Markings for drums containing mercury flasks will have country of origin, number of flasks, and net weight. Markings for containers other than flasks will be determined by DNSC-OL.
- 4. Storage**
- a. Flasks of mercury will be stored in an upright position within 30-gallon UN approved drums, or in specially designed box pallets in a dry sprinklered warehouse segregated by country of origin. Mercury should not be stored in the same section with highly combustible commodities such as rubber. A drip pan will be placed under the drums, or flasks, to contain any mercury from leaking containers.
 - b. Leaking containers should be replaced before placing in permanent storage. Should leakage occur during the life of storage, the mercury should be recovered and filtered through cheesecloth into a special flask or flasks stenciled "Mercury from Leakers" to distinguish it from that in original flasks. Note Paragraph 5, PRECAUTIONS TO BE TAKEN. Any increase in the number of flasks resulting from an accumulation of mercury from leakers, should be reported on DNSC Form 42, Receiving Report. No increase in weight should be recorded as this weight is already accounted for in the original receipts of the mercury. When leakage is detected, the Directorate of Stockpile Operations and the Directorate of Environmental Management shall be notified.
 - c. To facilitate the taking of a physical inventory at any time by count and computation the same number of flasks will be placed in each drum, or box pallet, except when an odd number of flasks do not fill up a drum or a box pallet. The pallets shall be stacked in uniform rows and height. Each pallet or drum will indicate the number of flasks contained within.

5. Precautions to be Taken

- a. Health- Elemental mercury can be taken into the body by inhaling mercury vapor, absorption through the skin, or ingestion of by mouth, and these can result in acute

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or chronic illness. Therefore, personnel in mercury storage areas must take special precautions. Follow DNSC Occupational Health Guidelines for mercury.

b. General

1. The storage site for mercury should be in an area apart from materials such as food for man or animals, products for biological use, medical supplies, clothing, or other materials, which might become contaminated.
2. Although mercury in tightly stoppered iron or steel containers does not present a health hazard to employees, mercury that has escaped into the room through leakage or spillage or has been absorbed into the floors and walls does present a hazard. Under these conditions it is possible that the concentration of mercury vapor in the air may exceed the guidelines that have been set forth in standards of good industrial practice such as Threshold Limit Values (TLV) promulgated by the American Conference of Governmental Industrial Hygienists.
3. Meticulous housekeeping procedures should be enforced to prevent the absorption of mercury into the floors and walls of the buildings and to prevent the accumulation of hazardous concentrations of mercury vapor in the storage area. Should leakage or spillage occur it shall be cleaned up immediately. Small quantities of mercury may be collected by a capillary tube attached to an aspirator bottle. Larger spills require a mercury vacuum. Care must be exercised to prevent spilled mercury from entering a water drainage system.
4. Walk through inspections, when no appreciable amount of time is spent in the mercury storage area, are not considered hazardous to personnel. If personnel are to spend any greater length of time in the area, the area must be ventilated sufficiently so that the mercury vapor concentration does not exceed the DNSC action level for mercury. Testing with a mercury vapor detector shall be done whenever there is a question about the concentration of mercury in the air. Under the direction of DNSC-E, mercury storage areas shall periodically be tested with a mercury analyzer to determine the mercury content in the air. The results of the tests will be furnished to depot officials.
5. Personnel performing repackaging, reflasking, or cleanup operations shall be provided with appropriate safety equipment and clothing, including
 - a. Half facepiece, dual cartridge respirator with NIOSH approval for mercury.
 - b. Impervious type coveralls with hoods and booties
 - c. Nitrile gloves
 - d. ANSI approved safety shoes
 - e. Safety goggles or glasses with side shields

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6. There shall be no eating, drinking, or smoking in the work area. Personnel leaving the work area should wash with hot water and soap and change clothes.
7. Caution placards shall be placed on all entryways into the mercury storage areas. As mercury is a toxic metal, firefighting personnel and others who may have occasion to enter a mercury storage area under fire conditions must be cautioned that highly toxic mercury vapor may be present. Each entrance into a mercury storage area shall be marked:

“CAUTION”
MERCURY, METALLIC
Highly toxic by skin absorption
And inhalation of fume or vapor

Reference: Occupational Health Guidelines-Mercury, Revised January 15, 1997
Page 5, paragraph 1

Environmental Inspection Plan For Mercury in Storage

The Defense National Stockpile Center (DNSC) stores 4,436 metric tons of mercury. Most of the inventory has been stored for nearly 50 years in steel flasks. For more information on sampling and testing please refer to Chapter 5-15, page 10 of 26.

1.0 Problem Definition and Background

The DNSC has recently over packed the stockpile mercury at New Haven, IN; Warren, OH; and Somerville, NJ to ensure that no mercury will be released into the environment. The new packaging configuration is six, 76-pound steel storage flasks, placed inside a 30-gallon, 16-gauge steel drums with a 6-mil plastic bag, absorbent pads on the bottom and cardboard dividers as cushioning. Five such configured drums are placed on a two-way; flush; non-reversible; 48" X 48"; group III; hard wood; four-stringer pallet. The storage of Stockpile mercury will be in a specially prepared, secured warehouse.

At room temperature mercury is a shining, mobile liquid metal, silver white in color and is slightly volatile. Liquid Mercury and mercury vapor pose a health hazard if sufficient quantities are inhaled, ingested or absorbed through the skin. After absorption, the blood carries elemental mercury to the central nervous system where it may causes damage.

2.0 Purpose of the Environmental Inspection Plan

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This Environmental Inspection Plan has been prepared to improve the inspection and reporting process for the mercury storage area and to document and support the correct storage and control measures of mercury required for the protection, safety and health of workers, the public and environment.

3.0 Environmental Protection Specialist

The duties of the Environmental Specialist are to conduct and report measurements of mercury vapors in the air and visually inspect for metallic mercury on the floor, drip pans, pallets, or drums. The inspection tag information will be completed after each inspection. The inspection report will utilize the mandatory Excel format provided on December 22, 1999. All reports will be concise, factual, and reflect the storage conditions. All reports shall be transmitted electronically to a Headquarters Environmental Protection Specialist.

4.0 Inspection Equipment Required

Direct reading mercury vapor monitor, 120 volt 500 watt quartz high intensity portable lights with an output of 16,830 lumens, and personal protective equipment such as protective clothing and a respirator with mercury filters.

5.0 Operational Procedures

The Directorate of Environment will assign a qualified Environmental Protection Specialist to perform the inspection. A Headquarters Environmental Protection Specialist will review the inspection report prior to distribution and complete a memorandum of concurrence for all corrective actions. The Director of Environment Management will review all memorandums of corrective action prior to distribution. The Headquarters Environmental Protection Specialist will electronically transmit all reports and memorandums to the respective Distribution Facility Manager, the Chief of Operations Division, and the Chief of the Environmental Management Division.

5.1 Frequency of Inspections

A normal inspection level is defined as one inspection per month. A reduced inspection will be one inspection each six months. A tightened inspection is defined as one inspection per week.

Normal inspection to reduced inspection will occur when four consecutive normal inspection cycles do not detect any visible mercury or mercury vapors at or above the DNSC action level of 0.025 mg/m^3 (25,000 nanograms/ m^3),

Tightened inspection will occur when one inspection detects visible mercury or mercury vapors in excess of 0.025 mg/m^3 (25,000 nanograms/ m^3) and will continue until any

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visible mercury is cleaned and mercury vapors are reduced to less than 0.0125 mg/m³ (12,500 nanograms/m³),

Normal inspection frequency will resume when two tightened inspection cycles do not detect visible mercury or mercury vapors in excess of 0.0125 mg/m³ (12,500 nanograms/m³).

5.2 Temperature, Barometric Pressure, and Humidity

On the day of the inspection the inspector will document the inside and outside temperature for the Depot. This information will be documented in the inspection report.

5.3 Vapor Monitoring

A direct reading mercury vapor monitor with detection limits at 0.001 mg/m³ (1,000 nanograms/m³) shall be utilized to record the levels of mercury vapors in the warehouse air. A total of four air samples will be taken in each inspection aisle, two at the breathing zone and two at the floor level. The samples will be taken at random locations in the inspection aisle. The sample shall be documented on the attachment portion of the report. If all of the samples are under 0.025 mg/m³ (25,000 nanograms/m³), DNSC action level, no action is required. If any reading is found to be above the DNSC action level, an investigation of the storage will be initiated to determine the cause. Corrective action will take place to reduce mercury vapors in the air to below the DNSC action level.

5.4 Visual Inspection

The mercury storage warehouse and storage aids will be visually inspected with the use of high intensity lights. The floor, drip pans, pallets, and drums will be thoroughly visually inspected for metallic mercury. If metallic mercury is found an investigation will be initiated to determine the cause. Corrective action will take place to remediate the visual metallic mercury and prevent future leakage.

5.5 Documentation and Records

Depots storing metallic mercury were provided an inspection-reporting format on December 22, 1999. The documentation of the inspection will be completed on the DNSC Form 30 with an attachment per the instruction page. All reports will be concise, factual, and reflect the storage conditions. All reports will be transmitted electronically to the Depot Manager, Chief of Operations and the Chief of Environmental Management Division.

5.6 Corrective Action

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The Environmental Protection Specialist will consult with the Headquarters Environmental Protection Specialist and the responsible Distribution Facility Manager to determine best corrective action. The Headquarters Environmental Protection Specialist will document the corrective action concurrence in memorandum format and follow-up on the corrective action weekly until the corrective action is completed.

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B. THIS	and Specific Warehouse location: Depot Area Open Storage Area:		
6) TITLE OF PERSON RESPONSIBLE FOR MATERIAL		7A. TEL. NO. OR CODE	7B. EXT
INSPECTION AREA (Check and complete. Explain negative responses)			YES
14	A. Storage Facilities Are of the Type Prescribed in the Storage Manual		N/A
	B. Storage Facilities Are Maintained in Good Order		N/A
15	A. Material Is Stored In the Manner Prescribed in the Storage Manual		N/A
	B. Material Is Free of Deterioration, Infestation, Contamination, Commingling, Migration and Erosion		N/A
16	A. Depot Manager Confirmed that all entries have been Posted		N/A
	B. Depot Postings are: Last RR No. Date OSR No Dated		N/A
Quantity indicated in Item 14h reflects Depot Posting and agrees with actual and/or computed count			N/A
17	SECURITY AND PROTECTION Security and Fire Protection are being provided in accordance with Quality Assurance and Materials Inspection Handbook and Storage Manual Requirements		N/A
			N/A
18	CONTAINERS, PILES AND UNITS A. Material is Stored in Proper Containers (Check only if applicable)		N/A
	B. All Containers, Piles and/or Units Are Marked as Prescribed in the Storage Manual		N/A
19	C. Condition of Containers (Give exact number in Class III under remarks)		(1) CLASS I N/A
			(2) CLASS II N/A
			(3) CLASS III N/A

14. DESCRIPTION OF CONTAINERS, PILES, OR OTHER UNITS

Type (Pile, case, ingot, bale etc.)	WIDTH c.	LENGTH d.	HEIGHT e.	DIAMETER f.	g. WEIGHT OF UNIT		TOTAL NUMBER OF UNITS h.	i. TOTAL WEIGHT	
					(1) GROSS	(2) NET		NET WEIGHT POUNDS	
b.									

5 (Review all other appropriate questions contained in "guide for the inspection of stockpiled materials and storage facilities", and if deficiencies are found, give the appropriate guide numbers and complete details in this block)

See Attached Narrative

6 RECOMMENDATIONS (Not to be construed by storage depot or facility as authorization to proceed with remedial measures beyond the scope of authority).

7) INSPECTOR (Type or Print)	→ E. DIVISION	→ DNSC-EE	→ SUPERVISORY E
	→ DEPOT MANAGER	→ STOCKPILE OP DIV	→ DNSC-EH
	→ E SPECIALIST	→	→ EWA
		18A. SIGNATURE	18 B. DATE OF SIGNATURE

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6. Average Storage factor

- a. Volume: 18 Net cubic feet per short ton
- b. Square Feet – 5.6 gross square feet per short ton

FOR ADDITIONAL INFORMATION ON THIS COMMODITY REFER TO THE SAFETY DATA MATERIAL SHEET OR THE MOST RECENT PURCHASE SPECIFICATION.