APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

1. *Description*

a. Tungsten concentrates may be received for storage in any of the following classes:

(1) Class I - High-grade

(2) Class II - High-grade with limited uses

(3) Class III - Medium-grade with limited uses

b. Each of these classes will have some or all of the following types:

(1) Type A - Ferberite

(2) Type B - Hubnerite

(3) Type C - Wolframite

(4) Type D - Natural Scheelite

(5) Type E - Synthetic Scheelite

c. Ferberite has a black color; Hubnerite ranges from reddish brown to black; Wolframite ranges from brown to black; Natural Scheelite ranges from brownish to grayish white; and Synthetic Scheelite is almost white. When acquired, tungsten concentrates shall meet Purchase Specification P-93-R2 (Current Edition).

2. *Packaging*

a. Material presently in storage may be packaged in standard steel drums (painted), hot-dip galvanized, C-1 (latest revision), steel drums, canvas or burlap bags, wooden cases and oak kegs. The steel drums may range in size from 15- to 55-gallon capacity and weigh approximately 350 to 1,500 pounds each, depending on the size of the drum. Bagged material will weigh about 100 pounds each and wooden cases about 120 pounds each. The oak kegs weigh from 75 to 520 pounds each. All containers comprising a lot should be of the same type, size and shape.

b. New tungsten concentrates probably will be received in 55 gallon capacity steel drums, hot-dip, galvanized, conforming to Defense National Stockpile Container Specification C-1 (latest revision), Drums: Steel, Hot-Dip, Galvanized. Material presently in other types or sizes of containers shall remain in present containers until otherwise authorized by the DNSC-OL.

3. *Marking*

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

a. Prior to receipt, each container will be marked with the following information:

(1) Name of Product

(2) Name of Producer

(3) Type (Ferberite, Hubnerite, etc.)

(4) Class and Type (Coded)

(5) Gross and Net Weights

(6) Government Contract Number

(7) Lot Number

(8) Drum Serial Number (e.g., 1/20, 2/20, etc).

b. The containers of earlier receipts of concentrates were marked showing the above information by means of gummed identification labels or by stenciling on the container. All new acquisitions will be marked by means of metal tags attached to the clamp ring bolt with wire (refer to Storage Instructions for Individual Commodities, Section 4, Paragraph 4-7.c, "Identification Tags for Metals"). The tag will be embossed to show the above information with a duplicate tag inside of the drum. The outside tag will also be embossed to show, "Duplicate Tag Inside Drum."

c. Identification of material shall be obtained from information shown on documents accompanying each shipment and on shipping instructions issued by the DNSC-OL. The DNSC-OL shall be notified immediately if shipments are received prior to receipt of identifying documents, if containers are received without proper identifying markings, or if the markings on the container are not in agreement with those shown on the documents and/or shipping instructions.

4. *Storage*

a. Material in standard steel drums other than C-1 (latest revision), canvas or burlap bags, wooden cases and oak kegs shall be stored in a sprinklered warehouse, shed or other structure so as to protect the containers from the weather. In climates where condensation forms on painted drums, with resultant drum deterioration, the sheds shall be closed to minimize air circulation and rapid temperature changes on drum surfaces. The DNSC-OL will specify type of closure required. Material in hot-dip, galvanized, C-1 (latest revision), steel drums will also be stored in a warehouse, shed or other structure unless storage in the open is specifically authorized by the DNSC-OL.

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

b. When storage in the open is authorized, the space utilized shall be equivalent to Type B or better, as described in Section 4 of this Storage Manual, capable of sustaining a load of not less than 2,000 pounds per square foot. Hot-dip galvanized drums may be recognized by a one-inch letter "S" in the gauge date line which is embossed in the bottom of the drums by the drum manufacturer. Drums made from electrolytically galvanized steel sheet do not carry the letter "S" and must be stored in a warehouse, shed or other suitable structure.

c. In every case, storage identity shall be maintained by class, type, contract number and lot number as indicated on each container and in shipping documents.

d. When drummed material or material in kegs is to be stored in covered space, the first tier of containers shall be placed in upright position on floor pallets after which one-inch thick, random length and width hardwood dunnage lumber shall be used between each succeeding tier. If the use of dunnage lumber between tiers is not practical because of weight of containers, or difficulty in handling, pallets may be used between tiers. Complete description of each lot shall be indicated on a card which shall be prominently displayed and securely attached to each lot. DNSC depots will use the Warehouse Materials Identification Card, DNSC Form 41, for this purpose. The forms, which are specifically designed for use with Stockpile material, will be furnished to military depots upon request.

e. When material in hot-dip, galvanized, C-1 (latest revision), steel drums is authorized for storage in the open, drums shall be stored on their side and stacked in cordwood fashion on concrete runners or concrete blocks. When stored in this manner, the joint of the locking ring holding the head on the drum should always be at the bottom. Storage aids used to keep drums stable shall be of concrete; use of cinder blocks for this purpose are prohibited. Maximum stacking height of drums stored in open space will be four drums unless otherwise directed by the DNSC-OL. Each lot should be stored so that it is readily accessible for outshipment. Lots may be stored in adjacent rows, without aisles, and a row may contain parts of two lots provided each part is readily accessible by use of overhead handling equipment. Drum storage areas should be laid out with emphasis on maximum occupancy since no rotation handling is expected. Arrangements for concrete runners or concrete blocks and other storage aids will be made by the DNSC-OL and established as a Special Project.

f. Drums may sometimes be marked only on their sides. In order to identify contents of drums stored horizontally in open space, it may be necessary for the depot to mark the required identity data on the top cover of such drums, or to attach appropriate identification tags to the clamp ring bolt, whichever is deemed most appropriate under the conditions involved and authorized under the project. Special projects will be established by the DNSC-OL for extra work involved at the depot in markings or otherwise identifying the material.

g. Whether stored in a warehouse, shed or other covered space, or in the open, drums shall be stored in uniform rows and tiers so as to facilitate the taking of an inventory at any time by counting the rows and tiers and computing the total quantity. In doing this, however, economical

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

use of space must be given full consideration and all segregation and other requirements must be met. When pallets are used for inside storage, a uniform number of drums shall be placed on each pallet, except when an odd number on the top pallet of a stack of uniform height will complete the lot.

h. Tungsten concentrates in bags will be stored in box pallets in dry warehouse space. Bagged material presently stored on flat pallets shall remain as is unless restorage is specifically authorized by the DNSC-OL.

i. To facilitate the taking of a physical inventory at any time by count and computation, the same number of bags shall be placed in each box pallet, except when an odd number of bags in the top pallet of a uniform stack will complete the lot. Therefore, the pallets shall be block stacked in uniform rows and to a uniform height. In doing this, economical use of space must be given full consideration, and segregation requirements must be met.

j. Material in boxes shall be stored on base floor pallets in uniform rows and tiers so as to facilitate the taking of an inventory at any time by physical count and computation. If pallets are used between tiers, a uniform number of boxes shall be placed on each pallet, except when an odd number on the top pallet of a uniform stack will complete the lot.

k. With regard to material in bags and boxes, a minimum clearance of twenty-four inches will be maintained between stacks and exterior walls, fire walls, fire doors and fire door openings. Maximum storage height will be sixteen feet or at least thirty-six inches below automatic sprinkler heads and overhead structural members (including lower chord and other roof truss members, beams and girders, but excluding vertical supporting columns, etc.). Individual block stacks will be limited to 3,000 square feet in floor area. A clearance of eighteen inches will be maintained between stacks and heating appliances, piping, electrical wiring and fixtures, etc. Main transportation aisles will be a minimum of ten feet in width. Clearance between stowage piles will be at least four feet, except as specific for main transportation aisles.

5. *Precautions To Be Taken*

a. *Health*. Tungsten concentrates may contain traces of radioactivity; therefore, any work concerning storage, handling or repackaging which involves known radioactive tungsten shall be accomplished in accordance with instructions issued by the DNSC-OL. Synthetic Scheelite is irritating to the skin, particularly when the skin is moist. Goggles and gloves should be worn during any repackaging operations.

b. *General*.

(1) Rough handling may cause extensive damage to the galvanized coating on the drums. When discovered, all abrasions and/or scratches shall be coated with a zinc base paint prior to placement of drums in permanent storage. Proper care shall be exercised in handling drums in

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

order to avoid damage. Upon receipt, drums should be carefully checked to insure that the lids are securely fastened.

(2) Appropriate storage personnel shall periodically inspect accessible wooden kegs, cases, burlap bags and light gauge cans of tungsten in storage. Any deficiencies or irregularities with respect to the condition of the containers shall be brought to the attention of the DNSC-OL. Conditions to be observed are unusual shrinkage of staves, excessive deterioration of hoops or bands, splitting of keg heads or staves or case boards, bursting bags, and unusual oxidation of outside surfaces of metal drums.

(3) Moist tungsten concentrates are corrosive.

6. *Average Storage Factor*

a. 3.5 square feet per short ton

Shipment Procedures For Radioactive Tungsten Ores & Concentrates
(Ship in accordance with 49 CFR 173.427)

1. CONVEYANCE AND MATERIAL

- Lots designated radioactive will be shipped as follows:

- Inspect and document that the drums are suitable for shipment. This is a separate report to be accomplished by a General Supply or Environmental Protection Specialist. The report form is included herein. Original of the report is given to the Depot Manager; the only copy is given to a Specialist who will use it as an attachment to the DLAH Form 32 Sales Shipment Report. Drums that do not pass inspection, and are likely to release materials during transit, must be repackaged.

- The drums do not have to be labeled, but the outer packaging (plastic bag or "supersack") 1) must be marked or stenciled "Radioactive-LSA" on two opposite sides and 2) must be marked with the name and address of the consignor and consignee.

- Drums must be banded and braced to prevent shifting under conditions normal to transportation.

- Conveyances must be closed van or rail car and must be exclusive use.

- Conveyance must be placarded "Radioactive 7". See 49 CFR 172.556 for details of the placard. The purchaser or his representative must placard the truck. We will placard rail car shipments.

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

2. SHIPPING PAPERS

- The purchaser will be the shipper *of record.* Though DOT regulations also identify us as an "offeror" of this material (since we have made the DOT classification determination and performed the packaging function), we still require the purchaser or his representative to sign the shipping papers.

- Specific instructions for maintenance of exclusive use must be provided to the carrier and included with shipping paper information. Bill of lading must be annotated "Specific Instructions for Exclusive Use Control Attached." This should be conveyed to the dispatcher when arranging for shipments.

- The appropriate DOT shipping information is:

Proper Shipping Name:	Radioactive material, LSA, n.o.s.
Hazard Class:	7
ID / UN Number:	UN 2912
Emergency Response Phone:	Shipper of Record's emergency phone number. MSDS and/or Emergency Response Guide 170 should be attached to the shipping paper

- The Shipper Certification Statement is to be signed by the purchaser or his agent.

- Foreign shipments of this material are not permitted since stockpile containers are presently unsuitable for this use.

3. RADIATION PROTECTION

- Depot RPO (or RSO) monitors the packages to assure that gamma radiation does not exceed 10 mR/hr at a distance of one meter (3.3 feet). If dose rates exceed this level see 49 CFR 173.441(b) for further radiation level limits. A written record of the monitoring shall be included in, or attached to, the sales shipment report.

4. CONTAMINATION CONTROL OVERPACKAGING

- For domestic shipment of these materials, repackaging in clean "strong tight" packages is the most attractive option for the DNSC. These materials, with the current packaging and pallet, will be placed inside a clean heavy gauge (6 mil) plastic bag or a "supersack." The plastic bag or supersack is then sealed and becomes the "strong tight" package described in 49 CFR 173.427(c)(1). Care must be taken during packaging to ensure that all hard points on the drums and pallets covered by the bag or supersack are padded to prevent abrasion from breaching the bag or supersack during handling and transport. The following outlines the overpacking process to produce "strong tight" packages:

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

- 1) Place a pallet on the floor.
- 2) Place cardboard padding on the pallet.
- 3) Using a forklift, pick up the pallet with drummed material.
- 4) Carefully pad all hard points like pallet corners, edges, and drum edges with cardboard cushioning material.
- 5) Slide a heavy gauge plastic bag or supersack over the pallet and drums while it is suspended on the forklift tines.
- 6) Set the bagged pallet onto the cardboard covered pallet and remove the forklift.
- 7) Seal up the plastic bag or supersack.
- 8) Band up, do not staple, the cardboard tray around the base of the bagged pallet.
- 9) Finally, band the entire bagged load to the bottom pallet taking care to pad any potential chafe points.
- 10) Mark or stencil "Radioactive-LSA" on two opposite sides of the package (49 CFR 173.427(6)(vi).
- 11) Mark package with consignee's and consignor's name and address (49 CFR 172.301(d).

DLA/DNSC SHIPMENT CERTIFICATION FOR DRUM CONTAINERS OF RADIOCTIVE LSA, N.O.S. MATERIAL

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

SALES CONTRACT NO._____ **Release No._____**

MATERIAL NAME _____

PURCHASE CONTRACT NO.(S)_____

PURCHASE LOT NO.(S)_____

TOTAL NO. DRUMS IN SHIPMENT_____

DEPOT_____

OSR Number_____ Date Issued_____

CLOSED VAN/BOX CAR NO._____

Total Shipment Wt. (Lbs.): Gross_____Net_____

This is to certify that the drums in this shipment have been visually inspected and found to be sound and tight. No holes were detected, the bung seals (if applicable) are intact and locking rings and bolts/nuts are tight. All drums in this load are suitable for transportation.

_____ _____

Signature Date

Limited Distribution: Original to DNSC Depot Manager

APPENDIX 4-A

STORAGE OF TUNGSTEN CONCENTRATES

INSTRUCTIONS FOR EXCLUSIVE USE SHIPMENT CONTROLS

The conveyance is for the sole use by a single consignor and all loading and unloading is to be executed under the direction of the consignor or consignee.

Changing or altering this conveyance in any way before this shipment reaches its destination is prohibited except for emergency situations. Similarly there should be no entry into this conveyance before it reaches its destination.

If the seal applied at point of origin has to be removed, the carrier must reseal the conveyance as soon as possible, and then must note on the bill of lading, the new seal number as well as the reason for the removal of the original seal.

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