HANDLING, SHIPPING, AND DISPOSITION OF LARGE ELECTRIC STORAGE BATTERIES, ELECTROLYTES, AND OTHER BATTERIES

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1.0 LARGE BATTERIES - GENERAL

1.01 The Operating Telephone Companies (OTCs) commonly use large wet cell lead-acid batteries to provide reserve power in network facilities. The batteries vary in size and shape. The largest weigh about 1700 pounds, and may contain several hundred gallons of electrolyte, usually sulfuric acid, although some batteries may contain alkaline solutions. Batteries are generally used in groups of 8, 12, 24, or more.

1.02 Lead-acid batteries are classified as a hazardous material due to the corrosive nature of the contained electrolyte, and certain management controls are required to assure personnel safety when working with batteries.

1.03 In service, lead-acid batteries may develop a sludge as a result of the breakdown of plates and internal components. These sludges contain small amounts of heavy metals such as lead and cadmium.

1.04 Upon disposition, because the batteries represent a potential source of environmental contamination, special control measures are necessary to assure that the hazardous and toxic materials (the electrolyte and sludges) contained in batteries are properly treated by firms who accumulate, recycle, or otherwise treat batteries.

1.05 The purpose of this practice is to provide general instructions for the safe handling of batteries and battery fluids as well as to detail regulatory requirements for shipment and disposal.

2.0 HANDLING AND PREPARING LARGE BATTERIES FOR SHIPMENT

2.01 Shipments of batteries and battery fluids, both new and used, are subject to regulations of the U.S. Department of Transportation (Title 49CFR) for handling, packing, marking, and labeling. Battery disposal activities are impacted by regulations of the U.S. Environmental Protection Agency.

2.02 Handling - It is common practice to use a strap around battery casings in order to lift the battery with a crane or hoist. Generally, this is

a suitable technique for new batteries with undamaged casings, but during several years of service, casings may become cracked or weakened and a careful inspection of each casing should be made prior to strapping and lifting. If a casing is not in good condition, fluids should be removed prior to moving the unit (refer to Section 3.01).

2.03 It has been reported that 15- or 20- year old batteries with apparently sound casings will sometimes develop cracks or leaks if left standing on a truck bed or in temporary storage after removal. This condition apparently results from stress and strain caused by lifting, and underscores the need for safety precautions.

2.04 When working with batteries or battery acid, nylon coveralls, safety goggles, rubber overshoes, rubber gloves, and rubber aprons should be worn for protection against possible contact with electrolyte or alkaline solutions.

2.05 To prevent electrolyte splashing during transit, removable type explosion-proof vents shall be replaced with a shipping plug or corks procured locally. Filling tubes shall also be plugged and terminals shall be protected against short circuits with tape, caps, or protective packaging.

3.0 PACKAGING

3.01 Damaged cells - If a cell is damaged, or if electrolyte is leaking or seeping, the electrolyte shall be extracted before further disposition. Unless specially trained OTC craft people and special corrosion resistant pumps and tools are available, it is recommended that a qualified vendor service be contracted to remove acids from damaged cells.

3.02 Defective cells - Cells that become electrically defective during the installation process should be packaged in cartons used for the shipment of the replacement cell.

3.03 Reusable cells - Cells that are being removed from a facility for reuse shall be palletized or individually packaged as outlined below (Reference pages 7 and 8):

a) When many batteries are being shipped, each battery should be protected against short circuits. Groups of batteries should be secured to each other and then to pallets with steel bands to withstand shocks normally incident to transportation. Plastic or fiber bands are not recommended for this purpose due to insufficient material strength and resistance to acids.

b) Batteries packaged in an ***individual container*** shall be completely surrounded and all voids filled with dunnage material such as newsprint or corrugated fiberboard. Terminal posts cannot come in contact with the top of the container. Each container shall be securely closed, and a minimum of one strap, plastic or steel, shall be used across the top, sides, and bottom of container.

3.04 Scrap batteries - Scrap batteries being shipped via common carrier can be palletized or individually packaged as referenced in Paragraph 3.03, or they can be shipped loose providing:

a) No other hazardous materials are transported in the same vehicle.

b) The batteries are loaded or braced so as to prevent damage and short circuits in transit.

c) Any other material loaded in the same vehicle is blocked, braced, or otherwise secured to prevent contact with or damage to the batteries.

d) The transport vehicle is carrying no material shipped by any person other than the shipper of the batteries.

4.0 MARKING

4.01 Each container or pallet-mounted unit shall be marked with the proper shipping name: "Battery, electric storage, wet filled with acid - UN2794".

4.02 Additionally, each container or unit shall be marked with the name and address of the consignee and consignor ***if*** part of the shipment

will be transferred from one motor carrier to another. If the entire truckload lot is tendered from one consignor to one consignee, individual packages do not have to be marked with names and addresses.

4.03 All markings (labels or tags) must be durable, in English and printed on or affixed to the surface of the container or palletized unit.

4.04 Marking must be displayed on a background of sharply contrasting color and must be located away from any other marking that could reduce its effectiveness.

4.05 Each container or palletized unit must be marked "THIS END UP" to indicate the upward position. Additionally, arrows indicating "THIS WAY UP" should be used (Reference page 8).

5.0 LABELING

5.01 A 4-inch square CORROSIVE label shall be applied to each container or unit near the proper shipping name marking (Reference pages 7 and 8).

6.0 PLACARDING

6.01 Shippers are responsible for providing corrosive placards to the carrier when a shipment of batteries exceeds 1,000 pounds (aggregate gross weight).

6.02 The corrosive placards must be located on both sides and both ends of the motor vehicle and must be readily visible from the direction they face.

7.0 SHIPPING PAPERS

7.01 In accordance with Title 49CFR, shipments of batteries must be accompanied by a properly filled out shipping paper.

7.02 The regulations of the U.S. Department of Transportation (DOT) require that certain information be provided in very specific order and format on shipping documents.

a) Descriptions of hazardous material must be entered before description of any non-hazardous materials in the same shipment. For batteries, the following is a proper shipping description:

"Battery, electric storage, wet, filled with acid - UN2794 - Corrosive Material".

This proper shipping description must be used exactly as stated above, printed or typed, no abbreviations allowed.

b) Quantities must be indicated in units of weight (pounds, tons) and may be placed before or after the description.

c) The U.S. DOT hazard class for batteries is "Corrosive Material".

7.03 It is important to provide shipping documents which exactly match U.S. DOT requirements and all personnel engaged in shipping batteries or any other hazardous material should ensure compliance to the most recent regulatory instructions.

8.0 BATTERIES AS HAZARDOUS WASTE

8.01 Batteries removed from service have a commercial value and every effort should be made to recover this resource of the company.

8.02 Recovery is most often achieved by disposing of batteries through a "recycler", "reclaimer", or "salvage yard", where batteries are accumulated for resale. Primary interest of recyclers is the lead plates contained in the batteries. However, it is the intent of environmental laws that hazardous materials (the acid and sludge) be properly controlled, and not become a source of environmental pollution.

8.03 Under present ***federal*** regulations supporting the Resource Conservation and Recovery Act (RCRA), battery accumulators and smelters are not required to obtain U.S. EPA identification as Treatment, Storage, or Disposal Facilities (TSDF's). This results from certain exemptions from regulation if hazardous materials are being beneficially used, reused, or legitimately recycled.

8.04 Federal guidelines are, however, minimum guidelines. The possibility of serious environmental contamination may be low due to the dispersion of hazardous materials contained in a single battery. However, when large numbers of batteries are disposed of frequently over a long period of time, the potential for pollution due to uncontrolled processes, is raised.

8.05 Several tons of batteries may originate from a single central office removal, and within any one operating area this process is frequently repeated. It is in the best interest of the OTC and its suppliers to assure that the activities of generation, transportation, storage, and disposal of batteries is done in a manner which minimizes the potential for environmental pollution.

8.06 A suitable management plan for battery disposition requires extraordinary discussions with suppliers to assure both federal and state regulatory requirements are met.

8.07 It is in the best interest of the OTC to visit the suppliers facilities to confirm that:

a) Batteries are properly handled and stored.

b) The supplier demonstrates a knowledge of applicable environmental and transportation regulations for storage and

c) The facility is maintained in a professional, well run manner.

8.08 A supplier, (accumulator or smelter), may become a generator of hazardous waste as a result of operations. In this case the supplier should be able to demonstrate that proper EPA identification has been obtained for that activity. This may include a National Pollution Discharge Elimination System (NPDES) permit or TSDF identification, as appropriate.

8.09 In some states where recycling exemptions are not allowed, batteries may be declared a hazardous waste and hence subject to full environmental regulations, including the use of generator, transporter, and disposer identification numbers and hazardous waste manifests. Special state requirements should be determined with the assistance of company environmental coordinators.

9.0 SHIPMENTS OF ELECTROLYTE

9.01 Battery electrolyte is identified by the US DOT as a hazardous material. The proper shipping name for electrolyte is: "Battery fluid, acid - UN2796 - Corrosive Material".

9.02 Battery acids must be packaged in accordance with DOT regulations (Title 49CFR). Among the options are:

1. (Preferred): US DOT Specification, 37P Steel drum with polyethelene liner (15 gallon capacity only).
2. (Acceptable): US DOT Specification 1EX glass carboy in plywood drum (5 gallon minimal capacity).

9.03 ***Marking*** - End of container must be marked with proper shipping name: "Battery fluid, acid - UN2796" and, if transported by highway and/or transferred between transporters, container must be marked with name and address of both consignee and consignor.

9.04 ***Labeling and Placarding*** - Each container should have a single CORROSIVE label placed near the proper shipping name.

9.05 ***Waste Electrolyte*** - Unless recycled, electrolyte being discarded is considered a hazardous waste. US DOT Specification 37P steel drums with polyethelene liners or 1EX glass carboys may be used for disposal. Environmental coordinators should be consulted prior to disposal. General requirements are:

a) Each container must be marked with the proper shipping name: "Waste battery fluid, acid - UN2796".

b) Corrosive placarding is required on transport vehicles (both ends and both sides) where more than 1,000 pounds of gross weight of all hazardous material is shipped from one facility.

c) Proper federal and/or state hazardous waste manifest must be prepared with the assistance of the company environmental coordinator.

9.06 ***Clean-up materials*** - Clean-up materials contaminated with electrolyte are considered a hazardous waste. The general requirements for disposal are similar to those stated in Paragraph 9.05.

a) Containers - Any non-leaking metal drums - not metal overpack - with removable head may be used for shipment (DOT Specification 17H).

b) All clean-up materials should be placed in plastic bags (standard trash bag) before placing in the drum.

c) Each container must be marked "Waste Corrosive solid, N.O.S. (Battery electrolyte in absorbent media and/or related debris) - UN1759".

d) Affix a single CORROSIVE label to containers near proper shipping name.

10.0 OTHER TYPES OF BATTERIES

10.01 Many types of batteries are used by the OTCs in addition to large lead-acid types. These range from small "button" cells used in test instruments to ordinary flashlight and larger batteries. Ordinarily, small numbers of batteries may be discarded as trash. However, since most batteries contain chemicals, some of which may be hazardous or toxic, when large numbers are discarded due to scrap activities, end of shelf life, etc., certain control measures are necessary to meet environmental protection objectives. Generally, company environmental coordinators are responsible for identifying the nearest acceptable recycler or disposal.

10.02 ***CARBON-ZINC and ALKALINE CELLS (DRY CELLS)*** - These are ordinary "flashlight" or "transistor" batteries such as AA, C, D, or 9-volt. Used cells may be disposed of as trash. Placing larger cells in a plastic bag to prevent short circuits and potential fires is recommended. The number of batteries disposed of in a single dumpster or compactor should not exceed 100.

10.03 ***NICKEL-CADMIUM CELLS (Rechargeable dry cells)*** - These cells are generally identified by labels indicating "NICKEL-CADMIUM" or "NI-CAD". Nickel and cadmium are considered an EP-TOXIC hazardous waste under EPA regulations. They should be purged from scrap, and disposed of separately in an approved facility. Special care must be used to prevent shorting of NI-CAD batteries. Cells or assemblies of cells should be individually wrapped.

10.04 ***MERCURY AND SILVER OXIDE CELLS*** - These are non-rechargeable, generally small "button" cells with a stainless steel case. These cells are considered an EP-TOXIC hazardous waste under EPA regulations if discarded. They should be purged from scrap and disposed of separately in an approved facility.

10.05 ***LITHIUM CELLS AND BATTERIES*** -

10.06 These cells have a 5-10 year shelf life and are used in emergency equipment and certain computer circuitry. Metallic lithium can represent a severe fire hazard if the cells are broken open. The cells qualify as "reactive" hazardous waste under EPA regulations. Cells should be purged from scrap and disposed of separately in an approved facility.

10.07 U.S. Department of Transportation Regulations cover the disposal of lithium batteries as follows (49CFR - 173.1015):

a) Lithium batteries, for disposal, comprised of one or more cells, may be offered for transportation to a permitted storage facility and disposal site by motor vehicle only, if the battery:

1. When new, contained not more than 2 grams of lithium per cell;
2. Is equipped with an effective means of preventing external short circuits;
3. Is classified and offered for transportation as (hazard class) OMR-C; and

4. Is overpacked in a strong fiberboard box, or metal or fiber drum which complies with Paragraph 173.20 of Title 49CFR.

b) Paragraph (a) does not apply to lithium batteries which, when new, were excepted from regulation under Paragraph 173.206 (f) of Title 49CFR.

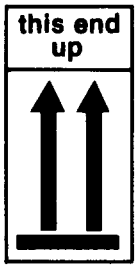
10.08 Shipments of lithium batteries for disposal are forbidden on passenger carrying aircraft or rail car and on cargo aircraft.

10.09 ***AUTOMOTIVE BATTERIES*** -

Automotive batteries commonly are replaced on a one-for-one basis as required. Most often used batteries are turned in for credit toward purchase of new units, and this appears to be the most practical means of disposal. Whenever possible, cartons or packaging from new batteries should be used for returning old. In any event, it is necessary to take normal safety precautions when handling automotive batteries and to either use replacement packaging or equivalent to prevent short circuits and spillage of electrolyte during transit.

10.10 The disposal of automotive batteries as trash should be discouraged. If large numbers of automotive batteries are collected for disposal, these batteries should be given the same management consideration as for large batteries as discussed in previous sections.

FEDERAL D.O.T. LABELS AND MARKS *



THIS END UP, MARK

1. The mark shall be white with black lettering and bottom line. The two arrows shall be in red.
2. The mark shall be durable and weather resistant.
3. Dimensions shall be 4'' x 6''. (Federal D.O.T., CFR Title 49, Part 162.312)

BATTERY FLUID, ACID, CORROSIVE MATERIAL, UN2796

OR

BATTERY FLUID, ALKALI, CORROSIVE MATERIAL, UN2797

BATTERY FLUID MARK

1. The mark shall be black with white lettering to read as shown.
2. The mark shall be durable and weather resistant.
3. Dimensions shall be 1-1/2'' x 6''. (Federal D.O.T., CFR Title 49, Part 172-101)

CORROSIVE LABEL

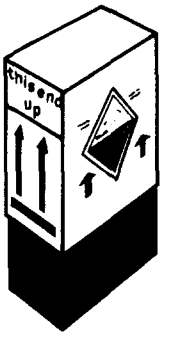
1. The Corrosive Label must be white in top half and black in lower half, the printing must be white and the symbol must be black and white as shown.
2. The label must be durable and weather resistant.
3. Label dimensions shall be 4'' x 4'' with each side having a black solid line border 1/4'' (6.3mm) from outer edge. (Federal D.O.T., CFR Title 49, Part 172.442)

* NOTE: In common usage, a mark would be something written on a package; a label would be a preprinted, adhesive backed - a stick on device. In regulatory language, a mark conveys specific information about the material in the package such as the name, or which way the package should be held. Marks may be preprinted or handwritten on a package. Labels convey a warning. Most labels indicate DOT hazard class, or indicate special restrictions. Labels have very exact specifications of size, color, and symbols.

PACKAGING INSTRUCTIONS
BATTERY, ELECTRIC STORAGE, WET, FILLED WITH ACID UN 2794
PACKAGED FOR ANY AUTHORIZED HIGHWAY TRANSPORT

INSTRUCTIONS:

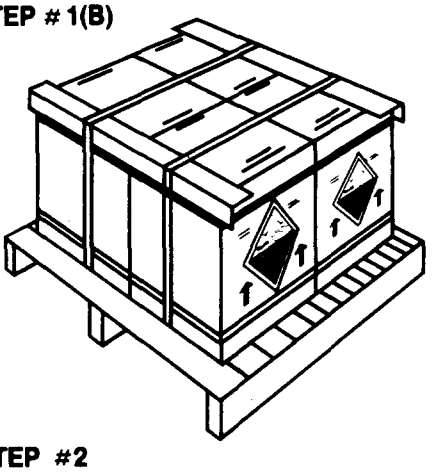
STEP # 1(A)



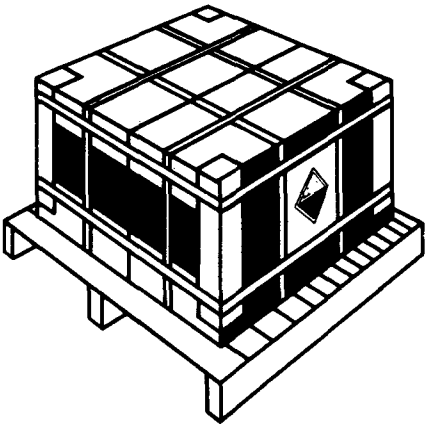
STEP # 1

1. **Using original packaging cartons, when available, package batteries as shown in STEP # 1, insert "A".**
2. **When a quantity of batteries are being transported, securely band the batteries to a pallet, as shown in STEP #1, insert "B".**
3. **Verify that all batteries are secured, fill caps secured or plugged, and loaded and banded to prevent electrical shorts.**

STEP # 1(B)



STEP #2



STEP # 2

1. **Where original cartons are not available package by banding to a pallet as shown in STEP #2.**
2. **Fill caps secured or plugged to prevent any spills.**
3. **Place a CORROSIVE label on two sides of the palletized package.**
4. **Load pallets on transport vehicle and secure pallets to prevent any movement of pallets.**
5. **Ensure that all batteries are packaged and loaded to prevent electrical shorts.**
6. **CORROSIVE PLACARDS must be used on all four sides of the transport vehicle when, 1000 pounds or more of batteries are on the vehicle.**