STORAGE BATTERY
LEAD-ACID TYPE
REQUIREMENTS AND PROCEDURES

1. GENERAL

1.001 This addendum supplements Section 157-601-701, Issue 18. Place this pink sheet ahead of Page 1 of the section.

1.002 This addendum is issued to add paragraphs 2.03.1, 2.03.2, 3.03.1, and 3.03.2 concerning identification of lead-sulfate crystals in lead-acid batteries. This addendum affects the Equipment Test List.

2. CHANGES TO SECTION

2.001 On Page 8, after paragraph 2.03, add the following paragraphs:

2.03.1 ***Identification of Crystals (Plastic Cases):*** Under normal float conditions, all cells should be free of crystals. The absence of crystals throughout the life of a battery plant indicates that the cells are floating properly and maintaining a full state of charge. Cells shall be inspected for lead-sulfate crystals as described in paragraph 3.03.1.

2.03.2 If crystals appear on all cells in a string, the following should be checked as possible causes for the abnormal condition.

(a) ***Rectifier Voltage:*** The appearance of crystals may indicate a low battery float voltage. Check to see if the battery string float voltage is correct according to Table C. Make appropriate rectifier adjustments if necessary. (See paragraph 2.02.)

(b) ***Plant Discharge:*** A battery discharge as a result of a power failure, testing, or other reasons may produce crystals on the cells. This is normal with all lead-acid cells since lead-sulfate is the material produced when a lead-acid cell is discharged. If the cause of the crystals is a recent discharge, the crystals will disappear when the cells have been fully recharged on float (usually within 2 weeks). ***It is mandatory to log all ac input power failure alarms in battery maintenance records.***

2.002 On Page 16, after paragraph 3.03, add the following paragraphs:

3.03.1 ***Identification of Crystals (Plastic Cases):*** There should be no lead-sulfate crystals or gray coloration present on the positive plates or straps when examined with a flashlight. Normally only the positive strap will be accessible for examination. In some arrangements the edges of the positive plates will also be visible (see Fig 0.1). The visible positive elements shall be black or dark brown and totally free of any diamond-like crystals or gray coloration. The disappearance of crystals normally occurs in three distinct phases:

Phase 1: Black and crystalline

Phase 2: Gray and lightly crystalline

Phase 3: Black or dark brown and crystal free.

The disappearance of crystals or gray coloration occurs from top to bottom during recharge. To insure total absence of crystals or gray coloration, where possible, inspection for crystals should be concentrated at the bottom of the positive plate. The flashlight is held close to the jar wall at an angle of approximately 45 degrees. The lead-sulfate crystals will appear as sparkling diamond-like reflecting particles or as gray coloration. Record presence or absence of crystals on battery maintenance records in place of cell voltage readings.

3.03.2 If crystals appear on one or a few cells in a string, the following actions should be taken.

(a) Check to see if a plant discharge has occurred. [See subparagraph 2.03.2(b).]

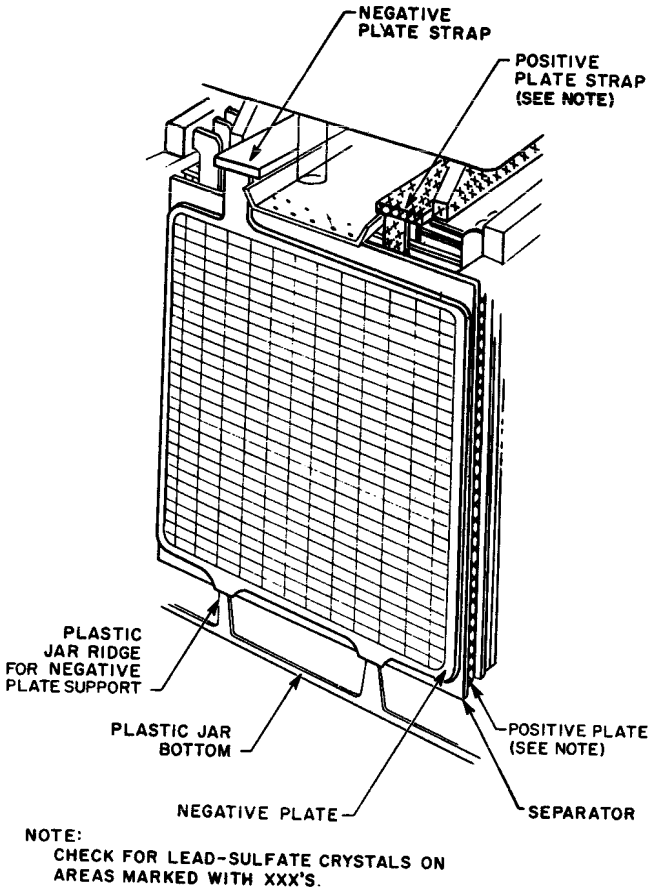

Fig. 0-1 — Schematic of Rectangular Cell Showing Possible Location of Lead-Sulfate Crystals on Positive Elements

(b) Measure the cell voltage. If the crystalline cell(s) indicates 2.09 volts or less and the cell is heavily crystalline (see paragraph 3.03.1, phase 1), the cell is shorted and should be reported in an engineering complaint.

(c) Measure temperatures of cells in each tier of string to determine the extremes of temperature differences. Temperature differences of 5°F or more between cells in a string can result in a float problem with the warmer cells which would result in the appearance of crystals. If temperature differences in excess of 5°F are found, appropriate ventilation should be provided to correct the condition.

(d) If the problem is not attributed to a shorted cell (b) or temperature variations (c), the cell(s) should be boost charged at 2.5V with a single-cell charger. The boost charge should be continued for at least 24 hours after the crystals have disappeared. Upon completion of the boost charge, the cell should be allowed to float in the string. If crystals do not reappear on float, no action need be taken. If crystals reappear, the cell(s) should be reported as an engineering complaint. Copies of the battery records should accompany the complaint.