U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

APR 20 2000

Ref. No. 00-0026

Mr. Richard L. Walters
HSC Packaging Engineer
P.O. Box 92919 Bldg.
Los Angeles, CA 90009

Dear Mr. Walters:

This is in response to your letter dated January 18, 2000, and subsequent telephone conversation with Mr. Eric Nelson of my staff regarding the classing of batteries you identified as nickel-hydrogen batteries under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

You stated that your battery uses aqueous potassium hydroxide as the electrolyte and is shipped with no free electrolyte that can spill, and contains no hydrogen. You also state that the battery is fully discharged and shorted across both terminals when in transportation and passes the vibration and pressure differential test requirements of § 173.159(d)(3). Based on the information you provided, it is the opinion of this Office that your batteries in the above configuration are not regulated by the HMR provided they are marked "NONSPILLABLE" or "NONSPILLABLE BATTERY" and are securely packaged.

I hope this satisfies your request.

Sincerely,

Delmer F. Billings
Chief, Standards Development
Office of Hazardous Materials Standards

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HUGHES
SPACE & COMMUNICATIONS
00-0026

R S P A Office of Hazardous
Materials Standards (DHM-10)
U.S. Department of Transportation
400 Seventh Street, S W.
Washington, D C 20590 – 0001

18 January, 2000

Ref. Request for written interpretive assistance 49 CFR § 107.14(b)

Please provide clarification of classification of nickel-hydrogen batteries and battery cells built by Hughes Space & Communications Co.

Electrolyte in nickel-hydrogen cells and batteries is aqueous potassium hydroxide, typically at 23 to 34 percent by weight. It is a liquid at 55° C, and there is no excess electrolyte as the cells are drained of any excess electrolyte as one of the final steps of the cell activation process.

Although the electrolyte may account for 10 to 15 percent of a cell's weight, no electrolyte would be free to flow from a cell or battery in the event of a crack or rupture. The electrolyte in the cell is mainly held in the pores of the positive electrodes and separators due to capillary action and surface tension.

Cell (casing) construction is in accordance with MIL-STD-1522 (see attachment) titled "Standard General Requirements for Operation of Pressure Missile and Space Systems", which exceeds the vibration test and pressure differential test requirements of 49 CFR § 173.159 (d)(3)

Cells and batteries are typically shipped and stored in a fully discharged and shorted condition, so short-circuiting during transportation would not be an issue, and there would be no internal pressure during transit.

Fully charged cells would contain hydrogen gas with internal pressure of up to 900 psig.

Cells or batteries are protected from short one or more of the following:
(a) Cell design whereby cell terminals are physically located on opposite ends of the cell.
(b) Battery design whereby all exposed cell terminals and power harnesses are covered with conformal coating and/or some form of electrical insulation.
(c) Fitted caps for battery power connectors.
(d) Packaging which protects the cells or batteries from damage, including from short circuit.

Sincerely,

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