Managing Lithium Sulfur Dioxide Batteries

FACT SHEET 37-033-1010

BACKGROUND: A number of used or unserviceable batteries meet the characteristic of reactivity under 40 CFR 261.23 and must be managed as hazardous waste (HW) or universal waste (UW). The Department of Defense (DOD) uses lithium sulfur dioxide (Li-SO_2) batteries in a variety of communications equipment. Most of these batteries contain a complete discharge device (CDD) that when activated, discharges the battery for safer packaging, transportation, and disposal. An extensive study conducted on various Li-SO_2 batteries by the U.S. Army Communications-Electronics Command (CECOM) shows that Li-SO_2 batteries discharged through the use of a CDD to a voltage of one volt per cell or less are unlikely to be reactive under plausible management conditions.[1]

CURRENT SITUATION: In a June 8, 2006, letter to Ms. Kamely, Acting Deputy Assistant Secretary of the Army, Installations and Environment, the EPA agreed that fully discharged (e.g., 1 volt or less) Li-SO_2 batteries are unlikely to exhibit the characteristic of reactivity. This only applies to the specific types of batteries tested by CECOM, notably multi-cell Li-SO_2 batteries. The BA-5590B/U configuration was chosen for testing as this represents the Li-SO_2 battery with the highest energy level. Batteries having a different chemical composition, design, or containing cells that are not fully discharged must be evaluated for HW characteristics. Table 1 provides a listing of the Li-SO_2 batteries containing 1 volt or less after discharge.

The EPA has not relieved the DOD of the land disposal restrictions (LDR) program requirements (40 CFR 268.9) which requires a generator of characteristic HW to determine any underlying hazardous constituents reasonably expected to be present at levels above the Universal Treatment Standards (UTS) ***at the point of generation***. Waste may not be land disposed unless UTS levels are below the regulatory limits. Data shows that Li-SO_2 batteries are expected to exceed the UTS level for acetonitrile of 38 mg/kg.[2]

BATTERY MANAGEMENT: Based on the June 8, 2006 EPA letter, DOD Li-SO_2 battery generators may activate the CDD device to discharge batteries. When the batteries listed in Table 1 are discharged to a voltage of one volt or less per cell in a series string they are not a HW for the characteristic of reactivity. However, discharged Li-SO_2 batteries remain a HW for acetonitrile and cannot be disposed as a solid waste until treated at an approved facility. One option for treatment is recycling; contact the installation environmental office for more information.

It is Army policy to discharge the batteries through the use of the CDD device and manage them as UW. Batteries may only be discharged at a UW collection point (location officially designated for the management of UW), a 90 or 180-day HW storage area, or a permitted Treatment, Storage, and Disposal Facility (TSDF) by trained personnel. Discharging the batteries at the point of generation is not allowed. See Table 2 for used or unserviceable Li-SO_2 battery management options. Batteries that are damaged or leaking may not be discharged and must be managed as HW IAW 40 CFR 261.

U.S. Army Public Health Command (Provisional)
Hazardous and Medical Waste
Aberdeen Proving Ground, MD 21010-5403
Commercial (410) 436-3651/DSN 584-3651

- Return unserviceable batteries to a central collection point on the installation to determine if the batteries can be reissued or disposed.

- If the batteries cannot be reissued, they must be taken to a UW collection point or a 90/180-day HW storage area for discharge.

- Activate the batteries' CDD in accordance with CECOM TB 43-0134, "Battery Disposition and Disposal" guidelines. ***Only trained personnel may activate the CDD!***

- Once batteries have reached a voltage of one volt per cell or less, manage them as UW IAW 40 CFR 273.

Table 1. Li-SO_2 Batteries Containing One Volt or Less After Discharge.

Type or Part No..	Final Battery Disposition
BA-5093, BA-5112, BA-5557, BA-5588, BA-5590B/U, BA-5590, BA-5598, BA-5599, BA-5600, BA-5800	manage as UW after complete discharge
BA-5567	no CDD required, contains < 0.5 g Li, manage as UW

Data provided by U.S. Army CECOM, Directorate for Safety, www.monmouth.army.mil/CELCMC/

Table 2. Management of Used or Unserviceable Li-SO_2 Batteries.

RCRA Storage Area	Treatment Option	Final Battery Disposition
satellite accumulation point, work station, shop area, etc.	CDD activation not allowed	transfer to a TSDF, 90/180 day or UW storage area
UW collection point	CDD activation permitted on intact batteries	manage as UW after complete discharge
90 or 180-day HW storage area	CDD activation permitted on intact batteries	manage as UW after complete discharge
TSDF	CDD activation permitted on intact batteries	manage as UW after complete discharge

[1] Lithium-Sulfur Dioxide Batteries Technical Report Reactivity, Klimek, Philip D,. US Army CECOM, Directorate for Safety, AMSEL-SF-SI, November 2004.
[2] Refer to CECOM Material Safety Data Sheet of $LiSO_2$ batteries, which lists acetonitrile as being ~5-6% of the item by weight.