

**United States Department of Agriculture  
Forest Service  
Office of Safety and Occupational Health  
Safety Alert**

**No. 2004-02**

**April 28, 2004**

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**Subject:** Fire Hazard associated with storage of MRE (Meals, Ready-to-Eat)

**Area of Concern:** Wildland Fire Food Cache Storage Areas

**Distribution:** Warehouse/Cache and Safety Managers

**Discussion:** This alert concerns fire/explosion hazards associated with MRES (Meal, Ready-to-Eat) and specifically, the food heating device found in hot meal packets - referred to as FRH (Flameless Ration Heater). The FRH is a food heating device developed by using hypercorrosion of a magnesium-iron alloy. The FRH, developed by BaseTech, is currently packaged with every MRE.

If the MRE's are exposed to fire and the magnesium powder ignites, a class D fire will occur -- exhibiting sparking and flare up if sprayed with water. In the event that the plastic pouch containing the FRH melts, the introduction of water to the magnesium-iron compound can cause the production of hydrogen (up to a maximum of a 1/3 cu. ft. per pad). If the hydrogen that is produced is allowed to accumulate in a confined space there is a potential for fire intensification and a risk of an explosion.

#### **Special Fire Fighting Precautions**

In the early phase of a fire, when only the cardboard and the plastic are involved, the fire can be fought with conventional suppression agents intended for class A fires. This requires very early detection and suppression of the fire *before* the involvement of magnesium or the production of significant amounts of hydrogen. If the addition of a fire fighting agent intensifies the reaction (which suggests magnesium has become involved), fire fighting operation with water should be stopped immediately. If the FRH continues to smoke or sizzle after the flames are out, hydrogen is being produced, and respiratory hazards may likely be evident. The addition of water, if indoors, should be stopped since it can increase hydrogen generation. If the magnesium becomes involved, neither foam nor water should be used due to possible fire flare up. FRHs should be allowed to burn to completion, when/where safely possible.

#### **Precautions to be taken in Handling and Storage**

FOLLOW THE INSTRUCTIONS carefully. Use the heating element to heat the food, return the unused heating element to the Cache Manager and/or immediate supervisor for proper disposal (identified below).

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**Warehouses with large quantities of FRH pallets in storage should heed these precautions:**

1. Protection against physical damage of the cases.
2. Protection from water in any form, including leaks, snow, rain, or flooding. Damaged cases should be handled with particular care since they are more vulnerable to activation by water.
3. Protection against sources of ignition.
4. Early fire suppression which is essential to prevent the formation of a difficult to suppress magnesium fire. This also prevents breaching the integrity of the plastic pouches that protect the FRH from activation by fire fighting water.
5. Equipment for fighting Class A and Class D fires should be available.
6. Proper ventilation should be provided so that hydrogen will not build-up to an explosive concentration.
7. Training of the local fire service in fighting combined Class A and Class D FRH fires.
8. Complete burn-out of the fire should be planned for if early suppression is unsuccessful.

Locations where moderate quantities of FRHs are stored (such as one or two pallets in a distribution center) should ensure the same protective measures as for large quantities, except that complete burn-out may be replaced by safe movement of the pallet outdoors. If ignition of FRH occurs, numbers 1-3 above should be followed during transportation. In the event of fire, the material should be off-loaded to the outdoors and allowed to burn-out. Appropriate warning labels should be placed on the exterior of the case and should be visible when cases are stacked on a pallet regardless of case orientation.

**Disposal Instructions:**

Although the Material Safety Data Sheet stipulates that MRE packages may be disposed of as solid waste, it should be noted that this is only in the event that the packages are in tact. "Used" MRE heaters, which have been activated to heat a meal, are not considered as a hazardous waste by the Environmental Protection Agency (EPA). Once the heater is reacted with water at the end of the heating cycle, all that remains are inert substances with no adverse impact on human health or the environment. "Used" MRE heaters may be thrown away in the regular garbage.

"Unused" MRE heaters on the other hand are considered by the EPA as a hazardous waste. Organizations which utilize MRE's must establish procedures to ensure that "unused" heaters which have been removed from a food packet, are not disposed of in the regular trash and are collected by supervisory personnel or CACHE managers and stored for later disposal or reuse as an MRE heater.

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"Unused" heaters, which have been removed from the food packet and not used as intended by the packet manufacturer, are considered by the EPA to be a RCRA D003 reactive hazardous waste. There are five management options with "unused" MRE heater packets:

1. Recycle the heaters through the Defense Re-use and Marketing Office (DRMO) or other qualified recycling program.
2. Return heaters to the manufacturer.
3. Dispose of them as hazardous waste through your hazardous waste disposal contract in a permitted facility.
4. Activate the "unused" heater in water as instructed by the manufacturers' instructions and dispose of the (now) "used" heater as ordinary garbage. This process of activating the "unused" heater with water to facilitate disposal as garbage is subject to the RCRA law. This process which ensures the material is inert, will meet the "DEACT" standard stipulated in 40 CFR 268.48 Universal Treatment Standards, prior to land disposal
5. Collect and store the "Unused" heaters for re-use as an MRE heating agent. CAUTION "unused" heaters which have been removed from a food packet and have been identified for re-use with MRE meals, must be STORED as a water reactive flammable solid and transported as Water-reactive solid, self heating, n.o.s. Class 4.3 UN3135 and placarded as "Dangerous when wet".

**IMPORTANT REGULATORY NOTE:** Collecting and storing "unused" MRE heaters when the real intent is found not to be, reuse as an MRE heater, is a violation of Federal law. (See US EPA letter May 20, 1999 EPA Review of the classification and disposal of unused Flameless Ration Heaters for the Army's Meals Ready to Eat (MRE) in the context of the Resource Conservation and Recovery Act (RCRA)).

**Point of Contact:**

Questions should be directed to your local/regional Hazardous Materials Coordinator; Gary Hoshide, (406)329-1029 ([ghoshide@fs.fed.us](mailto:ghoshide@fs.fed.us)), Frank Mills, R4 Hazardous Material Coordinator (801) 625-5794 ([fmills@fs.fed.us](mailto:fmills@fs.fed.us)); or Allison Good, WO Safety Manager, (202) 205-2934 ([agood@fs.fed.us](mailto:agood@fs.fed.us)).