

**PLAN OF ACTION**  
**TO ADDRESS BATTERY SAFETY CONCERNS**  
U.S. Department of Transportation and Stakeholders  
March 15, 2007

On February 22, 2007, the Pipeline and Hazardous Materials Safety Administration (PHMSA) hosted a meeting of public and private sector stakeholders who share our concern with the safe transportation of batteries and battery powered devices. The meeting included representatives of the National Transportation Safety Board (NTSB), the Federal Aviation Administration (FAA), the National Highway Traffic Safety Administration (NHTSA), battery and electronics manufacturers, the Air Transport Association (ATA), the Air Line Pilots Association (ALPA), and emergency responders. We came together to discuss recent incidents involving batteries in transportation and came away with a multi-faceted strategy for reducing the likelihood of incidents occurring on passenger aircraft.

The action plan outlined at the meeting and memorialized here reflects an approach we call “Enterprise Government” – bringing together public and private sector stakeholders on all sides of an issue to identify and advance governmental and private sector solutions. Together we identified a series of immediate and longer-term actions that participants in this enterprise are taking or will take to enhance safety. These actions will include comprehensive reporting and investigation of battery-related incidents; improved battery, consumer product, and software design; development and implementation of a technical standards agenda; consideration and implementation of improved regulatory standards; focused enforcement; and development and implementation of a public outreach and education campaign. Through an integrated and cooperative approach, we can be most successful in reducing incidents, enhancing safety, and protecting the public. Other parties that wish to participate and can contribute to the enterprise are invited and encouraged to do so.

**The Safety Problem**

Since 1991, PHMSA and FAA have received approximately 75 reports of transportation incidents involving various kinds of batteries and battery-powered devices. These reports, along with information about battery-related incidents outside of transportation and product recalls and warnings, have raised concerns about the potential for device- and battery-related fires aboard aircraft. Participants in the February 22 meeting acknowledged that the data on device and battery incidents is incomplete. Underreporting of incidents, destruction of physical evidence, and inadequate investigation of incidents all have left us with incomplete information about the actual performance of batteries and battery-powered devices in transportation.

Although we acknowledged that further investigation is needed, the participants in the February 22 meeting identified a number of factors that have contributed to battery incidents:

- Increased number and types of batteries in transportation;
- Increased energy density in batteries;
- Short-circuiting of batteries due to improper protection or packaging;
- Inadvertent activation and overheating of equipment;
- Battery manufacturing defects, design, and quality assurance issues;
- Device design, manufacturing, and quality assurance issues;
- Lack of public awareness of safe handling precautions; and
- Non-compliance with DOT regulations and undeclared shipments.
- Counterfeit batteries.

### **Immediate Actions**

1. PHMSA will ***publish a safety advisory*** and a press release, followed by a passenger friendly brochure, informing the public of methods for properly handling and packing batteries and battery-powered equipment to minimize fire hazards. We anticipate publishing this Safety Advisory and rolling out the public outreach campaign by March --, 2007.
2. The Air Line Pilots Association, International (ALPA) will ***issue an advisory*** to pilots in conjunction with the PHMSA safety advisory.
3. The Air Transport Association (ATA) will assist in communication ***of the safety advisory message*** and work with the airlines to identify effective means to get the message out (e.g. through airline web sites). ATA will assist PHMSA in communicating with the Airport Operators to identify other means for disseminating the safety message.
4. PHMSA and FAA will ***coordinate their public affairs message*** and media response to get the safety message out to the traveling public.
5. The Portable Rechargeable Battery Association (PRBA), National Electrical Manufacturers Association (NEMA), ATA, and The National Association of State Fire Marshals (NASFM) will ***identify public and industry groups that can assist in disseminating the safety message***.
6. PRBA will ***provide a status of all ongoing standards activities*** with identified objectives as they relate to safety identified.
7. PHMSA and other meeting enterprise participants ***will request media assistance*** in disseminating the safety message and educating passengers.

8. PHMSA will ***work with a broad group of stakeholders***, including airlines, pilots, battery and electronic device manufacturers and emergency responders to develop public outreach materials aimed at reducing the risk of battery incidents;
9. Participants in the enterprise will ***identify and make initial contact with consensus standards bodies and testing organizations*** to seek support for broader adoption and compliance with current standards and enhancing safety standards for manufacturing quality measures, fail-safe designs and effective hazard communication and packaging;
10. Enterprise participants will ***work with manufacturers and NASFM*** to identify effective voluntary practices that can be implemented to enhance safety immediately;
11. PHMSA will ***expedite final action in its two open rulemaking proceedings involving lithium batteries***: HM-224C, concerning enhanced design testing, hazard communication, and packaging requirements for lithium metal and lithium ion batteries transported by air, and HM-224E, in which we banned the transportation of primary lithium (metal) batteries as cargo aboard passenger aircraft.
12. PHMSA will initiate ***a rulemaking proceeding to develop further standards for the safe transportation of all types of batteries*** and equipment containing batteries or energy storage and supply sources. Before issuing a notice of proposed rulemaking, PHMSA will host a public meeting to explore regulatory options and needs. Options to be explored in the meeting will include, but are not limited to, (1) clarifying short-circuit protection methods; (2) mandating reporting of all battery incidents; and (3) strengthening packaging and hazard communication requirements.
13. PHMSA and FAA will ***expand our enforcement focus*** to identify and take corrective action against persons that are not compliant with current safety regulations.
14. PHMSA, FAA and NTSB will ***continue to evaluate the root cause*** of the Jet Blue incident including acquiring the batteries and having them tested. As part of this review PHMSA will work with industry experts.
15. PHMSA and FAA will ***expand accident investigation efforts*** and work with industry experts to better assess data, determine root causes of battery incidents, and develop corrective measures.
16. FAA will ***summarize efforts to address prohibitions to charging batteries*** aboard aircraft and determine whether current FAA technical standards for onboard charging are adequate.

17. PHMSA will *participate in the upcoming international battery safety conference* that will be held from March 19-22, 2007 in Fort Lauderdale, FL and other safety forums to raise awareness and partner with other stakeholders to enhance safety.
18. FAA will *distribute its in flight fire response safety brochure* to the group.

## Ongoing Actions

### **Investigation of the Cause of Incidents and Determination of Appropriate Actions**

- PHMSA, FAA and NTSB will continue monitoring incidents; *maintain and update the FAA incident list*; review all incidents to date; summarize the probable causes of these incidents; and evaluate whether planned actions adequately target probable causes of past incidents.
- PHMSA will coordinate with NASFM, the International Association of Fire Chiefs (IAFC), the International Association of Fire Fighters (IAFF), FAA, NTSB, the Consumer Product Safety Commission (CPSC), law enforcement and others to *preserve evidence* following incidents to enhance the ability to conduct root cause analysis.
- PHMSA, PRBA, NEMA and NASFM will *convene a meeting of technical experts* to examine potential root causes of device and battery-related fires and to meet with consensus standard organizations to determine the adequacy of current standards and what steps can be taken for broader adoption and compliance by May 30<sup>th</sup>.
- Underwriters Laboratories Inc. (UL) will work closely with US Customs and Border Protection personnel to provide them with information needed to distinguish between authentic and counterfeit UL marks and investigate field reports of incidents associated with Listed or Recognized lithium-ion batteries.
- PHMSA and FAA will continue coordination with NASFM, IAFC and IAFF to *share information on incidents*. We will work with these organizations to assist with outreach and applying an enterprise approach to reducing incidents, identifying root cause and enhancing regulatory requirements and compliance.

### **Design standards review and development of enhanced consensus standards**

- PHMSA, PRBA, NEMA, CPSC and NASFM will *work with consensus standards bodies and testing organizations* to enhance safety standards with respect to manufacturing quality measures, fail-safe designs and effective hazard communication and packaging and support broader adoption and compliance.

- PRBA and NEMA will work with PHMSA and other stakeholders on developing tools that can effectively address battery counterfeiting.
- Enterprise participants will *share information* on product recalls including effectiveness of retrieving recalled units.

### **Regulatory Initiatives**

- PHMSA will use its position as United States delegate to the United Nations Subcommittee of Experts on the Transport of Dangerous Goods (*UN Subcommittee*) and the International Civil Aviation Organization (ICAO) Dangerous Goods Panel to promote international standards that enhance the safety of batteries in transportation.
- PHMSA will *commence a rulemaking* proceeding to consider adoption into the Hazardous Materials Regulations the recent revisions to the lithium battery standards in the UN Recommendations on the Transport of Dangerous Goods, Model Regulations and the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air. These revisions (1) require individual packaging of lithium cells or batteries; (2) require protection against short circuiting and accidental activation of lithium battery-powered equipment; (3) eliminate the current exception from marking, documentation, drop testing, and gross mass limit for packages containing fewer than 24 lithium cells or 12 batteries; (4) standardize marking requirements for SP 188; and (5) prohibit the transport of damaged lithium batteries aboard aircraft that have the potential of producing a dangerous evolution of heat, fire, or short circuit (e.g., those being returned to the manufacturer for safety reasons).

### **Public Service Campaign for Aircraft Passengers, Consumers and Infrequent Shippers**

- PRBA, NEMA, FAA, PHMSA, ATA, UL and National Highway Traffic Safety Administration (NHTSA) will *work collaboratively to develop a sustained safety message* and public outreach campaign.
- DOT will work with the Transportation Security Administration (TSA) to *identify and implement measures that can be taken at security check points and baggage screening operations* to address the safety problem.

### **Response to Battery Fires Aboard Aircraft (Emergency Procedures)**

- ATA will *work with airline safety officers* to assess flight crew training relative to battery safety and emergency response. (ongoing)

- PHMSA, ALPA and the International Federation of Air Line Pilots Associations (IFALPA) will work collectively to *enhance the awareness of pilots* and crew members to response procedures relevant to battery incidents aboard aircraft. The advisory will be sent to approximately 100,000 airline pilots worldwide, and to flight safety departments for coordination with flight attendant safety organizations.

### **Enforcement**

- PHMSA and FAA will continue with the *development of joint enforcement protocols* and a risk based approach to assessing compliance.