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Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation
Washington, DC 20590

Submitted electronically to www.regulations.gov

Re: Docket No. PHMSA–2009–0095 (HM–224F)
RIN 2137–AE44

Dear Dr. El-Sibaie,

Thank you for the opportunity to provide the following comments in response to the Notice of Proposed Rulemaking (NPRM), *Hazardous Materials: Transportation of Lithium Batteries*, published in the January 11, 2010 *Federal Register*. The comments are submitted on behalf of the Dry Battery Section of the National Electrical Manufacturers Association (NEMA), which represents U.S. manufacturers of lithium metal batteries, and on behalf of industrial and electrical equipment manufacturers across several electroindustry sectors represented by NEMA, including but not limited to arc welding, industrial automation, utility equipment, and medical equipment.

NEMA is the association of electrical and medical imaging equipment manufacturers. Founded in 1926 and headquartered near Washington, D.C., its approximately 450 member companies, over 70% of which are small and medium companies, manufacture products used in the generation, transmission and distribution, control, and end use of electricity. These products are used in utility, industrial, commercial, institutional, and residential applications. The association's Medical Imaging & Technology Alliance (MITA) Division represents manufacturers of cutting-edge medical diagnostic imaging equipment including MRI, CT, x-ray, and ultrasound products. Worldwide sales of NEMA-scope products exceed $120 billion. In addition to its headquarters in Rosslyn, Virginia, NEMA also has offices in Beijing and Mexico City.

Key Points

In summary, most of the proposals contained in the NPRM would place a significant and undue burden on multiple U.S. industries without measurably improving safety of pilots, crew, passengers and cargo on aircraft over and above that resulting from the existing requirements contained in the International Civil Aviation Organization's (ICAO) *Technical Instructions for the Safe Transport of Dangerous Goods By Air* and the United Nations *Recommendations on the Transport of Dangerous Goods - Model Regulations*. Moving the U.S. Hazardous Materials

Regulations for lithium batteries and products that contain or are packed with lithium batteries further away from the requirements agreed at the international level will merely increase confusion, will not increase compliance, and has the potential to result in greater instances of non-compliance and reduced levels of safety.

Most of PHMSA's proposals in the NPRM rely on conjectures, assumptions, inadequate technical work and testing, and a flawed cost-benefit analysis. Procedural and analytical requirements from Executive Order 12866 and guidance of the Office of Management and Budget have not been adhered to.

Summary of NEMA Safety Activities

NEMA and its member companies are committed to safe transportation of their products and take measures that go beyond regulatory requirements to ensure safety and customer satisfaction.

For example, in 2003, following the battery incident at Los Angeles International Airport involving a pallet of lithium metal batteries that received extremely abusive handling, NEMA lithium battery companies in coordination with PRBA and the Battery Association of Japan (BAJ), adopted the VTCP (Voluntary Transportation Communication Program) to, among other things, increase outer packaging durability, use a shipment caution label, and increase documentation for shipping channels. The VTCP also recommended quarantine and inspection of damaged shipments before they could be transported. These measures were eventually adopted by PHMSA as part of the current regulations. This incident is cited in the current NPRM, but the NPRM makes no mention of industry voluntary measures or that PHMSA made regulatory changes to adopt these practices.

In an earlier but similar example of leadership, NEMA's Power Electronics Section launched in 2001 a voluntary program under which after December 31, 2004 participating companies' uninterruptible power systems (UPS) units and battery cabinets containing internal batteries have been shipped with the batteries disconnected and with precautionary package labeling.

More recently, NEMA was an active participant in multi-industry and multi-stakeholder cooperative efforts with PHMSA in 2007 and 2008 to develop and promote the SafeTravel website (SafeTravel.dot.gov) and other measures to better ensure battery safety in transportation.

In addition, NEMA member companies are leading contributors in U.S. and international standards development committees that cover batteries and battery-using devices, including those of the American National Standards Institute (ANSI) and the International Electrotechnical Commission (IEC).

With regard to the proposals presented on January 11, 2010, NEMA has devoted considerable resources – in a very compressed timeframe due to PHMSA's denial of our request for an extension of the 60-day comment period – in order to contribute to the technical basis for rational and effective regulation of lithium batteries in transportation. Our findings are discussed in detail in the comments and attachment below. We commend these findings and discussion to PHMSA

and the Federal Aviation Administration (FAA) for serious and lengthy consideration as the agencies contemplate next steps.

Safety Incidents Involving Lithium Batteries

In the NPRM, PHMSA states,

> *Most of the recent lithium battery incidents have been determined to originate from packages in non-compliant shipments of lithium batteries.*

As NEMA has previously communicated to PHMSA on several occasions, greater enforcement of the current regulations, and PHMSA coordination with industry and its international partner government agencies, would go much further in eliminating the confusion and lack of training that PHMSA and FAA "believe" is to blame for non-compliance. Moreover, harmonization of U.S. regulations with the current ICAO and UN model regulations would be the most effective, when coupled with compliance outreach and enforcement of the regulations.

Consolidate and Simplify Regulations

NEMA supports PHMSA efforts to consolidate current and revised lithium battery requirements into one section of the HMR. Consolidation would reduce confusion among those who must be aware of the regulations in order to achieve full compliance with them. Small and infrequent shippers would be more likely to achieve compliance if the applicable regulations are available in one easily-referenced location and harmonized with the international regulations. Links to this location should be posted prominently on internet distributor websites.

Evidence Preservation

PHMSA proposes,

> *to require a shipper, carrier, package owner or person reporting an incident under the provisions of §§ 171.15 or 171.16 to provide upon request, by an authorized representative of the Federal, State or local government agency, reasonable assistance in investigating the damaged package or article, if available.*

NEMA supports this proposal. If such a requirement had been in place earlier, more information on and analysis of the FAA-cited battery transportation incidents might be available. Companies who have submitted information on products through the PHMSA online reporting system have been told by PHMSA staff that insufficient agency resources are available to investigate.

Defective or Damaged Batteries

In the NPRM, PHMSA proposes to limit transportation of damaged or defective batteries to highway or rail transport only.

NEMA is generally supportive of requirements that limit transportation of such units. However, we oppose the overly broad characterization of returned/defective batteries and the unnecessary impact on product which may be defective from a performance standpoint but safe in all other means. We recommend that PHMSA regulations be harmonized with the international wording/terminology for such a proposal, which states that "lithium batteries defective for safety reasons…or producing…heat, fire, or short circuit are forbidden for transport [on aircraft]." Lithium batteries that may be considered "damaged" or "defective" by scratches on the outer casing, incorrect markings, etc., are still safe to ship by aircraft.

Specifically, transport of units that are defective for safety reasons should be restricted to surface modes, including maritime cargo vessel. The cargo vessel option is necessary to enable returns from overseas if the air mode is not available. Failure to allow a mode that will enable returns from overseas will be counterproductive, since it will prevent battery companies from fully investigating and analyzing product defects or failures.

Harmonization with International Regulations

In the NPRM, PHMSA states,

> *[The] current exception-based system [for lithium batteries] has created a set of regulations that is not easily understood or enforced…This…adds to the difficulty of ensuring compliance.*

We agree that the regulator bears a significant responsibility and duty to make its regulations understandable to those who are required to comply – and that the regulator must ensure that full compliance with the regulations is possible.

The fact remains that the exception-based system is based on the internationally agreed approach to mitigate risk in a cost-effective manner. This is preferable to the blunt instrument of over-regulation now being considered. U.S. hazardous materials regulations in this area should be consistent with worldwide accepted standards. The proposed regulations will make it very burdensome and costly to ship lithium batteries in and out of the U.S. The additional costs to comply may drive customers that are outside the U.S. to find non-U.S. suppliers in order to avoid the increased costs incurred due to additional testing, packaging, labeling, and shipping requirements that would go above and beyond those associated with the international regulations.

Mandatory Retention and Availability of Testing Records

NEMA does not oppose this proposal. Any reputable business should have these records readily available at a corporate level even without this proposal, albeit for a specified timeframe.

Design Type Testing

PHMSA proposes to require complete retesting of a cell or battery if any change is made to the design that results in a more than a 5 percent change in mass to the anode or cathode.

PHMSA fails to provide any technical justification or safety argument to support such a change. PHMSA simply states that a change of 20 percent is "too high." No evidence has been provided that links the existing 20-percent rule to any cited incidents. We are unable to find any references by PHMSA citing any examples where the proposed change would have prevented an incident. This proposal appears to be solely punitive and have no technical basis. It would increase the number of battery designs subject to testing at a substantial cost. PHMSA failed to factor in this additional cost in their cost-benefit analysis.

In addition, such a requirement would not be harmonized with 5th Revised Edition of UN Manual of Tests and Criteria. It would require retesting of cells and batteries currently on the market because DOT failed to provide grandfather clause and would result in immediate disruption of millions of shipments of cells, batteries and equipment. This proposal would violate and World Trade Organization's Agreement on Technical Barriers to Trade. A testing requirement, along with a short compliance deadline, could impact the ability to ship lithium batteries for life-saving medical devices and equipment.

Any proposed changes to design type testing requirements should first be addressed by the experts currently participating in the UN working group on lithium batteries. The next working group meeting is scheduled for May 2010. PHMSA staff are already full participants in these meetings.

PHMSA should give time for recent changes to U.S. regulations to require UN testing of lithium cells and batteries – a requirement that took effect only in October 2009 – to take effect and focus on working with U.S. Customs to ensure sure lithium cells and batteries transported into the U.S. comply with this requirement.

PHMSA states, without documentary support:

> *[W]e remain uncertain that all manufacturers or battery assemblers take such steps or are even aware of the need to test each battery design type.*

This statement further validates our comment that PHMSA should focus on compliance and enforcement of existing regulations and not develop and impose new regulations at this time. However, by its own admission, PHMSA does not have sufficient resources today to enforce current regulations.

Internal Short Circuit Test

Members of NEMA are involved at the UN and IEC level, with PHMSA and other Competent Authority participation, on development of an appropriate internal short circuit test. NEMA supports the ongoing work and argues that it is premature to comment on the test at this time in the context of the NPRM.

However, we still raise the question of the applicability for such a test for lithium primary batteries. At the cell level, this test is not relevant due to the different chemistry and design of lithium primary batteries. An internal short within a lithium primary cell could result in an accelerated discharge of the stored energy, but does not initiate the recently publicized but rare "thermal runaway" scenario.

Cell/Battery Marking Proposal

PHMSA requests comment on the feasibility of a "UN" quality mark on a cell or battery. NEMA opposes this proposal since it will raise costs without any safety benefit for cells, batteries or devices in transportation. As with other quality certification marks, the "UN" quality mark could be counterfeited. In addition, most batteries installed in equipment are not visibly available for inspection. It could also be confused with the UN specification mark which used for packaging. An etched laser mark to a lithium battery used in an implanted medical device may require FDA review and approval which is a long and expensive process. Finally, there is little space available on small cells and batteries for such a mark. If PHMSA moves forward to develop a proposal, it it should contain an exception for small batteries that do not have sufficient space on the outer case to house such a mark.

If PHMSA decides to proceed with a proposal for a quality mark, PHMSA should make that proposal available for further comment prior to any adoption.

Elimination of Exceptions for Small Lithium Batteries

In the NPRM, PHMSA states,

> *Once lithium batteries are fully regulated, enforcement agencies will be able to take appropriate action against non-compliant shipments, reducing the number of non-compliant packages and therefore, reducing the number of lithium battery incidents*

What exactly has prevented PHMSA from enforcing its regulations to date? PHMSA could easily find lithium batteries for sale that do not pass the existing UN T-Tests and that are being shipped in violation of existing regulations. On March 9, 2010, a simple "Lithium Batteries" search on a popular internet auction website identified 14,272 listings of lithium batteries for sale. Purchasing from this or other similar websites and simple testing by PHMSA would go a long way in reducing the number of poor quality batteries in the U.S.

We reject the rationale that because PHMSA has been unable to manage and enforce its own regulations that it is justified in imposing additional regulations.

NEMA opposes PHMSA's refusal to adopt the ICAO exceptions now in place in the rest of the world to allow small quantities of lithium metal batteries to travel by cargo aircraft when packaged and labeled in accordance with the regulations. While we still disagree with the need for this requirement, we are not asking for PHMSA to remove the current U.S. ban on the shipment of lithium metal batteries on passenger aircraft. NEMA also opposes PHMSA's

determination to require devices containing or packed with lithium batteries to travel by air only as fully regulated Class 9 hazardous materials. As discussed elsewhere in these comments, implementation of this proposal – regardless of timeline – would have a major deleterious impact on commerce for all devices that rely on lithium batteries. Such a rule would have disproportionate implications for many sectors and users.

PHMSA states:

> *The proposals outlined in this NPRM have the net effect of moving a discrete number of shipments of lithium cells and batteries that are currently handled as general cargo into the hazardous material transport system.*

This statement is deceptive and inaccurate, since this provision would bring in any device containing or packed with a lithium battery above the proposed "0.3 grams/3.7 watt-hours" threshold. The number of these shipments may be discrete in that they are quantifiable, but PHMSA has made no genuine attempt to do that. PHMSA has demonstrated a poor understanding of the value chain for batteries and for many battery-containing devices.

Specifically, there appears to be a misunderstanding within PHMSA that every battery-containing shipment only moves once, from source to end customer. This is not the case; a battery or battery-containing device usually makes several journeys using more than one mode of transportation as it moves through commerce from its origin to the final consumer. Shipment of equipment for service, repair or replacement also multiplies the number of trips. PHMSA fails to account for this not only in its cost analysis but also the substance of the proposed regulations.

PHMSA also ignores that many product types are already subject to safety regulation by other federal agencies, most prominently by the Food and Drug Administration (FDA).

Several speakers at the March 5 public hearing (including AdvaMed, Boston Scientific and Medtronic) discussed this matter and highlighted the stringent FDA safety controls that are required for implantable medical devices such as pacemakers (which contain a lithium metal battery, chosen for its long-life and safe operation in high temperatures). These controls ensure that the battery is safe, because the product cannot be permitted to threaten the health of the patient intended to be protected by the device.

Many medical devices used outside the human body for monitoring, treatment, imaging and therapy also contain multiple lithium "button cell" batteries on their printed circuit boards. These devices contain as many as 12 batteries of various sizes. Products include defibrillators, patient monitoring, respiratory equipment, and imaging systems using ultrasound, magnetic resonance, x-ray, nuclear medicine and computed tomography systems.

Products used in the workplace are also already regulated for safety by the Occupational Safety and Health Administration (OSHA) of the Department of Labor.

In addition, PHMSA has provided no technical documentation to provide a basis for the "less than 0.3 grams/3.7 watt-hours" threshold for exceptions for small batteries packed with or contained in equipment. As stated in the preamble, PHMSA believes these batteries "do not pose an unreasonable risk in transport". PHMSA also appears to state that the exception is based on its interest in "reduc[ing] compliance costs and facilitat[ing] multimodal transportation without sacrificing safety."

Unfortunately, for many handheld device product lines, the proposed threshold falls somewhere in the middle, thus dividing a product line into two groups; each with separate transportation requirements. This situation simply adds to the logistical complications, something PHMSA indicates in this section that it is trying to avoid. While the proposal's intention to reduce compliance costs without reducing safety are laudable, this exception illustrates the importance achieving these objectives through harmonization with the global approach to air transportation. The ICAO Technical Instructions (Section II of Packing Instructions 965-970) address this issue by providing an exception for a wider class of battery products (i.e., <1 gram/cell lithium content and <20 Wh/cell) that imposes reasonable packaging requirements over whole product lines of handheld devices. The consistent requirements across a product line, as well as the consistency within a global application, would reduce compliance costs and eliminate complexity and potential confusion without sacrificing safety.

In addition, PHMSA's seemingly arbitrary threshold (<0.3 grams) would provide a loophole for types of batteries that have low quantities of lithium metal but have been involved in FAA-cited transportation incidents due to other factors (lack of UN testing, packaging), based on information FAA and PHMSA have shared with the public.

Again, PHMSA lacks a clear and well-founded rationale to move forward with provisions that are not harmonized with the international model regulations.

Moreover, PHMSA states:

> *[T]he [proposed] requirement to identify and package lithium batteries as Class 9 materials provides significant safety benefits without imposing large additional costs on air carriers.*

We oppose the first part of the previous statement and disagree with the second part. The statement of "significant safety benefits" is undocumented and unproven and unfortunately any cost increases will be borne by the consumer.

NEMA strongly recommends that PHMSA and its regulatory partners take sufficient time to recognize the additional protection from short circuit or other malfunction that equipment and additional packaging provide to lithium batteries. PHMSA should exempt equipment and devices containing or packed with lithium batteries from full regulation under Class 9.

PHMSA states:

> *A requirement for small lithium batteries and cells to be transported as Class 9 materials will have significant safety benefits that will more than offset any additional transportation costs that may result. PHMSA invites comments on the impacts associated with elimination of existing regulatory exceptions and the risk reduction benefits associated with eliminating the exceptions.*

On the contrary, we see issues with the lack of harmonization with the international regulations and removal of the exceptions. U.S. regulations that are different from international regulations will result in confusion for entities shipping products into the U.S. or forwarding products from the U.S. We ask that PHMSA document the basis for the assumption that any safety benefits will accrue.

From our perspective, an emergency situation on an aircraft that could in theory involve a lithium battery or device – whether or not Class 9 packaged and labeled – would result in exactly the same pilot actions as any other.

Packaging and Stowage for Air Transport

PHMSA offers several proposals to minimize the risk of external short circuit and resulting incidents. However, there is nothing offered by PHMSA that justifies these proposed changes or demonstrates such changes would improve safety.

Prevention of external short circuits is already covered by the existing U.S. regulations and has been addressed recently at the international level. At the same time, in an attempt to justify its proposals to the uninformed reader, PHMSA relies ineffectively on two example incidents.

The first incident – "that involved a shipment of 120,000 lithium metal batteries contained in small packages" – occurred in April 1999 at Los Angeles International Airport, was the result of egregious mishandling, and has been addressed by PHMSA through changes to mandatory requirements preceded by voluntary industry action, as discussed previously in these comments. No incidents involving bulk shipments of lithium metal batteries have been reported since 1999. The newly proposed regulations would add no further safety benefit.

The second incident cited, "involving lithium metal batteries contained in personal disposable vaporizers", would not be addressed at all by the proposed requirements and, in fact, the batteries involved in this incident would be exempt from the proposed regulations as they contain less than 0.3 grams of lithium. It is also not clear from any PHMSA documents that these batteries passed the existing UN T-tests. It is known that the manufacturer of these batteries only had "Technician Replaceable" UL Recognition on other batteries which are clearly consumer batteries.

NEMA opposes the proposals to limit stowage of lithium battery shipments to restricted areas of the aircraft or require fireproof containers since they will severely limit commerce without

addressing safety issues that have been identified. PHMSA and FAA are well aware that no such FAA-approved containers exist at the present time. FAA has not announced any plans to develop or approve such a container. In addition, very few cargo aircraft have crew accessible stowage locations and fire suppression systems are generally not present on cargo aircraft.

Independent Pilots Association member Jess Grigg stated at the March 5 public hearing on the NPRM that cargo aircraft need better fire detection and active fire suppression to better ensure pilot safety in the event of a fire in flight.

In addition, we oppose imposing any restrictions on the number of packages that can be shipped. If a package is properly packaged and labeled in compliance with the current regulations it should be allowed to ship without any further restrictions. In the NPRM, PHMSA solicited additional ideas in this area. NEMA is ready and willing to work with PHMSA on this issue. Nevertheless, enforcement of current regulations is paramount.

Regarding the proposed requirement for waterproof packaging, PHMSA should proactively harmonize U.S. regulations with the changes made to the ICAO TIs by the Dangerous Goods Panel (DGP) in October 2009. Specifically, as part of an agreement to clarify the packing instructions for lithium batteries, the requirement for waterproof packaging was removed without opposition from the U.S. delegation to the DGP meeting. Water – even full immersion of a lithium metal battery – will not impact safety in any way. In fact, the battery will just slowly discharge.

Labeling for Air and Ground

Existing international labeling requirements combined with those being proposed will cause confusion in multi-modal as well as cross-border ground transport. As noted previously, PHMSA shows a lack of understanding of distribution systems for batteries and products containing batteries. The reality is that products are shipped and received multiple times and can travel on several different modes on its journey. Products also frequently cross international borders along their way. Thus, international model regulations were developed to make sure commerce is not slowed unnecessarily while a common level of safety and risk management/mitigation is achieved.

Under the proposals contained in the NPRM, a shipment containing lithium metal batteries coming from Canada into the U.S. would be labeled differently depending on whether it was to travel by air or by ground. Similarly, if the shipment was heading in the other direction, from the U.S. to Canada by air, the package would be required to display the “Cargo Aircraft Only” label. Once the shipment lands in Canada, however, the Cargo Aircraft only label would need to be covered or removed – incurring a labor cost – so that the shipment could fly on cargo or passenger or mixed aircraft for the rest of its journey outside the U.S.

Impact on International Trade

PHSMA is in error in its determination that the proposed rule, if finalized, would not create unnecessary obstacles to the foreign commerce of the United States. PHMSA appears to rely on the false reasoning that all air shipments of lithium batteries entering the U.S. would have to meet the same requirements.

NEMA is pleased that the U.S. enquiry point for the World Trade Organization's Agreement on Technical Barriers to Trade (TBT) posted a notice of the NPRM, but disappointed that it was posted only on February 22 (more than a month after the NPRM's publication in the Federal Register and less than a month before the March 12 deadline for comments).

Moreover, PHMSA appears to have given little recognition to the TBT Agreement, which addresses the issue of international standards. Specifically, the Agreement provides that where relevant international standards exist, a WTO member state adopting a technical regulation or standard should use the international standard as the basis for the technical regulation. A country may diverge from the international standard only if the international standard would be "ineffective or inappropriate". In this case, PHMSA has not met that burden of proof.

Finally, PHMSA should take the engagement of U.S. trade agencies as further confirmation of the significance of the NPRM in posing barriers to U.S. foreign commerce. Specifically, officials of the Office of the U.S. Trade Representative and U.S. Customs and Border Protection attended the March 5 public hearing.

Accelerated Compliance

PHMSA states:

> *We are seeking comments as to the feasibility and practicability of…requiring compliance with the provisions of the final rule no later than 75 days after its publication in the Federal Register*.

In summary, assuming PHMSA moves forward with all of its proposals, a 75-day compliance deadline is unfeasible, unworkable, and impossible. To better achieve its own objectives, for any final rule PHMSA should revert to previous practice and allow 18-24 months for compliance. Given PHMSA's resource challenges in enforcing its current regulations, we would expect that PHMSA would also need a significantly longer period than 75 days in order to prepare itself to implement and enforce a new rule.

As stated by OMB in 2007 guidance to federal agencies,

> *the cost of a regulation may vary substantially with different compliance dates....a regulation that provides sufficient lead time is likely to achieve its goals at a much lower overall cost than a regulation that is effective immediately.*[1]

Accelerated compliance in 75 days is not feasible due to the presence of products already in commerce today that would be affected by the final rule but unable to comply. There is no proposal from PHMSA to grandfather products that are already manufactured or in commerce before a compliance date. To enable compliance with any proposals, PHMSA must provide a grandfather clause and a bright line of compliance products manufactured after a certain date. This being said, setting such a date certain only 75 days from publication of the final rule would be unrealistic in the extreme and indicate that PHMSA is not serious about enabling and enforcing compliance.

For example, the new design type testing requirements in the NPRM would put small companies that do not have their own testing facilities at a severe disadvantage. The testing facilities able to do these tests are few, and the capacity does not exist to test more designs than are normally in the design process. Increased demand for testing will not be able to be met in 75 days.

The proposal to ignore ICAO and UN approved small quantity exceptions and require lithium battery shipments to be fully regulated under Class 9 would have an enormous effect on the demand for and the availability of certified UN specification packaging. However, as PHMSA may or may not be aware, making packaging changes requires testing. Specifically, a stacking test performed to ensure that packaging can be certified takes at least 28 days (35 percent of the 75-day period). PHMSA appears to be operating in abstract isolation – an alternate reality in which every company gets what it needs to comply at a reasonable cost and without negatively impacting other any companies that require the same or similar packaging materials and testing and certification services.

In addition, given current capacity 75 days is unrealistic to achieve adequate hazardous materials handling training to all within the value chain that are covered by the proposal.

As indicated above, an accelerated timeline would also significantly increase costs on those who would have to comply.

The 75-day proposal is not in line with PHMSA's proper regulatory practice and is inconsistent with PHMSA's historical recognition that regulatory changes that significantly affect testing, certification, packaging, labeling and marking generally require a longer period of time for the practical achievement of compliance. Discussion citing previous final rule packages and their compliance dates with preamble language that supports demonstrates this point.

[1] OMB Circular A-4, p. 7.

- HM–224D and HM–215J (74 FR 2199, published January 14, 2009) allows for 24 months to achieve compliance with new requirements for batteries and battery powered devices. In response to a commenter's request to shorten the proposed compliance date, PHMSA responded "Additionally, we believe the January 1, 2011 [indicating a 24 month compliance time frame] date provides an adequate transitional period for use of the new stacking marking …"

- HM–218D (73 FR 4699, published January 28, 2008) allowed for 24 months to achieve compliance with new requirements that enhanced the effectiveness of hazard communication relative to ethanol/gasoline blends. PHMSA justified this timeframe by stating "To minimize regulatory cost and burden, these requirements will not become effective for two years."

- HM–224B (72 FR 4442, published January 31, 2007) allowed up to two years to comply with new packaging requirements addressing transportation of oxygen cylinders aboard aircraft. The preamble concluded, "It appears compliance with the additional overpack requirements of one year following the publication of the final rule as proposed in the NPRM may result in insufficient time or undue hardship on the affected parties to come into compliance with the new requirements. A compliance date that allows flexibility for the affected parties and sufficient time for various manufacturers to develop and market the necessary equipment would better serve the overall objectives of this rulemaking. Therefore, we are amending the HMR to establish a mandatory compliance date of two years following the effective date of the final rule."

- HM–237 (71 FR 3418, published January 23, 2006) allowed for 11 months to comply with requirements that changed the certification, packaging and transport of lighter and lighter refills.

These examples demonstrate a historic and reasonable understanding by PHMSA that changes to packaging, labeling and marking, let alone testing and certification, generally require a reasonable period of time for the compliance. The proposed 75-day period does not reflect the prior recognition the practical implications and therefore appears arbitrary.

PHMSA's failure – to meet its own timelines to perform a rulemaking in 2009 to adopt changes agreed to the ICAO Technical Instructions in 2007 – does not justify its proposal to place undue burdens on battery and device manufacturers and consumers. PHMSA's proposal is already raising fears in distribution channels that product in the supply chain will be stalled by a 75-day requirement.

As stated at the outset of this section, to be administrable and practical, any compliance proposal must have a grandfathering mechanism for products already manufactured.

Exceptions for Air Passengers, Crewmembers and Operators

In the regulatory text of the NPRM, PHMSA proposes to make some changes to §175.10. These proposed changes are not explained or even mentioned in the explanatory portion of the Notice. We oppose any proposed change or implication of the proposal on dry cell batteries to restrict air crews and passengers from carrying alkaline batteries in their checked baggage. There is no technical justification for a restriction that all dry cells and batteries must be carried in carry-on baggage only.

PHMSA Cost-Benefit Analysis and Regulatory Flexibility Analysis

As stated previously, the regulatory and cost analyses performed by PHMSA for the NPRM are woefully inadequate and produced estimates that are incomplete and severely understated.

In summary, the PHMSA analysis produced a first year cost of compliance with the proposed rule of $9.4 million. This contrasts sharply with good faith estimates of the dry battery industry alone.

In late February and early March, NEMA performed a confidential survey of members of its Dry Battery Section on the cost impact that many of the NPRM elements,

- removal of the small quantity exceptions for batteries and equipment
- UN specification packaging for all air shipments
- Class 9 hazard marking and documentation
- hazardous materials training for personnel
- UN re-testing with 5 percent mass change
- internal short circuit testing
- visible marking on cells and batteries
- stowage for air transport (crew accessibility, FAA-approved container and Class C cargo compartment)
- 75-day mandatory compliance deadline

would have on their lithium metal battery businesses. Alone, without even factoring in costs of their customers – including the many industries that use lithium metal batteries in their devices – the survey found that first-year costs of compliance would exceed $22 million.

Moreover, PHMSA's cost analysis is fatally flawed in that it specifically excludes any mention or analysis of cost impacts on manufacturers of products and equipment that contain or are packed with lithium batteries. As stated previously, many industries and many individual companies use lithium batteries and many sales outlets, including distributors and retailers, provide these products to consumers – this would by far be the largest group impacted by the proposed regulations. The cost to these entities would far exceed the impact on battery manufacturers alone.

The constrained time frame of the 60-day comment period precluded a full multi-industry survey of the cost impacts the NPRM provisions would have on these entities. With the much greater amount of time that PHMSA has devoted to preparation and analysis of the NPRM, it is regrettable that the agency was unable or unwilling to conduct a full cost analysis.

The PHMSA cost analysis also ignores the general economic impact and inefficiencies that a lack of harmonization would generate. For example: the previously mentioned example of a shipment entering the U.S. via ground transport from Canada. This type of business decision would have a negative financial impact on U.S. air carriers but would be a boon to non-U.S. air carriers.

To briefly cite some additional weaknesses in the PHMSA cost analysis:

- It ignores the cost to package individual cells/batteries.

- Cargo stowage costs omit consideration of the analysis that a near monopoly of one carrier will ensure a higher price. Even if several carriers decided to carry Class 9, supply (limited space) and demand will drive prices higher.

- On the subject of training: Just because after the first rounds of training on lithium batteries one might assume that these elements would be "inserted" into training modules for future sessions does not reduce or eliminate the cost. It is specialized training with a fixed cost per employee and the lowest cost training options may not be effective.

- In addition, PHMSA ignores that many required trainees will be working for companies that would normally never need a "hazmat"-trained shipping team. These costs are not adequately addressed.

- On information collection costs, PHMSA's assumptions and analysis are inaccurate. A design drawing for a simple battery pack adequate for use in any reasonable quality system will take 8-16 hours of a skilled draftsman, along with a few hours of engineering support. Both types of employees earn more than $25 per hour. Even the smallest assembler has more than 10 designs or they would go out of business. Major companies have hundreds of designs.

- On potential benefits of adopting NPRM proposals, PHMSA ignores that the several scenarios of past incidents it cites would not be addressed by the proposals. These scenarios should be excluded from the estimate of benefits.

- On enforcement, PHMSA states, "Once lithium batteries are fully regulated, enforcement agencies will be able to take appropriate action against non-compliant shipments, reducing the number of non-compliant packages and therefore, reducing the number of lithium battery incidents." This is unjustified as it ignores that PHMSA does not have sufficient resources available today to enforce current regulations.

- PHMSA states: "PHMSA and FAA cannot say definitively that the lithium battery fires would have been prevented had the provisions of this NPRM been in effect at the time the fires occurred. However, in an effort to estimate the benefits associated with the reduction in fire risks expected to result from adoption of the provisions in this NPRM, PHMSA assumed that the likely cost of lithium battery fire incidents is nine percent of the total costs resulting from the hazardous materials fires occurring from 1995 to 2004." If PHMSA cannot make a determination that NPRM provisions would prevent incidents, how can it assume any safety benefits from the proposals? Why does PHMSA assume the likely cost of incidents rather than calculate the actual costs?

Given the complexity and breadth of the PHMSA proposals, the true cost of full compliance with the final rule as proposed would not be known by affected and compliant parties for at least one year after the effective date. Others, who realize the prohibitive nature of these compliance costs, are unlikely to invest in compliance and will continue to be the source of risk and incidents.

Testing of Lithium Batteries and Products Containing Lithium Metal Batteries

To help inform PHMSA and the industry under the umbrella of the NPRM about the behavior of lithium metal batteries and devices, NEMA contracted with an outside testing firm to perform FAA-type fire testing of lithium metal batteries contained in equipment.

Due to PHMSA's refusal to extend the 60-day comment period, not all testing could be completed to meet today's deadline. However, the results of testing conducted to date show that lithium metal batteries that have passed the UN T-tests and are contained in or with equipment that is packaged in accordance with current regulations, do not propagate a fire that might be initiated inside a cargo compartment by another shipment. Additional testing is planned in the coming days.

The executive summary of the initial test report is attached to these comments. Any additional testing results and reports will be shared with PHMSA and FAA at the earliest possible opportunity for their consideration.

In addition, NEMA is aware of testing of lithium metal batteries that has recently been conducted independently on behalf of the Battery Association of Japan (BAJ). BAJ will submit a report with its written comments. NEMA commends these results to PHMSA's and FAA's attention.

Conclusions

As PHMSA states,

> *The need…to aggressively enforce all applicable regulatory requirements is critical to air safety*.

We agree: existing rules need to implemented and more thoroughly and aggressively enforced by the U.S. PHMSA's proposals to create U.S. requirements beyond and inconsistent with those

already in place in the rest of the world will prove redundant and confusing, generate legitimate trade complaints, result in significantly higher costs throughout the chain of commerce and result in no obvious improvement of crew or passenger safety.

The proposed rule would impose a disproportionate cost on consumers of lithium cells and batteries, including assemblers, original equipment manufacturers (OEMs), distributors, retailers, and final consumers, including household, medical and military entities.

NEMA submits that implementation of the rules as proposed would lead PHMSA to be even less able to enforce requirements on those parties who to date have shown little regard for compliance, in contrast to the companies that NEMA represents, who have a stellar safety record and who hold safety as the highest priority.

A U.S. refusal to harmonize with international model regulations will increase the misunderstandings PHMSA cites, make it more likely that infractions or incidents could occur, decrease air safety, and help to create the situation PHSMA says it is trying to avoid.

Should you have any questions regarding any of the foregoing, please contact Craig Updyke of my staff at cra_updyke@nema.org or (703) 841-3294.

We at NEMA look forward to a renewed dialogue with PHMSA and FAA that will help ensure safe transportation of lithium batteries and the devices that rely on them.

Respectfully,

Kyle Pitsor

Kyle Pitsor
Vice President, Government Relations

cc: The Honorable Ray LaHood, Secretary
U.S. Department of Transportation

The Honorable J. Randolph Babbitt, Administrator
Federal Aviation Administration

The Honorable Cynthia L. Quarterman, Administrator
Pipeline and Hazardous Materials Safety Administration

Attachment: Executive Summary of March 12, 2010 Draft Report by Exponent for NEMA, "US FAA-Style Flammability Assessment of Lithium-Primary Battery Packs Packed With and Contained In Equipment (UN3091)

Failure Analysis Associates

Exponent®

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US FAA-Style Flammability Assessment of Lithium-Primary Battery Packs Packed With and Contained In Equipment (UN3091)

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US FAA-Style Flammability Assessment of Lithium-Primary Battery Packs Packed With and Contained In Equipment (UN3091)

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Executive Summary

As part of an NPR published on January 11, 2010, PHMSA proposes to eliminate the regulatory exceptions (Special Provision 188 in 49 CFR Section 172.102(c)) for lithium cells and batteries when transported aboard aircraft. This would include the exception on lithium batteries with greater than 0.3 g of lithium that are "packed with" or "contained in" equipment. In order to assist NEMA (National Electrical Manufacturers Association) with a response to the NPR, Exponent conducted heat release analyses and testing of lithium batteries "contained in" and "packed with" equipment (UN3091): specifically, on lithium iron disulfide and lithium manganese dioxide primary batteries used in flashlights and weapon lights with lasers as packaged for air shipment. Additional testing of lithium thionyl chloride primary batteries in highway toll transponders packed for shipment to customers is planned.

Air shipment packages were analyzed to estimate the quantity of stored energy that would be released by complete combustion of all components (packing materials, plastics, and batteries) and to compare the contribution of the batteries to the total energy content of the entire package. Flame attack tests were conducted to compare the fire behavior of packages containing batteries to those not containing batteries. Exponent also conducted cell initiation testing to assess the effect of an internal fault occurring in a single cell contained in or packed with equipment. Test setups and procedures were similar to those described in the Federal Aviation Administration (FAA) report [1] titled "Flammability Assessment of Bulk-Packed, Nonrechargeable Lithium Primary Batteries in Transport Category Aircraft."

Based on the analyses and tests conducted, Exponent concludes:

1. Batteries do contain stored chemical and electrical energy that can be released during a fire and add to the total heat release of the fire. However, analysis of flashlights and weapon lights with lasers with cells "contained in" or "packed with" equipment as packaged for air shipment suggests that this contribution is fairly modest. Combustible materials such as cardboard, paper, and plastic within the package produce the bulk of the heat release.

2. Flame attack testing on packaged systems resulted in initial combustion of packaging materials, and did not affect the batteries. Flames typically self extinguished within five minutes due to limited airflow into the chamber. Cell venting did not occur during flame attack testing. The lithium-primary (Li-primary) cells did not appreciably affect combustion of the surrounding packing materials.

3. Cell initiation testing (conducted on a single cell contained in or packed with equipment) resulted in heat damage to adjacent systems and packing materials. Cell thermal runaway did not propagate to adjacent systems and the external packaging was mostly intact.