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1056. Hazardous Waste Tanks and the Less than 90-Day Accumulation Time Limit	ENCORE	APR 23, 2015
1057. Decharacterized RCRA Waste - Manifesting and LDR Reporting	ENCORE	APR 30, 2015
1058. Decharacterized Hazardous Waste Listed Solely for Non-Toxic Characteristics	ENCORE	MAY 7, 2015
1059. Decharacterized Wastes, <90-Day Accumulation Time Limits and LDR Storage Prohibition	ENCORE	MAY 14, 2015
1060. Decharacterized Wastes and the LDR Dilution Prohibition	ENCORE	MAY 21, 2015
1061. Hazardous Debris Macroencapsulation and Size Reduction	ENCORE	MAY 28, 2015
1062. Universal Waste Lamps and Prohibition on Crushing		JUN 4, 2015
1063. F003 Listed Hazardous Waste and the 10% Rule	ENCORE	JUN 11, 2015
1064. F001 - F005 Listed Hazardous Waste and the 10% Rule	ENCORE	JUN 18, 2015
1065. Macroencapsulation of Hazardous Debris and Presence of Free Liquids	ENCORE	JUN 25, 2015
1066. DOT Shipping of Damaged, Defective or Recalled Lithium Batteries		JUL 1, 2015
1067. Used Oil Eligibility for Animal and Vegetable Oils	ENCORE	JUL 9, 2015
1068. Used Oil Eligibility for Petroleum Oils Mixed with Animal or Vegetable Oils		JUL 16, 2015
1069. Conditioned Exclusion for Listed Hazardous Waste Debris Treated via Extraction/Destruction	ENCORE	JUL 23, 2015
1070. Conditioned Exclusion for Characteristic Debris Treated via Immobilization		JUL 30, 2015
1071. RCRA Personnel Training and Classroom Training vs. Online Training		AUG 6, 2015
1072. PCB Decontamination Standards with No Decontamination Performed		AUG 13, 2015
1073. PCB Manifest Exceptions a.k.a. When is a PCB Manifest Not Required	ENCORE	AUG 19, 2015
1074. PCB Manifest Relief a.k.a. When is a PCB Manifest Not Required – The Sequel		AUG 27, 2015
1075. Hazardous Debris and Radioactively Contaminated Cadmium Batteries	ENCORE	SEP 3, 2015
1076. Hazardous Debris and Radioactively Contaminated Lead Acid Batteries	ENCORE	SEP 10, 2015
1077. Mercury Wet Cell Batteries - Debris or Not Debris	ENCORE	SEP 17, 2015
1078. Hazardous Debris and Non-Radioactive Lead Acid Batteries		SEP 24, 2015
1079. Unused Paraformaldehyde - U Listed Hazardous Waste or Not?	ENCORE	OCT 1, 2015
1080. CAS Numbers and the Hazardous Waste "U" and "P" Listings	ENCORE	OCT 8, 2015
1081. Universal Waste One Year Accumulation and Multiple Handlers	ENCORE	OCT 15, 2015
1082. LDR Notifications and F001-F005 Constituents of Concern	ENCORE	OCT 29, 2015
1083. LDR Notifications and F001-F005 Constituents of Concern – Again	ENCORE	NOV 5, 2015
1084. LDR Notifications and F001-F005 Constituents of Concern - One Last Time	ENCORE	NOV 12, 2015
1085. DOT and Terminal Protection of Alkaline Batteries	ENCORE	NOV 19, 2015

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## TWO MINUTE TRAINING

**TO:** CH2M HILL PLATEAU REMEDIATION COMPANY

**FROM:** PAUL W. MARTIN, RCRA Subject Matter Expert  
CHPRC Environmental Protection, Hanford, WA

**SUBJECT:** DOT AND TERMINAL PROTECTION OF ALKALINE BATTERIES

**DATE:** NOVEMBER 19, 2015

<u>CHPRC Projects</u>	<u>CH PRC - Env. Protection</u>	<u>MSA</u>	<u>Hanford Laboratories</u>	<u>Other Hanford Contractors</u>	<u>Other Hanford Contractors</u>
Richard Austin Roni Ashley Tania Bates Bob Cathel Rene Catlow Richard Clinton Larry Cole John Dent Brian Dixon Eric Erpenbeck Stuart Hildreth Mike Jennings Stephanie Johansen Jeanne Kisielnicki Melvin Lakes Jim McGrogan Stuart Mortensen Anthony Nagel Dean Nester Dave Richards Phil Sheely Connie Simiele Jennie Stults Michael Waters Jeff Widney	Brett Barnes Mitch Boyd Ron Brunke Bill Cox Laura Cusack Lorna Dittmer Rick Engelmann Ted Hopkins Sasa Kosjerina Jim Leary Dale McKenney Jon McKibben Rick Oldham Linda Petersen Fred Ruck Ray Swenson Wayne Toebe Lee Tuott Daniel Turlington Dave Watson Joel Williams	Jerry Cammann Jeff Ehlis Garin Erickson Lori Fritz Panfilo Gonzales Jr. Dashia Huff Mark Kamberg Edwin Lamm Candice Marple Saul Martinez Jon Perry Thomas Pysto Christina Robison Don Rokkan Lana Strickling Lou Upton	(TBD)  <u>DOE RL, ORP, WIPP</u>  Mary Beth Burandt Duane Carter Cliff Clark Mike Collins Tony McKarns Ellen Mattlin Greg Sinton Scott Stubblebine	Bill Bachmann Dean Baker Scott Baker Lucinda Borneman Paul Crane Tina Crane Greta Davis Jeff DeLine Ron Del Mar John Dorian Mark Ellefson Darrin Faulk Joe Fritts Tom Gilmore Rob Gregory Gene Grohs James Hamilton Andy Hobbs Ryan Johnson Dan Kimball Megan Lerchen Richard Lipinski Charles (Mike) Lowery Michael Madison Terri Mars Cary Martin Grant McCalmant Steve Metzger Tony Miskho Matt Mills Tom Moon Chuck Mulkey Mandy Pascual Kirk Peterson Jean Quigley	Dan Saueressig Merrie Schilperoort Joelle Moss Glen Triner Greg Varljen Julie Waddoups Jay Warwick Kyle Webster Jeff Westcott Ted Wooley

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## TWO MINUTE TRAINING

**SUBJECT:** DOT and Terminal Protection of Alkaline Batteries

**Q:** In terms of the Department of Transportation (DOT) shipping requirements, must standard alkaline batteries of 9 volts or less have terminal protection, i.e., must the ends of the batteries be taped or protected in some way?

**A:** According to 49 CFR 173.21(c), “Forbidden materials and packages” the offering for transportation or transportation of electrical devices, such as batteries and battery-powered devices, which are likely to create sparks or generate a dangerous evolution of heat, is forbidden unless packaged in a manner which precludes such an occurrence.

The phrase, “packaged in a manner which precludes such an occurrence” is interpreted as terminal protection which can include taping of the positive anode or taping of both the positive and negative anode with an appropriate tape such as electrical or duct tape. Other packaging to preclude sparks or heat such as the manufacturer’s packaging or placing individual batteries in plastic baggies can constitute terminal protection.

Concerning applicability of terminal protection for standard alkaline batteries, a [DOT letter dated November 25, 2009](#) stated:

*“... it is the opinion of this Office [DOT] that used or spent dry, sealed batteries of both non-rechargeable and rechargeable designs, described as "Batteries, dry, sealed, n.o.s." in the Hazardous Materials Table in § 172.101 of the HMR and not specifically covered by another proper shipping name, with a marked rating up to 9-volt are not likely to generate a dangerous quantity of heat, short circuit, or create sparks in transportation. Therefore, used or spent batteries of the type "Batteries, dry, sealed, n.o.s." with a marked rating of 9-volt or less that are combined in the same package and transported by highway or rail for recycling, reconditioning, or disposal are not subject to the HMR.”*

Alkaline batteries meet proper shipping name of “Batteries, dry, sealed, n.o.s.” Therefore, alkaline batteries of 9 volts or less are not subject to the Hazardous Materials Regulations (HMR) and hence, terminal protection is not required. Other types of batteries such as lithium batteries would require terminal protection to preclude the creation of sparks or the dangerous generation of heat.

### SUMMARY:

- Certain batteries that can create sparks or generate dangerous heat are forbidden from transportation unless packaged in a manner to preclude such an occurrence.
- The phrase “packaged in a manner to preclude” sparks and heat can include terminal protection via taping with electrical or duct tape; packaging in manufacturer’s packaging; or placing individual batteries in plastic baggies.
- Standard alkaline batteries of 9 volts or less are not subject to the HMR and therefore do not require terminal protection.

An excerpt from 49 CFR 173.21 and the November 25, 2009 DOT letter are attached to the e-mail. If you have any questions, please contact me at “Paul\_W\_Martin@rl.gov” or at (509) 376-6620.

**FROM:** Paul W. Martin

**DATE:** 11/19/15

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## TWO MINUTE TRAINING - ATTACHMENT

**SUBJECT:** DOT and Terminal Protection of Alkaline Batteries

### 49 CFR §173.21 Forbidden materials and packages

Unless otherwise provided in this subchapter, the offering for transportation or transportation of the following is forbidden:

- (a) Materials that are designated “Forbidden” in Column 3 of the §172.101 table.
- (b) Forbidden explosives as defined in §173.54 of this part.
- (c) Electrical devices, such as batteries and battery-powered devices, which are likely to create sparks or generate a dangerous evolution of heat, unless packaged in a manner which precludes such an occurrence.
- (d) For carriage by aircraft, any package which has a magnetic field of more than 0.00525 gauss measured at 4.5 m (15 feet) from any surface of the package.
- (e) A material in the same packaging, freight container, or overpack with another material, the mixing of which is likely to cause a dangerous evolution of heat, or flammable or poisonous gases or vapors, or to produce corrosive materials.
- (f) A package containing a material which is likely to decompose with a self-accelerated decomposition temperature (SADT) of 50 °C (122 °F) or less, or polymerize at a temperature of 54 °C (130 °F) or less with an evolution of a dangerous quantity of heat or gas when decomposing or polymerizing, unless the material is stabilized or inhibited in a manner to preclude such evolution. The SADT may be determined by any of the test methods described in Part II of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter).
  - (1) A package meeting the criteria of paragraph (f) of this section may be required to be shipped under controlled temperature conditions. The control temperature and emergency temperature for a package shall be as specified in the table in this paragraph based upon the SADT of the material. The control temperature is the temperature above which a package of the material may not be offered for transportation or transported. The emergency temperature is the temperature at which, due to imminent danger, emergency measures must be initiated.

§173.21 Table: Method of Determining Control and Emergency Temperature.

*(Removed to save space)*

- (2) For self-reactive materials listed in §173.224(b) table control and emergency temperatures, where required are shown in Columns 5 and 6, respectively. For organic peroxides listed in The Organic Peroxides Table in §173.225 control and emergency temperatures, where required, are shown in Columns 7a and 7b, respectively.
- (3) Refrigeration may be used as a means of stabilization only when approved by the Associate Administrator. Approvals issued by the Bureau of Explosives are no longer valid (see §171.19 of this subchapter). Methods of stabilization approved by the Associate Administrator are as follows: ...

**TWO MINUTE TRAINING - ATTACHMENT**

**SUBJECT:** DOT and Terminal Protection of Alkaline Batteries

**PHMSA Interpretation #09-0219**

**November 25, 2009**

Mr. Ronald B. Johnstone  
Consulting Engineer  
251 Rodonovan Drive  
Santa Clara, CA 95051-6605

Ref. No. 09-0219

Dear Mr. Johnstone:

This responds to your September 14, 2009 letter requesting further clarification of the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to the transport of discarded household batteries.

According to your letter, the city of Santa Clara has a battery recycling program which requests homeowners to tape the positive terminal of household batteries prior to placing them in plastic bags for curbside battery recycling. In your letter, you state this program of taping the positive terminal is due to overzealous interpretation of the requirements of §173.21(c) and subsequent interpretations on the transportation of batteries. You assert that few households will take the time to tape the batteries for recycling and batteries will again be placed in general household garbage for disposal.

In your letter, you also reference a letter issued by this Office on June 23, 2009 (Ref. No. 09-0090) in which we provide interpretation that spent 1.5-volt alkaline dry cell batteries are not subject to regulation under the HMR when transported by highway or rail because they are not likely to generate a dangerous quantity of heat nor are they likely to short circuit or create sparks when they are transported in a packaging with no other battery types or chemistries present. You suggest that we broaden this interpretation to include all discarded household batteries of 1.2-1.5 volt AAA, AA, C, D and 9-volt of any chemistry because you believe such batteries are safe for transport.

The HMR govern the safe transportation of hazardous materials in commerce. A local government agency that transports hazardous materials (e.g., transporting discarded household batteries as part of a government recycling program) using its own personnel is not engaged in transportation in commerce and, therefore, is not subject to the HMR. However, if the local government agency transports hazardous materials for a commercial purpose, utilizes contract personnel to transport the materials, or offers a hazardous material for transportation to a commercial carrier, then the HMR apply.

Under § 173.21(c), the HMR prohibit the transportation of electrical devices that are likely to create sparks or generate a dangerous quantity of heat, unless the devices are packaged in a manner that precludes such an occurrence. Certain dry battery chemistries such as dry, sealed batteries are subject to limited regulation under the HMR while other batteries such as lithium batteries are more fully regulated under the HMR because of different risks in transportation associated with different battery chemistries. Thus, this Office disagrees that discarded household batteries of any chemistry and marked voltage as you describe are safe for transport without protection against short circuiting or damage to terminals.

(Continued)

**FROM:** Paul W. Martin

**DATE:** 11/19/15

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## TWO MINUTE TRAINING - ATTACHMENT

**SUBJECT:** DOT and Terminal Protection of Alkaline Batteries

However, after further consideration and analysis of dry, sealed battery chemistries and based on information available to us, it is the opinion of this Office that used or spent dry, sealed batteries of both non-rechargeable and rechargeable designs, described as "Batteries, dry, sealed, n.o.s." in the Hazardous Materials Table in § 172.101 of the HMR and not specifically covered by another proper shipping name, with a marked rating up to 9-volt are not likely to generate a dangerous quantity of heat, short circuit, or create sparks in transportation. Therefore, used or spent batteries of the type "Batteries, dry, sealed, n.o.s." with a marked rating of 9-volt or less that are combined in the same package and transported by highway or rail for recycling, reconditioning, or disposal are not subject to the HMR. Note that batteries utilizing different chemistries (i.e., those battery chemistries specifically covered by another proper shipping name) as well as dry, sealed batteries with a marked rating greater than 9-volt may not be combined with used or spent batteries of the type "Batteries, dry, sealed, n.o.s." in the same package. Note also, that the clarification provided in this letter does not apply to batteries that have been reconditioned for reuse.

I hope this information is helpful. If you need further assistance, please contact this Office.

Sincerely,

Charles E. Betts  
Chief, Standards Development  
Office of Hazardous Materials Standards

173.21(c)  
DMS ID# 09-0219

**FROM:** Paul W. Martin

**DATE:** 11/19/15

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