

Stationary Battery Management and Recycling

North American Recycling Requirements



ComplianceKnowledgeCenter.com

Recycling Requirements

- End-of-Use Management
- Recycling Regulations
- Packaging and Transportation
- Documentation & Reporting
- Training



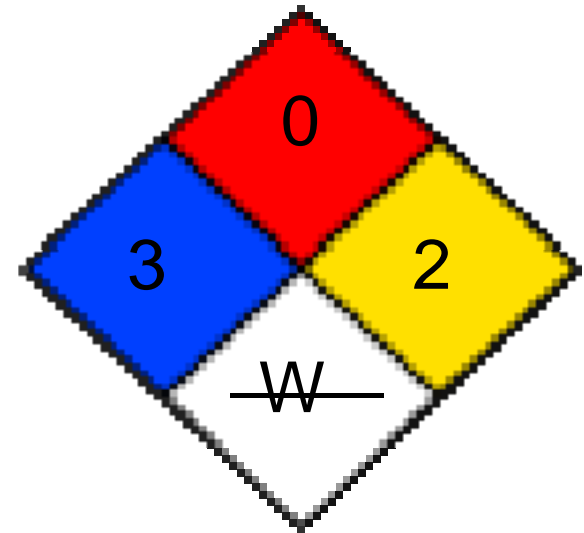
Battery Management

- ❑ Stationary Battery types
 - Lead-Acid – Flooded and VRLA
 - Nickel Cadmium
 - Lithium-Ion
- ❑ When to Recycle
 - End-of-Usable Life
 - Site Decommissioning
 - Battery Failure



What Materials are Regulated?

- ❑ Lead Acid – Flooded and VRLA
 - Sulfuric Acid Electrolyte – H_2SO_4
 - Lead - Pb
 - Hydrogen Gas – H_2
- ❑ Nickel Cadmium
 - Potassium Hydroxide Electrolyte – KOH
 - Cadmium – Cd
- ❑ Cradle-to-Grave Management
 - Installation
 - Operation
 - De-installation
 - Recycle



Why have Recycling Requirements?

- Reduce the consumption of raw materials
- Reduce the volume of waste materials that must be treated and disposed of.
- Prevent hazardous materials from entering ground water.
- Reduce Air Lead Concentrations
- Corporate Social Responsibility and Environmental Policy





Canadian Regulations for Recycling

- ❑ Workplace Hazardous Materials Information System (WHMIS)
- ❑ SLABs (Spent Lead-Acid Battery) meets the definition of a hazardous waste if not properly managed as recyclable material.
 - Controlled under the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (EIHWRMR).
- ❑ Province of British Columbia
 - Environment Management Act, Reg 449/2004, Recycling Regulation
 - Product Stewardship for Lead-Acid Batteries:
- ❑ Province of Ontario
 - Environmental Protection Act - Reg 347/1990, Waste Management
- ❑ Quebec & Manitoba (intend to follow Ontario or BC)



US Regulations for Recycling

- US RCRA (Resource Conservation and Recovery Act)
Subpart C Hazardous Waste
- Spent Lead-Acid Batteries Being Reclaimed (40 CFR 266.80 Subpart G)
- “Universal Waste” rule in (40 CFR part 273)
- Requirements for Wet Battery Shipments and Packaging (49 CFR 173.159)



Battery Recycling Rates (BCI Study)

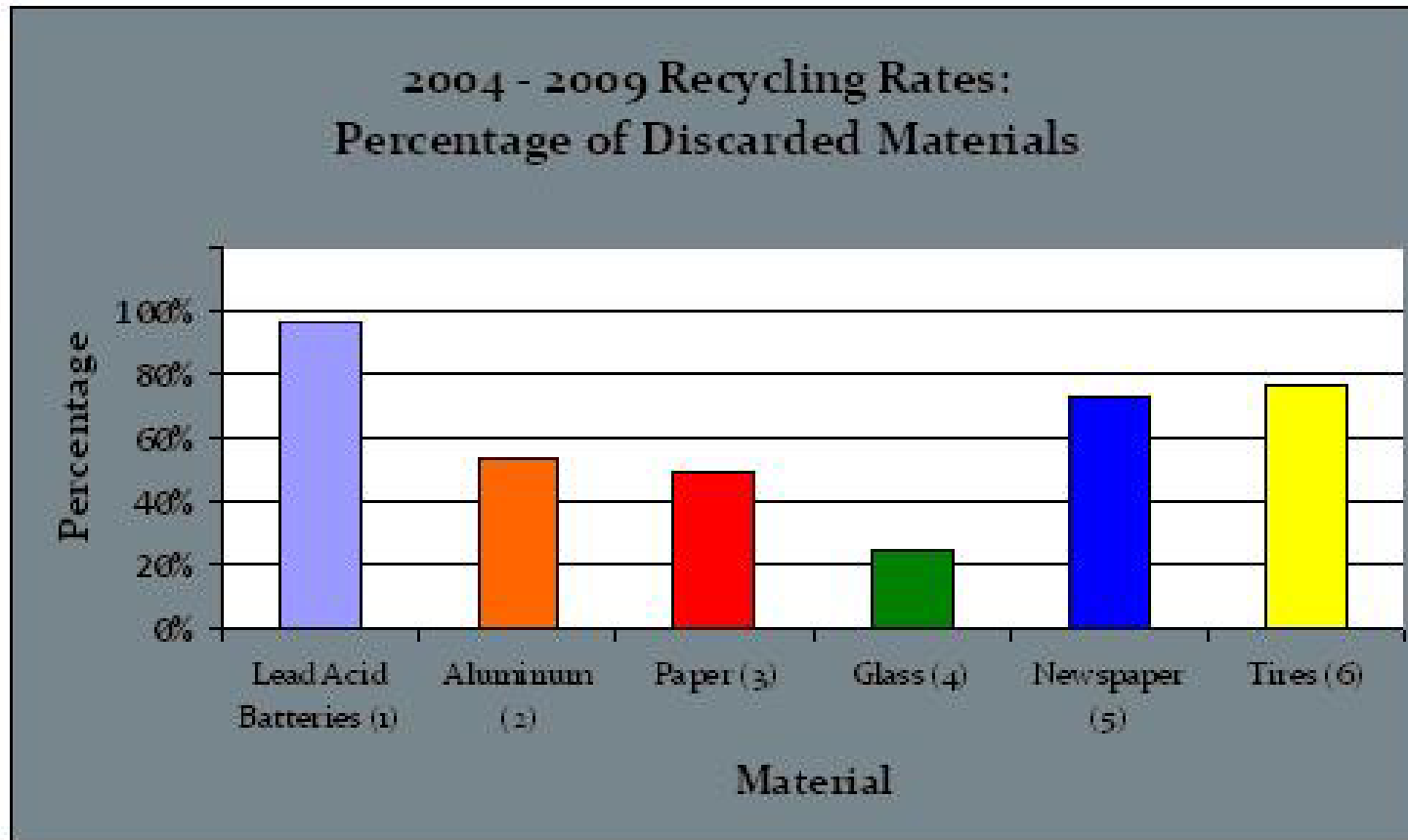
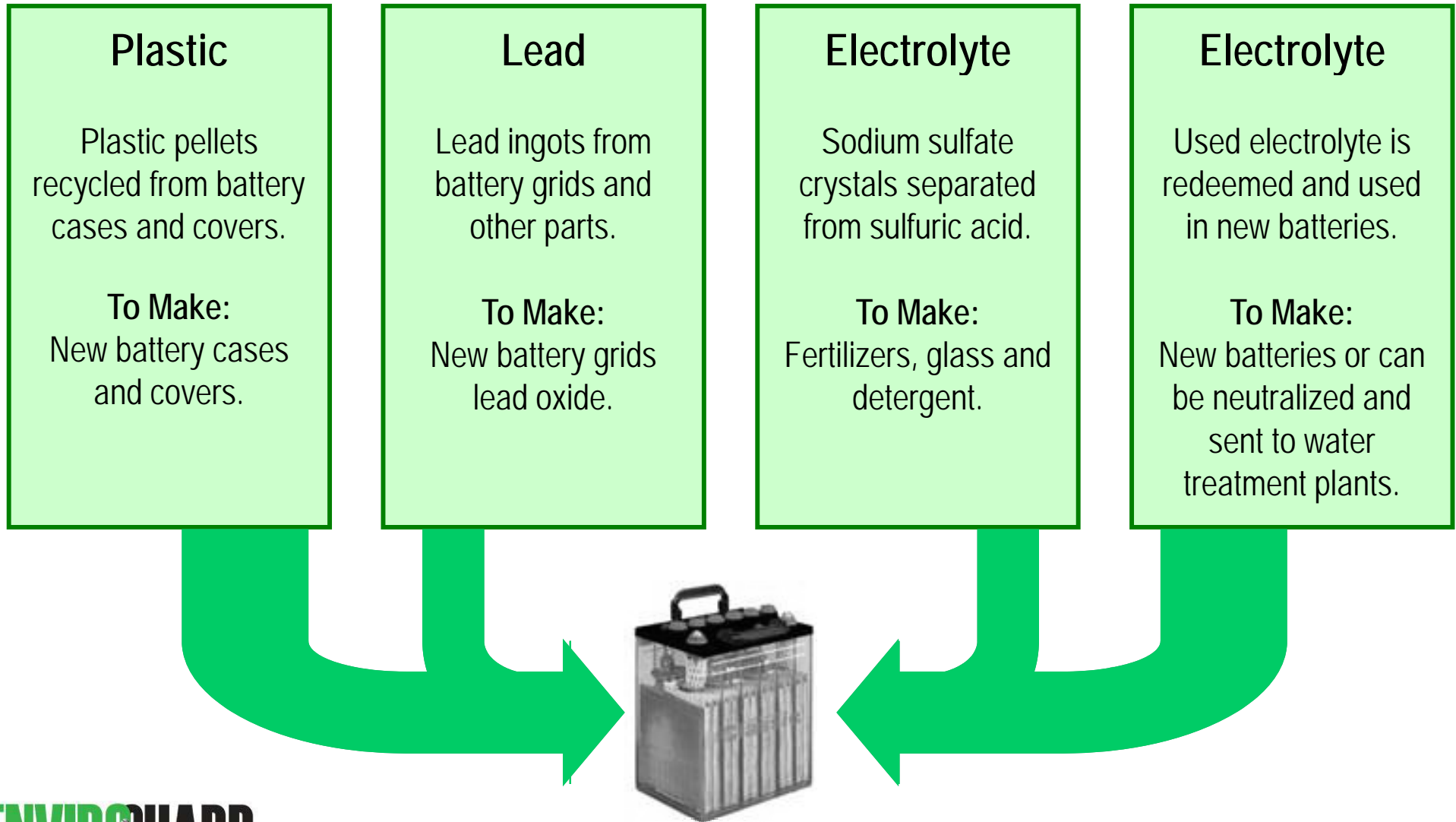


Chart courtesy of Battery Council International

Sources:

- 1) SmithBucklin Marketing and Research and Statistics Group 2009
- 2) Aluminum Association, Can Manufacturers Association, and the Institute of Scrap Recycling Industries 2009
- 3) American Forest and Paper Association 2004
- 4) EPA 2005
- 5) Recycling Revolution 2004
- 6) Rubber Manufacturing Association/Rubber World Journal 2009

What Materials are Recycled?



Cradle-to-Grave Management

Hazardous
Material &
Waste
Generation



Transportation



Disposal/
Recycler



Documentation
&
Certificate of
Disposal

Why is packaging Important?

- ❑ Proper packaging Prevents:
 - Risk of Personnel injury
 - Fire hazard due to short circuit
 - Chemical spill should the load shift
 - Potential of Hydrogen Gas Explosion
 - Avoid fines and penalties



Battery Shifting due to Poor Packaging



Photo courtesy of Wiley Rein LLP

Battery Shifting due to Poor Packaging



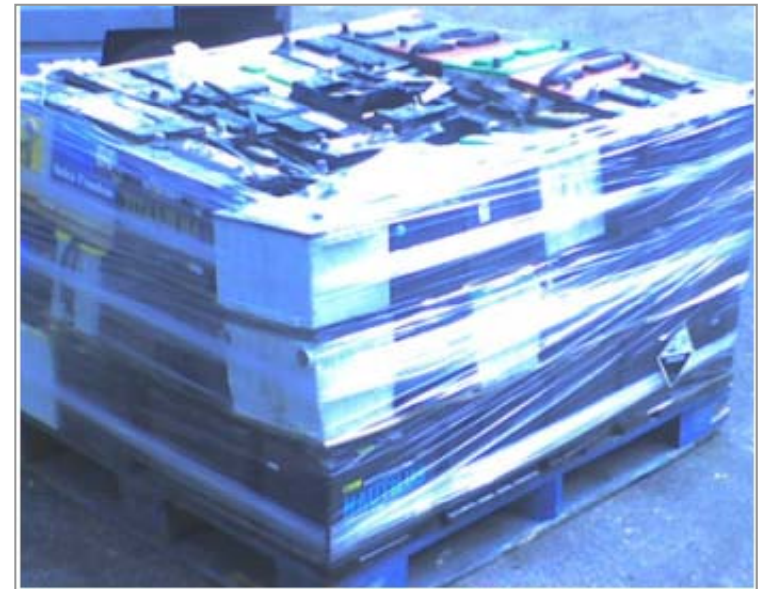
Photo courtesy of Wiley Rein LLP



Photo courtesy of Wiley Rein LLP

Battery Packaging Guidelines

- ❑ Do NOT mix battery types
- ❑ Prevent short circuiting
 - Non-conductive Packaging
 - Separate batteries
 - Protect exposed terminals
- ❑ Authorized packaging.
 - Metal Drums are NOT authorized
 - Pallets must be secure
- ❑ Handled by trained persons
- ❑ Shipping with other types of classified materials



Transport Canada - www.tc.gc.ca

DOT Packaging Requirements

- ❑ Proper insulation includes:
 - Taping the terminals of the batteries.
 - Packaging in individual plastic bags.
 - Other forms of insulation such as plastic caps.



Photo courtesy of Wiley Rein LLP

Damaged or Leaking Batteries

- ❑ Leaking batteries must be in approved drum



Photo courtesy of Wiley Rein LLP

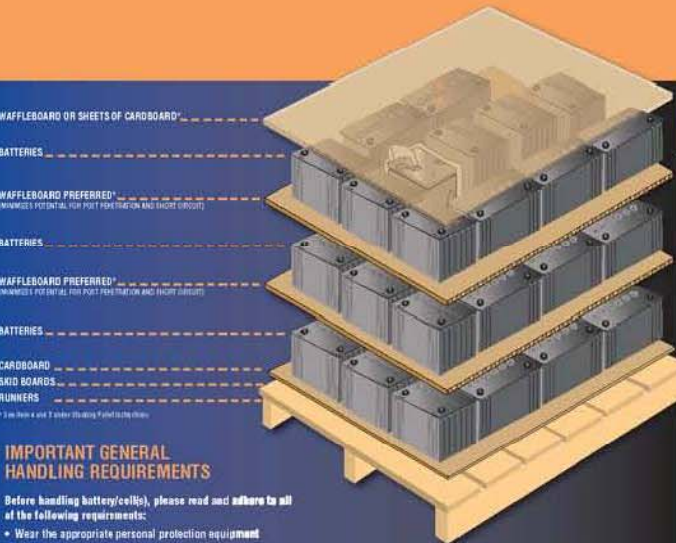


Packaging Guidelines



Packaging and Securing Used Stationary Batteries/Cells

THESE GUIDELINES ARE TO ASSIST IN COMPLIANCE WITH FEDERAL DEPARTMENT OF TRANSPORTATION (USDOT) REGULATIONS*. PLEASE ASSIST THE DRIVER IN COMPLYING WITH THE LAW. FAILURE TO COMPLY WITH THE GUIDELINES CAN RESULT IN REFUSAL BY THE CARRIER TO ACCEPT MATERIAL. IN ADDITION, FAILURE TO COMPLY CAN RESULT IN FINES AND PENALTIES FROM FEDERAL, STATE, AND LOCAL AUTHORITIES.



IMPORTANT GENERAL HANDLING REQUIREMENTS

Before handling battery/cells, please read and adhere to all of the following requirements:

- Wear the appropriate personal protection equipment
- Handle all returned batteries with the same responsible care as new batteries
- Keep batteries upright at all times. Do not tip over on side or upside down (Except Non-Spillables)
- Do not drop batteries. Put batteries carefully down on skid/pallet
- Only lead-acid batteries may be returned
- Do not double stack cells or batteries on skid/pallet
- Terminals must be protected with non-conductive caps, tape or other insulating material (e.g. waffleboard, cardboard) to prevent shorting
- Total height of package not to exceed 1 1/2 times the skid/pallet width
- Any damaged or cracked cell must be free of electrolyte and placed in a heavyweight clear polyethylene plastic bag (min. 6 mil) that is securely closed.
- All vent caps must be in place

IMPORTANT SKID/PALLET SPECIFICATIONS

- Use a skid/pallet provided with a new shipment to return used motive batteries if possible
- Maximum skid/pallet size: 48" x 44" or 48" x 40"
- Skid/pallet boards: 5/8" inch thick minimum preferred
- Skid/pallet must be constructed with a minimum of three bottom runners
- Skid/pallet sturdy and durable enough to handle the weight of battery load

INSTRUCTIONS FOR STACKING USED STATIONARY MONOBLOCK BATTERIES

1. Select a sturdy skid/pallet with no broken or missing boards. (See "Skid/Pallet Specifications" for details).
2. Be sure there are no nails sticking up, which could puncture the batteries. Stack return battery pallet using pallet provided with new shipment if possible.
3. Place a layer of cardboard on the pallet to prevent the batteries from sliding off of the pallet.
4. Make the first layer of batteries level and as close together as possible. If some of the batteries are shorter, they should be placed in the center of layers. Any taller batteries should be placed on the top layer.
5. Place waffleboard (preferred) or sufficient cardboard (multiple sheets if necessary) between all layers, including the top layer of batteries to prevent the possibility of puncturing the batteries above and short circuits. Place cardboard on top of pallet.
6. Batteries with terminals on the side must be stacked so the posts are facing away from each other and not facing towards the outside of the pallet. Terminals on the side must never touch. (see Fig. 1 and 2)
7. Terminals on the top must be positioned toward the outside of the pallet so the layer above it leans toward the center. (Fig. 3)
8. Make sure that no batteries are overhanging the waffleboard or sheets of cardboard. (Fig. 4)



INSTRUCTIONS FOR WRAPPING USED STATIONARY MONOBLOCK BATTERIES FOR SHIPMENT

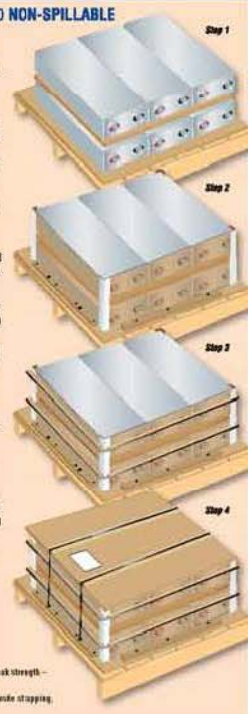
All batteries must be secured to the pallet with stretch wrap. Stretch wrap works best if it is pulled tight before stretching it around the corners.

1. Start with the stretch wrap turned sideways to create a rope effect (see fig. 1). Wrap around the top layer at least twice.*
 2. Still using the rope effect, wrap the top layer twice* again, crossing over the top each time to form an "X-pattern." This will pull the batteries towards the center to prevent batteries from falling off of the pallet, a DOT requirement.
 3. Hold the stretch wrap open (see Fig. 2 and 3), wrap around the bottom layer twice**, being sure to catch the edges of the pallet.
 4. Finally, after placing cardboard on top of the batteries, wrap around the top layer twice** with the stretch wrap in the open effect and tear at the last corner.
- * Wrap as many times as necessary to stabilize the load



INSTRUCTIONS FOR PREPARING USED NON-SPILLABLE STATIONARY CELLS FOR SHIPMENT

1. Place cells on skid/pallet that meets pallet specifications noted in this document. Use Trivall (3 Layer Cardboard) or Waffleboard between layers.
2. Place your first layer of cells on top of the plywood. Place cells on their side to help avoid the possibility of them falling over during shipment. Place one layer of 5/8" Trivall or Waffleboard on top of the first layer of cells. Place the next layer using the same guidelines. Continue building layers, making sure that you do not exceed maximum pallet weight. (See Step 1). Place Trivall or Waffleboard around ALL sides of the cells.
3. Secure the cells by nailing wooden cleats to the skid on all sides so the Trivall is held tightly against the cells and will remain vertical.
4. Install cardboard corner supports initially with packing tape to make it easier to manage before banding (See Step 2).
5. Install metal or plastic banding* horizontally around each layer of cells as shown in drawing (Step 3). Before pulling tight, place wooden strips under the banding as shown to provide support for the cardboard. Note, the wooden strips can be held in place with packing tape to make it easier to manage before tightening the banding.
6. Once each layer has one horizontal band securing them, place 1/2" plywood on the top layer and secure with two bands vertically that run from front to back on the skid. Drill holes through clearing/skid boards as close to cells as possible and run banding through holes and around batteries to secure.
7. After you have completed banding, place the RSA tag on top of the pallet to complete preparation for shipping (See Step 4).



INSTRUCTIONS FOR PREPARING USED FLOODED STATIONARY CELLS FOR SHIPMENT

- Cells must be palletized using a skid/pallet (See "Skid/Pallet Specifications" for details).
- Cells must be upright and secured with wooden cleats on skid/pallet.
- Cells must be banded with steel or plastic banding* and a minimum of three horizontal bands and two vertical bands around cells are required.
- Adequate reinforcement (e.g. plywood) must be placed on the top and sides of the cells to prevent shorting, cutting or distortion.
- Metal banding CAN NOT come in contact with the posts or terminals of the cells.



NOTE:
Do not run banding around the outside of skid boards to avoid the possibility of boards collapsing during shipment.

*These Guidelines were developed by a committee of industry experts and are believed adequate to assure compliance with USDOT requirements effective as of December 2010. However, regulatory requirements in transit, regulatory authorities may challenge the adequacy of your packaging and load securing notwithstanding your compliance with these Guidelines. Seek legal advice if you have any questions about these issues.

Battery Council International
401 North Michigan Avenue, Chicago IL 60611
www.batterycouncil.org
©2010 Printed in the USA.

Battery Council International Used Battery Stack and Wrap Flyer



Transportation Requirements

☐ Regulations

- Transportation of Dangerous Goods (TDG) Regulations.
- Requirements for Wet Battery Shipments and Packaging (49 CFR 173.159)

☐ Requirements

- Hazardous Material Classification
- Packaging
- Registration for shipper (49 CFR107)
- Training
- Container Marking & Labels
- Shipping Papers – Bill of Lading
- Hazardous Waste Manifest
- Vehicle Loading & Unloading
- Placards
- Security & Emergency Procedures



Photo courtesy of Wiley Rein LLP



Extensive Training

- Persons involved in transportation of hazardous material must be Trained in:
 - Hazard Communication
 - Battery and Battery Room Safety
 - Transportation of Hazardous Material Training
 - Packaging and Handling Training
 - Security Training
 - Refresher Training





Recordkeeping

- ❑ Documentation and Reporting
 - Hazard Communications (OSHA 29 CFR 1910.1200)
 - Canada Occupational Health And Safety Regulations
 - *SOR/86-304 Warning of Hazardous Substances 10.13*
- ❑ Permits & Licenses
 - Hazmat profile for batteries
- ❑ Documented Paper Trail
 - Bill of lading (from/to facilities)
 - Bill of lading to recycler
 - Control numbers or serial numbers
- ❑ Training Records





Lead Smelters in Canada

- ❑ Canadian Environmental Protection Act, 1999 (SOR/91-155)
 - Regulations Respecting the Release into the Ambient Air of Lead from Secondary Lead Smelters Lead Smelters in Canada
- ❑ Lead Smelters in Canada
 - Metalex Products Ltd.
 - Guelph Suburban Metals
 - Raw Materials Corporation
 - Teck, Trail, BC
 - Tonolli, Mississauga, ON
 - Newalla, Montreal, PQ
 - Xstrata, Belledune, NB



Selecting a Recycling Vendor

- Vendor Requirements
 - Compliance to Regulations
 - Proper equipment for de-commissioning / de-installation
 - Insurance requirements
- Trained in all aspects of recycling process
- Battery Packaging
- Transportation Permits & Placards
- Marking and Labeling
- Proper Documentation
 - Hazardous Material Manifest
 - Bill of Lading
 - Recycling Certificate

Recycling Requirements

- Battery and Battery Room Safety Practices
- Documentation and Reporting
- Training for all recycling steps
- Packaging and Transportation





References

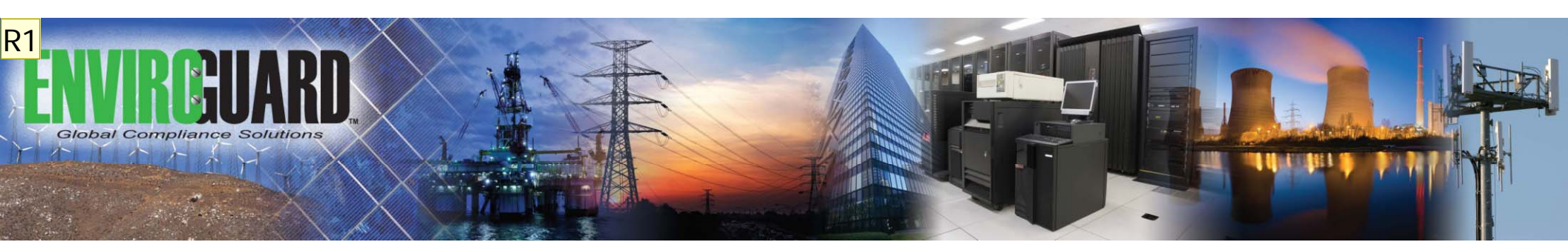
- ❑ BCI (Battery Council International)
<http://www.batterycouncil.org>
- ❑ Environment Canada
<http://www.ec.gc.ca>
- ❑ Transport Canada
<http://www.tc.gc.ca>
- ❑ Province of British Columbia
 - Environment Management Act, Reg 449/2004, Recycling Regulation
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/449_2004
 - Product Stewardship for Lead-Acid Batteries:
<http://www.env.gov.bc.ca/epd/recycling/batt/index.htm>
- ❑ Ontario Ministry of the Environment
<http://www.ene.gov.on.ca/environment>



Acknowledgements

- Dave Weinberg, Wiley Rein LLP
- East Penn Manufacturing, Inc.
- Battery Council International
- Veolia Environmental Services





ENVIROGUARD
Global Compliance Solutions™

Thank You

Mark Durmisevich

Email: MDurmisevich@EnviroGuard.com

Call: 800-206-9884



ComplianceKnowledgeCenter.com

