



Recycling of Spent Batteries on the NCF Campus

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Purpose

Provide guidelines to insure the recycling of spent batteries on the New College of Florida Campus to support our sustainability initiative and to comply with state and federal Universal Waste requirements.

Definitions

EPA – Environmental Protection Agency – Federal Agency that governs and regulates environmental issues.

DEP – (Florida) Department of Environmental Protection – The state agency that regulates environmental issues in Florida. DEP has authority to enforce federal environmental regulations in this state.

RCRA – Resource Conservation and Recovery Act – a federal law that regulates the management and disposal of hazardous wastes.

Hazardous Waste – Any waste material that meets any one criteria of flammability, corrosivity, reactivity, fails a TCLP test, or is listed by EPA as a Hazardous Waste.

Universal Wastes - As defined by EPA, Hazardous Wastes that are subject to the universal waste management requirements in 40 CFR 273, including:

- (1) Batteries as described in §273.2;
- (2) Pesticides as described in §273.3;
- (3) Mercury-containing equipment as described in §273.4; and
- (4) Lamps as described in §273.5.

Responsibility

This section sets forth the various responsibilities of individuals involved in the process of implementing and maintaining this program.

1. The President of The NCF has the ultimate responsibility for ensuring that safety and environmental management programs are implemented and adhered to on campus. The individuals listed below are to act as the President's representatives and handle the day to day issues associated with this program.
2. The Provost, Vice President for Finance and Administration, and Department Heads are responsible for ensuring that faculty and staff are provided with resources and support necessary to provide a safe working and teaching environment, and comply with the intent of this program, within the fiscal resources of the College.
3. The Director of Environmental Health and Safety will develop policy and procedure; provide technical support, consultation, information regarding training, and periodic safety and environmental compliance audits.
4. The Faculty and Staff of the College are responsible for oversight of safety and health issues within their areas of responsibility related to the instruction of students.
 - a. Faculty are responsible for ensuring that students attend training and work safely to insure students understand the proper management of spent batteries;
 - b. Explain proper and safe procedures for management and disposal;
5. Each student, faculty and staff member is expected to attend training and follow procedures and practices outlined in this training guide.

Environmental Procedures

Providing a safe work and learning environment is a fundamental goal of New College, as well as providing an environmentally friendly, safe, and sustainable campus. The use of batteries in electronic equipment is essential to the operation, function and portability of such equipment and technology. However, the proper management and disposal of batteries is essential to prevent pollution to the environment and to comply with regulations.

The following guideline represents a summary of the requirements that must be followed to maintain compliance with New College environmental regulations.

Recycling of Batteries

1. All rechargeable batteries **must** be recycled. This includes but is not limited to nickel cadmium (Ni-Cd), Lead acid, nickel metal halide (NiMH), lithium, and lithium ion batteries.
2. All non-rechargeable batteries containing lithium, cadmium, mercury, silver, lead, or other heavy metals **must** be recycled.
3. Traditional alkaline or carbon/zinc batteries are not required to be recycled by regulations, but may be collected for recycling by our vendor. Recycling conserves resources and is support of the College's sustainability program.

Management of Spent Batteries

Departments that use portable equipment that generate spent/used batteries, on a regular and recurring basis, a collection area should be established to insure that batteries are collected and managed in accordance with state and federal regulations.

Departments that generate spent/used batteries on an occasional basis may contact Environmental Health and Safety (EH&S) for collection information.

The improper management and disposal of Universal Waste Batteries is a violation of RCRA and may lead to hazardous waste citations and fines. Therefore, management and recycling of batteries in accordance with the Universal Waste rules is paramount.

Lead Acid Batteries

Lead Acid batteries are found in many products and equipment. Prior to the disposal of these products, the lead acid batteries must be removed from the equipment prior to disposal and managed for recycling.

The following products may contain lead batteries:

- Automobiles
- Lawn Equipment
- Golf/Utility Carts
- Fire Alarm Panels
- Security Panels
- Emergency Lights
- Exit Lights
- Computer UPS Systems (Back-ups)
- Other – Bicycle lights, electric bicycles, misc. equipment.

Lead acid batteries (automotive and sealed gel cells) must be managed in an area that is out of the weather and contained to prevent spills to the environment. Batteries may not be stored on or above the soil with out secondary containment.

Each battery must be labeled "Spent Lead Battery for Recycling", or similar wording.

Each battery must be labeled with it's "Out of Service" date.

Batteries may not be stored on site longer than one year from the "Out of Service" date.

Leaking batteries must be contained and managed independently as Hazardous Waste (See Appendix A)

Nickel Cadmium Batteries/Alkaline Batteries/Nickel Metal Halide

Nickel Cadmium (Ni- Cd) and Nickel Metal Halide (NiMH) batteries are found in many types of products. Prior to the disposal of these products, the batteries must be removed from the equipment prior to disposal and managed for recycling.

The following products may contain Ni-Cd or NiMH batteries:

- Two way Radios
- Portable Power Tools
- Portable Scientific Equipment
- Portable Electronics
- Cell Phones
- Laptop Computers
- Exit Lights

When batteries are taken out of service, they must be placed in a sealed container and dated with an "Out of Service" Date.

In lieu of labeling each battery, the container may be labeled with the "Out of Service" date; however, all batteries in the container must be removed from site within one year of the "Out of Service" date.

Each container or battery must be labeled Spent Ni-Cd/NiMH batteries for recycling, or similar.

Batteries may not be stored on site longer than one year from the "Out of Service" date.

Leaking batteries must be contained and managed independently as Hazardous Waste (See Appendix A)

Alkaline batteries may be stored/mixed with the Ni/Cd for recycling.

Lithium Batteries

Lithium-metal batteries must be handled carefully to prevent short circuiting causing heat generation and fire. Battery terminals should be covered to prevent contact and short circuiting.

Lithium Batteries may be found in:

- Computers
- Cameras
- Video Recorders
- Other Electronics

Lithium-ion batteries are not as dangerous as lithium-metal; however, caution should still be used.

All lithium containing batteries may be placed in the same container.

Each container or battery must be labeled Spent Lithium batteries for recycling, or similar.

Batteries may not be stored on site longer than one year from the "Out of Service" date.

Button Batteries

Button batteries may contain silver, mercury, lithium or other compounds.

Button batteries are found in many small electronics and computer boards.

These batteries should be placed in a closed container, labeled and dated as indicated above.

DO NOT mix different types of button batteries.

Specialty Batteries and Contracts

All rechargeable batteries must be recycled. Some equipment and instrument suppliers provide a battery recycling service as part on a contract or maintenance agreement with the equipment. Some specialty batteries may be discounted when the spent battery is recycled with the supplier. Maintenance of records and receipts of any individual department/contract battery recycling transactions is responsibility of that department.

Recordkeeping

Disposal and recycling receipts and manifests shall be maintained on file on the Office of Environmental Health and Safety.

Receipts of departmental/contract battery recycling should be forwarded to Environmental Health and Safety.

References

1. Governors Executive Order 2000-292
2. OSHA 29 CFR 1910
3. NCF Safety Policy Statement
4. NCF Environmental Policy Statement
5. NCF Safety Programs as listed on web: <http://www.ncf.edu/campus-directory/administrative-offices/human-resources/environmental-health-safety/safety--environmental-compliance>
6. F.S 403.721 Standards, requirements, and procedures for generators and transporters of hazardous waste and owners and operators of hazardous waste facilities
7. FAC 62-730 Hazardous Waste
8. American College and University, President's Climate Committee
9. http://www.dep.state.fl.us/waste/quick_topics/publications/shw/batteries/pdf_files/4037192.pdf
10. http://edocket.access.gpo.gov/cfr_2003/julqtr/pdf/40cfr273.2.pdf

NEW BATTERY PACKAGING GUIDELINES

from AERC

EFFECTIVE 10/01/03

In the attached document you will find AERC's revised packaging guidelines to be used when shipping batteries to AERC. These guidelines have undergone review and revision by AERC in order address safety requirements for handling, storage and transportation of batteries. The guidelines also meet new USDOT packaging regulations that have been proposed for lithium batteries. The ruling, known as HM224C, was created as a direct response to safety concerns when packaging and transporting lithium batteries. These regulations have already been adopted for international shipments and are expected to be adopted in the near future in the US.

There have been numerous incidents in the industry involving lithium batteries, several of which include waste facility fires, employee injuries, truck fires, retail establishment fires and consumer injuries. All such incidents have involved improper packaging and/or unsafe handling of lithium batteries.

AERC's goal in providing these guidelines is threefold. First, AERC wishes to provide guidance to generators of batteries so that when the batteries are taken out of service, they are handled and packaged properly so that the generator may avoid incident at its site. Secondly, AERC needs to ensure that waste batteries are packaged properly, so that they arrive at AERC safely. Finally, AERC must ensure that its employees and facilities remain safe and without incident caused by improper packaging of batteries.

Therefore, please review the following guidelines closely and begin implementing these procedures for packaging and shipping immediately. AERC will expect all generators to adhere to these guidelines by October 01, 2003. When batteries are received at AERC, a quality control inspection will be performed on each container to ensure that proper packaging methods have been used. Those containers found to be improperly packaged will be assessed off-spec fees to recoup additional handling and repackaging costs assumed by AERC to achieve the necessary, safe, packaging standards.

Upon review, should you have any questions on the attached guidelines, please contact an AERC customer service representative at one of the numbers listed below. AERC appreciates the opportunity to serve your battery recycling needs, and to provide you with procedures and guidelines that will help to protect you, your employees and your company.

SHIPPING AND PACKAGING GUIDELINES FOR CATEGORY 1 LEAD ACID AND SEALED LEAD ACID BATTERIES

General Packaging Guidelines

- Do Not mix lead acid batteries with any other type of battery or material as dangerous hydrogen gases may evolve causing explosion or fire.
- Do Not use metal drums to pack lead acid batteries. Metal drums will not be accepted.
- Containers larger than 5-gallons in size must be secured to pallets for shipping.
- It is strongly recommended that containers of different category wet cell batteries be segregated on separate shipping pallets to minimize potential for reaction in the event of a spill / leak during transportation.
- All batteries must be kept DRY. However, do not package batteries with vermiculite, desiccant, or other packaging material.
- Package batteries to protect against short circuits and to withstand the shocks normally incident to transportation. This can be completed by taping all terminals or contacts with electrical tape or contact covers.
- Leaking batteries must be packaged separately and shipped as a hazardous waste. All free liquid must be separated from the battery casing and containerized. Under no circumstances may free liquid be shipped in the same container as the battery casing! A separate recycling profile must be completed for leaking batteries and battery "free liquid". Contact AERC sales for more information.
- All batteries must be segregated by DOT compatibility and packaged in accordance with USDOT regulations.
- Not adhering to these packaging guidelines will result in a \$500 minimum off-spec fee per occurrence, plus \$50 /man-hour labor charge thereafter.
- Drums must have bungs in lids. Vented pressure relief bungs are required for 15, 30 and 55-gallon containers to minimize pressure buildup. Contact your AERC sales department for information on how to obtain these bungs.
- Due to safety and handling concerns, in-process off-spec batteries will not be returned to the generator if AERC is capable of handling the material. Off-spec fees will still be applied.

Packaging Small, Non-leaking Wet-Cell (less than 3"x5"x6") and Dry-Cell (sealed) Lead Acid Batteries (any size)

- Package small (less than 3"x5"x6" in dimension), **non-leaking** lead acid batteries in one of the following USDOT containers at the Packing Group III performance level:
 1. 1H2 - Plastic, removable head drum; or,
 2. 1G2 - Fiberboard drum with poly liner (4 mil thickness); or,
 3. CF - Fiber box with poly liner (4mil thickness).

Packaging Large, Non-leaking Wet-Cell Lead Acid Batteries (greater than 3"x5"x6")

- Large, **non-leaking** lead acid batteries (greater than 3"x5"x6") must be packaged using one of the following methods:
 - Place batteries securely on a wooden pallet. Place a piece of electrical tape over each terminal to avoid terminal contact. Use shrink-wrap or nylon strapping to secure batteries to the pallet. **DO NOT USE METAL STRAPPING TO SECURE BATTERIES TO THE PALLET.** Batteries may be double stacked on pallets, but pallet height may not exceed 2 times the height of the battery.
 - Individual, large lead acid batteries may be packaged one battery per pallet, poly 5-gallon pail or fiberboard box. Terminals must be taped as above to avoid contact.

Packaging Leaking Lead Acid Batteries

Leaking, lead acid batteries must be packaged as follows:

- Separate all free liquid from battery casing. This liquid should be placed in a poly 1H1 drum or other DOT container compatible with the battery liquid. Profile this solution separately using an AERC Recycling Profile.
- Place the battery carcasses in a poly drum liner (4 mil thickness) and place in a poly 1H2 (removable head) drum. Once again, leaking batteries must be profiled separately from non-leaking batteries for special handling considerations.
- Do not pack battery carcasses with vermiculite, desiccant or packaging material.
- Leaking batteries must be labeled and shipped as a hazardous waste.

Labeling Requirements

- Attach the appropriate Hazard Class 8 or 9 label to the outer container. Attach a master packing slip indicating description and size of all batteries on each pallet, or use an individual packing slip indicating description, total count and weight for each individual container.
- If shipping via a Bill of Lading, attach a Universal Waste Label to the container.
- If shipping via a Hazardous Waste Manifest, attach a Hazardous Waste Label to the container.

SHIPPING AND PACKAGING GUIDELINES FOR CATEGORY 2 ALKALINE OR NICKEL-CADMIUM BATTERIES, ZINC AIR, CARBON ZINC (NON-MERCURY), NICKEL IRON, AND NICKEL METAL HYDRIDE BATTERIES

General Packaging Guidelines:

- Do Not mix category two batteries with any other type of battery to ensure that only batteries that are chemically compatible are packaged together.
- Containers larger than 5-gallons in size must be secured to pallets for shipping.
- It is strongly recommended that containers of different category wet cell batteries be segregated on separate shipping pallets to minimize potential for reaction in the event of a spill / leak during transportation.
- All batteries must be kept DRY. However, do not package batteries with vermiculite, desiccant, or other packaging material.
- Package batteries to protect against short circuits and to withstand the shocks normally incident to transportation. This can be completed by taping all terminals or contacts with electrical tape or contact covers.
- Leaking batteries must be packaged separately and shipped as a hazardous waste. All free liquid must be separated from the battery casing and containerized. Under no circumstances may free liquid be shipped in the same container as the battery casing! A separate recycling profile must be completed for leaking batteries and battery "free liquid". Contact AERC sales for more information.
- All batteries must be segregated by DOT compatibility and packaged in accordance with USDOT regulations.
- Not adhering to these packaging guidelines will result in a \$500 minimum off-spec fee per occurrence, plus \$50/man-hour labor charge thereafter.
- Drums must have bungs in lids. Vented pressure relief bungs are required for 15, 30 and 55-gallon containers to minimize pressure buildup. Contact your AERC sales department for information on how to obtain these bungs.
- Due to safety and handling concerns, in-process off-spec batteries will not be returned to the generator if AERC is capable of handling the material. Off-spec fees will still be applied.

Packaging Dry-Cell, Non-leaking Category 2 Batteries

- All batteries must be segregated (leaking from non-leaking) and packaged in accordance with USDOT regulations.
- Package non-leaking batteries in one of the following USDOT containers at the Packing Group III performance level:
 1. 1A2- Steel, removable head drum with a minimum 4 mm thickness plastic drum liner;

2. 1H2- Plastic, removable head container; or,
 3. 1G2- Fiberboard drum.
- Place each battery in individual plastic bags; *OR*,
Use original packaging in which the batteries were received; *OR*,
Place a piece of electrical (insulation) tape over each terminal to avoid terminal contact.

Packaging Non-leaking Wet-Cell NiCd Batteries and Wet-Cell Alkaline Batteries

- Large, **non-leaking** wet NiCd batteries (greater than 3"x5"x6") must be packaged using one of the following methods:
 - Place batteries securely on a wooden pallet. Place a piece of electrical tape over each terminal to avoid terminal contact. Use shrink-wrap or nylon strapping to secure batteries to the pallet. **DO NOT USE METAL STRAPPING TO SECURE BATTERIES TO THE PALLET.** Batteries may be double stacked on pallets, but pallet height may not exceed 1/1/2 times the width of the pallet.
 - Individual, large Category 2 batteries may be packaged one battery per pallet, poly 5-gallon pail or fiberboard box. Terminals must be taped as above to avoid contact.

Packaging Leaking Category 2 Batteries

- Separate all free liquid from battery casing. This liquid should be placed in a poly 1H1 drum or other DOT container compatible with the battery liquid. Profile this solution separately using an AERC Recycling Profile.
- Place the battery carcasses in a poly drum liner (4 mil thickness) and place in a poly 1H2 (removable head) drum. Once again, leaking batteries must be profiled separately from non-leaking batteries for special handling considerations.
- Do not pack battery carcasses with vermiculite, desiccant or packaging material.
- Leaking batteries must be labeled and shipped as a hazardous waste.

Labeling Requirements

- Attach the appropriate Hazard Class 8 label to the outer container.
- Attach a master packing slip indicating description and size of all batteries on each pallet, or use an individual packing slip indicating description, total count and weight for each individual container.
- If shipping via a Bill of Lading, attach a Universal Waste Label to the container.
- If shipping via a Hazardous Waste Manifest, attach a Hazardous Waste Label to the container.

SHIPPING AND PACKAGING GUIDELINES FOR CATEGORY 3 MERCURY, MERCURIC OXIDE, CARBON ZINC (WITH MERCURY), ATON, AND BUTTON CELL SILVER OXIDE BATTERIES

General Packaging Guidelines

- Do Not mix Category 3 batteries with any other type of battery to ensure chemical and USDOT compatibility.
- Containers larger than 5-gallons in size must be secured to pallets for shipping.
- All batteries must be kept DRY. However, do not package batteries with vermiculite, desiccant, or other packaging material.
- Package batteries to protect against short circuits and to withstand the shocks normally incident to transportation. This can be completed by taping all terminals or contacts with electrical tape or contact covers.
- Leaking batteries must be packaged separately and shipped as a hazardous waste. All free liquid must be separated from the battery casing and containerized. Under no circumstances may free liquid be shipped in the same container as the battery casing! A separate recycling profile must be completed for leaking batteries and battery "free liquid". Contact AERC sales for more information.
- All batteries must be segregated by DOT compatibility and packaged in accordance with USDOT regulations.
- Not adhering to these packaging guidelines will result in a \$500 off-spec fee per occurrence, plus \$50 /man-hour labor charge thereafter.
- Drums must have bungs in lids. Vented pressure relief bungs are required for 15, 30 and 55-gallon containers to minimize pressure buildup. Contact your AERC sales department for information on how to obtain these bungs.
- Due to safety and handling concerns, in-process off-spec batteries will not be returned to the generator if AERC is capable of handling the material. Off-spec fees will still be applied.

Packaging Non-leaking Category 3 Batteries:

- All batteries must be segregated (leaking from non-leaking) and packaged in accordance with USDOT regulations. Package non-leaking batteries in one of the following USDOT containers at the Packing Group III performance level:
 1. 1A2 - Steel, removable head drum with a minimum 4 mm thickness plastic drum liner;
 2. 1H2 - Plastic, removable head drum; or,
 3. 1G2 - Fiberboard drum.
- Place each battery in individual plastic bags; *OR*, Use original packaging in which the batteries were received; *OR*, Place a piece of electrical (insulation) tape over each terminal to avoid terminal contact.

Packaging Leaking Category 3 Batteries

- **Leaking, Category 3 batteries must be packaged as follows:**
 - **Separate all free liquid from battery casing. This liquid should be placed in a poly 1H1 drum or other DOT container compatible with the battery liquid. Profile this solution separately using an AERC Recycling Profile.**
 - **Place the battery carcasses in a poly drum liner (4 mil thickness) and place in a poly 1H2 (removable head) drum. Once again, leaking batteries must be profiled separately from non-leaking batteries for special handling considerations.**
 - **Do not pack battery carcasses with vermiculite, desiccant or packaging material.**
 - **Leaking batteries must be labeled and shipped as a hazardous waste.**

Labeling Requirements

- **Attach the appropriate Hazard Class 8 label to the outer container.**
- **Attach a master packing slip indicating description and size of all batteries on each pallet, or use an individual packing slip indicating description, total count and weight for each individual container.**
- **If shipping via a Bill of Lading, attach a Universal Waste Label to the container. If shipping via a Hazardous Waste Manifest, attach a Hazardous Waste Label to the container.**

SHIPPING AND PACKAGING GUIDELINES FOR CATEGORY 4 LITHIUM, LITHIUM ION AND MAGNESIUM BATTERIES

THESE GUIDELINES ARE WRITTEN TO TAKE INTO ACCOUNT NEW U.S. DOT REGULATIONS, WHICH GO INTO EFFECT FOR LITHIUM BATTERIES IN 2004. AERC HAS ADOPTED THESE GUIDELINES TO ENSURE NOT ONLY DOT PACKAGING COMPLIANCE BUT ALSO TO ENSURE THAT LITHIUM BATTERIES ARE HANDLED AND PACKAGED SAFELY FROM THE POINT OF GENERATION THROUGH RECEIPT AT AERC.

General Packaging Guidelines

- **Do Not mix Category 4 batteries with any other type of battery to ensure chemical and USDOT compatibility. Mixing this category with others could cause explosion or fire.**
- **Containers are limited to 5-gallons maximum in size (66 lb gross weight per container).**
- **Since Lithium is a water-reactive metal, all batteries must be kept dry.**
- **Package batteries to protect against short circuits and to withstand the shocks normally incident to transportation. This can be completed by taping all terminals or contacts with electrical tape or contact covers. Failure to protect terminals will lead to a fire or explosion during storage and/or transportation!**
- **Batteries must be cushioned from contact with other batteries by layering with vermiculite, speedi-dry or kitty litter. Failure to properly cushion could lead to a direct short, fire or explosion during storage and/or transportation!**
- **Leaking batteries must be packaged separately and shipped as a hazardous waste. All free liquid must be separated from the battery casing and containerized. Under no circumstances may free liquid be shipped in the same container as the battery casing! A separate recycling profile must be completed for leaking batteries and battery "free liquid". Contact AERC sales for more information.**
- **All batteries must be segregated by DOT compatibility and packaged in accordance with USDOT regulations.**
- **Not adhering to these packaging guidelines will result in a \$500 off-spec fee per occurrence, plus \$50 /man-hour labor charge thereafter.**
- **Due to safety and handling concerns, in-process off-spec batteries will not be returned to the generator if AERC is capable of handling the material. Off-spec fees will still be applied.**

Packaging Non-leaking Category 4 Batteries:

- **All batteries must be segregated (leaking from non-leaking) and packaged in accordance with USDOT regulations.**

- Package **non-leaking** batteries in one of the following USDOT containers at the Packing Group II performance level - 5-gallon pail maximum outer shipping container:
 1. 1A2 – 5-gallon steel, removable head drum with a minimum 4 mm thickness plastic drum liner;
 2. 1H2 – 5-gallon plastic, removable head drum; or,
 3. 1G2 – 5-gallon fiberboard drum.
- Place each battery in individual plastic bags; *OR*, Use original packaging in which the batteries were received; *OR*, Place a piece of electrical (insulation) tape over each terminal to avoid terminal contact. Failure to protect terminals will lead to a fire or explosion during storage and/or transportation!

Provide cushioning for each battery to prevent contact with other batteries by layering with vermiculite, speedi-dry or kitty litter. Failure to provide adequate cushioning will lead to a fire or explosion during storage and/or transportation!

Packaging Leaking Category 4 Batteries

Leaking, Category 4 batteries must be packaged as follows:

- Separate all free liquid from battery casing. This liquid should be placed in a poly 1H1 drum or other DOT container compatible with the battery liquid. Profile this solution separately using an AERC Recycling Profile.
- Place the battery carcasses in a poly drum liner (4 mil thickness) and place in a poly 1H2 (removable head) drum. Once again, leaking batteries must be profiled separately from non-leaking batteries for special handling considerations.
- Do not pack battery carcasses with vermiculite, desiccant or packaging material.
- Leaking batteries must be labeled and shipped as a hazardous waste.

Labeling Requirements

- Attach a Hazard Class 9 label to the outer container.
- Attach a packing slip to the outer container. The packing slip should indicate description, total count and weight of the container.
- If shipping via a Bill of Lading, attach a Universal Waste Label to the container. If shipping via a Hazardous Waste Manifest, attach a Hazardous Waste Label to the container.