

Battery Technologies for Data Centers and Network Rooms: Environmental Regulations

By Stephen McCluer

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Executive Summary

While most commercial battery back-up systems fall below government-required reporting levels, very large UPS and DC plant batteries may have to comply. Failure to comply can result in costly penalties. For lead acid batteries, environmental compliance focuses on the amount of sulfuric acid and lead at a particular location. Power ratings for VRLA batteries and modular battery cartridges are much higher than for flooded batteries at the same reporting threshold. This paper gives a high level summary of the regulations and guides the reader to sources of full information.

Introduction

UPS systems in offices and information technology (IT) centers overwhelmingly use lead acid type batteries with one of the following three technologies: Vented (Flooded or Wet Cells); Valve Regulated (VRLA); or Modular Battery Cartridges (MBC).

Environmental regulatory compliance is focused on the amount of electrolyte/sulfuric acid and lead in a particular location. Of the three technologies, flooded batteries contain the highest levels of electrolyte/sulfuric acid and lead. The smaller amounts of electrolyte / sulfuric acid and lead in VRLA batteries and MBC allow for larger battery systems to be installed without the regulatory compliance required of comparable vented batteries.

Some common questions upon installing a UPS battery system are:

- Will I have to report my batteries as hazardous material (hazmat)?
- Where do I find the rules?
- What are EPCRA, SARA, SERC, CERCLA, LEPC, etc. and why do I care?
- What do I have to declare?
- When do I have to declare it?
- To whom do I have to declare it?
- What forms do I have to use?
- What if I don't do it?

Most commercial battery back-up systems fall below government-required reporting levels, but large UPS and DC plant batteries may have to comply. Failure to comply can result in costly penalties. Wading through the Code of Federal Regulations can drive a person mad. Approximately 90% of stationary batteries used in the USA are lead-acid. Lead and electrolyte must be reported in different ways to different organizations depending upon the circumstances. VRLA have some advantages over flooded batteries. This paper attempts to cut through the maze and focus specifically on lead-acid battery requirements in terms that a civilian can understand. In general, the rules apply only to very large battery installations, and generally concern planning (reporting the presence of batteries at a site) and accidents (reporting spills or "releases").

The following scenario illustrates the common concern about batteries and compliance:

An IT manager is responsible for a building into which he will be installing (or maybe already has installed) a large, lead-acid battery system to back up critical operations. He is nervous enough about all these batteries and stored electricity under his roof, and now somebody says that he may have a compliance issue. He's already been down the road with the electrical inspectors and fire marshals, and now he hears that the

Federal Government may have a disturbing interest in his facility as well. Who are these people and what do they want?

Getting Started

It is important to understand and get personal with the Environmental Protection Agency (EPA). The Occupational Safety and Health Agency (OSHA) has a thing or two to say, but the EPA is really the driver. They want to know the quantities of substances that could be dangerous to employees or neighbors. If a site has a few hundred battery containers full of lead and sulfuric acid, it is certainly a likely candidate. As with most projects these days, the Internet is a great place to start to gather information. Those who have had dealings with any government in the past already know that there is no single place to go to get an answer to anything, and this will certainly be no exception. However, the best starting place to learn about this subject is www.epa.gov.

In order to better navigate around this website, it is useful to know a few of the buzzwords about the topic. The two broad topic areas that need to be addressed are:

- Pro-active: reporting the hazardous materials present in the batteries at your site
- Re-active: reporting accidents (i.e., spills or “releases”)

These can be broken down into four, more specific types of activities:

- Emergency planning and emergency response plans
- Hazardous chemical storage reporting
- Toxic chemical release inventory
- Emergency release notification

See Appendix A for a glossary of terms most likely to be encountered.

The potentially hazardous substances listed on a material safety data sheet in a lead-acid battery are:

- Electrolyte – Electrolyte in a lead-acid battery is about 1/3 sulfuric acid (CASRN # 7664-93-9) and 2/3 water. Sulfuric acid is considered an “Extremely Hazardous Substance” [EHS]. It is also important to know if the electrolyte is in a liquid state (used in so-called “vented” or “flooded” batteries), or if it is immobilized (as in a Valve Regulated Lead Acid [VRLA] battery).
- Lead [Pb] – CASRN # 7439-92-1 – Battery plates and posts contain solid lead, most of which is encased inside the container. Minute amounts of lead could be suspended in the liquid electrolyte.
- Lead Dioxide [PbO₂] – CASRN # 1309-60-0 – Lead Dioxide is pasted onto the positive plates encased inside the battery. It can only be exposed if the container is ruptured.
- Lead sulfate [PbSO₄] – CASRN # 7446-14-2 – Lead sulfate is formed at both the positive and negative plates during discharge. It normally is present only in insignificant amounts.

Where are the rules?

Before there can be procedures, there must be rules or, in the case of governments, there must be laws. Oddly enough, the laws that affect data centers got their start in 1980 with the EPA “Superfund.” The law was called the “Comprehensive Environmental Response, Compensation, and Liability Act,” or CERCLA (pronounced SIR-cla). In 1986 CERCLA was amended by yet another Act of Congress called the “Superfund Amendments and Reauthorization Act,” (SARA). Embedded in Title III of SARA was the creation of the “Emergency Planning and Community Right-to-Know Act” (EPCRA).

Laws say what must be done, and can be found in the U.S. Code.

SARA is codified in 42 U.S.C 9601 et seq.

EPCRA is codified in 42 U.S.C. 1101 et seq.

Regulations give the procedures of how to do it and can be found in the Code of Federal Regulations (CFRs).

Both the US Code and the CFRs are generally referenced, so it is important to understand both. They both have similar requirements, and they both have similar numbering system, so stay alert. The same chemical will have different reporting requirements and quantities from one section to the next

SARA Title III has four major reporting requirements with the following statutory citations:

Table 1 –SARA Title III and the U.S. Code

SARA SECTION	TOPIC	USC SECTION
302	Emergency planning and emergency response plans for >350 extremely hazardous substances Threshold Planning Quantity (pounds) on site at any one time	11002
304	Emergency release notification Reportable Quantity (pounds) released in a 24-hour period for >1,000 substances	11004
311	Community right to know Threshold Planning Quantity (pounds) for 500,000 products	11021
312	Emergency and hazardous chemical inventory forms	11022

The Code of Federal Regulations is divided into 50 “titles.” OSHA is covered under Title 29, whereas EPA rules fall under Title 40, **Chapter I. Subchapter J** covers Superfund, Emergency Planning, and Community

Right-to-Know programs in Parts 300 - 399. EPCRA is covered in Parts 350 - 372. Only the Parts that correspond to the above and are relevant for stationary storage batteries are described in this paper.

Emergency Planning and Emergency Response Plans

Every community in the United States must be part of a comprehensive plan to prepare for and respond to emergencies involving hazardous substances.

SERCs – The governor of each state designates a State Emergency Response Commission that is responsible for implementing EPCRA provisions within the state.

LEPCs – Under the supervision of the SERCs are some 3,500 emergency planning districts, and within each of those is a Local Emergency Planning Commission. LEPC's members usually include representatives of local fire department, police, civil defense, public health, transportation and environmental agencies, as well as representatives of affected large facilities, community groups and media.

Emergency Response Plan – LEPC's must develop an emergency plan, review it annually, and provide information about chemicals that are present in the community to its citizens.

40 CFR (Chapter I, Subchapter J) Part 355 – Emergency Planning and Notification

Description

- Lists “extremely hazardous substances” (EHS)
- Sets limits for “Threshold Planning Quantities (TPQ)”
- Requires facilities to develop and implement State and local emergency response plans under EPCRA

Reporting Quantities

For stationary batteries, the minimum threshold planning quantities are defined in Appendix A

- **500 pounds of sulfuric acid** (CASN # 7664-93-9)
Note 1: Under statute, the threshold planning quantity in 40 CFR 355-Appendix A for sulfuric acid is 1,000 pounds. However, a footnote refers the reader to 40 CFR 370.20 (b)(1) which says, “The minimum threshold for reporting for extremely hazardous substances is 500 pounds... or the TPQ, whichever is lower.” As sulfuric acid is classified as EHS, its reportable quantity is 500 pounds.

Note 2: This is *not* the amount of *electrolyte*. The government allows breaking out the amount of acid that is in the electrolyte. Because electrolyte is only about 1/3 acid and 2/3 water, the amount of electrolyte would be about three times higher than the amount of acid. Note also

that the requirement is by weight of liquid (pounds), not volume. Contact the battery manufacturer for the exact amount.

Actions Required (for quantities in excess of the Threshold Planning Quantity)

- Notify the commission within 60 days after acquiring the substances for which the facility is subject to emergency planning requirements (one time only)
- Designate a Facility Emergency Response Coordinator
- Notify the Local Emergency Planning Commission (LEPC)
- Provide any information necessary to create a local emergency plan

In the event of an “emergency release”

- Notify the Local Emergency Planning Commission (LEPC) and the State Emergency Response Commission (SERC) as soon as possible (no longer than 24 hours) about the release of a reportable quantity (RQ) of acid if it results in exposure to persons beyond the boundaries of the facility. Notification can be verbal (phone, radio, or in person).
- If it is “transportation-related,” notify the 911 operator
- Follow up in writing with details about the time, duration, media into which the release occurred, any known health risks, appropriate first aid, proper precautions to be taken, summary of actions taken, and contact information
- Reportable Quantities (RQ) are defined in 40 CFR 302.4
 - 10 pounds of lead (only if diameter of the pieces of sold metal is < 100 micrometers (0.004 inches)
Note: Minute amounts of lead suspended in the liquid electrolyte might fall within the size regulated here
 - 10 pounds of lead sulfate
 - 1,000 pounds of sulfuric acid

Penalties for non-compliance (per Section 355.50)

- Civil penalties
 - \$25,000 per day for each violation
 - \$75,000 per day for each subsequent violation
- Criminal penalties
 - Up to \$25,000 fine, or 2 years in prison, or both for first conviction
 - Up to \$50,000 fine, or 5 years in prison, or both for subsequent conviction

40 CFR (Chapter I, Subchapter J) PART 370 – Hazardous Chemical Reporting: Community Right to Know

Description

- Requires the reporting of the presence of “hazardous chemicals” under EPCRA
- The objective is to enhance community awareness and aid in the development of state and local emergency response plans

Reportable Quantities

For stationary batteries, the minimum threshold planning quantities (TPQ) are:

- 10,000 pounds of lead*
*Note: a “hazardous chemical” is any chemical that is a physical or health hazard that requires a Material Safety Data Sheet. Although lead is included under this definition, it would normally not have to be reported per 40 CFR 370.2, exemption (2) which excludes “any substance present as a solid in any manufactured item to the extent exposure to the substance does not occur under normal conditions of use.”
- 500 pounds of sulfuric acid*
*Note: This is not the amount of *electrolyte*. The government allows you to break out the amount of acid that is in the electrolyte. So because electrolyte is about 1/3 acid, the amount of electrolyte would be about three times higher than the amount of acid.

Actions Required

- Submit Material Safety Data Sheets (MSDS)* to the Local Emergency Planning Commission (LEPC), State Emergency Response Commission (SERC), and the local fire department
* see OSHA 29CFR 1910.1200(g) for MSDS development
- Prepare “Tier 1” inventory reports on hazardous material present in the facility during the preceding calendar year above threshold limits
 - Due March 1 of each year. OR
- Prepare “Tier 2” inventory reports upon request by the LEPC, SERC, or local fire department
 - Due March 1 of each year*
*Note: almost all jurisdictions require “Tier 2” reports because they require more detail than a “Tier 1” report. It is possible that *both* Tier 1 *and* Tier 2 would be required
- Provide MSDS to any person in the community who asks for one in writing from the LEPC
- Provide “Tier 2” reports to any person in the community who asks for one in writing from the LEPC or SERC

Penalties for non-compliance (per Section 370.5)

- Failure to provide MSDS sheets: \$10,000 per day for each violation
- Failure to provide Tier I or Tier II inventory reports: \$25,000 per day each violation

Emergency Release Notification

40 CFR (Chapter I, Subchapter J) PART 302 – Designation, Reportable Quantities, and Notification

Description

- Designates substances considered to be “hazardous materials” (hazmat) under CERCLA
- Sets notification requirements for release of hazardous materials
- Establishes “Reportable Quantities” (RQ), including substances designated under the “Clean Water Act” (see Table 302.4)
- Requires notification about the release above a Reportable Quantity to the National Response Center (NRC) (see Section 302.6), with the same type of information as required by the SERC and LEPC. Tel: (800) 424-8802
- Requires criminal penalties for a responsible person who fails to immediately report a release to the NRC

Reporting Quantities

For stationary batteries, notification is required for the release of Reportable Quantities (RQ):

- 10,000 pounds of lead
- 1,000 pounds of sulfuric acid*
*Editorial comment: one gallon of electrolyte weighs about eight pounds. Because electrolyte is approximately 2/3 water, one would have to experience a spill of about 375 gallons of electrolyte. Most stationary battery containers hold less than ten gallons (although some hold as much as 20 gallons). It is difficult to imagine an incident that could result in the release of 375 gallons short of a major earthquake or a volcano. Therefore, one would probably never experience an incident with a flooded battery of a magnitude great enough to trigger notification to the NRC. Because VRLA batteries have “immobilized” electrolyte (i.e., unable to flow), it is safe to say that VRLA batteries would be exempt from reporting under this section.

40 CFR (Chapter I, Subchapter J) PART 372 – Toxic Chemical Release Reporting: Community Right-to-Know

Description

- Although the title sounds like this Part should apply, it is rarely used for batteries except under the extraordinary set of circumstances in which the batteries are used in a site that already falls within an identified Standard Industrial Classification (SIC) major group and has at least ten employees.

- It is not concerned with “spills” or accidental release, but actual “use” (or handling) of a chemical. By a long stretch one could fall into this category if, for example, they were filling dry-charged batteries with electrolyte. Otherwise, 40CFR372 applies only to battery manufacturers.
- It is important to be aware of this requirement if the amount present in a facility exceeds the threshold quantity.

Reporting Quantities

For stationary batteries, declare when quantities present in the facility exceed threshold quantity of:

- 10,000 pounds of sulfuric acid (in airborne form), CAS # 7664-93-9)
- 100 pounds of lead (CAS # 7439-92-1)

Actions Required

- Receive from persons who distribute products containing toxic chemicals the name and Chemical Abstract Service Registry Number (CASRN) of each chemical, per Section 372.45
- Section 372.38 identifies lead as a “chemical of special concern.” The owner or operator must submit to EPA and to the State in which the facility is located a completed Toxic Release Inventory “Form R” (EPA Form 9350-1) if quantities exceed the threshold quantity
 - Due: July 1 of each year
- Request an exemption for reporting batteries per 372.38. Users can *normally* claim exemption from reporting batteries as an “article” because batteries meet three criteria:
 - Formed to a specific shape or design during manufacture
 - Has end-use functions dependent in whole or in part upon its shape or design
 - Does not release a toxic chemical under *normal* circumstances of “otherwise” use at the facility.

Other Considerations

Battery manufacturers must provide Material Safety Data Sheets (MSDS) upon request. They can also provide precise information about the volume/weight of electrolyte in a battery. VRLA batteries use “starved electrolyte” technology, thereby allowing them to use significantly less electrolyte than a comparably rated “flooded” battery. Consequently, the power ratings of systems using VRLA batteries can usually be much larger before they hit the reporting thresholds described above. For example, in one instance where two battery systems of approximately equal ampere-hour batteries were compared, it took only 147 cells of the flooded battery to reach the 500 pound reporting threshold, whereas it took 746 cells of VRLA batteries to reach the same threshold (i.e., five times as many VRLA batteries).

Although **disposal of lead-acid batteries** could be the topic of a paper all on its own, it should be mentioned that disposal of batteries must be carefully controlled. Battery recycling is required by the Solid

Waste Disposal Act, Public Law 89-272, 79 Stat.997, as amended by the Resource Conservation and Recovery Act (RCRA), Public Law 94-580, 90 Stat 2795 (1976). Facilities still operating are covered by RCRA. Sites no longer in operation yet still requiring cleanup are covered by CERCLA. Regulations for packaging and transport of batteries are addressed in 49 CFR 173.159.

Some battery manufacturers will pick up expired batteries free of charge just so they can recycle the lead and plastics for use in new batteries. It is important to obtain and save complete documentation certifying that the batteries have been properly recycled. Even if someone has a good-faith document showing that the batteries were picked up and properly disposed of, they are still designated as a Potentially Responsible Party (PRP) and may be liable for substantial clean-up fees if the batteries later turn up in a toxic waste site – even if they didn't know about it!

Conclusions

Most commercial applications of stationary lead-acid batteries will fall well below the reporting quantities required by the EPA. Flooded batteries are more likely than VRLA batteries to require reporting, whether for reporting inventory or for the release of hazardous materials. Large battery systems can add significantly to a company's compliance work. Although spills or releases of hazardous material (hazmat) for batteries at the reporting threshold are quite rare, one must nevertheless report the presence of battery inventories in the building to local and state authorities, and one must have an emergency preparedness plan in place.

The following is a summary of the steps for inventory reporting per EPCRA:

1. Take an inventory of all batteries in the facility
2. Contact the battery manufacturer(s) and provide model/catalog number of every battery. Ask for
 - Material Safety Data Sheets
 - Spec sheets on each battery; specifically
 - Amount (weight) of lead in each battery
 - Amount (weight) of acid in each battery
 - Amount (weight) of lead dioxide in each battery
3. Calculate the aggregate (total) amount of each material that is present in the entire facility (if on a campus, includes all buildings)
 - Total = number of battery jars X weight of material per jar
4. Determine if the aggregate amount exceeds the minimum threshold for reporting:
 - 500 pounds of sulfuric acid (or approx 1500 pounds of electrolyte)
 - 10,000 pounds of lead
 - 10,000 pounds of lead sulfate
5. If threshold is exceeded
 - Contact the facility's Emergency Response Coordinator (ERC); appoint an ERC if none already exists

- Contact the Local Emergency Planning Commission (LEPC); determine the type of report required (usually a “Tier Two” report)
 - Fill out the forms. Owner, operator, or officially designated representative must certify the accuracy of data
 - Submit the form plus Material Safety Data Sheets (MSDS) within 60 days after receipt of batteries that cause the facility to exceed the reporting amount (or as soon as possible if already on site). Forms can be found in www.EPA.gov >Laws & Regs >CFR >CFR Title 40 >Ch I >Sub Ch J >Part 370 >370.40 or 370.41
6. Submit updates
- Annually by March 1 for the previous year
 - Within 90 days of any significant change
7. Permit on-site inspections upon request by the Fire Department having jurisdiction
8. Submit Tier 1, Tier 2, and / or MSDS within 30 days of a request by the SERC, LEPC, or Fire Dept.
9. Get help at:
- EPCRA Hotline: (800) 424-9356 or (703) 412-9810 (M-F, 9:00 – 6:00)EST
 - CEPPPO (Chemical Emergency Preparedness & Prevention Office)
 - www.epa.gov/ceppo/ or
 - <http://yosemite.epa.gov/oswer/ceppoweb.nsf/webprintview/epcraOverview.htm>

About the Author:

Stephen McCluer is a Senior Applications Engineer for external codes and standards compliance at APC. He has 25 years of experience in the power protection industry, and is a member of NFPA, ICC, IAEI, ASHRAE and the IEEE Standards Council. He serves on a number of committees with those organizations, is a frequent speaker at industry conferences, and has authored technical papers and articles on power quality topics.

Appendix A: Acronyms and Terms

CAA	Clean Air Act
Carcinogen	Any chemical identified as a carcinogen by the National Toxicology Program or regulated as a carcinogen by OSHA per 20CFR 1910.1200 Appendix A
Caustic	Having power to burn, corrode, or eat away animal tissue by chemical action. Not defined by EPA; Potassium hydroxide in NiCad batteries is an example of caustic material
Corrosive	A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact
CAS (RN)	Chemical Abstract Service (Registry Number)
CERCLA	Comprehensive Environmental Response, Compensation and Liabilities Act (Superfund)
CFR	Code of Federal Regulations
EHS	Extremely Hazardous Substance (see EPCRA Section 302)
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to know Act
Facility	All buildings, equipment, structures, and other stationary items located on a single site that are owned or operated or under the control of the same person. A facility may contain more than one "establishment."
Hazardous Substance	Any substance listed in 40 CFR Part 302, table 302.4. Any chemical that can cause a physical or a health hazard as determined by the chemical manufacturer in accordance with 29 CFR 1910.1200
LEPC	Local Emergency Planning Committee
NRC	National Response Center - Spills/releases above threshold quantities must be reported by phone to the NRC
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act of 1976, as amended
Release	Any spilling, leaking, emptying, escaping, dumping, or disposing into the environment
RQ	Reportable Quantity – releases above this quantity (in pounds) must be reported (see EPCRA Section 302)
Regulations	Rules created and published by EPA to implement the statutes passed by Congress.
SARA	Superfund Amendment and Reauthorization Act of 1986
SERC	State Emergency Response Commission
Statute	Legislation passed by the United States Congress (e.g., CAA and EPCRA)
Toxic or Highly Toxic	A chemical that is lethal when tested on laboratory rats and rabbits per OSHA 20CFR 1910.1200 Appendix A
TPQ	Threshold Planning Quantity – presence in a facility of substances above this quantity (in pounds) must be reported (see EPCRA Section 302)
TQ	Threshold Quantity (term is used generically in this paper to mean the limit above which a substance must be reported) Reportable quantity (in pounds) per Clean Air Act section 112 [r].

Appendix B: Where to get EPA information on Batteries

Information Type	Contact Information / Comments / Description
HELP	RCRA, Superfund and EPCRA Call Center Tel: 1-800-424-9346 Mon-Fri, 9:00 a.m. – 5:00 p.m. EST x 2 Regulatory information x 4 EPCRA x 3 Documents
EPA	www.EPA.gov
Community Right-to-Know Reporting Requirements SARA Sections 311	40 CFR 370-EPA -- Hazardous Chemical Reporting & Community Right-to-Know Requirements www.epa.gov/docs/epacfr40/chapt-I.info >subch-J >370 29 CFR 1910.1200 -- Hazard Communications www.access.gpo.gov/nara/dfr/waisidx-03/20cfr1910a-03.html
Emergency Planning SARA Sections 301-303	40 CFR 355 – EPA Regulations for Emergency Planning and Notification under CERCLA www.epa.gov/docs/epacfr40/chapt-I.info > subch-J >355
Emergency Release Notification SARA Section 304	40 CFR 355 – EPA Regulations for Emergency Planning and Notification under CERCLA www.epa.gov/docs/epacfr40/chapt-I.info > subch-J >355 40 CFR 302 – Designation, Reportable Quantities, and Notification: www.epa.gov/docs/epacfr40/chapt-I.info > subch-J >302 29 CFR 1910.1200 -- Hazard Communications www.access.gpo.gov/nara/dfr/waisidx-03/20cfr1910a-03.html
Laws and Regulations	Laws & Regulations www.epa.gov/ceppo/rules/
Clean Air Act CAA Section 112[r] Accidental Release Prevention – General Duty Clause	40 CFR 68 – EPA accidental Release Prevention Requirements and Risk Management Programs Under the Clean Air Act, Section 112[r] www.epa.gov/ceppo/rules/112r-pra.html www.epa.gov/swercepp/rules/caaa112r.txt
Worker Protection	40 CFR 311 – Worker Protection www.epa.gov/docs/epacfr40chapt-I.info >subch-J >311
EPCRA Interpretations FAQ	EPCRA Letters in Response to Frequently Asked Questions www.epa.gov/swercepp/pubs/epcra/faqs.html
Code of Federal Regulations CFR	Code of Federal Regulations www.gpoaccess.gov/cfr/retrieve.html

References

Technical Application Note #4, Codes, Practices and Procedures for Valve Regulated Lead-Acid Batteries Use in Stationary DC Power Battery Rooms,” Panasonic Battery,
www.panasonic.com/industrial/battery/oem/chem/vrla/index.html

EPA 550-F-00-004, "The Emergency Planning and Community Right-to-Know Act," U.S. Environmental Protection Agency/Office of Solid Waste and Emergency Response/Chemical Emergency Preparedness and Prevention Office, March 2000

Code of Federal Regulations
www.gpoaccess.gov/ecfr/index.html

EPCRA Overview
<http://yosemite.epa.gov/oswer/ceppoweb.nsf/webprintview/epcraOverview.htm>

Laws & Regulations, www.epa.gov/ceppo/

Solid Waste Disposal Act/Resource Conservation & Recovery Act
www.ecs.noaa.gov/documents/eo12780.html

29 CFR 1910.1200 - Hazard Communications,
www.gpoaccess.gov/ecfr/index.html > Title 20 - Labor > Subtitle B > 1900-1910-OSHA

40 CFR 68 – EPA Accidental Release Prevention Requirements & Risk Management Programs Under the Clear Air Act, Section 112[r]
www.EPA.gov/ceppo/rules/caaa112r.txt
www.gpoaccess.gov/ecfr/index.html > title 40-Environment > Parts 64-71 > Part 68-Chemical Accident Protection

49 CFR 173.159 – Transportation of wet batteries
www.gpoaccess.gov/ecfr/index.html > Title 49 – Transportation > Subtitle B

40 CFR 302-EPA - Designation, Reportable Quantities, & Notification,
www.EPA.gov/docs/epacfr40/chapt-I.info >Subchapter J – Superfund > Part 302

40 CFR 311 – Worker Protection

www.EPA.gov/docs/epacfr40chapt-I.info >subch J > Part 311

40 CFR 355-EPA – Regulations for Emergency Planning & Notification under CERCLA

www.EPA.gov/docs/epacfr40/chapt-I.info >subch J > Part 355

40 CFR 370-EPA - Hazardous Chemical Reporting & Community Right-to-Know Requirements

www.EPA.gov/docs/epacfr40/chapt-I.info sub > Part 370

IEEE 1184, *Guide for Batteries for Uninterruptible Power Systems*,” Institute of Electrical and Electronics Engineers