

A Guide on Hazardous Waste Management for Florida's



Laboratories

Prepared by: Florida Department of Environmental Protection Hazardous Waste Compliance Assistance Program



This document was published to help educate businesses on hazardous waste management issues affecting them. The suggested options may help businesses to operate in an environmentally appropriate manner. Some of the options may go beyond what is required to remain in compliance with regulations. Business owners are responsible for obtaining complete information about applicable regulations. Misrepresentations or omissions by the Florida Department of Environmental Protection or the Florida Center for Solid and Hazardous Waste Management do not relieve any person from any requirement of federal regulations or Florida law.

These regulations are available at many public libraries. In addition, the Florida Department of Environmental Protection and the United States Environmental Protection Agency have posted links to copies of these regulations on the agencies' Internet sites:

http://www.dep.state.fl.us/waste/quick_topics/publications/default.htm

Why should I care about hazardous wastes?

As a business owner, operator or employee, you may be producing materials that can harm people and the environment. This booklet offers helpful tips on how to:

- Comply with federal and state hazardous waste regulations.
- Avoid penalties by properly managing hazardous wastes.
- Save money on disposal costs by reducing hazardous wastes.

Health and Environment

Hazardous wastes spilled or dumped on the ground or disposed in dumpsters may seep into groundwater and contaminate drinking water supplies.

Hazardous wastes may run off into the nearest body of water where they may poison or kill fish and other wildlife.

Hazardous wastes pose a risk to you, your employees and your community.

Cost Savings

State and county inspectors may visit your business to ensure that hazardous wastes are being managed properly. State penalties range from \$100 to \$50,000 **per violation per day**.

Reducing hazardous wastes can reduce your production and disposal costs and reduce your risk of future liability.

Public Image

Your customers will appreciate your efforts to prevent pollution.

Your community will recognize your business as a good neighbor.

What is a hazardous waste?

A waste is hazardous if:

- It is listed as a hazardous waste in the Title 40 Code of Federal Regulations (CFR) Part 261, Subpart D.
- It has any of the characteristics described below:

Characteristic Wastes

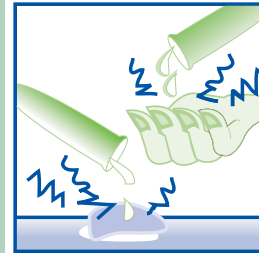
Ignitable

Ignitable wastes are flammable or spontaneously combustible. If they have a flashpoint of less than 140 degrees Fahrenheit or an alcohol content of 24% or more, they are hazardous wastes. Examples include some alcohols and chromates (oxidizers).



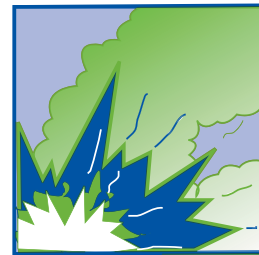
Corrosive

Corrosive wastes can burn the skin or corrode metals. Liquids with a pH of 2 or lower or 12.5 or higher are corrosive. Examples include strong acids and bases.



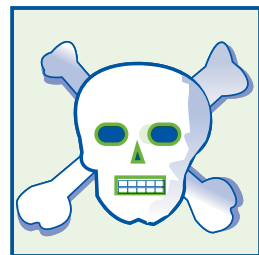
Reactive

Reactive wastes are unstable and may explode or react rapidly or violently with water or other materials. Examples include sulfides, cyanides and crystallized (dry) picric acid.



Toxic

Wastes are toxic if they contain certain heavy metals above specific concentrations, such as chromium, lead, mercury or cadmium, or toxic organic chemicals. Examples include benzene, trichloro-ethylene and tetrachloroethylene.



Listed Wastes

Some industrial processes and chemical wastes are listed specifically as hazardous in the federal regulations under 40 CFR 261, Subpart D. Copies of the rule can be found at many public libraries, on the internet (<http://www.gpoaccess.gov/cfr/index.html>) or may be purchased from the Government Printing Office.

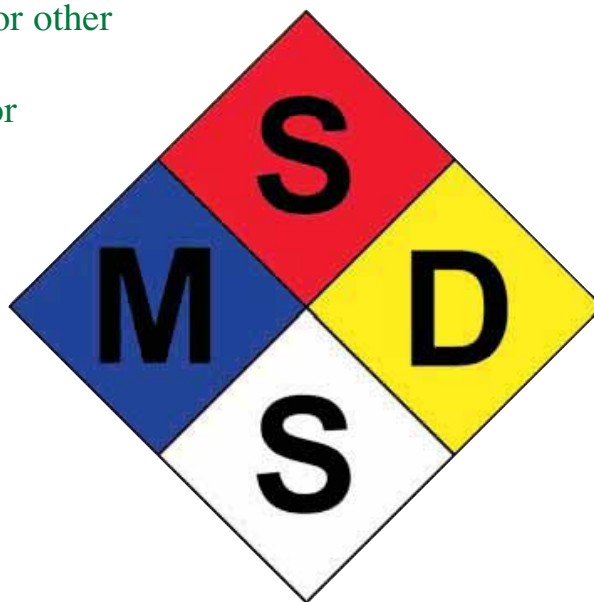
Acutely Hazardous Wastes

Small amounts of very dangerous wastes, such as arsenic and cyanide compounds, are regulated in the same way as large amounts of other wastes. A business that generates 2.2 pounds (1 kilogram) or more of these acutely hazardous wastes per month is subject to full regulation under the hazardous waste rules.

Identifying Your Hazardous Wastes

It is very important to determine whether a waste is hazardous or non-hazardous. There are several ways to identify hazardous wastes.

- Always ask for a Material Safety Data Sheet (MSDS) before ordering any new product. The MSDS will give you valuable information about the product. Note: the MSDS does not identify chemicals present in concentrations less than 1%, or 10,000 parts per million.
- Talk to product suppliers and manufacturers.
- Read product labels.
- Compare product and process information to hazardous waste characteristics and to wastes listed in federal regulations.
- If product or process information is not available or is inconclusive, have a commercial lab sample and test the waste using the TCLP test or other appropriate analytical tests.
- A non-hazardous material or product may become a hazardous waste due to contaminants added during use. Lab testing may be necessary.



Sources of Hazardous Waste

- **Spent solvents** used in cleaning, extraction and other processes.
- **Non-empty** solvent containers or aerosol cans.
- **Testing samples**, if they are not entirely consumed by the test procedure.
- **Unused reagents** that are no longer needed, do not meet specifications, are contaminated, have exceeded their storage life or are otherwise unusable in the lab.
- **Reaction products** of known or unknown composition. Try to identify reaction products and label them for proper disposal.
- **Absorbents** used to clean up hazardous wastes.
- **Contaminated materials** such as glassware, gloves, paper and plastic products.
- **Used chromatography vials.**
- **Gas cylinders.**
- **Mercury spills.**



Typical Hazardous Wastes

ACIDS/BASES (corrosive)

Acetic acid
Ammonium hydroxide
Hydrochloric acid
Muriatic acid
Nitric acid
Oleum
Potassium hydroxide
Sodium hydroxide
Sulfuric acid

REACTIVES

Calcium metal
Dry picric acid (should not
be disposed of by
untrained personnel)
Potassium cyanide
Potassium metal
Sodium hydride
Sodium sulfide
Stannic chloride

OXIDIZERS (ignitable)

Ammonium chromate
Chromium trioxide
Lead chromate
Manganese dioxide
Potassium permanganate
Silver nitrate
Sodium bromate
Sodium chromate

SOLVENTS (ignitable)

Acetone
Benzene
Ethanol
Ethyl ether
Formaldehyde (potential)
Hexane
Isopropanol
Methanol
Methylene chlorides
Methyl ethyl ketone (MEK)
Pentane
Pyridine
Tetrahydrofuran
Toluene
Xylene

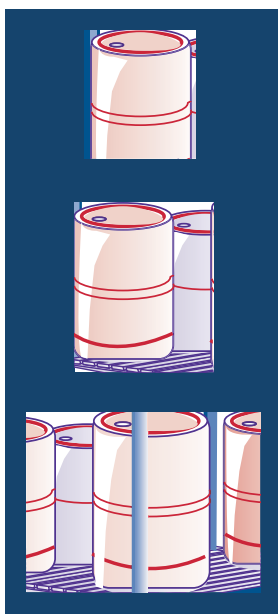
TOXICS

Acetaldehyde
Allyl alcohol
Barium
Carbon disulfide
Carbon tetrachloride
Chloroform
Chromium
Hydrazine
Lead
Mercury
Naphthalene
Sodium azide



How should I manage hazardous wastes?

First, determine how much hazardous waste you generate **each month**. The rules you must follow depend on how much you generate, how much you store and how long you store it.



Less than 220 pounds (100 kilograms or about half a drum): you are a “Conditionally Exempt Small Quantity Generator” (CESQG).

220 - 2,200 pounds (100-1,000 kilograms or about half a drum to 5 drums): you are a “Small Quantity Generator” (SQG).

More than 2,200 pounds (1,000 kilograms or more than about 5 drums or 1 kilogram or more of acutely hazardous waste): you are a “Large Quantity Generator” (LQG).

The following practices may be required for your business. Even if they are not required, they are good waste management practices. Additional information is available from FDEP.

Containers

- Maintain containers in good condition. Prevent leaks, ruptures and accumulation of rainwater on tops of drums.
- If a container leaks, transfer waste to a new container.
- Keep containers closed. Use self-closing funnels when adding waste. Do not allow wastes to evaporate; this is a serious offense.
- Wastes must be compatible with the container. For example, use HDPE plastic containers for corrosive wastes.
- Never place incompatible wastes, such as wastes that react with each other (e.g., acids and bases), in the same container.

Storage

- Maintain adequate aisle space between container rows to allow inspection for leaks and damages.
- Store ignitable and reactive wastes at least 50 feet from property boundaries.
- Store containers with incompatible wastes in separate areas.
- Time limit for SQGs is 180 days and 90 days for LQGs.

Labels



- The above label represents proper wording for a hazardous waste label. You must also comply with FDOT.
- Label every container with the type of waste and whether it is hazardous or non-hazardous.
- Include the accumulation start date (the date when waste was first placed in the container).
- Include your laboratory name and address.
- Include federal waste code numbers.

Transport and Disposal

- Make sure your transport and disposal facility have US EPA identification numbers.
- Use manifests for all hazardous wastes shipped off-site. Keep the manifests on-site. (CESQGs do not have to manifest their waste)

Inspections and Recordkeeping

- Inspect containers at least once a week and keep a written log of container inspections.
- Keep a record of larger spills and use this information to identify the spill prevention options that might help your lab.
- Keep training and inspection records for three years.
- Keep manifests and shipping receipts for three years.
- Keep records of lab tests for three years.
- Keep land disposal restriction forms for three years from the date the waste was last shipped.

Training

- Train all personnel to identify, reduce and properly handle wastes.
- Train new employees before they handle hazardous wastes.
- Inform employees of the importance of pollution prevention.

How can I reduce hazardous wastes?

Reducing hazardous wastes makes good business sense. Benefits include:

- Saving money on waste management costs.
- Reducing concerns about penalties and liability.
- Creating a safer, healthier workplace.
- Promoting positive public relations with clients, customers and the local community.

How do I begin?



- Make a commitment to reducing wastes in every area of your laboratory's operations.
- Evaluate your laboratory's wastes and identify areas where changes can be made.
- Encourage the participation of all laboratory personnel through education, training and incentives.

Purchasing

- Save money by ordering smaller quantities of chemicals and reducing the need to dispose of excess chemicals.
- Purchase smaller packages of chemicals to reduce storage requirements and reduce the risk of breakage and accidents.
- Purchase gas cylinders from vendors who will take back the empty cylinders.
- Purchase chemicals from suppliers who will take back unopened chemicals.
- Purchase supplies from vendors who promote small quantity purchases and who will accept returns of unopened bottles.



Inventory



- Use older chemicals first.
- Use the chemicals in the stockroom first before ordering new products.
- Label all chemicals with date of manufacture.
- Create an effective inventory system to reduce waste.
- After inventory is reduced, prevent accumulation of new inventory.
- If a constant stock is required, perform an inventory review at least once a year.

Laboratory

- Do microscale experiments using smaller vessels and smaller amounts of chemicals.
- Do one-pot reactions where one reaction's product(s) can be the starting point for another reaction.
- Use water-based solvents.
- Perform in-lab treatment of waste including neutralization, separation, fixation, oxidation, precipitation, degradation or ion exchange.
- Reuse acid mixtures for electroplating.



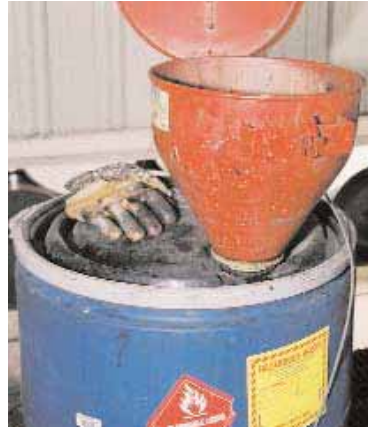
Cleanup

- Use detergents and hot water instead of chromic acid solutions to clean.
- Recover noble metals such as silver and palladium and heavy metals such as mercury.
- If possible, convert waste to product for another reaction.
- Train all personnel to use smaller amounts of chemicals and to properly dispose of waste.

Dos and Don'ts



DO
Keep containers closed



DON'T
Leave containers open

MANUAL DUST INSPECTION

The following information is to be used for the purpose of the manual dust inspection. The inspector is to inspect the container for the presence of dust, and to record the results of the inspection. The inspector is to record the results of the inspection in the following table. The inspector is to record the results of the inspection in the following table.

INSPECTOR: _____ DATE: _____

LOCATION: _____

CONTAINER ID: _____

CONTAINER TYPE: _____

CONTAINER VOLUME: _____

CONTAINER WEIGHT: _____

CONTAINER ID	DATE	INSPECTOR	CONTAINER TYPE	CONTAINER VOLUME	CONTAINER WEIGHT
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DO
Keep accurate inspection logs



DO
Label all containers



DON'T
Leave containers unlabeled

Who needs to know if my laboratory generates hazardous waste?

Post Emergency Information

Post the following information near every telephone:

- * Fire department phone number.
- * Emergency coordinator's name and phone number.
- * Locations of fire alarms and extinguishers.
- * Locations of spill control materials.

Notify FDEP

If your laboratory is a small or large quantity generator, notify FDEP to obtain a US EPA identification number. Local environmental agencies also should be notified.

Notify local authorities

Police and fire departments and local hospitals that would respond to an emergency need to know that there are hazardous wastes on your property.

Designate an emergency coordinator

This person must know what to do in case of fire, spill or other emergency and must be on the premises or on call 24 hours a day.

Develop a contingency plan

Guidance on contingency plans is available from FDEP. Large quantity generators must have a written plan that includes:

- * Emergency response arrangements with police and fire departments, hospitals and emergency response contractors.
- * Emergency coordinator's address and phone number.
- * On-site emergency equipment descriptions and locations.
- * Evacuation plan and routes, including a site diagram.
- * Spill reporting procedures.

Smaller generators (SQGs and CESQGs) also should have a contingency plan.

Tips from Inspectors

Drums



- You cannot have any mystery drums. All drums must be labeled and have a “birthdate” on them.
- Evaporation of hazardous waste is a serious violation. Do not allow the hazardous wastes to

evaporate. When you are not in the process of putting waste into the drum, you must keep it closed.

- You also are required to keep the top of the drum clean.
- Do not store old drums outside. If they get stormwater inside them, you will have to sample the stormwater and determine whether the water in the drum is hazardous. Insist that the person who sold you the drum and its contents takes the drum back when you are done with it.

- Inspectors go into dumpsters and walk the entire property line of a business. They go back into trees looking for orphan drums and distressed/dead vegetation.



Spills

- Clean up your spills at the time of the spill.

Transport

- The only generators who are allowed to transport their own waste are conditionally exempt small quantity generators. All other generators must use a hazardous waste hauler that has a permit from the FDEP and the US EPA.

Waste

- The most common violation is the non-determination of whether something is a waste.
- Abandoned products are wastes.
- If you throw away containers, make sure the container is completely empty and rinsed before you place it in a waste receptacle. If you throw away aerosol cans, make sure the can has a hole in it, and that you have drained the liquids out of the can. If you are throwing away paint containers, be sure to drain all the paint out of the container.

Water

- If you discharge any waste that could be construed as a hazardous waste into a city sewer, you must have the written permission of the city sewer system. The city sewer system must be a Publicly Owned Treatment Works (POTW). It cannot be a privately owned package plant.
- If you use rags, you should send the rags to a linen service that is served by a publicly-owned sewage treatment plant. If you use paper towels, you must make a determination as to whether the used paper towels are a hazardous waste.
- Know where your drains go. All drains that lead from a hazardous materials area to a stormwater area should be sealed shut.



Checklist

This checklist will help you prevent the most common hazardous waste violations. For more detailed information on hazardous waste management requirements, contact FDEP.

- Each month, identify and record types and quantities of hazardous waste.
- Notify FDEP and obtain a US EPA identification number.
- Use proper containers to collect and store wastes.
- Label all containers, whether product or waste, as to their contents.
- Include accumulation start dates on labels.
- Keep all containers of hazardous waste or products containing regulated solvents closed at all times unless actively removing from or adding to them.
- Maintain aisle space between containers for inspection.
- Inspect containers weekly for rust, leaks or damage and keep a log.
- Train employees to properly handle hazardous wastes.
- Designate an emergency coordinator.
- Post emergency information near each phone.
- Develop a contingency plan for emergencies.
- Use manifests for all waste transported for disposal.
- Keep all records for at least three years.



What is the Academic Labs Rule?

Laboratories owned by or formally affiliated with colleges and universities may be eligible to use the Academic Laboratories Rule (Subpart K) for managing hazardous waste. Subpart K provides an optional alternative to the Satellite Accumulation Area (SAA) generator regulations.

Subpart K is tailored for the academic laboratory environment:

- Hundreds of different hazardous wastes that vary over time
- Small volumes of each waste
- Many points of generation
- Hazardous waste generated by students with high turnover, minimal training, and limited accountability

Subpart K offers benefits and incentives for participating academic laboratories:

- Increased Laboratory Safety
 - ✓ More accurate hazardous waste determinations made by experts
 - ✓ Training required for students and laboratory workers
 - ✓ Laboratory clean-out incentives for removing expired chemicals
 - ✓ Time-driven removals of hazardous waste on a regular basis
 - ✓ Laboratory Management Plan for safer practices and increased awareness
- More Flexibility
 - ✓ Choice of when and where to make hazardous waste determinations
 - ✓ Performance-based container management standards
- Efficiencies and Cost Savings
 - ✓ Laboratories not required to count unused hazardous wastes generated during a once-a-year laboratory clean-out toward generator status
 - ✓ Thirty days allowed for once-a-year laboratory clean-out and no volume limit for clean-out materials
 - ✓ On-site consolidation means less vendor time on-site and fewer partially full containers
 - ✓ Increased laboratory safety leads to reduced liability and the potential for lower insurance rates

Laboratories that intend to use this option must notify the Florida Department of Environmental Protection using the Florida Notification of Regulated Waste Activities form 8700-12FL, and develop and implement their own laboratory management plans. A table comparing SAA with Subpart K follows on the next page.



Side-by-Side Comparison: Satellite Accumulation vs. Academic Labs Rule

	Laboratories that Operate as Satellite Accumulation Areas (SAA)	Laboratories that Operate Under the Academic Laboratories Rule (Subpart K)
Regulatory Citation	<ul style="list-style-type: none"> 40 CFR 262.34(c) 	<ul style="list-style-type: none"> 40 CFR Part 262 Subpart K
Applicability	<ul style="list-style-type: none"> Any SQG or LQG may establish an SAA “at or near any point of generation” 	<ul style="list-style-type: none"> Any CESQG, SQG or LQG that is an eligible academic entity may opt into Subpart K An eligible academic entity is a <ul style="list-style-type: none"> College or university (C/U), or Teaching hospital or non-profit research institute that is owned by or has a formal written affiliation agreement with a C/U
Terminology for regulated materials	<ul style="list-style-type: none"> Hazardous waste Acute hazardous waste 	<ul style="list-style-type: none"> Unwanted material Reactive acutely hazardous unwanted material
Maximum accumulation time in lab	<ul style="list-style-type: none"> No time limit, unless maximum accumulation volumes are exceeded (see below) 	<ul style="list-style-type: none"> Six months
Maximum accumulation volume in lab	<ul style="list-style-type: none"> 55 gallons of hazardous waste Total of 1 quart of 124 P-listed acute hazardous wastes 	<ul style="list-style-type: none"> 55 gallons of unwanted material Total of 1 quart of 6 P-listed reactive acutely hazardous unwanted materials
Time allowed to exceed maximum volumes in lab	<ul style="list-style-type: none"> 3 calendar days 	<ul style="list-style-type: none"> 10 calendar days
Container labeling in lab	<ul style="list-style-type: none"> “Hazardous waste” or “Other words that identify the contents of the container” 	<ul style="list-style-type: none"> “Unwanted material” or “other equally effective term,” and Information re: contents of the container, and Sufficient information to make a hazardous waste determination, and Accumulation start date
Hazardous waste determination	<ul style="list-style-type: none"> Must be made at the point of generation: In the SAA When the waste is first generated 	<ul style="list-style-type: none"> Choice of where and when to make: In the lab, before it is shipped off-site Within 4 days of arriving at on-site Central Accumulation Area (CAA) Within 4 days of arriving at on-site TSD

This chart is a summary of federal regulations and is not intended to be exhaustive.

Prepared by EPA, July 2009



	Laboratories that Operate as Satellite Accumulation Areas (SAA)	Laboratories that Operate Under the Academic Laboratories Rule (Subpart K)
Acutes – Hazardous waste determination and generator status	<ul style="list-style-type: none"> Any of 124 P-listed acute hazardous waste codes could apply LQG status if >1 kg/month None required for laboratory personnel Training required for personnel outside of SAA 	<ul style="list-style-type: none"> Any of 124 P-listed acute hazardous waste codes could apply LQG status if >1 kg/month Training that is “commensurate with duties” is required for lab workers and students in labs Training required for personnel outside of lab (“trained professionals”)
Training	<ul style="list-style-type: none"> None required for laboratory personnel Training required for personnel outside of SAA 	<ul style="list-style-type: none"> Training that is “commensurate with duties” is required for lab workers and students in labs Training required for personnel outside of lab (“trained professionals”)
Container management	<ul style="list-style-type: none"> Containers must be in good condition Contents must be compatible with container Containers must be kept closed except: <ul style="list-style-type: none"> When adding or removing waste 	<ul style="list-style-type: none"> Containers must be in good condition Contents must be compatible with container Containers must be kept closed except: <ul style="list-style-type: none"> When adding, removing, or consolidating unwanted materials Working containers may remain open until the end of shift or procedure, whichever is first When venting is necessary
On-site consolidation of containers	<ul style="list-style-type: none"> Transfer of containers between SAAs is not allowed, therefore on-site consolidation of containers may not occur without a 90/180 day area 	<ul style="list-style-type: none"> Transfer of containers between labs is allowed, therefore on-site consolidation of containers may occur without a 90/180 day area
Laboratory clean-outs	<ul style="list-style-type: none"> Maximum volumes are easily exceeded and excess volumes must be removed within 3 days Often results in an increase in generator status (episodic generation) 	<p>Incentives provided to conduct clean-outs: (limited to once per lab per 12 months)</p> <ul style="list-style-type: none"> 30 days to conduct a clean-out Do not have to count hazardous waste from a clean-out toward generator status if it is an UNUSED commercial chemical product (i.e., P- or U-listed, or characteristic)
Laboratory management plan (LMP)	<ul style="list-style-type: none"> Not required 	<p>2-Part LMP required with 9 elements:</p> <ul style="list-style-type: none"> Contents of Part I are enforceable <ul style="list-style-type: none"> 2 elements in Part I Contents of Part II are NOT enforceable <ul style="list-style-type: none"> 7 elements in Part II

Where can I get more information?

Additional information on hazardous waste reduction and regulations is available from many sources.

Florida Department of Environmental Protection

District offices and the Tallahassee office offer technical assistance, fact sheets and other publications on hazardous waste regulations.

Hazardous Waste Compliance Assistance Program

Bob Martinez Building

2600 Blair Stone Rd.

Tallahassee, FL 32399-2400

(800) 741-4DEP (850) 245-8707

<http://www.dep.state.fl.us/waste/>

[quick_topics/publications/default.htm](http://www.dep.state.fl.us/waste/quick_topics/publications/default.htm)

Available publications include:

Summary of Hazardous Waste Regulations

Requirements for Conditionally Exempt Small Quantity Generators

Handbook for Small Quantity Generators of Hazardous Waste

The 8700-12FL form can be found under the Rules information link.

U.S. Environmental Protection Agency

The US EPA has published a series of industry-specific guidelines and handbooks on preventing pollution and complying with hazardous waste regulations.

RCRA Hotline: (800) 424-9346

Your Trade Associations

Many trade associations have published guides to help you find solutions to your hazardous waste management problems.

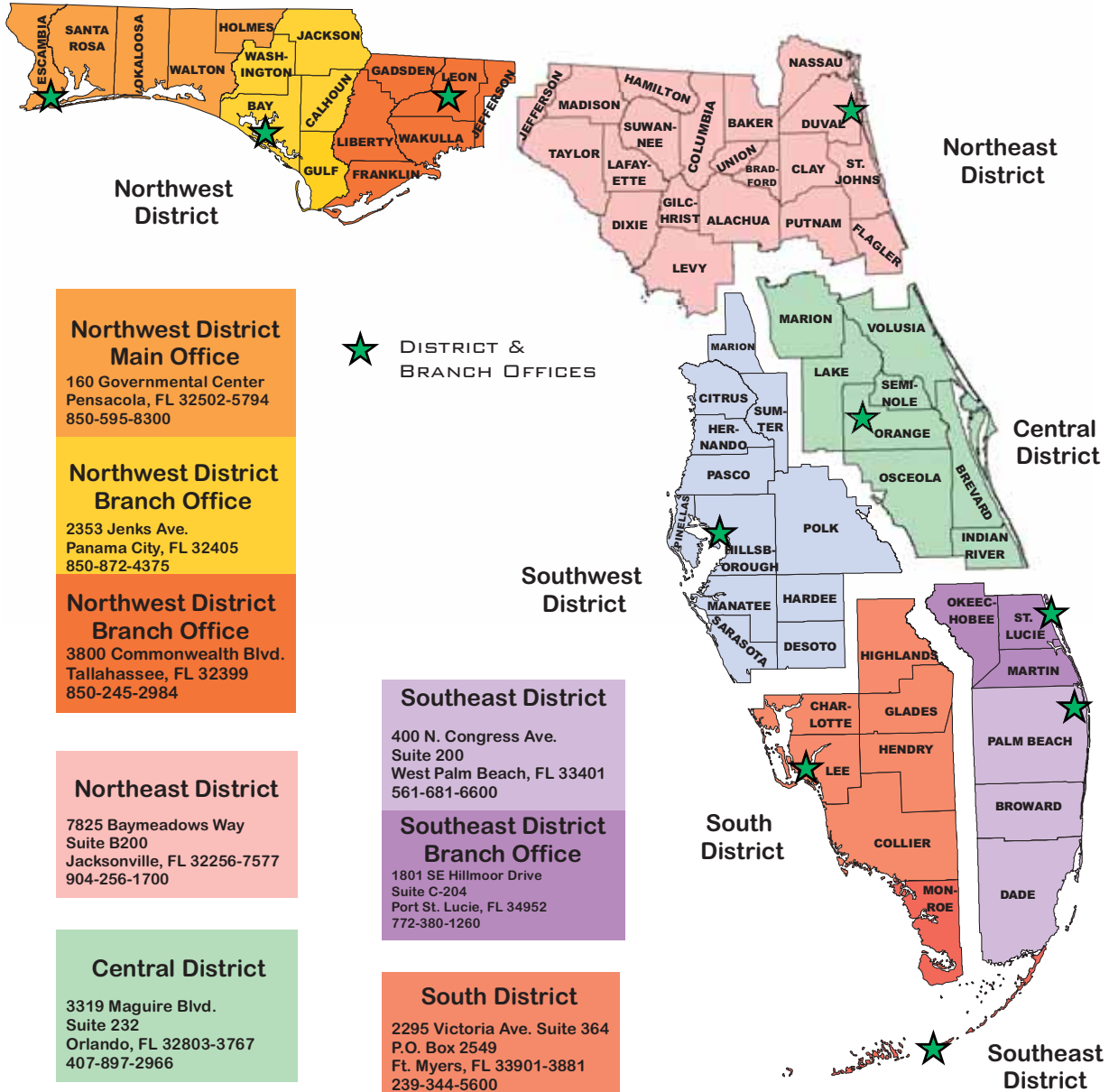
Florida Small Business Assistance Program



The Small Business Assistance Program helps businesses with environmental concerns and problems related to compliance with air regulations. Assistance is confidential and staff experts have business experience.

Phone: (800) 722-7457

Florida Department of Environmental Protection District Offices



**Northwest District
Main Office**
160 Governmental Center
Pensacola, FL 32502-5794
850-595-8300

**Northwest District
Branch Office**
2353 Jenks Ave.
Panama City, FL 32405
850-872-4375

**Northwest District
Branch Office**
3800 Commonwealth Blvd.
Tallahassee, FL 32399
850-245-2984

Northeast District
7825 Baymeadows Way
Suite B200
Jacksonville, FL 32256-7577
904-256-1700

Central District
3319 Maguire Blvd.
Suite 232
Orlando, FL 32803-3767
407-897-2966

Southwest District
13051 N Telecom Parkway
Temple Terrace, FL 33637-0926
813-632-7600

Southeast District
400 N. Congress Ave.
Suite 200
West Palm Beach, FL 33401
561-681-6600

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Branch Office**
1801 SE Hillmoor Drive
Suite C-204
Port St. Lucie, FL 34952
772-380-1260

South District
2295 Victoria Ave. Suite 364
P.O. Box 2549
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239-344-5600

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2796 Overseas Highway
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305-289-7070

