



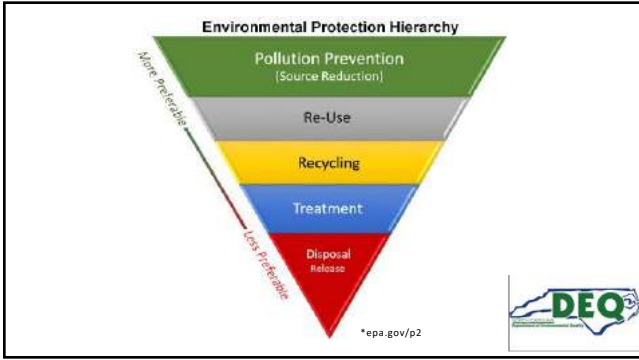
1



2



3



4


Waste Minimization

Waste Minimization

- The use of **source reduction and/or recycling methods** prior to energy recovery, treatment, or disposal of waste(s).
- Any action that reduces the amount and/or toxicity of chemical wastes that must be shipped off-site for disposal as hazardous waste.

*If you are a LQG or SQG, [40 CFR 262.27](#) requires you to demonstrate some form of waste minimization activity, depending on your generator status.

↑ You agree to this when signing the manifest ↑



5


Waste Minimization

Hazardous Waste Manifest Certification Statements

40 CFR 262.27 A Large Quantity Generator (LQG) or Small Quantity Generator (SQG) who initiates a shipment of HW will certify as such in **Item 15** Uniform Hazardous Waste Manifest:

(a) "I am a **Large Quantity Generator**. I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment."

(b) "I am a **Small Quantity Generator**. I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford."



6

Waste Minimization Plan

- Maintain a written waste minimization plan
- If no written plan is maintained, be prepared to fully **explain & demonstrate** your waste minimization activities during the inspection process. At a minimum, provide a written policy statement.






7

Waste Minimization & Biennial Report

The Biennial Report (LQGs) reflects:

- The efforts undertaken during the year to **reduce** the **volume & toxicity** of the HW generated;
- The **changes** in volume & toxicity achieved in comparison to previous years.

8

Waste Minimization

Waste Minimization **does not** include:

- Waste Treatment
 - Processes designed to change the physical, chemical, or biological composition of waste streams
- Energy Recovery
- Disposal of Waste
- Dilution for Toxicity Reduction (**illegal** per RCRA)

§268.3 Dilution prohibited as a substitute for treatment.

(a) Except as provided in paragraph (b) of this section, no generator, transporter, handler, or owner of a treatment, storage, or disposal facility shall in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with subpart C of this part, to circumvent the effective date of a prohibition in subpart C of this part, to otherwise avoid a prohibition in subpart C of this part, or to circumvent a land disposal prohibition imposed by RCRA section 3004.



(b) Dilution of a waste shall be prohibited only because they exhibit a characteristic in treatment systems which include land-based units which treat wastes subsequently discharged to a water of the United States pursuant to a permit issued under section 402 of the Clean Water Act (CWA) or which treat wastes in a CWA-equivalent treatment system, or which treat wastes for the purposes of pretreatment requirements under section 307 of the CWA is not impermissible dilution for purposes of this section unless a method other than dilution has been specified in §268.40 as the treatment standard, or unless the waste is a D003 reactive cyanide waste or an organic cyanide.

9

Benefits of Waste Minimization
Reductions

Reduces:

- Hazardous and solid waste generation
- Raw material and product losses (expired materials)
- Raw material purchase costs (purchase only what is needed)
- Waste management recordkeeping and paperwork burden
- Waste management costs (time=\$)
- Workplace accidents/exposure
- Compliance violations





10

Source Reduction

Source Reduction reduces or eliminates the generation of waste at the source and refers to any practice that reduces the use of hazardous materials in production processes. Examples include:



- **Reformulating or redesigning products**, example: lead free PVC compounds (lead in PVC occurred in US; as recent as 2015 in Europe).
- **Using less toxic feedstocks**, example: lead-free solder in manufacturing;
- **Improving work practices**, example: rotating stock/ingredients to prevent expiration



11

Source Reduction Strategies
Reducing Your Waste Generation



- Reuse/recycling
- Inventory control
- Preventative maintenance
- Process changes
- Waste audits
- Use of less-hazardous (or non-hazardous) products/ingredients
- Personnel training

12

Source Reduction Strategies
Personnel Training

- All personnel with hazardous waste management responsibilities should receive thorough introductory and refresher training to ensure that proper procedures are followed to comply with RCRA regulations.
- Trained personnel =>
 - Proper waste management=>
 - Reduced exposure/waste generation

13

Source Reduction Strategies
Housekeeping

Good housekeeping helps prevent product loss and subsequent waste management costs.

Measures include:

- Procurement strategies
- Proper storage practices
- Handling & spill preparedness
- Disposal and training




What's the plan?

14

Source Reduction Strategies
Procurement

Procurement strategies begin with evaluating your purchasing practices:

- Establish a procurement schedule.
- Track your material use and needs.
- Check your vendors' policies on "buy-back" or returns, material guarantees, or other amenities.




15

Source Reduction Strategies
Recycling Examples

Alternate Uses Include:

- **Direct use** - an ingredient in a product or substitute product: latex paint can be mixed with ash to make cement mix for concrete.
- **Recovery and/or purification** - spent solvents, petroleum and used oils: recycling initiatives for acetone, paint thinner, engine oil, metalworking fluids, hydraulic fluids, & refrigerator oil to recover usable components.

These activities may be RCRA regulated. Be sure to understand the processes and any applicable exclusions or exemptions.



16

Source Reduction Strategies
Reuse/Recycling: Batch Distillation

Batch Distillation Units can maximize productivity while minimizing the quantity of hazardous waste generated.




17

Source Reduction Strategies
Reuse/Recycling: On-Site Distillation

Large Constant Feed Units

Mobile/Contractor Distillation Units

... can decrease disposal costs and enhance recovery and reuse of the product.




18

Source Reduction Strategies
Recycling Examples

When mercury is recycled from old equipment like switches, it can be used in new products that still require mercury.

Recycling of mercury has been so successful that there is now enough recycled mercury in the U.S. that manufacturers do not need to use new mercury from mines!



19

Source Reduction Strategies
Inventory Control

Failure of QA/QC inventory



20

Source Reduction Strategies
Preventative Maintenance - Inspections

Conduct routine PM on equipment



Equipment failure =
Waste generation &
Lost production



21

Source Reduction Strategies
Process Changes

Consider a process change
Consider the following:


- Changes versus current practice
- Look at multiple aspects
 - Reduced toxicity
 - Reduced waste disposal costs
 - Reduced product costs
 - Reduced training costs





22

Source Reduction Strategies
Process Changes

A water-based electro-deposition system replaced a traditional spray booth.



A powder coating system can also be substituted for a traditional paint booth.





23

Source Reduction Strategies
Using Non-Hazardous Products

A boat manufacturer introduced a biodegradable plant-based ester (non-hazardous) into all areas of manufacturing which eliminated all acetone (hazardous solvent) usage at the facility (Poly-Chem Acra Strip 600 Composite Resin Remover).

Less than two years later, they were able to renotify from a LQG to a SQG and operate as a Very Small Quantity Generator of HW with the exception of tank clean-out events once every few years.


24

Source Reduction Strategies
Waste Audit

The **Waste Audit** is an in-plant analysis of each operation generating waste.

- Good operating practices
- Input materials substitution
- Technology modification
- Closed-loop recycling
- Product substitution

Audits help identify areas for improvement.



25

Source Reduction Strategies
Minimize Resource Usage

Sky Lights





All fluorescent light fixtures are **off**.
The light source is entirely **solar**.





26

US EPA Sustainable Materials Management

Sustainable Materials Management (SMM) is the focus of US EPA Waste Minimization efforts.

The use & reuse of materials in the most productive & sustainable way across the entire life cycle (from point of resource extraction through material disposal: Cradle-to-Grave).

27

Sustainable Materials Management

➤ By examining how materials are used throughout their life cycle, the SMM approach seeks to:

- Use materials in the most productive way with an emphasis on using less.
- Reduce waste chemicals and environmental impacts throughout the material life cycle.
- Assure we have sufficient resources to meet current and future needs.

28

Sustainable Materials Management
Product Design

The **US EPA** has emphasized that by looking at a product's life cycle, we can find new opportunities to reduce environmental impacts, conserve resources, and reduce costs.

For example, re-designing a product to:

- Be manufactured using different, fewer, less toxic and more durable materials.
- Have a useful end-of-life and be readily dis-assembled.
- Develop an ongoing relationship between manufacturer and customers to ensure best use of the product, its maintenance, and return at end-of-life.

29

US EPA Safer Choice Program

- Helps consumers and commercial buyers find safer products;
- Identifies products that perform well;
- Identifies products that are safer for human health and the environment.

30

USEPA Safer Choice Program

The Safer Chemical Ingredient List is grouped by Functional-Use Class

Example Classes:
Chelating Agents, Defoamers, Polymers, Processing Aids & Additives, Solvents, Specialized Industrial Chemicals, Surfactants, Degreasers and more

<http://www2.epa.gov/saferchoice/safer-ingredients>

Code	Common Name	CAS Registry Number	Functional Use
●	Glyceryl octanoate decanoate	65381-09-1	Solvents
●	Isopropanol	67-63-0	Antibacterial Antiseptics; Solvents; Surfactants
●	Isopropyl 3-hydroxybutyrate	54019-98-1	Solvents
●	Isopropyl myristate	110-27-0	Solvents
●	Methyl laurate	111-82-0	Lubricants; Skin Conditioning Agents; Solvents
▲	Methyl oleate	112-62-0	Solvents
●	Potassium acid, 2-methyl-, 1,2-dimethyl ester	14035-94-0	Solvents
●	Propylene glycol	5042-50-6	Solvents
●	Polypentane glycol mono methyl ether	9094-18-4	Solvents



31

NCDEQ Resources

Division of Environmental Assistance and Customer Service (DEACS)

NC Tax Certification Program

Environmental Stewardship Initiative (ESI)

32

NC Tax Certification Program

North Carolina offers a tax exemption on equipment and facilities used **exclusively** for recycling and resource recovery.


Tax Certification Program Rules **15A NCAC 13B Section 1500**
<http://deq.nc.gov/about/divisions/waste-management/solid-waste-section/tax-certification-program>

15A NCAC 13B 1501 RESOURCE RECOVERING FACILITIES

(a) A resource recovering facility is a building, or buildings, or parts thereof, and includes any equipment exclusively and integrally used therein for obtaining material or energy resources from solid waste. The facility also includes land occupied by the buildings and equipment.

(b) Facilities used to collect, sort, or otherwise prepare solid waste for reuse or recycling are resource recovering facilities.

(c) Incidental or supportive facilities and equipment as defined in 1506(a) of this Section do not qualify for special tax treatment as resource recovering facilities.



33

NC Tax Certification Assistance

For questions about Tax Certification applications & eligibility: **Chris Hollinger, Compliance Officer**
Solid Waste Section
Phone: 919-707-8284
Chris.Hollinger@ncdenr.gov

The image shows a form titled 'APPLICATION FOR TAX CERTIFICATION & EXEMPTION' for 'Solid Waste Recycling or Resource Recovery Facility and Equipment'. It includes instructions for applicants, a section for 'Applicant' information, and a section for 'Facility' information. The form is partially filled out with handwritten text.

34

Division of Environmental Assistance & Customer Service (DEACS)

- Helps broaden the understanding of the environmental regulatory and permitting programs to improve **Customer Service Assistance**.
- Can assist with communication between your facility & NCDEQ.

35

Division of Environmental Assistance & Customer Service (DEACS)

DEACS helps expand the use of sustainable practices regarding:

The diagram consists of four rounded rectangular boxes arranged in a 2x2 grid, connected by arrows. The top-left box is blue and labeled 'Energy Efficiency'. The top-right box is light blue and labeled 'Water Efficiency'. The bottom-left box is green and labeled 'Leaning/P2'. The bottom-right box is light green and labeled 'Waste Reduction'. Below the diagram is the DEQ logo and a URL: <https://deq.nc.gov/about/divisions/environmental-assistance-customer-service>

36

Division of Environmental Assistance & Customer Service (DEACS)

DEACS helps create economic growth by promoting recycling, material management programs, and the expansion of recycling infrastructures.




 <p>Programs Offered Support for businesses, local governments and more.</p>	 <p>General Recycling Information Recycling materials, facilities and programs.</p>	 <p>Directories and Maps Recycling market information and more.</p>
 <p>Organics Recycling and Compost Learn about organic recycling, market resources and incentives.</p>	 <p>Data, Reports and Publications Take a closer look at the history efforts regarding solid waste and materials management.</p>	 <p>Links Other resources, agencies and organizations.</p>

<https://deq.nc.gov/conservation/recycling>




37

NC Environmental Stewardship Initiative (ESI)



www.ncesi.org

- DEQ **recognition** program for superior environmental performance
- DEACS staff serve as coach to member and manage program
- **Voluntary and free**
- Funded through EPA Pollution Prevention Grant



38

NC Environmental Stewardship Initiative



ESI invites industry to partner with the State in reducing industrial waste from all media. This includes:

- Hazardous & Solid Waste Reduction
- Energy Usage Reduction
- Wastewater Reduction
- Water Conservation
- Air Quality Improvements

Waste minimization planning includes multiple environmental factors, not just hazardous waste.

ESI Elements Include:



- Technical and Compliance Assistance
- Waste, Energy, Water Assessments
- Personalized On-site Emergency Management Service (EMS) Assistance
- Performance Gap Analysis
- Internal Audit Assistance
- Waste Sort Assistance
- Facilitation Assistance

39

ESI MEMBER LEVELS



- The **Partner** level is designed for adoption by a broad range of organizations interested in beginning the process of developing a systematic approach to improving their environmental performance.
- The **Rising Steward** level is designed for organizations that have a mature environmental management system (EMS).
- The **Steward** level is for organizations that already display a commitment to exemplary environmental performance beyond what is required by law.


40

Division of Environmental Assistance and Customer Service


2002	2023
• 1 Steward	• 30 Stewards
• 27 Partners	• 10 Rising Stewards
	• 52 Partners at over 150 sites

41



ESI Member Map



42



43



44



45
