

**Hazardous Material Control Research Institute
Certified Hazardous Material Manager
Review Course**

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WASTE MINIMIZATION

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**WASTE NOT GENERATED DOES NOT REQUIRE
INVENTORY, STORAGE,
TRANSPORTATION,
OR DISPOSAL**

**500,000,000,000 lbs of toxic waste
are produced annually in the US**

FOREIGN APPROACH TO WASTE MINIMIZATION

- * Less Reliance on Regulation
- * More Positive Incentives
- * Increased Technical Assistance
- * Greater Cooperation Between Govt & Industry
- * Less Confrontation

JAPAN

- * Financial Incentives - government loans for waste minimization investments and plant relocation
- * Technical Assistance - government and trade associations maintain technical staff
- * Demonstration Plants - Clean Japan, with MITI and others, builds one or more model plant a year
- * Administrative Guidelines - goal is recycling 70% of
all industrial waste. In 1980, 42% of
292,000,000
tons was recycled

DENMARK

Industries and farmers are required to deliver their hazardous waste to a central treatment plant

Technological Institutes provide technical assistance

- * Act as consultants for small industry
- * Maintain liaison with industry
- * Perform research
- * Develop clean processes
- * Assist in process startup
- * Funding - 50:50 :: govt : industry served

SWEDEN

Franchise Board's permitting system provides incentives for waste minimization

The Permit Application:

- * Provides the general plans for plant operation
- * Lists proposed emissions and discharges and their impact

The Franchise Board:

- * Has an adequate number of competent staff
- * Gives fast decisions (< 6 months)
- * Is relatively free from politics

FEDERAL REPUBLIC OF GERMANY

The environmental agency (UBA) goes directly to company management to work out coop solution

If company fails to cooperate:

- * Incentives offered
- * Regulatory pressure exerted
- * Publication of company's environmental practices

THE NETHERLANDS

TWO TRACK APPROACH:

- 1) “Black List” of Dangerous Substances
- 2) Focus on Target Industry (group of generators)

Approach organizes effort for greatest impact

Based on greatest risk to human health and the environment

Agency rewarded for eliminating waste stream

HIERARCHY OF WASTE MANAGEMENT OPTIONS

- * SOURCE REDUCTION - reducing the amount of waste at the source through process changes
- * RECYCLING - reusing and recycling wastes as substitutes for feedstocks and ingredients
- * TREATMENT - destroying, detoxifying, or neutralizing wastes
- * DISPOSAL - discharging wastes into ambient water or air, or depositing wastes into or onto the land

SOURCE REDUCTION

1) PRODUCT CHANGES

PURPOSE: reduce waste from manufacture, use, and disposal of products

2) PROCESS CHANGES

PURPOSE: reduce waste created during production

CONCERN: how the product is made

SOURCE REDUCTION PRODUCT CHANGES

- * Reduce Environmental Impact of Product

Example: modify product to avoid solvent use

- * Increase Product Life

Example: modify product to extend coating life

SOURCE REDUCTION PROCESS CHANGES

Input Material Change

Technology Changes

Improved Operating Practices

SOURCE REDUCTION PROCESS CHANGES

INPUT MATERIAL CHANGES

* Material Purification

Example: use of raw materials that are free of trace h

* Substitution of Less Toxic Materials

Example: use of less hazardous or toxic solvent
for cleaning or as coating

SOURCE REDUCTION PROCESS CHANGES

TECHNOLOGY CHANGES

- * **Layout Changes**
ex: redesign equipment and piping to reduce holdup
- * **Increased Automation** - can reduce operator error
- * **Improve Operating Conditions**
ex: change to mechanical cleaning to avoid solvent use
- * **Improved Equipment**
ex: vapor recovery unit to capture & return emissions
- * **New Technology**
ex: speed controls on pump motor to save energy

SOURCE REDUCTION PROCESS CHANGES

IMPROVED OPERATING PRACTICES

- * Operating and maintenance procedures
- * Management practices
- * Material handling improvements
- * Production scheduling
- * Inventory control
- * Training
- * Waste segregation

RECYCLING VS DISPOSAL COSTS

<u>EXPENDITURE</u>	<u>DISPOSAL</u>	<u>RECYCLING</u>
Capital Cost	Low	High
Operating Cost	High	Low or Profitable
Social Cost	Very High	Low

REGULATORY REQUIREMENTS 1990 POLLUTION PREVENTION ACT (PPA)

Established the Toxic Release Inventory (TRI) to document the release and reuse of chemicals

TRI reporting requirements:

- * Amount entering any waste stream
- * Amount recycled on or off site
- * Source reduction practice used
- * Techniques used to identify source reduction
- * Amount released during a one-time event

REGULATORY REQUIREMENTS RCRA / CERCLA

Waste generators must certify on waste manifests that an in-place program exists “to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable”

Must make same certification for any new permit issued for treatment, storage, and disposal of hazardous waste

Must describe in a biennial report to the U.S.EPA any waste minimization program and accomplishment during the reporting period

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