

OSHA HAZWOPER 8-Hour Annual Refresher Course Summer 2004

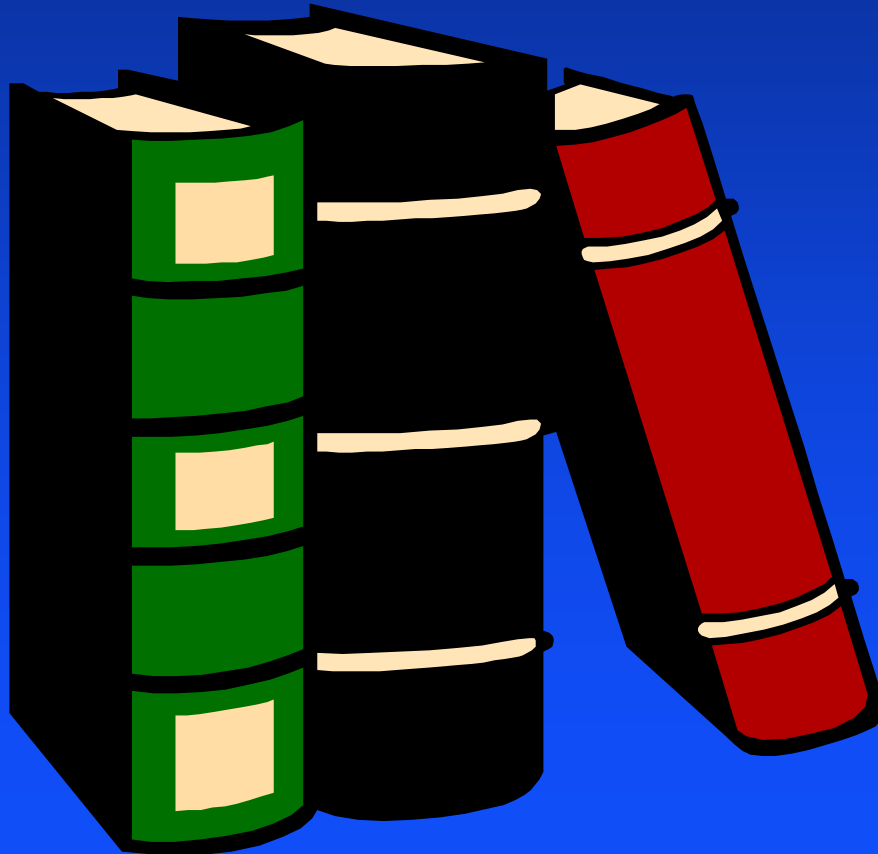
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Refresher Course Overview

- Federal & State Regulation Review & Update
- Review of 29 CFR 1910.120 Standard
- Respiratory Protection Review: CBRN Respirator
- Managing Hazardous Materials Exercises
- Biosafety
- Weapons of Mass Destruction Update
- Domestic Preparedness
 - ◆ National Incident Management System
 - ◆ Incident Command System
 - ◆ Federal Response Plan Review
- Heat & Cold Stress

Hazardous Waste Legislation



Environmental Protection Agency (EPA)

- RCRA (1976) – **Resource Conservation & Recovery Act** – waste treatment from “cradle to grave” (generate>treat>store>dispose); strengthened in 1984
- HSWA (1984) – **Hazardous and Solid Waste Amendments** – regulated landfill waste and design, waste generators, underground storage tank leakage
- CERCLA (1980) – **Comprehensive Environmental Response, Compensation & Liability Act** – \$1.6 B tax based on product quantity used for remediation of abandoned/uncontrolled waste – “Superfund”
- SARA (1986) – **Superfund Amendments & Reauthorization Act** – \$9 B more for cleanup

Definitions

■ **Solid Waste**

- ◆ General term referring solid material that has no value (but someone's waste may be someone else's “gold”)

■ **Municipal Solid Waste**

- ◆ Refers to SW coming from normal residential communities (i.e. homes, restaurants, institutions)

■ **Industrial Waste**

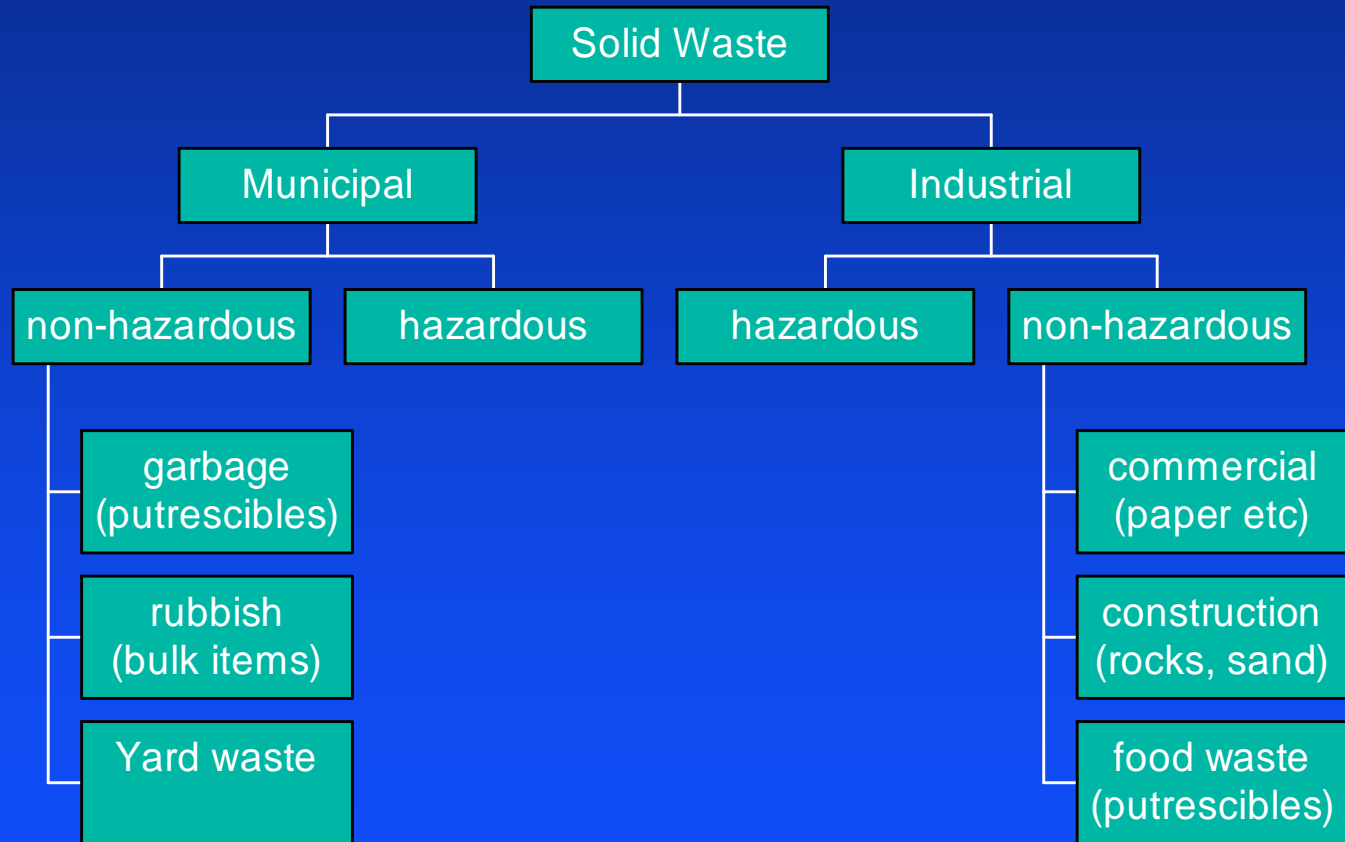
- ◆ Refers to SW coming from industrial (for-profit) establishments

■ **Hazardous Waste**

- ◆ May come from either Municipal or Industrial sources

■ **Other terms (refuse, garbage, trash, rubbish)**

Solid Waste Classification



Hazardous Waste



What Types of Hazards Exist?

- **Chemical Hazards** (corrosive, ignitable, toxic, reactive, etc.)
- Biological Hazards (bacteria, viruses, fungi)
- Physical Hazards (heat, noise, radiation)
- Safety Hazards (slips, trips, falls)
- Ergonomic Hazards (CTS, MSD, RSI)

Threats Posed by Careless Disposal

- Direct Contact
- Fire and/or Explosions
- Poison via the Foodchain
- Air Pollution
- Surface Water Contamination
- Groundwater Contamination

Physical Properties Impacting Hazardous Effects

- Combustibility – flash point *above* ambient T°
- Flammability – flash point *below* ambient T°
- Explosiveness – *extremely rapid* rate of reaction
- Toxicity – ability to induce *harmful effect*
- Reactivity – ability to undergo *chemical reaction*
- Corrosiveness – pH <2 (*acid*) or pH >12.5 (*base*)

Physical Properties Impacting Hazardous Effects

- **Solubility** – ability to be *dissolved* into solvent
- **Specific Gravity** – density ratio with *water*
 - ◆ (<1 – float on water; >1 - sink in water)
- **Vapor Density** – density ratio with *air*
 - ◆ (<1 – disperse in air; >1 - settle close to ground)
- **Vapor Pressure** – pressure exerted by a *vapor*
 - ◆ (BLEVE -Boiling Liquid Expanding Vapor Explosion)
- **Boiling Point** – T^0 *liquid* changes to *vapor*
- **Melting Point** – T^0 *solid* changes to *liquid*
- **Flash Point** - *minimum* ignition T^0 for vapors

When Is It Hazardous Waste?

If & When hazardous substances are discarded or intended to be discarded such as:

- Commercial chemical products (non-usable)
- Manufacturing chemical intermediates
- Residue remaining in a chemical container
- Residue or contaminated soil, water, or other debris from chemical spill cleanup

Hazardous Waste Definition

- More than 500 wastes or waste streams identified for their ability to cause extremely adverse health effects in humans and or plants
 - ◆ “A Waste or Combination of Wastes as defined in 40 CFR 261.30-34”
 - ◆ Listed F, K, P, U Type Wastes – Subpart D
 - ◆ “Those Substances Defined as Hazardous Wastes in 49 CFR 171.8”
- “Wastes defined as ignitable, corrosive, reactive, toxic materials (as defined in 40 CFR 261.20-24)”
 - ◆ (D wastes - Subpart C)”

Environmental Protection Agency (EPA) - Waste

RCRA - Resource Conservation & Recovery Act (1976)

- Waste treatment addressed from “**cradle to grave**” (generate>treat>store>dispose)
- Only applies to **active and future facilities** and does not address abandoned or historical sites
- **HSWA** – Hazardous & Solid Waste Amendments - 1984 amendments to RCRA that required phasing out land disposal of hazardous waste (more stringent hazardous waste management standards set – **monitoring wells, leachate membranes**)

Hazardous Waste Categories

Nonspecific Source Wastes (F) -

- generic wastes produced by common manufacturing & industrial *processes* (i.e. metal plating, petroleum refinery)

Specific Source Wastes (K) -

- wastes from *specially identified industries* (i.e. pharmaceutical, pesticide, iron & steel)

Commercial Chemical Products (P & U) -

- *specific chemical products or chemical intermediates* – *P items are highly toxic; U items less toxic* (i.e. phosgene vs. acetone)

Generators, Transporters, & TSD Facilities (RCRA)

- **Generators** are facilities (places or people) who make or “generate” hazardous waste.
- **Transporters** are people who move hazardous wastes.
- **TSDF's** are facilities that treat, store, and/or dispose of hazardous waste. They are regulated and must have, among other requirements, an EPA ID#.

Generator Standards

- Hazardous waste determination
- Obtaining EPA identification number
- Adhering to proper manifest protocol
- Adhering to waste pre-transport requirements
- Establishing proper recordkeeping/reporting
- Executing proper waste exporting/importing

Transporter Standards

- Obtaining EPA identification number
- Adhering to waste transfer facility requirements
- Adhering to proper manifest protocol
- Establishing proper recordkeeping
- Executing proper waste transport
- Adhering to proper accidental waste discharge and clean up protocol

TSDF Standards

- Obtaining EPA identification number
- Posting required notices
- Executing general waste analysis
- Providing security onsite
- Executing general inspection requirements
- Providing personnel training
- Providing requirements for handling hazardous waste
- Providing location standards
- Addressing Preparedness & Prevention, Contingency Plan & Emergency Procedures, Manifest System, Recordkeeping/Reporting, etc.

Regulated Hazardous Waste

- More than 85% of all hazardous wastes are produced by the following generators:
 - ◆ Chemical and allied product companies
 - ◆ Metal-related industries
 - ◆ Petroleum and coal products
- Types of “quantity generators” per month:
 - ◆ Large: >2,200 lbs. (>1000 kg.)
 - ☞ (chemical & pharmaceutical plants)
 - ◆ Small: between 2,200 lbs. and 220 lbs.
 - ☞ (laboratories, printers, dry cleaners)
 - ◆ Conditionally Exempt Small: <220 lbs.
 - ☞ 1-hour photo labs, dental offices

Non-RCRA Regulated Hazardous Waste

- Domestic sewage
- Irrigation waters or industrial discharges allowed under Clean Water Act
- Nuclear material regulated by Atomic Energy Act (i.e. tritium)
- Household wastes – paint & pesticides
- Certain mining and mineral processing wastes

Common Household Hazardous Waste Products

- Cleaning Products (oven, drain, wood, tub)
- Automotive Products (motor oil, antifreeze)
- Lawn & Garden Products (herbicides, insecticides)
- Indoor Pesticides (ant, cockroach, flea, rat, moth)
- Workshop/Painting Supplies (thinner, glue, stain)
- Miscellaneous (batteries, mercury thermometers)
- Flammable products (kerosene, propane, diesel)

Methods of Hazardous Waste Disposal

- **Secure Chemical Landfill** (with leachate control systems and monitoring wells; more stringent laws made these unfavorable)
- **Deep Well Injection** (liquid wastes pumped into porous rock formations well below drinking water aquifers)
- **Physical, Chemical, Biological Treatment** (evaporation, carbon adsorption; neutralization, oxidation-reduction; biostimulation)
- **Controlled Incineration** (burn at very high temperatures; afterburners, scrubbers, electrostatic precipitators reduce pollutants)
- **Waste Exchanges** (recycling – clearinghouse established to link buyers and sellers of waste)

Remediation Technologies

■ Chemical

- ◆ Neutralization, Precipitation
- ◆ Oxidation, Reduction
- ◆ Ion Exchange
- ◆ Disinfection

■ Physical

- ◆ Screening, Sedimentation
- ◆ Filtration
- ◆ Stripping, Air and Steam

■ Biological

- ◆ Aerobic
- ◆ Anaerobic

Environmental Protection Agency (EPA) - Waste

CERCLA – Comprehensive Environmental Response, Compensation and Liability Act (1980)

- Set up “tax” system to collect monies for cleanup and put it into a “**Superfund**” (orig. \$1.6 Billion collected)
- Tax on quantity of product produced, not waste produced
- Developed site evaluation model “**Hazard Ranking System**” to rank worst sites
- If sites not serious enough, states usually pick them up for cleanup
- Created **National Priorities List** (worst sites)
- As of July 2003 - 1,233 uncontrolled sites

Determining Who Caused Hazard

- While EPA cleans and investigates site, an investigation is conducted to determine who caused hazard and attempt to recover costs
- All “potentially responsible parties” (PRPs) are identified
- Two (2) pathways are possible
 - ◆ PRPs agree on responsibility and share cleanup expenses
 - ◆ PRPs go to court and battle out liability
- ROD – Record of Decision, this is the final court determined legal remedy. It is the agreement between “responsible parties” and EPA

Environmental Protection Agency (EPA) - Waste

SARA – Superfund Amendments & Reauthorization Act (1985)

- Continuation (**reauthorization**) of CERCLA
- Additional monies collected for “Superfund” (\$8.5B)
- **Community Right-to-Know** provisions created (i.e., these reports are available to neighborhood fire stations)
- **Toxic Release Inventories** must be made available to communities (annual report of releases to air and water)
www.epa.gov/tri
- Spills and leaks of certain chemicals and in certain quantities must be reported

“Superfund” Issues



“Superfund” Process

- Site discovered
- Site secured
- Remedial Investigation / Feasibility Studies conducted
- Remediation selection method chosen
- Construction begins
- Site Remediated



“Superfund” Process – National Priority Listing (NPL)

- Site proposed
- Public comments taken by EPA
- EPA responds to comments
- Site placed on NPL List by EPA if:
 - ◆ EPA “Hazard Ranking System” screening passed
 - ◆ State designates site as top-priority site in state
 - ◆ All three criteria met:
 - ☞ ATSDR issues health advisory banning people
 - ☞ EPA says site is significant public health threat
 - ☞ EPA feels remedial authority more cost-effective than emergency removal authority

“Superfund” Site Conversion

Wide Beach Development, Brant, NY



Source: U.S. EPA

EPA removes contaminated soil to protect area residents and return the property to productive use.



Source: Environmental Engineering, Inc.

EPA's cleanup of the Wide Beach Development protected area residents and the environment, and improved the long-term economic viability of this small resort community.

“Superfund” Site Statistics 2004

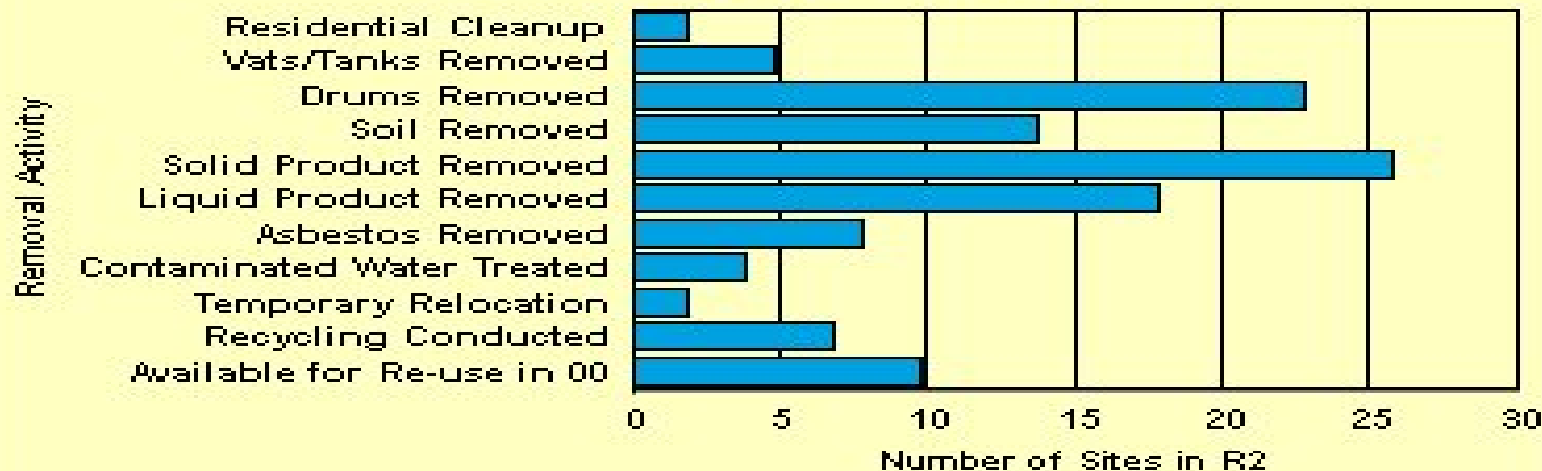
- 926 “Superfund” sites have had all cleanup construction completed.
- There are 1,644 NPL sites:
 - ◆ 68 sites have been proposed
 - ◆ 1,237 sites are final
 - ◆ 47 sites have been partially deleted
 - ◆ 292 sites have been deleted

“Superfund” –Region 2

Summary of Region 2 FY 00 Removal Activity

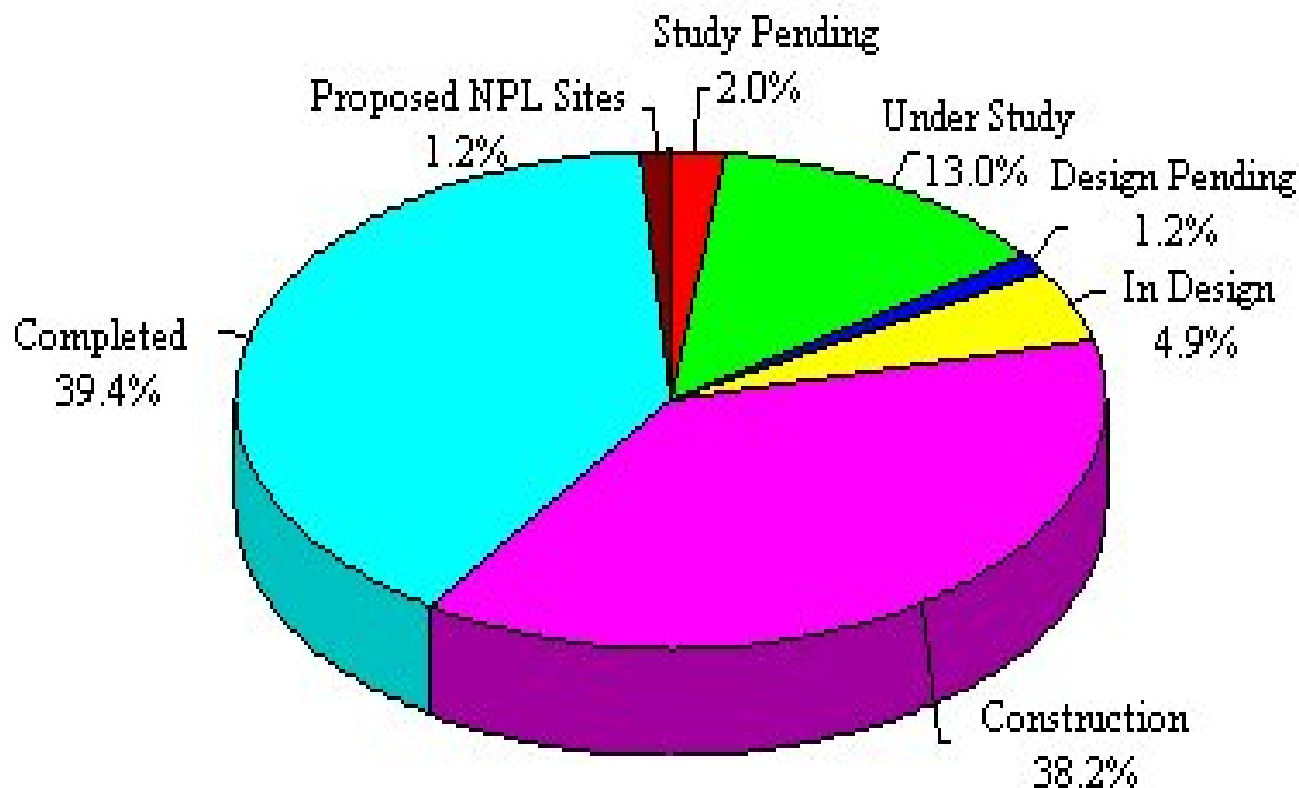


Summary of FY 00 Removal Activity



“Superfund” –Region 2

FY 00 Status of Region 2 Superfund Sites
243 NPL Sites (and 3 Proposed Sites)



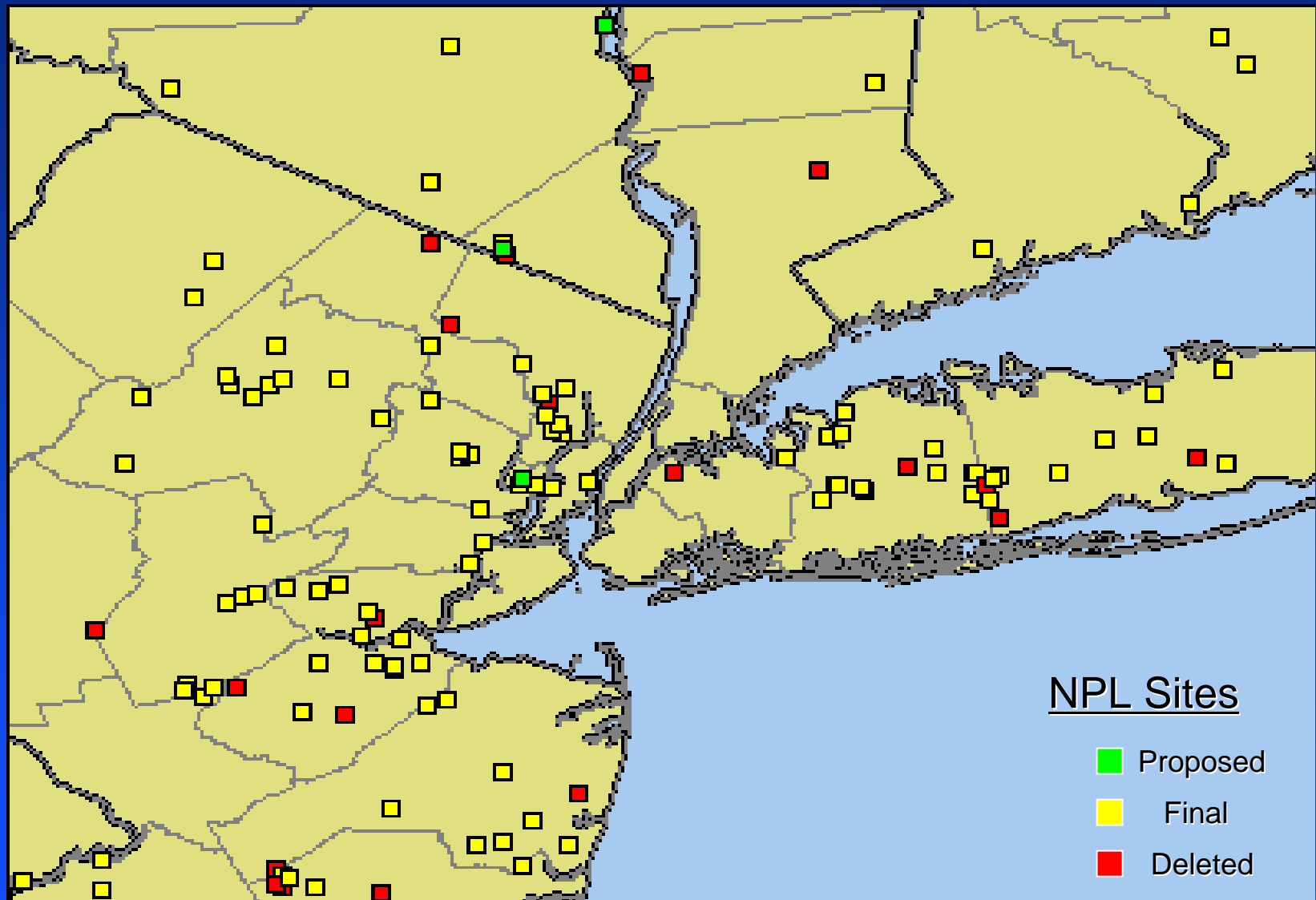
“Superfund” –Region 2

Table 1 - Status of Region 2 National Priorities List Sites 2000

State or Territory	Number of NPL Sites, Total / Proposed	Deleted From NPL or Construction Complete	Under Construction or in Design Stage	Under Study or Proposed to NPL
New Jersey	129 / 2	45	63	23
New York	100 / 1	44	43	14
Puerto Rico	12 / 0	8	2	2
Virgin Islands	2 / 0	0	1	1
Total	243 / 3	97	109	40

<http://www.epa.gov/region02/superfund/update.htm#I6>

Regional “Superfund” Sites (NPL)



<http://map3.epa.gov/enviromapper/index.html>

“Superfund” – Hudson River

Hudson River PCBs Site

- During a 30-year period ending in 1977, between 209,000 and 1.3 million pounds of PCBs were released into the Hudson River from two GE capacitor manufacturing plants located in Fort Edward and Hudson Falls, New York. PCB oils were released both directly and indirectly from these plants.
- In February 2002, EPA signed a Record Of Decision (ROD) to conduct the long-term cleanup of a 40-mile portion of the site in the upper Hudson. The decision calls for dredging 2.65 million cubic yards of contaminated sediment to remove an estimated 150,000 pounds of PCBs at an estimated cost of \$500 million.

<http://www.epa.gov/superfund/accomp/success/hudson.htm>

Staten Island Fuel Facility Explosion

On Friday, February 21, 2003, at 10:16 a.m., an Exxon/Mobil Oil Storage Facility on New York's Staten Island

exploded. The storage facility, Port Mobil, is located at the southern end of New York Harbor on Arthur Kill River. The site is 203 acres, has 39 operational tanks, and employs 31 people. The tanks hold premium gasoline, regular gasoline, low sulfur diesel, other distillates, and jet fuel. The explosion apparently occurred when a pump malfunctioned while unloading unleaded gasoline from a barge. A plume of smoke was seen for miles. Information posted on the Exxon/Mobil website the afternoon of the incident informed the public that the air at ground level posed no significant health risks and the black particles seen in the air were essentially soot.

The owners of the barge, the Bouchard Barge Company, lost two employees in the explosion. An unknown number of people were evacuated within a half mile of the site of the accident. The owner of the depot was in critical condition with 15% of his body covered in third degree burns.

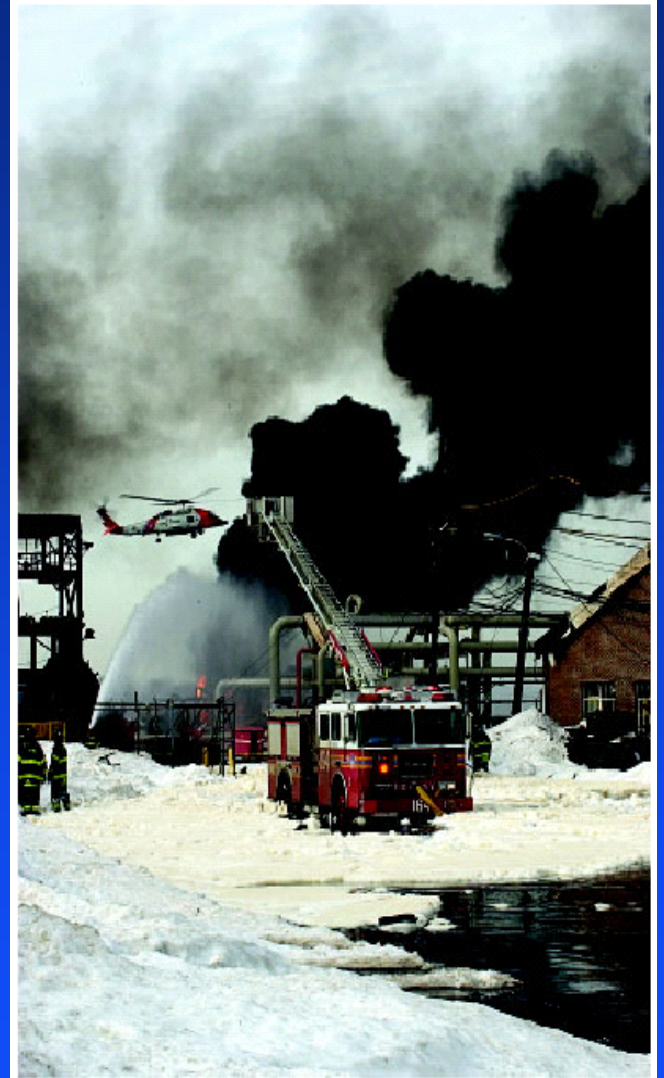
The local fire department was called to the scene. Clean Harbors, a cleanup contractor, was also mobilized at the event but was not allowed to begin work until the fire was extinguished and the appropriate authorities granted permission. The U.S. Coast Guard

(USCG) lead response efforts and placed oil boom in the water surrounding the facility to contain the spill and allow the fuel to burn off the surface. EPA Region II supported the response and the Edison, New Jersey Emergency Response Team and additional contractors were called in to assist at the site.

An Exxon/Mobil employee claimed that the malfunctioning pump was tested before the blast occurred. The USCG is investigating the accident to determine the cause of the explosion and to help prevent and better respond to future occurrences.

For more information, contact James Daloia, EPA Region 2 at 732-906-6907, deloia.james@epa.gov.

Smoke Plume from Staten Island Barge Explosion - courtesy USCG

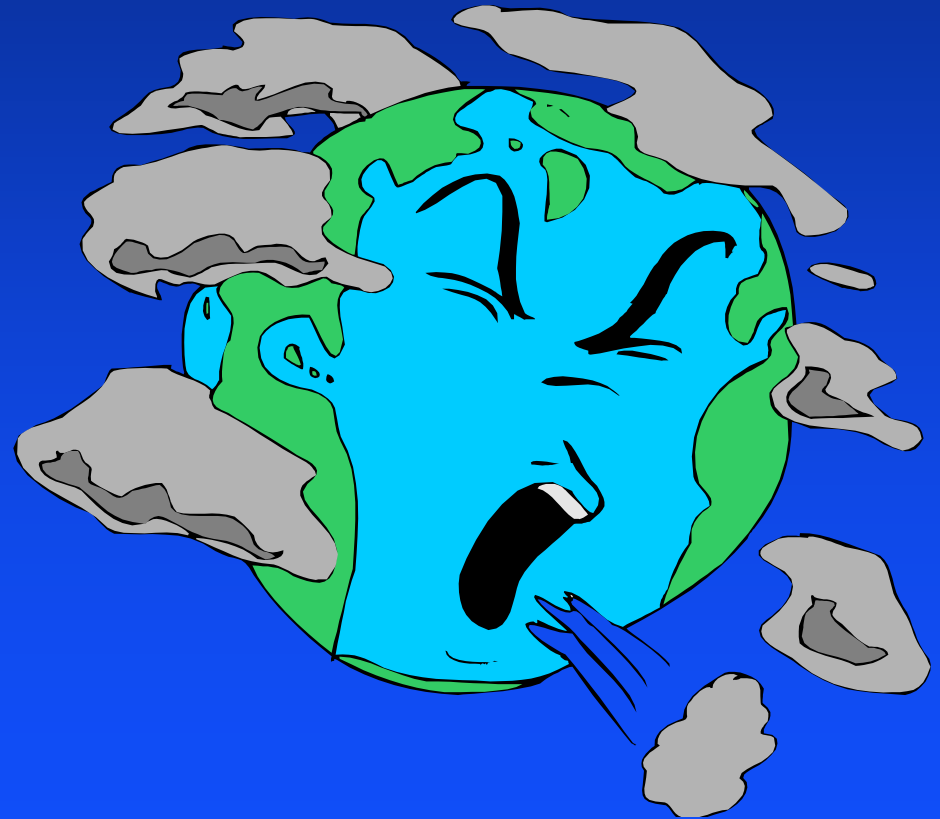
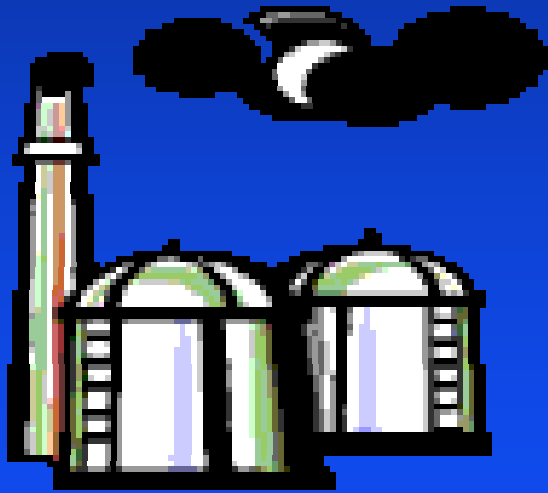


<http://www.epa.gov/oilspill/pdfs/0703update.pdf>

Environmental Protection Agency (EPA)

- CAA (1970) - Clean Air Act - established air quality standards & regulated pollutant levels
- CWA (1977) - Clear Water Act - established clean water standard for discharge of pollutants into U.S. waterways
- TSCA (1976) - Toxic Substances Control Act - Manufacturers and importers of chemicals required to include info about health and environmental effects of those chemicals

Air Pollution



Sources of Air Pollution

Major

- **Transportation** – automobiles and trucks
- **Electric Power Plants** – burn coal and oil
- **Industry** – steel mills, metal smelters, oil refineries, pulp and paper mills

Minor

- **Heating homes and buildings** - oil, gas, electricity vs. coal
- **Burning refuse** – sanitary landfills or incinerator with pollution control devices

Environmental Protection Agency (EPA) - Air

CAA - Clean Air Act (1970)

- Established **National Ambient Air Quality Standards** (NAAQS) – to protect public health & environment in every state by 1975
- States developed **state implementation plans** (SIP's) applicable to appropriate industrial sources in state
- Amended in 1977 to set new goals (dates) for achieving attainment of NAAQS since many areas of the country had failed to meet the deadlines
- 1990 amendments goal was to meet insufficiently addressed problems (acid rain, ozone depletion, etc.)

Criteria Air Pollutants (National Ambient Air Quality Standards)

- These 6 (formally 7 with hydrocarbons) air pollutants were chosen because of their ubiquity and health significance. Hydrocarbons are now regulated under the new air toxics program.
- The 6 NAAQS are:
 - ◆ **Particulates** – PM_{10} and $PM_{2.5}$
 - ◆ Sulfur Dioxide – SO_2
 - ◆ Carbon Monoxide – CO
 - ◆ Oxides of Nitrogen – NO_x (NO and NO_2)
 - ◆ **Ozone and Photochemical Oxidants** – O_3
 - ◆ Lead – Pb

Clean Air Act Amendments of 1990

- New Source Performance Standards
- Automotive Efficiency Standard (cleaner)
- Air pollution control devices (autos)
- Fuels Regulation (oxygenated fuels)
- National Emission Standards for Hazardous Air Pollutants – NESHAP (localized, very toxic – 188 chemicals at present)
- Air Pollution Credits - “smog futures” (SIPs)
- “Clear Skies” legislation (in Congress) - smog

Ambient/Emissions Trends

	Percent Change in Air Quality 1983-2002	
	1983-2002	1993-2002
NO _x	-21	-11
O ₃ 1-h	-22	-2
8-h	-14	+4
SO ₂	-54	-39
PM ₁₀	-	-13
PM _{2.5}	-	-8
CO	-65	-42
Pb	-94	-57

	Percent Change in Emissions 1983-2002	
	1983-2002	1993-2002
NO _x	-15	-12
VOC	-40	-25
SO ₂	-33	-31
PM ₁₀	-34	-22
PM _{2.5}	-	-17
CO	-41	-21
Pb	-93	-5

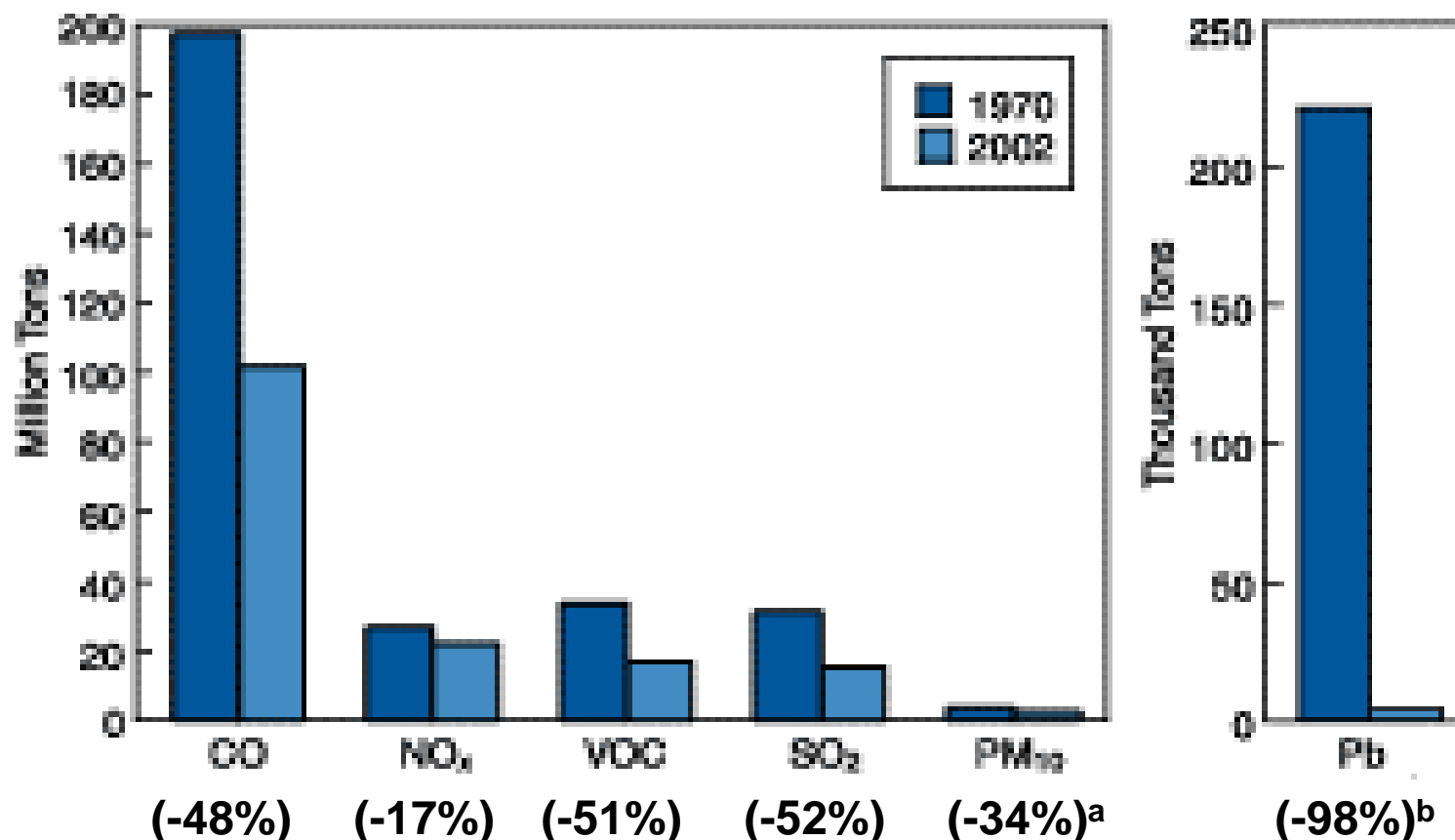
Changes in air quality concentrations do not always match changes in nationwide emissions due to:

- Location of monitors (urban vs. total emissions)
- Not all of the principal pollutants emitted directly to the air (ozone)
- Amount measured depends on monitor distance from chemical reactions
- Emissions from some sources are estimated rather than measured
- Weather conditions contribute to the formation/buildup of pollutants (ozone – hot, dry, stagnant conditions)

Negative numbers indicate improvements in air quality or reductions in emissions. Positive numbers show where emissions have increased or air quality has gotten worse.

Long Term Air Quality Trends

Comparison of 1970 and 2002 Emissions

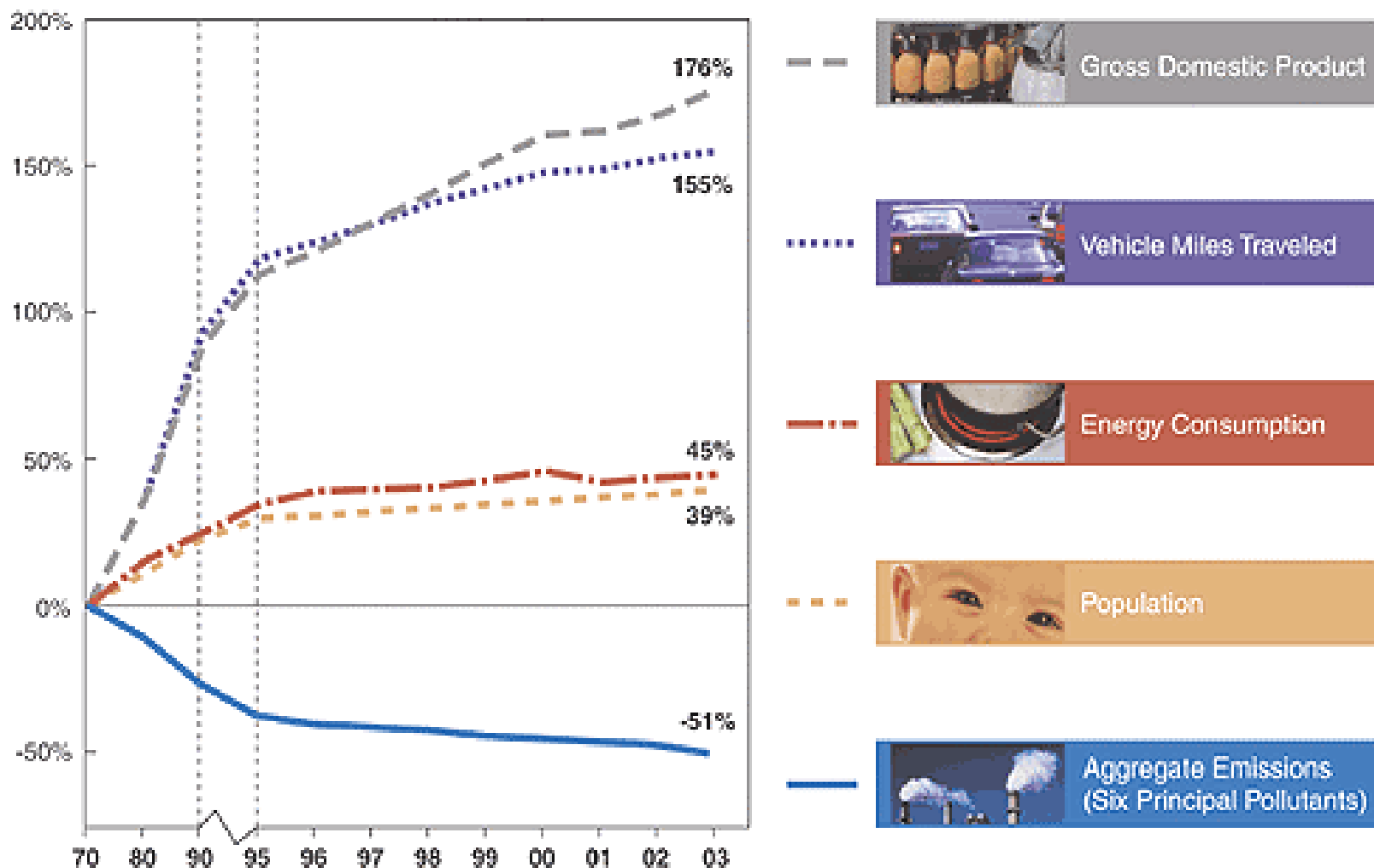


^a Based on 1985 emission estimates. Emission estimates prior to 1985 are uncertain.

^b Values for lead are based on 2001 data; 2002 data for lead are not yet available.

Despite Increases, NAAQS Decreased!

Comparison of Growth Areas and Emissions



The graph below shows that between 1970 and 2003, gross domestic product increased 176 percent, vehicle miles traveled increased 155 percent, energy consumption increased 45 percent, and U.S. population grew by 39 percent. During the same time period, total emissions of the six principal air pollutants dropped by 51 percent.

Water Pollution



Water-Related Regulations

- US Public Health Service - first water quality standard (varied by state; only addressed microbiological quality)
- **US EPA - Safe Drinking Water Act**
 - ◆ *National Primary Drinking Water Regulations*
primary standards – enforceable; protect health
 - ◆ *National Secondary Drinking Water Regulations*
secondary standards – non-enforceable; cosmetic (skin or tooth discoloration) & aesthetic (taste, odor, or color)
 - ◆ *Monitoring* – present and future health threats
 - ◆ *Public notification provision* – see DEP report

Typical Water Treatment System

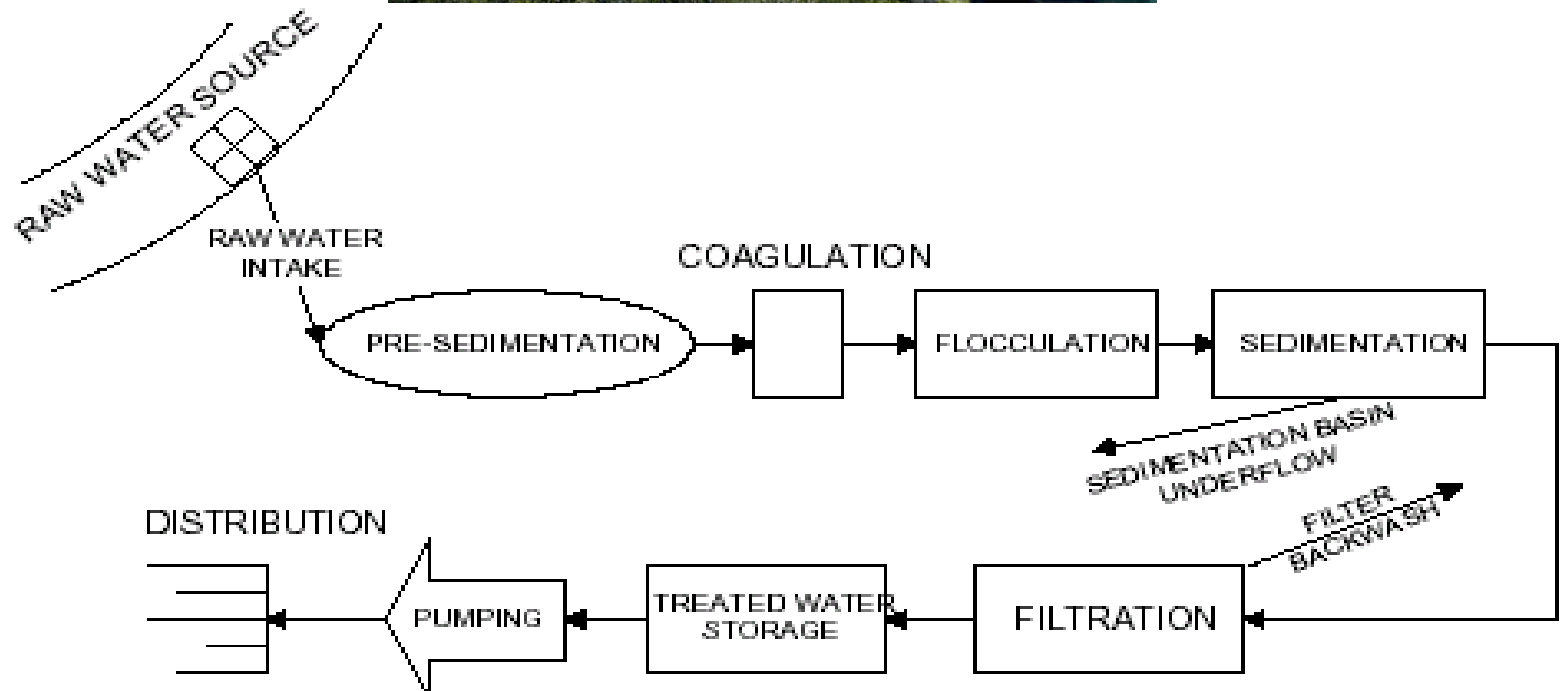


Figure 10-1. A Typical Conventional Water Treatment System

Drinking Water Treatment – Drinking Water

- **Primary** Treatment (**mechanical** process)
 - ◆ Screening – large objects (leaves)
 - ◆ Sedimentation – heavy suspended material
 - ◆ Coagulation – Alum added; flocs fall to bottom
 - ◆ Filtration – beds of sand, crushed coal, or earth
- **Secondary** Treatment (**disinfection** process)
- (**Tertiary** Treatment, **if necessary**)
 - ◆ VOCs, phosphates, metals
 - ◆ air stripping, land application, ion exchange

Publicly Owned Treatment Works (POTW) – Waste Water

- **Primary** Treatment (**mechanical** process)
 - ◆ Screening
 - ◆ Sedimentation
- **Secondary** Treatment (**biological** process)
 - ◆ Trickling filters (crushed stone beds + slime)
 - ◆ Activated Sludge (sewage + sludge + air mix)
- **Tertiary** Treatment (**disinfection** process)
 - ◆ Chlorine, ozonation, UV light
 - ◆ Membrane/carbon filtration, air stripping

Hazardous Substances



Environmental Protection Agency (EPA) - Chemicals

TSCA – Toxic Substances Control Act (1976)

- Prevented the introduction of toxic substances into everyday life (mostly industrial products)
- Pre-manufacturing notice (PMN), and Significant New Use Requirements (SNUR) gave EPA a chance to **evaluate toxicity before product comes to market** (new adhesives, cleaners, pigments)
- Manufacturers must submit results of toxicological testing to EPA. EPA reviews and may ask for further testing.
- TSCA has **power to ban harmful industrial chemicals** that pose an unreasonable risk (asbestos, Polychlorinated Biphenyls, etc.)

Material Safety Data Sheets (MSDS)

- Substance Identity
- Hazardous Ingredients
- Physical Data (BP, VP, SG, MP, etc.)
- Fire and explosion data (FP, LEL, UEL)
- Reactivity data (stability, incompatibilities)
- Health hazard data (acute, chronic)
- Precautions for safe handling and use
- Control measures (PPE, etc.)

Environmental Protection Agency (EPA) - Pesticides

FIFRA – Federal Insecticide, Fungicide and Rodenticide Act (1996)

- Controls pesticide approvals and renewals (specific use, on specific product, at specific level)
- Set 5-year “Sunset Clause” (every approval expires in 5 years and must be re-evaluated and renewed)
- Covers biocides, disinfectants, sanitizing agents, repellants etc.
- Pesticides must be registered and their users, certified

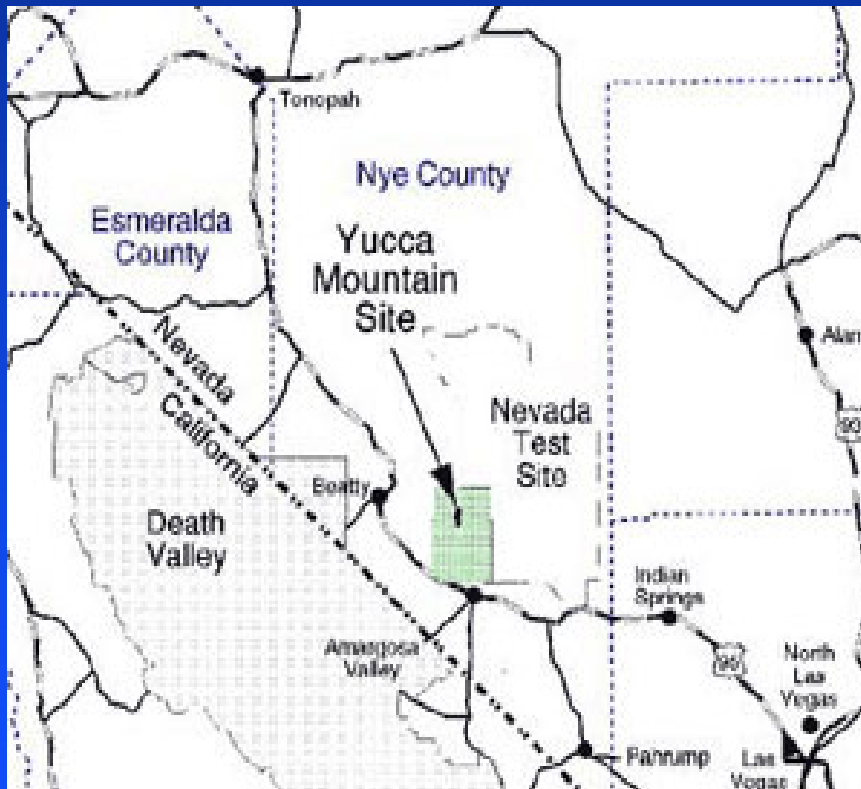
Non-EPA Hazardous Waste Laws

- Nuclear Waste Policy Act (1982) – addressed radioactive waste management (Nuclear Regulatory Commission)
 - ◆ Atomic Energy Act (AEA) of 1954
- MWTA (1988) – Medical Waste Tracking Act – addressed using manifest system for biomedical waste (program varies state-by-state)

Nuclear Regulatory Commission

High-Level Waste Disposal

Photo and Location of Yucca Mountain



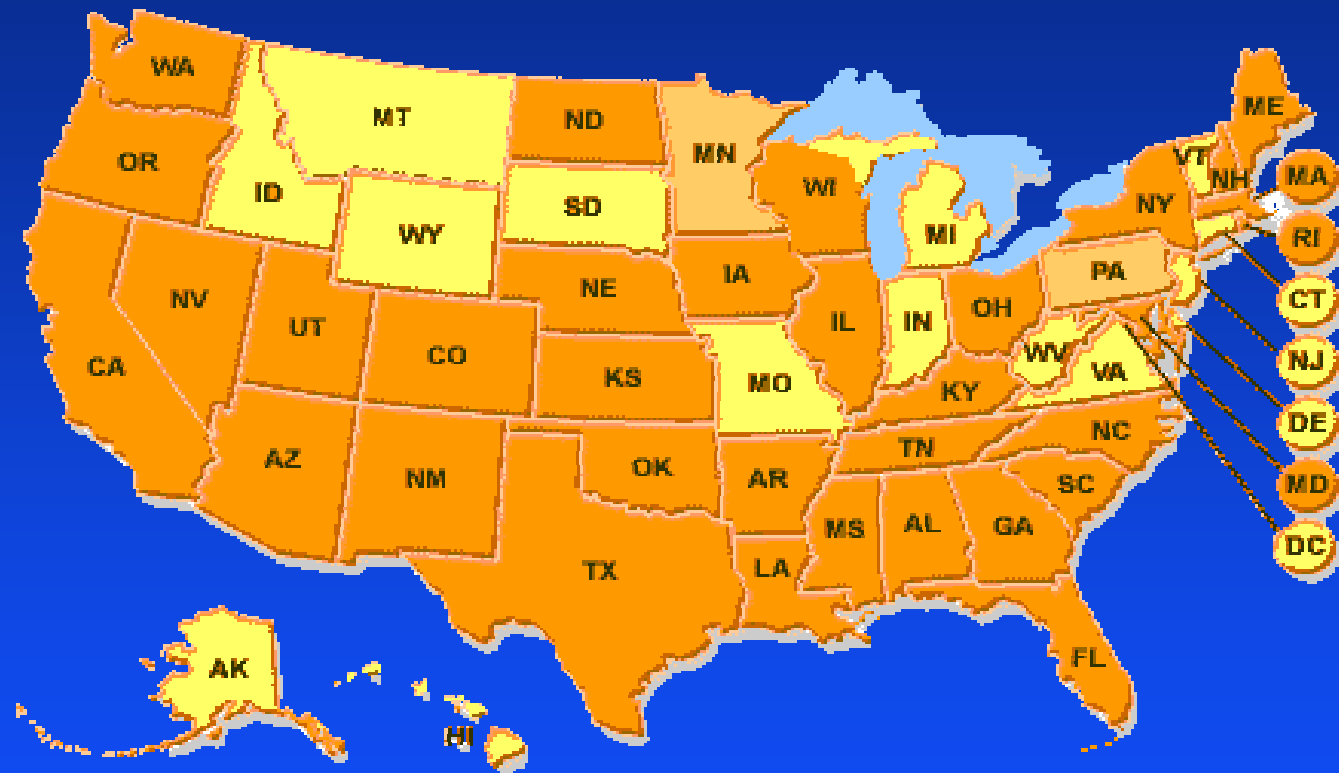
Map showing the location of Yucca Mountain in relation to major highways; surrounding counties, cities, and towns in Nevada and California; the Nevada Test Site; and Death Valley National Park.

Yucca Mountain is located on federal land in Nye county in southern Nevada, approximately 160 km (100 miles) northwest of Las Vegas.

<http://www.nrc.gov/waste/hlw-disposal/photo-loc.html>

Nuclear Regulatory Commission

Low-Level Waste Disposal



Agreement States **Non-Agreement States** **Letter of Intent-AS**

<http://www.hsrn.dornl.gov/nrc/rulemaking.htm>

NYS Medical Waste Tracking Act

- Approximately 18,000 regulated medical waste (RMW) generators in New York State dispose of an estimated 200,000 tons of RMW annually. In the late 1980's, medical debris washed up on New York beaches, resulting in the enactment of the federal Medical Waste Tracking Act (MWTa) of 1988.
- As a result of that Act, a \$1.5 billion per year medical waste management industry was born, stricter RMW disposal laws and regulations were developed, and sensitivity regarding the proper management and disposal of RMW increased.
- Although the MWTa expired in 1991, this Act, public sensitivity and a large body of state and federal laws and regulations have shaped the State's regulated medical waste program.

Department of Transportation (DOT) - Transport

HMTA - Hazardous Materials Transportation
Act (1974)

- Established standards for transporting hazardous materials interstate

Department of Transportation Placard Review



Hazard Classification System

Class 1 - Explosives

Class 2 - Gases

Class 3 - Flammable liquids

Class 4 - Flammable solids

Class 5 - Oxidizers & Organic peroxides

Class 6 - Toxic & Infectious substances

Class 7 - Radioactive materials

Class 8 - Corrosive materials

Class 9 - Miscellaneous dangerous goods

Color ID Clues for Placards

orange - explosive

red - flammable

green - non-flammable

yellow - reactive

white - poisonous

white/red vertical stripes - flammable solid

white over black - corrosive

two colors - two major hazards

Symbol & Hazard Class ID Clues for Placards

bursting ball - explosive (1)

flame - flammable (2)

slash W- dangerous when wet (4.3)

skull & cross bones - poisonous (6)

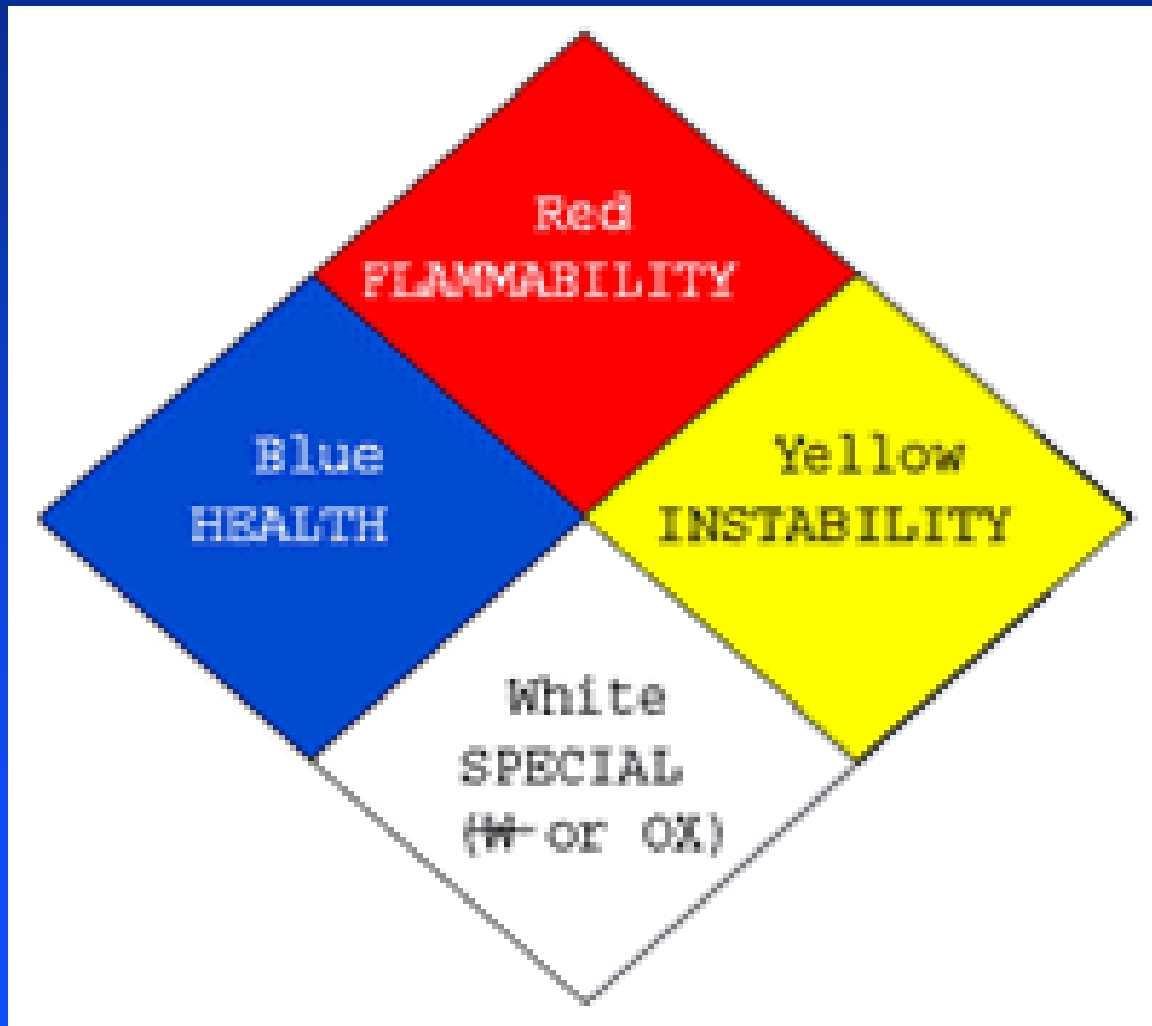
circle with flame - oxidizing material (5)

cylinder - gas under pressure (2.2)

propeller - radioactive (7)

test tube/hand/metal - corrosive (8)

National Fire Protection Association Guide



National Fire Protection Association Guide

	<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>
4	<i>IDLH</i>	<i><73°F</i>	<i>Detonates Easily</i>
3	<i>Level A</i>	<i>73-100°F</i>	<i>Strong Shock</i>
2	<i>Level B</i>	<i>100-200°F</i>	<i>Violent Chemical Change</i>
1	<i>Level C</i>	<i>>200°F</i>	<i>Unstable if heated</i>
0	<i>Level D</i>	<i>>1500°F</i>	<i>Stable</i>

Occupational Safety and Health Act (OSHA) - Labor

- OSHA (1970) - Employer provides a “safe and healthy” workplace. Employee abides by employer rules concerning same.
- Two types of inspectors
 - ◆ Compliance Safety Officers (CSO)
 - ◆ Compliance Health Offices (CHO)
- Inspection Program (random, planned, complaint driven, referral and accident) enforces PELs
- “State plan”, which must be “at least as stringent” as federal standard, allows state public employees to be covered under PEOSH (PESH Act passed in 1980 - NYS)

Occupational Safety and Health Act (OSHA) - Waste

“HAZWOPER” – Hazardous Waste Operations
and Emergency Response (1989)

- Requires health and safety training for persons managing hazardous materials (outgrowth of EPA’s SARA Title III)

Elements of a Site H & S Plan



Elements of a Site H & S Plan

- ID of Health & Safety Personnel
- Hazard Analysis
- Employee Training
- Written PPE Program
- Medical Surveillance
- Monitoring Protocol
- Site Control Measures
- Decontamination Procedures
- Emergency Response Plan
- Confined Space Entry Procedures
- Spill Containment Program
- Hazard Communication

Main Goals of Site S & H Plan

- There should be one *comprehensive written* Health & Safety program
- There should be one *comprehensive written site-specific* Health & Safety plan *per site*
- Plan must be made available to:
 - ◆ employer or employee representative
 - ◆ contractor, subcontractor, or other “exposee”
 - ◆ OSHA personnel
 - ◆ all agencies with regulatory authority over site

HAZWOPER Code Review



29 CFR 1910.120 - Highlights

- Site Characterization & Analysis
- Site Control
- Engineering Controls, Work Practices, PPE
- Monitoring
- Handling of Hazardous Waste Containers
- Decontamination Procedures
- Emergency Response
- TSDF Operations & RCRA

Site Characterization & Analysis

- Preliminary Evaluation Prior to Site Entry
- Hazard Identification
- Site, Job Task, Hazard & Safety Parameters
- Personal Protective Equipment (PPE)
- Monitoring Protocol
- Risk Identification
- Employee Notification

Site Control

- Part of required Site Safety & Health Program
- Developed during planning stages and modified as necessary
- Program includes:
 - ◆ site map
 - ◆ site work zones
 - ◆ use of “buddy system”
 - ◆ site communications
 - ◆ safe work SOP's
 - ◆ ID of nearest medical assistance

Engineering Controls, Work Practices, & PPE

- PPE Selection Dependent on Site Characterization & Analysis
- PPE Program:
 - ◆ selection
 - ◆ use & limitations
 - ◆ duration
 - ◆ maintenance & storage
 - ◆ decontamination & disposal
 - ◆ training & fitting
 - ◆ donning & doffing
 - ◆ inspection before, during & after use
 - ◆ program evaluation

Monitoring

- Initial Entry
- Periodic Monitoring
- Monitoring of High-Risk Employees

Handling Drums & Containers

- Opening Drums & Containers
- Material Handling Equipment
- Radioactive Wastes
- Shock Sensitive Wastes
- Laboratory Waste Packs
- Sampling of Drum & Container Contents
- Shipping & Transport
- Tank & Vault Procedures

Decontamination

- Develop & Follow Decontamination SOP's
- Choose Location to Minimize Exposure
- Dispose of Equipment & Solvents Properly
- Treat & Dispose of PPE Properly
- Authorized Employees to Handle PPE
- Notify Commercial Laundries of Hazards
- Install Proper Showers & Change Rooms

Emergency Response

- Develop Written Emergency Response Plan
- Elements of an Emergency Response Plan
- Procedures for Handling Emergency Incidents

TSDF Operations & RCRA

■ Develop Written Safety & Health Program

Selected Topics:

- ◆ Hazard Communication
- ◆ Medical Surveillance
- ◆ Decontamination
- ◆ New Technology
- ◆ Material Handling
- ◆ Training
- ◆ Emergency Response

Other Sections

- General Requirements
- Training
- Medical Surveillance
- Informational Programs
- Illumination
- Sanitation
- New Technology
- Emergency Response to Toxic Releases