

The Environment and You

Note: Due to security concerns, some information in this chapter has been removed or replaced with XXX.

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Attachment(s):

- ASU Diagram
- Carbon Dioxide Diagram
- Distribution Diagram
- Electronic Gases Diagram
- General Site Operations Diagram

Overview

Why is this chapter important?

This chapter provides BOC employees with information about Environmental Awareness, BOC/Group Environmental Policies, Philosophy, Management Systems, and Plans as well as good practices for handling day-to-day environmental issues.

Many regulations call for training of employees. By completing a review of this chapter, compliance will be achieved with several environmental regulations as well as BOC Group and external (ISO 14001, Responsible Care) requirements.

In addition, improving environmental awareness improves plant efficiency and environmental performance, while reducing the potential for violations, penalties, and long-term liabilities.

Purpose and Scope

Purpose

This chapter is intended to:

- Educate personnel in environmental awareness and the importance of complying with Environmental Management System(EMS) & regulatory requirements
- Identify employee roles and responsibilities
- Provide background information on BOC's Environmental Management System(EMS)
- Demonstrate that proper environmental management will improved efficiency
- Introduce concepts of environmental aspects/impacts, pollution prevention, and identify site significant environmental aspects/impacts
- Identify proper material and waste handling practices
- Provide appropriate spill response measures
- Review specific issues and Good Environmental Management Practices (GEMPs).

Scope

This chapter applies to all BOC process operations, distribution, and ISP employees in USA.

Responsibilities

Location Manager

The Location Manager or designee is responsible for:

- Understanding site regulatory issues.
- Operating equipment/facilities while complying with environmental laws and BOC policy.
- Conducting required monitoring/inspections and preparing applicable environmental regulatory reports.
- Implementing site corrective/improvement actions to comply with regulatory requirements.
- Developing and maintaining site Environmental Aspect/Impact Review inventory.
- Developing and maintaining site specific list of Good Environmental Management Practices (GEMPs) to be implemented through the Site Environmental Plan (for major sites).
- Bringing any environmental issues to the attention of the Safety, Health, and Environmental Quality (SHEQ) Committee.
- Notifying the Environmental Affairs department of any deficiencies or spill events.

Plant Operations, Maintenance, and Transportation Personnel

The plant operations, maintenance and transportation personnel are responsible for:

- Following BOC environmental policy and environmental laws.
- Implementing the Site Environmental Plan as designated by the Location Manager.
- Understanding the wastes generated by the site.
- Understanding penalties associated with non-compliance.
- Following proper procedures for handling chemicals and their impact on the environment.
- Following good spill prevention and clean-up procedures.

Environmental Management and Compliance

Why manage environmental compliance?

- It is BOC's Group Policy to comply with all environmental laws that affect our business.
- Regulatory penalties are reduced when plants are in compliance.
- Long term liabilities are avoided when environmental issues are properly managed.
- Provides improved efficiency due to process improvements, training, and procedural changes, which results in reduced spills/product and material losses.
- Managing environmental issues improves profits.
- Customers expect to work with environmentally responsible companies. BOC's commitment to the American Chemistry Council Responsible Care® Initiative, which requires continuous improvement in environmental protection and safety matters, will help demonstrate this. Many customers expect us to have an environmental management system and some may require registration to the ISO 14001 International Environmental Management System Standard.
- Communities expect us to protect their community and the environment.
- It's the right thing to do. We all expect to live and work in a clean environment. We want clean air to breath and water to drink. We want to leave the planet in good condition for future generations.

BOC Environmental Policy

Complying with BOC environmental policy is everyone's job

BOC has established an Environmental Policy (within SHEQ Policy) and Philosophy that expects us to comply with environmental laws and regulations (at a minimum), to prevent pollution as well as protecting the environment and community we work in. This provides policy to guide the company to act in a responsible manner and avoid some of the risks associated with environmental issues. The complete version of the Safety, Health, and Environmental Quality (SHEQ) Policy can be found in *VVP-01-06 : SHEQ Policy*.

Employee involvement is essential to implement environmental policies. All BOC employees are personally responsible for complying with environmental laws (federal, state and local) and BOC environmental requirements (IMS). It is the company's responsibility to provide appropriate training and resources and identify good operating practices (GEMPs) to implement these policies and procedures.

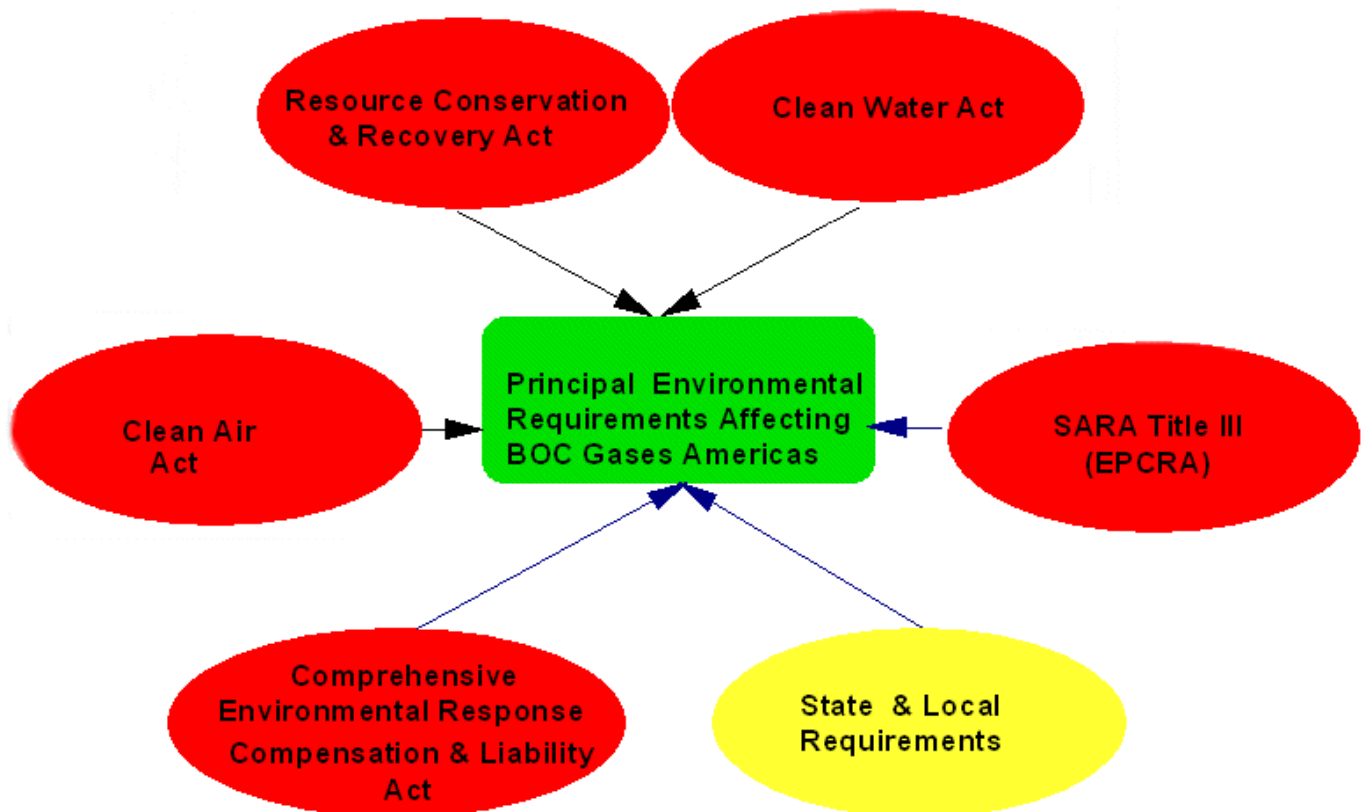
Environmental Laws and Standards

Closely follow laws and standards

BOC employees **must** implement/follow the following laws and procedures to avoid non-compliance:

- BOC Environmental Policy & EMS (IMS) Requirements
- Federal/State/Local Environmental Laws
- Good Environmental Management Practices (GEMPs)

U.S. Environmental Regulations



Summary of U.S. Environmental Regulations

These are some of the U.S. environmental regulations that affect BOC:

- **SARA Title III (Right-to-Know)** requires BOC to publicly report chemical inventories, chemical releases and emergency plans.
- **The Resource Conservation and Recovery Act (RCRA)** requires the plant to address solid and hazardous waste, storage, handling and disposal as well as underground storage tank management.
- Wastewater and storm water discharges and oil spill pollution prevention is regulated by the **Clean Water Act**.
- Ozone Depleting Substances (freons) and air emission sources requiring permits are regulated by the **Clean Air Act**.
- **The Comprehensive Environmental Responsibility and Cleanup Liability Act (CERCLA or Superfund)** requires companies like BOC to clean up sites and report spills.

Note: States and local government can and do create more stringent regulations in addition to those enacted by the U.S. Environmental Protection Agency (EPA).

This list is not all-inclusive.

Environmental Penalties/Responsibilities

Who's responsible for clean up?

There are a number of important environmental concepts to understand to determine responsibility:

- Companies carry "cradle to grave" responsibility for their wastes. BOC has responsibility for any waste that it generates forever or until it has been destroyed. Just because waste is taken off site and disposed of (landfilled) does not mean that BOC is free and clear of liability.
- The average cost in 1994 to clean up a Superfund site was 36 million dollars. BOC has spent many millions of dollars at dozens of Superfund sites and anticipates spending more to help clean up waste disposal sites that were legally used in the 1970s and 1980s.
- Environmental agencies look for a Potentially Responsible Party (PRP) to help pay for environmental clean-ups, especially established companies like BOC. They can also hold us "jointly and severally" liable for environmental problems. This means that BOC can be held partially or totally responsible for costs to clean up a Superfund or hazardous waste site even though we only contributed a portion of the problem.
- BOC presently estimates that we have tens of millions of dollars in future environmental clean-up costs from environmental issues that were caused many years ago as a result of practices that were acceptable at the time.

Civil and criminal penalties

The costs associated with environmental issues can be great. Large penalties can be assessed for environmental law violations.

- Civil penalties can be as high as \$32,000 per day per violation.
- Criminal penalties can be as high as 1 million dollars with jail sentences as high as 15 years.

These fines can apply to the company and to any individual in the company. Any interested group or individual can also sue BOC. Over the last several years BOC has successfully avoided major environmental lawsuits from environmental groups by demonstrating compliance with environmental laws.

Superfund example within BOC

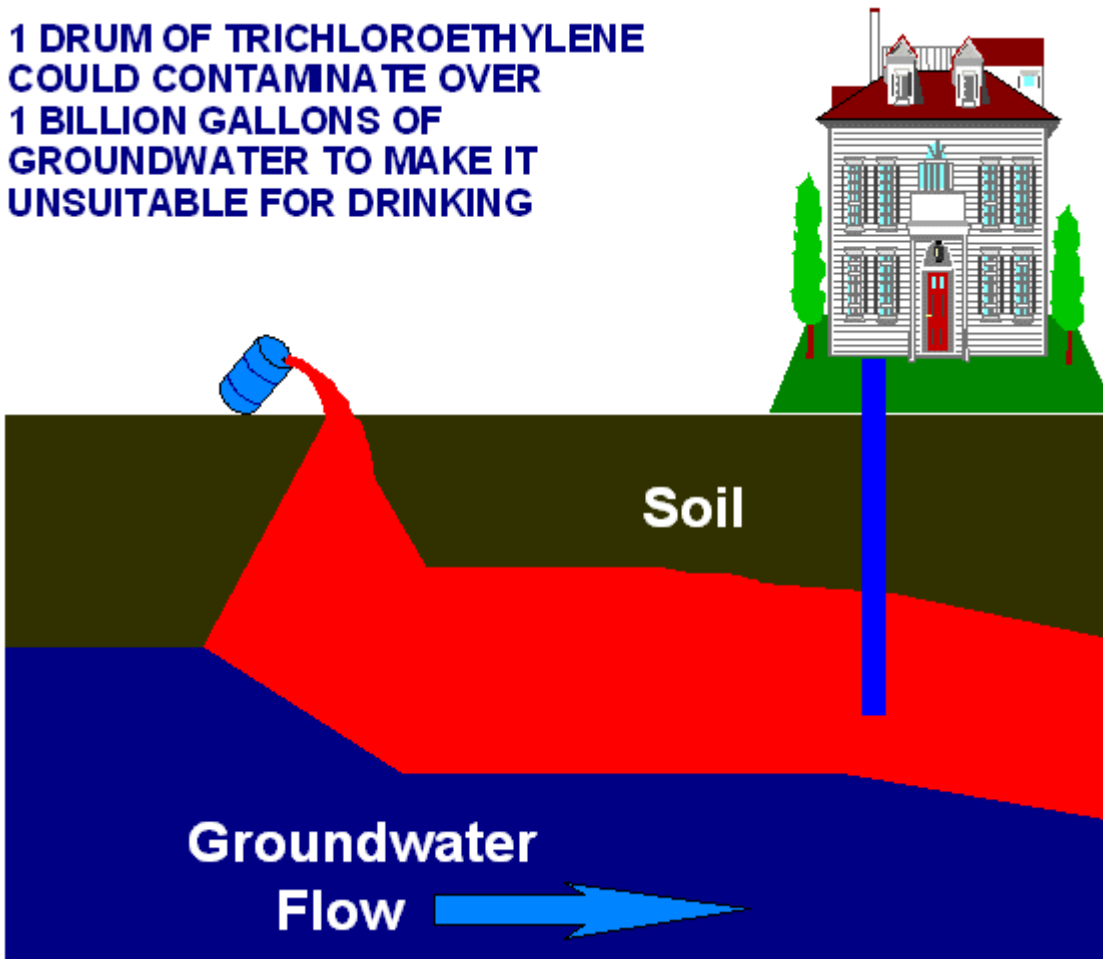
The BOC site in Vancouver, Washington was put on the federal Superfund site list due to ground water contamination resulting from solvent usage. It is likely that BOC will be cleaning up the ground water at Vancouver for 20 to 30 years costing many millions of dollars.

The owner, manager, and supervisor of the company next door to our Vancouver site were indicted and pleaded guilty (with major penalties and house arrest) for knowingly contaminating the same ground water we are cleaning up.

Ground water contamination

It doesn't take a large amount of spilled chemicals to cause a substantial amount of contamination and major clean-up costs. One drum of trichloroethylene can contaminate over 1 billion gallons of water to make it unsuitable for drinking.

**1 DRUM OF TRICHLOROETHYLENE
COULD CONTAMINATE OVER
1 BILLION GALLONS OF
GROUNDWATER TO MAKE IT
UNSUITABLE FOR DRINKING**



Ground water contamination with small quantities

If equally dispersed in one billion gallons of groundwater, one 55-gallon drum of trichloroethylene (TCE) would result in a ground water concentration of 55 parts per billion. Since the drinking water standard for TCE is 5 parts per billion, the billion gallons of water is no longer suitable for drinking. Smaller spills of less than a gallon, which occur periodically over time, can add up and cause similar problems.

Note: Solvents dropped on the ground do not necessarily evaporate or break down quickly. Often, they will enter the soil and sink to the ground water. Other chemicals, such as acetone, trichloroethane, mineral spirits, and oils can have similar environmental impacts with very small quantities.

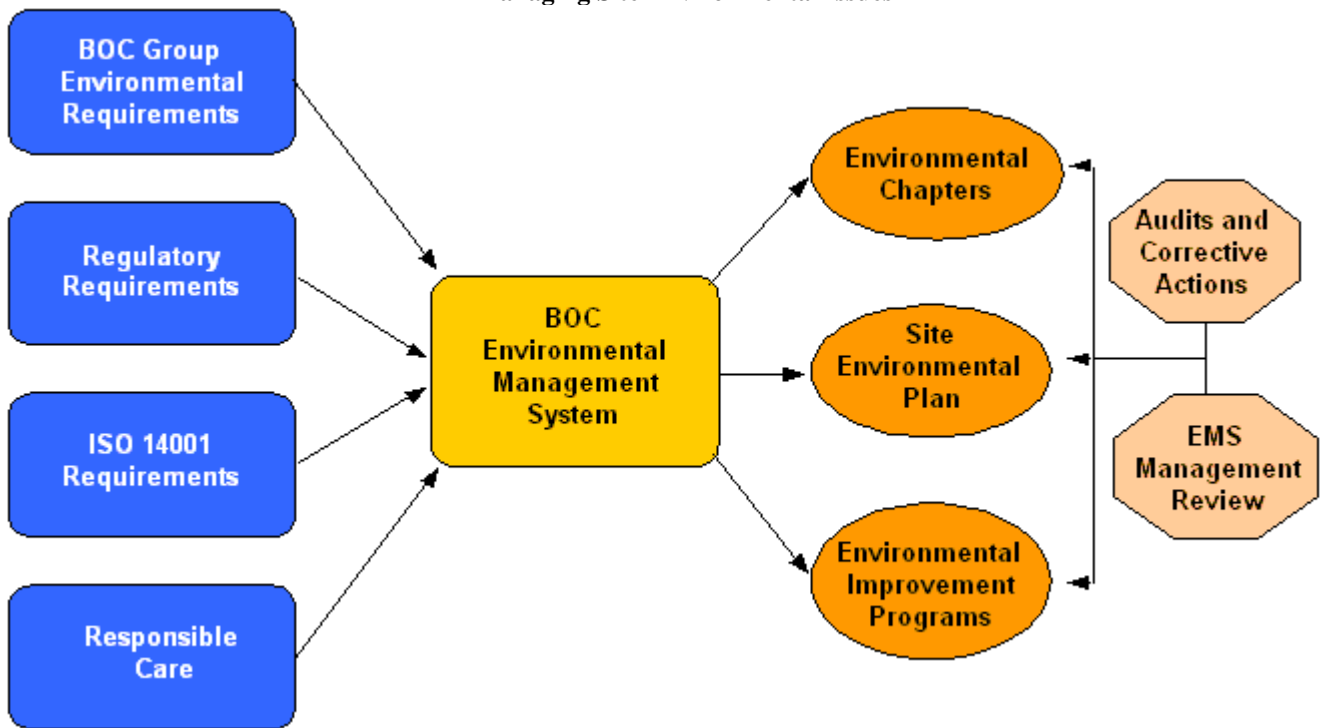


Constantly be aware of other chemicals that are used on-site that could cause ground water problems.

Managing Site Environmental Issues

The diagram below explains the BOC programs used to meet environmental regulatory requirements.

Managing Site Environmental Issues



**Implementing
EMS through the
Environmental
Plan**

BOC has developed an Environmental Management System (EMS) to aids facilities in complying with regulatory and BOC Group requirements as well as industry standards. The principal method to implement the EMS is through the Site Environmental Plan (at major sites) and/or Environmental Aspect and Impact Review. The site Environmental Plan can be found in **IMS-22-03 : *Environmental Plan for site.***

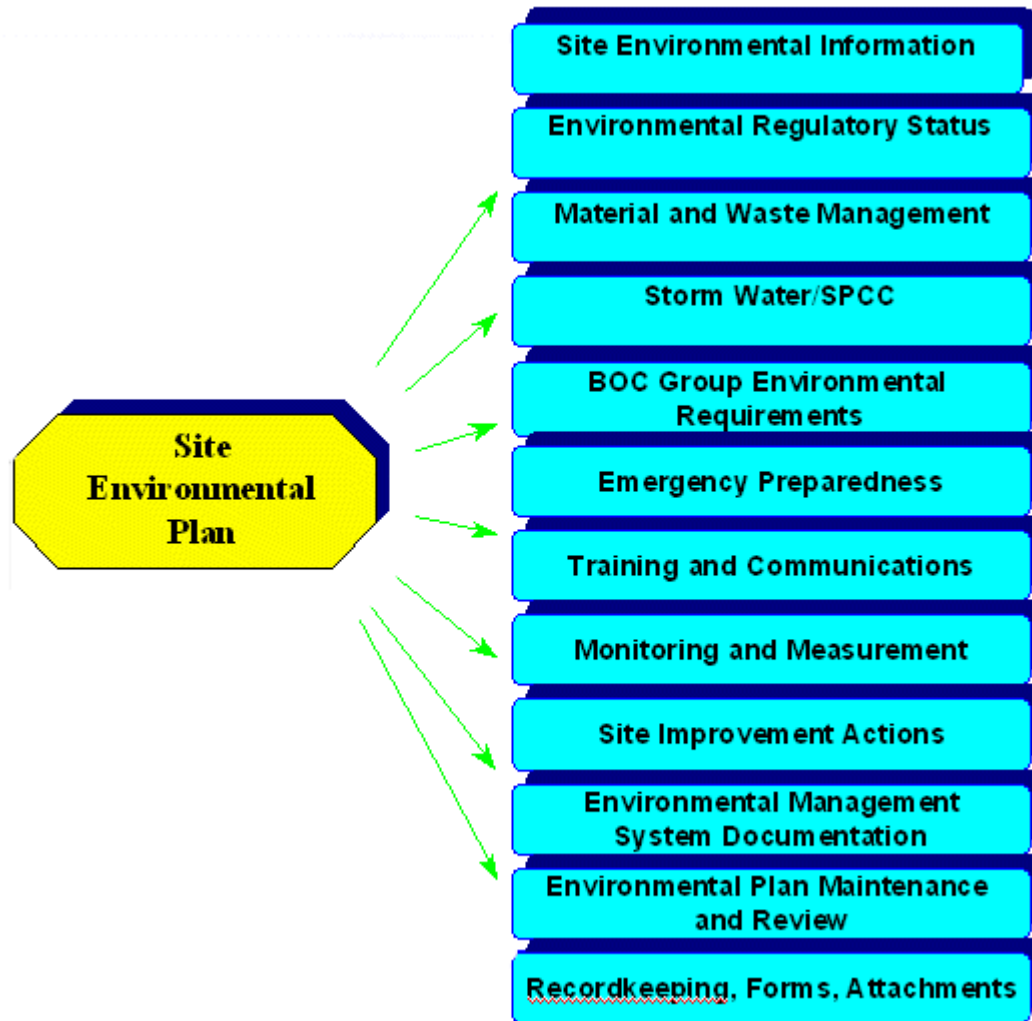
The Environmental Plan helps the site comply with:

- Hazardous waste
- Ozone depleting substances (ODSs)
- Storm water, spill prevention control and countermeasures (oil spill prevention - SPCC)
- Permits and monitoring
- Any other environmental regulatory requirements.

For most sites, this plan is required by regulation and is reviewed annually. Site employees will help implement the plan by:

- Conducting inspections
- Following Good Environmental Management Practices (GEMPs)
- Providing input for improvement (through the SHEQ Committee)
- Participating in training
- Following good spill clean up and housekeeping guidelines.

Components of the Site Environmental Plan



Environmental Aspects and Impacts Review

What is an environmental aspect?

An environmental aspect is an element of an organization’s activities, products or services that can interact with the environment. Examples include:

- Air emissions
- Wastes
- Water discharges
- Product losses
- Water and energy use.

It is important to understand that BOC will identify and evaluate these aspects to determine those having significant environmental impacts.

What is an environmental impact?

An environmental impact is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services, such as:

- Air pollution
- Global warming
- Ozone depletion
- Water and soil contamination.

**Site
Environmental
Aspect/Impact
Review**

Each site in BOC is required to complete an Environmental Aspect and Impact Review (see *IMS-21-03 : Environmental Aspect/Impact Review* and *IMS-21-04 : Environmental Aspect/Impact Review for Site*). This review uses an Excel spreadsheet to identify and evaluate the significance of environmental aspects and impacts associated with the site.

- Only Significant Environmental Aspects and Impacts need to be managed
- This process further helps sites to identify actions for continual improvement where environmental aspects/impacts are considered significant.

Typical Environmental Aspects (PGS)

Typical examples Typical environmental aspects (in addition to air and water releases) from production activities include:

- Waste solvents
- Waste oil
- Rags/spill cleanup materials
- Desiccants, refrigerant losses
- Cooling and process wastewater
- Energy use
- And product losses (processing and storage)

Additional wastes can be generated on-site. Examples could include scrap metals, office trash, light bulbs, batteries, paint, etc.

Typical Environmental Aspects (ISP and Electronic Gases)

- Typical examples**
- Product Releases (air emissions)
 - Scrubber media/solution wastes
 - Unserviceable Cylinders
 - Cylinder Prep & Paint Wastes
 - Lab Wastes
 - Waste Solvents
 - Waste Oil
 - Spill Cleanup Materials

Typical Environmental Aspects (Distribution)

- Typical examples**
- Fueling Leaks/Spills
 - Fuel Tank Leaks/Spills
 - Loading Product Losses
 - Truck Wash Effluents
 - Parts Cleaning Solvents
 - Used Tires
 - Used Oil
 - Used Antifreeze
 - Air Conditioner Refrigerant Losses
 - Waste Grease
 - Grease and Oil Leaks
 - Vehicle Air Emissions
 - Vehicle Noise
 - Waste Batteries

Pollution Prevention

Pollution prevention

Pollution prevention will be managed according to the following order with prevention being the preferable method.

- Pollution should be prevented, reduced or reused at the source whenever feasible.
- Pollution that cannot be prevented should be recycled in an environmentally safe manner.
- Pollution that cannot be prevented or recycled can be treated.

Benefits of preventing pollution

These concepts illustrate ways preventing pollution can save BOC money:

- Don't make waste. By eliminating or reducing wastes money is saved on materials, administration, disposal and clean-up costs.
- The benefits of the material/resource can be realized while minimizing pollution. Pollution is really a resource that is in the wrong place.
- By reducing non-product output, we increase efficiency and ultimately profits. Non-product output is anything that leaves the site that is not a product or container for a product. It includes wastes, waste streams, air emissions, and product losses.

Pollution Prevention Measures

Source Reduction

Pollution Prevention involves the reduction of waste or waste toxicity at the generation source. It can also be called waste minimization.

Through source reduction, risks to people and the environment can be reduced, financial and natural resources can be saved that would otherwise have to be expended on environmental clean-up or pollution control, and industrial processes can become more efficient. Source reduction is defined as any practice that:

- Reduces the amount of any pollutant, or contaminant entering waste
- Reduces the hazards to public health and the environment associated with the release of pollutant.

Source reduction practices can include:

- Equipment, process, procedure, or technology modifications
- Reformulation or redesign of products
- Substitution of raw materials
- Improvements in maintenance and inventory controls.

Under this definition, waste management activities, including recycling, treatment and disposal are not considered forms of source reduction.

Source reduction examples

The following are source reduction goals and examples within BOC:

1. Eliminate unnecessary chemical purchases and use only enough to get the job done.
 For example, a BOC site may buy extra chemicals to obtain a bulk discount. If the chemical isn't used for quite some time, the container label could become unreadable. Someone finds an unlabeled container and it has to be analyzed at a cost of \$1,000. Once the contents are identified, the container must be disposed of since we can't be sure it's uncontaminated. Transportation and disposal (incineration) are an additional \$750. An extra \$1,750 plus the cost of the original material was spent due to purchasing more chemicals than necessary.
 Only purchase the amount of chemical needed for a 6 month period.
2. Minimize environmental releases/losses.
 Conduct periodic maintenance to minimize oil or refrigerant leaks from equipment. To prevent liquid spills from reaching the ground or waterways, use secondary containment, such as dikes or spill pallets, and protect the area from wind or rain.
3. Material Substitution/Process Changes
 For example, replace halogenated solvents (Trichloroethylene) with citrus-based cleaners, etc.

These are some other areas where source reduction can be used when feasible.

- Waste Solvents
- Waste Oil
- Used Rags/Spill Materials
- Freons or Ammonia Refrigerants
- PPU/Gas Cleanup Materials
- Cooling Tower Blowdown and Condensate
- Water Use
- Energy Use
- Product Losses

Recycle/Reuse If source reduction cannot be used, recycling or reusing is the next best method.

Recycling

Using waste as material to manufacture a new product

Reuse

Reuse is a form of pollution prevention that prevents objects and materials from becoming waste. Reuse is generally preferred to recycling as it consumes less energy and resources than recycling.

Some examples that can be recycled/reused on or off-site, within BOC, are:

- Used oil
- Freon
- Used antifreeze
- Truck wash water
- Paper
- Solvents
- Scrap metal
- Tires
- Batteries
- Light bulbs

Efficiency through conservation

It is also important to carefully use resources, such as water, energy and materials (electricity, fuel oil, natural gas, etc.) They can be very expensive. Significant indirect environmental impacts can result from the use of these resources.

For example, indirect environmental impacts from use of electricity can involve air and water pollution as well as substantial waste generation from the burning of coal or other fossil fuels to generate the electricity.

Environmental Issues/GEMPs

Site housekeeping

Site housekeeping is very important for several reasons:

- A clean site provides a good first impression for customers, neighbors, and regulators.
- Shows our commitment to properly care for our property.
- Helps avoid many future problems such as complaints, fines, and investigations.
- Improves work environment for all employees.
- Clean Site = Employee/Company Commitment

Planned General Inspections

Planned General Inspections are routinely conducted to detect conditions that may lead to environmental problems. Each area of the plant will be inspected to determine if there are any safety, health, environment or housekeeping deficiencies. See *IMS-12-01 : Planned General Inspection* for more information.

Chemical Handling and Waste Recycling and Disposal

Chemical and waste handling guidelines

Chemicals and wastes **must** be handled and disposed of according to good practices to avoid costly disposal, government fines, and injuries.

All wastes **must** be stored in sound drums, tanks or other containers with proper labels. Use the following guidelines for handling waste:

- Containers **must** be closed to prevent spills when not in use, and maintained in good condition.
- Affix appropriate labels to all containers.
- Secondary containment in the form of dikes or spill pallets should be provided.
- If container is stored outside, ensure area or pallet is covered.
- Use drip pans in chemical dispensing areas.
- Clean up spills and leaks immediately. Do not attempt to wash away spill with water. This may create a larger quantity of waste to dispose of and depending on where water discharges to may be against the law.
- Inspect equipment and storage areas continually for signs of leaks, container problems, spills, etc.
- **Never** mix different wastes. For example, if you mix solvents such as 1,1,1 Trichloroethylene with used oil, the mixture will become a hazardous waste requiring costly disposal. Mixing of incomparable wastes can also cause fires or explosions.
- Don't store incompatible wastes or chemicals near each other to avoid fires or explosions.
- **Never** dispose of wastes down the drain, sinks, toilets or on the ground. It is illegal and could cause serious environmental problems.
- Wear appropriate personal protective equipment (PPE). Protect yourself by reviewing the MSDS for the chemical/material you are handling.
- Recycle or reuse when possible
- Use BOC approved waste contractors
- Know where your waste goes and how it is processed by communicating with the waste disposal company.
- Authorize release of waste by signing manifest
- Maintain appropriate documentation
- Use BOC Good Environmental Management Practices (GEMPs). For further information, see [IMS-22-11 : Environmental Risk Control Strategies and Good Operating Practices](#).

Recycling

Recycle waste materials as much as possible recognizing that companies accepting the material must be reputable. Be aware that "cradle to grave" liability can also affect chemicals and oils sent out for recycling. See [Error! Reference source not found. \(Page \)Error! Bookmark not defined.](#) if you are not sure about a company that you're working with.

Disposal

Use reputable and BOC-approved disposal companies. BOC has established National Contracts for hazardous and industrial waste disposal with Onyx and Safety Kleen to better control where waste goes while reducing overall company costs.

Hazardous waste documentation A hazardous waste manifest must be signed before a waste contractor removes hazardous waste from our property. The following guidelines can be used to ensure compliance:

- Review the accuracy of the manifest information before signing.
- Only **specified individuals** have the authority to sign hazardous waste manifests. The BOC individual signing the manifest is responsible for the information provided.
- Keep a copy of the manifest from the disposal facility so there is a record of where the waste went and method of disposal. Keep all documentation permanently on hazardous waste disposal.
- Keep bill of lading (i.e. shipping document) for recycled wastes not using a manifest. For example, in some states, batteries, used oil, and antifreeze may not require a full hazardous waste manifest.

See [IMS-22-08 : Waste Regulatory Compliance](#) for more information on proper disposal and handling of hazardous waste.

Equipment Leaks

Minimizing equipment leaks Equipment leaks can be a significant source of soil, ground water, surface water or storm water contamination. Pumps, compressors, heat exchangers, chillers and pipes can leak product, oils, freons, ammonia, acetone and scrubber solutions, etc.

These leaks can be minimized through:

- PM programs and scheduling repairs.
- Spill cleanup materials should be stored nearby and used.
- Larger leaks must be contained and corrected quickly to reduce material losses, regulatory penalties and future liabilities.
- If leaks occur outside and into secondary containment, rainwater or snow melt must be inspected prior to discharge. See [GOP-07-02 : Inspection and Maintenance of Drainage Controls](#) for more information.

Note: Freon leaks require EPA notification and repair for any annual losses that occur at a rate of greater than 35% of the system's total volume. Oil and other chemical spills may also require notification to the EPA and local regulating office.

Contaminated Soil

Handling soil contamination Contaminated soils can be a result of unrepaired leaks, accidental spills, etc. Stained soil and rock can also contaminate surface water when it comes into contact with storm water. These contaminated areas must be handled as follows:

- Contain and eliminate the source of contamination (repair the leak).
- Remove contaminated materials.
- Soil/rock may be required to be sampled and analyzed, so **do not** mix with any other wastes.
- Select the optimal disposal method for contaminated materials.
- Notify and work with Environmental Affairs during the initial discovery and during each phase of clean-up (regulatory notifications may also be required).

Responding To Spills

Responses to a spill

- Contain and/or clean up any spills immediately using available spill clean-up materials or call your designated spill clean-up contractor.
- Block any drains and/or ensure secondary containment valves are closed
- DO NOT attempt to wash away any spill with water!
- Call your supervisor immediately for any significant spill. If a supervisor is unavailable, Call **1-800-XXX-XXXX** and provide information about the spill, your name, and phone number where you can be reached. Someone from the Environmental Affairs Department will be contacted ASAP to assist with handling the spill. In many cases, the spill will have to be reported to Regulatory Agencies.
- If spill is larger than 25 gallons, outside responders may be necessary to comply with responder training requirements.
- Your supervisor may require your participation to follow the site Emergency Response Plan.
- To report a spill, use the Hazardous Substance Spill/Release Reporting Form in **IMS-24-05 : Accident/Incident Investigation and Reporting in North America**

Waste Flow Diagrams

Waste Flow Diagrams in PDF

Below are the Waste Flow Diagrams to several processes in PDF format:

- ***General Site Operations Diagram (see attachment)***
- ***ASU Diagram (see attachment)***
- ***Distribution Diagram (see attachment)***
- ***Carbon Dioxide Diagram (see attachment)***
- ***Electronic Gases Diagram (see attachment)***