Environmental Management Systems

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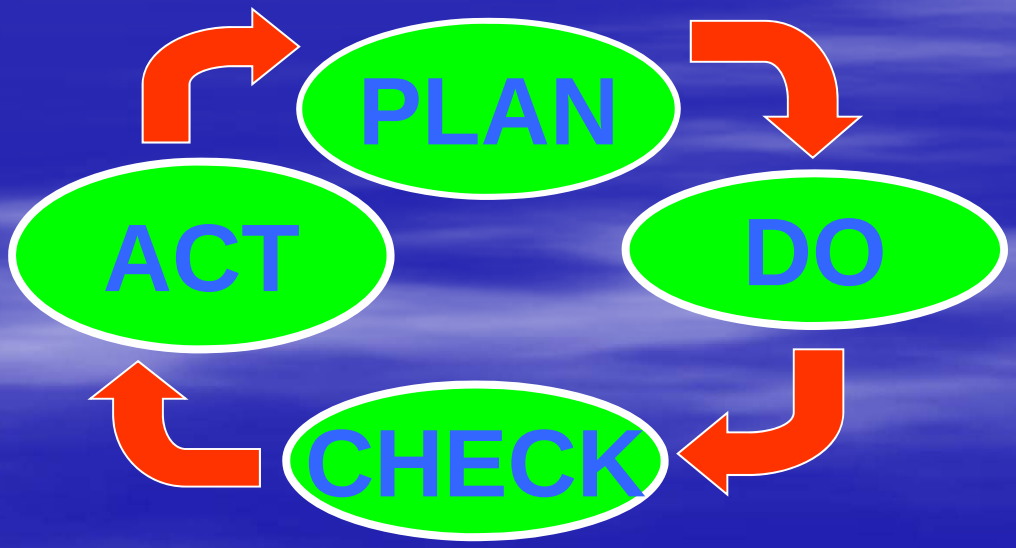
ISO 14001

- International standard
  - Same major categories as Performance Track
  - 17 key elements of an EMS
  - Based on “Plan, Do, Check, Act”



ISO 14001 Elements

- Policy
- Planning
  - Environmental aspects
  - Legal and other requirements
  - Objectives, targets and programs
- Implementation and operation
  - Resources, roles, responsibility and authority
  - Competence, training and awareness
  - Communication
  - Documentation
  - Control of documents
  - Operational control
  - Emergency preparedness and response

ISO 14001 Elements (cont.)

- Checking
  - Monitoring and measurement
  - Evaluation of compliance
  - Nonconformity, corrective action and preventive action
  - Control of records
  - Internal audit
- Management review

Potential Benefits of EMS

- Reduced cost of waste management
- Savings in consumption of energy and materials
- Lower distribution costs
- Improved corporate image - http://www.nytimes.com/2007/11/15/business/15plant.html?_r=2&ref=science&oref=slogin&oref=slogin
- Framework for continual improvement
- Regulatory relief
  - the source must state that it has or will have an environmental management system (EMS) before a SEP will be considered (KDHE BAR SEP policy, July 14, 2005)

What is an EMS?

A system that applies modern management techniques to environmental issues

…and leads to inclusion of the environment in the mainstream business plan

…and integrates environment into every aspect of operations and level of organization--ownership

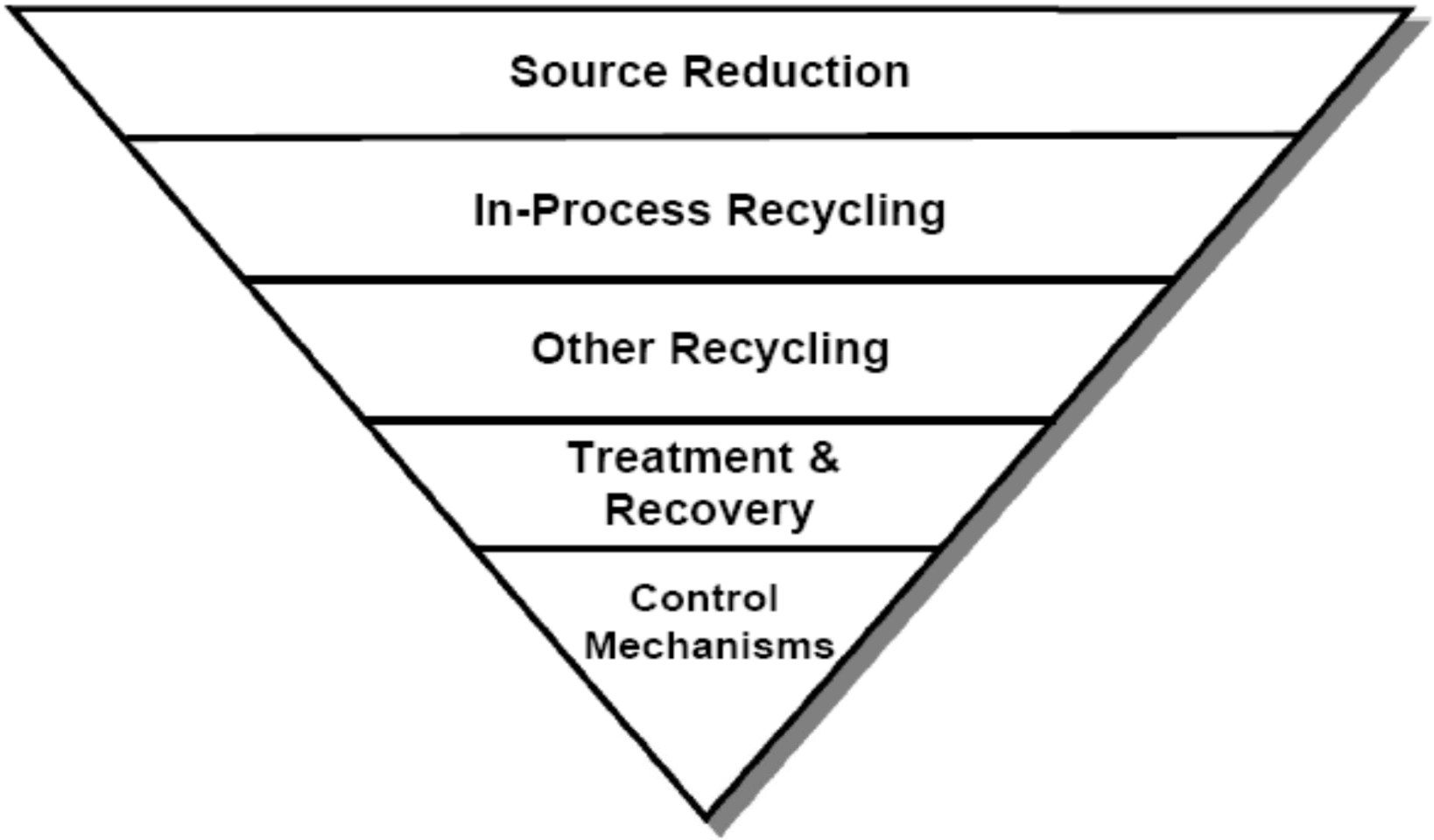
A Successful EMS Will

- Control risk
- Maintain compliance
- Reduce environmental impacts

Definitions

- Pollution Prevention (EPA) –
- The term "source reduction" means any practice which -
  - reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal
- Prevention of pollution (ISO 14001)
  - Use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impact
  - Note: prevention of pollution can include source reduction or elimination; process, product or service changes; efficient use of resources; material and energy substitution; reuse; recovery; recycling; reclamation, and treatment.

Prevention of Pollution Hierarchy



The EMS Planning Process

1. Identification of Activities, Products, and Services
2. Identification of (significant) Aspects
3. Identification of (significant) Impacts
4. Establish Objectives and Targets
5. Identification of requirements

ISO Standard

4.3.1 Environmental aspects

The organization shall establish, implement and maintain a procedure(s)

a) To identify the environmental aspects of its activities, products and services within the defined scope of the environmental management system that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services, and

b) To determine those aspects that have or can have significant impact(s) on the environment (i.e., significant environmental aspects).

Environment

Surroundings in which an organization (your company, business, entity, etc.) operates, including

- air,
- water,
- land,
- natural resources,
- flora (plant life), fauna (animal life),
- humans, and their interrelation.

Environmental Aspect

Element of an organization’s activities or products or services that can interact with the environment.

Example: Making Coffee

Identifying Aspects/Impacts

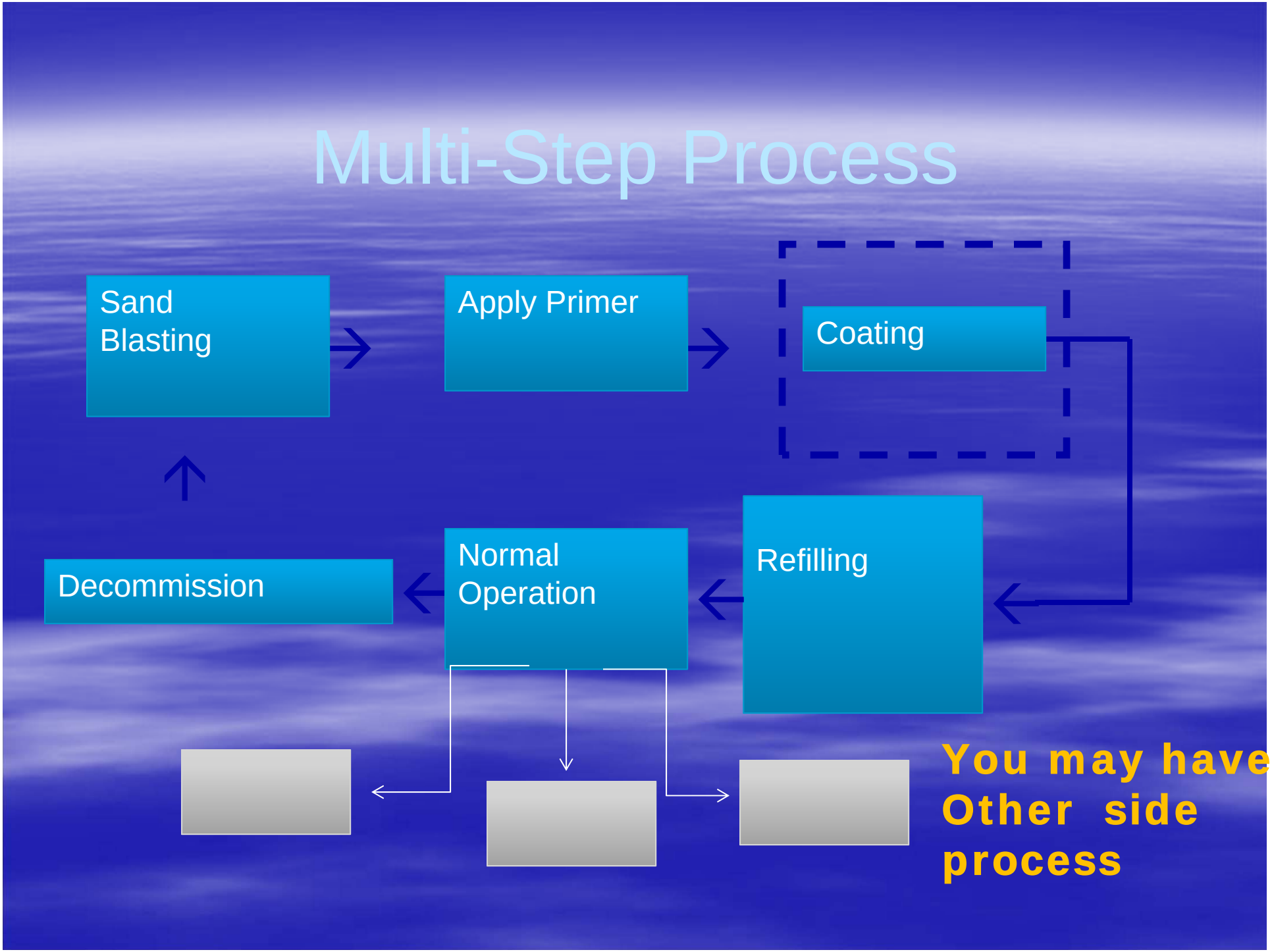
Inputs	Aspect	Outputs
Coffee Filters Water Coffee maker Sugar Cream Spoons Cups Napkins	Store Coffee Fill Container Pour Into Maker Measure Coffee Put in Filter Turn on power Pour into Cup Cream/sugar Clean Up Disposal	Cup of Coffee Packaging Spilled coffee beans Spent coffee & filters Spilled sugar & cream Unused sugar & cream Old smelly coffee Washwater for cups, pot, spoons, etc.

Definition Exercise

- Which of the following is an operation/activity, aspect, or impact?
  - Air pollution
  - Burning diesel fuel
  - Digester operations
  - Operating/maintaining backup generators
  - (Electrical) energy consumption
  - Water consumption
  - Herbicide application

Activity:
Storage Tank

Multi-Step Process



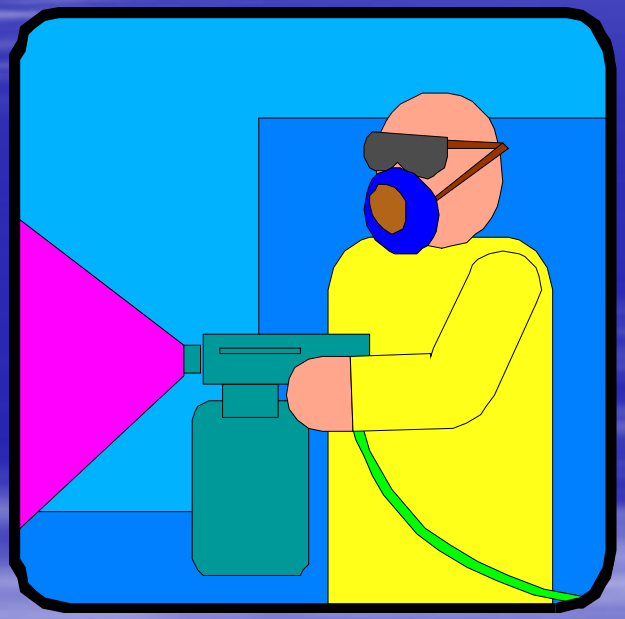
Identify Process Wastes

- Draw “chalk line” around area
- List everything that goes in and out

Surface Coating

Input

- Metal parts
- Paint
- Spray guns
- Filters
- Solvent
- Water
- Shop rags

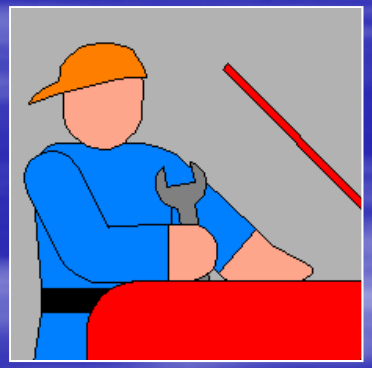


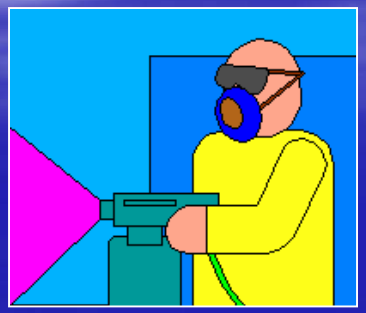
Output

- Painted parts
- VOCs to air
- Loaded filters
- Dirty guns
- Dirty rags
- Spent solvent
- Packaging (cans, cardboard)
- Wastewater
- Sludge

Beyond Production. . .

- General Maintenance/Janitorial
- Fleet Maintenance
- Office Procedures
- Shipping/Receiving





Environmental impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.

Typical Impacts

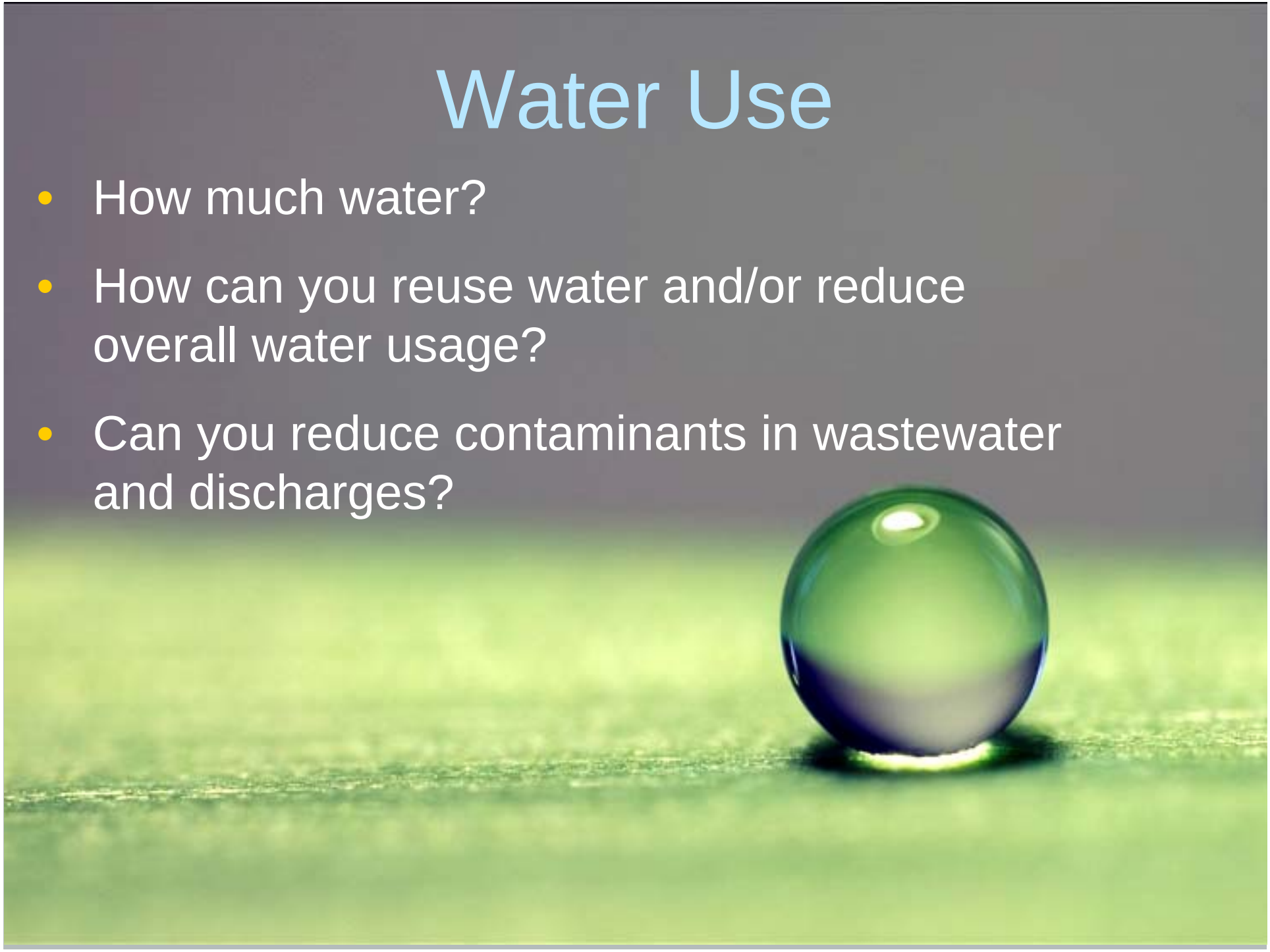
- Air Emissions
- Water
  - Use
  - Contamination
- Energy use
- Chemical Use
- Hazardous Materials/Waste
- Chemical Use

Air Emissions

- What is vented to the atmosphere?
- What are the hazards?
- Loss of product?
- Deterioration of Quality?

Water Use

- How much water?
- How can you reuse water and/or reduce overall water usage?
- Can you reduce contaminants in wastewater and discharges?



Energy Use

- How much energy is used in the process?
- How is the energy used?
- How can overall energy use be reduced?
- Is lighting efficient?
  - Natural lighting
  - Energy efficient lighting
- Can you consolidate operations/storage space?
- Is lighting, heating, or air conditioning needed? How much?
- Is renewable energy an alternative ?
  - External

Chemicals and Materials

- What types of chemicals are used?
  - How much?
- How can chemical use be reduced?
- Are there less harmful alternatives?
- Can you eliminate a chemical?
  - Can another do double duty?
  - Is the process that uses that chemical really necessary?

Hazardous Wastes/Materials

- What types of hazardous waste are tracked?
- Define the process that leads to generation.
- Are there opportunities for reduction?
- Do processes mix hazardous and non-hazardous materials?

Solid Waste

- What types of solid waste are generated?
- How much solid waste is generated?
- Are there opportunities for reduction, reuse, or composting?

All Materials

- Can materials be reused?
- Are there markets for the materials?
  - Other parts of the facility
  - Recycling market
- Is it possible to segregate in process?

Environmental Footprint

- How a facility's operations and services affect the environment. The environmental impact of a facility.
- Critical element of EMS: identify environmental aspects and determine which ones have significant impacts

Environmental Footprint ID

- Develop list of environmental aspects and impacts
- Use input/process/output diagrams (not required, but recommended)
- Consider the following:
  - Regulated aspects
  - Non-regulated aspects
  - Emergency situations/conditions
  - Positive impacts on the environment

Environmental Footprint ID

Operation/Activity	Aspects	Impacts
Driving fleet vehicle	Emission of VOCs	Increase in ground level ozone
Treatment of industrial wastewater	Discharges to stream	Degradation of aquatic habitat and drinking water supply
Storing diesel on site	Spills and leaks	Soil and groundwater contamination
Operating office lights	Electricity use	Air pollution, global warming
Printing pamphlets	Use of recycle paper	Conservation of natural resources

Identifying Aspects

- Which operations and activities interface with the environment in a way that could result (or has resulted) in environmental impacts?
- What materials, energy sources and other resources do we use in our work?
- Do we have emissions to the air, water or land?
- Do we generate wastes, scrap or off-spec materials? If so, does the treatment of disposal of these materials have potential environmental impacts?
- Which characteristics or attributes of our products or services could result in impact the environment (through their intended use, end-of-life management, etc.)?
- Does our land or infrastructure (e.g., buildings) interact with the environment?
- Which activities (for example, chemical storage) might lead to accidental releases?

Evaluating Impacts

- Are the impacts actual or potential?
- Are the impacts beneficial or damaging to the environment?
- What is the magnitude or degree of these impacts?
- What is the frequency or likelihood of these impacts?
- What is the duration and geographic area of these impacts?
- Which parts of the environment might be affected (e.g., air, water, land, flora, fauna)?
- Is the impact regulated in some manner?
- Have our interested parties expressed concerns about these impacts?

Environmental Footprint ID

Identify aspects and impacts exercise

Web Resources

- www.epa.gov/ems/
- www.iso.org/iso/en/iso9000-14000/index.html