Environmental Management System (EMS)

April 18, 2008
Tempe, AZ
Agenda

• Environmental Management System (EMS)
  – EMS as a framework for achieving goals
  – Tools for managing

• EMS in the Arizona
  – City of Scottsdale
  – Pima County Regional Wastewater Reclamation
Workshop Goals

• Become familiar with the EMS elements and process
• Learn about what other public agencies have been doing
• Learn about the EMS as a tool for achieving program goals
• …your goals?
EMS Value to Government

EPA PEER Center
(Public Entity EMS Resource)
Public Entity EMS Resource Center

- Website: www.peercenter.net
- EMS guidelines, tools
- Local Resource Centers
PEER Local Resource Centers

- 11 organizations nationwide to help local governments, public agencies
Some PEER-Assisted Entities

- Bay Area Rapid Transit (BART), CA
- City of Phoenix Public Transit Authority, AZ
- Arlington County, VA
- City of Scottsdale, AZ
- Port of Houston, TX
- University of Massachusetts, MA
- Sacramento Municipal Utility District, CA
- Jefferson County, AL
- King County Solid Waste, WA
- City of San Diego, CA
- City of Lowell, MA
- City of Berkeley, CA
The E in EMS
What is an EMS?

- The M in EMS: a management **framework** that provides a process for addressing issues

- The S in EMS: a **continual cycle** of planning, implementing, reviewing and improving
Environmental “Evolution”

1970’s -- Pollution Control

1980’s -- Recycling, pollution prevention, source control

1990’s -- Global Treaties: Montreal, Rio, Kyoto

2000’s -- GHG Reduction, Energy Conservation, Sustainability

ISO 14001 EMS Standard, 1996

Sustainable Earth Initiative 2008
ISO 14000

Environmental Management Standards

• Global trends
  – Montreal Agreement, ozone ban (1987)
  – Convention on International Trade in Endangered Species

• International Organization for Standardization
  – 140 member nations
  – Need for “harmonization” (EMAS, BS 7750)
  – 1996, ISO 14000 adopted

• International standard for Environmental Management System (EMS)
  – Voluntary
  – Focus is on processes, not performance
EMS Core Elements

- Environmental policy
- Environmental aspects
- Legal and other requirements
- Objectives & targets
- Environmental management programs
- Structure and responsibility
- Training: awareness & competence
- Communication
- EMS documentation

- Document control
- Operational control
- Emergency preparedness and response
- Monitoring and measurement
- Nonconformance & corrective and preventative action
- EMS audit
- Management review
How Does an EMS Work?

Commitment to Continuous Improvement

Policy

Aspects & Impacts

Environmental Management Programs

Roles & Responsibilities, Operational Controls, Corrective Action

Audit, Management Review

How do we affect the environment?

What will we do & how will we do it?

Who is responsible?

How do we fix problems?

Are we on the right track?
What Does an EMS Do?

• Focuses efforts on the environmental issues that are significant
• Monitors progress and allows for mid course correction
• Assigns responsibility and assures accountability
• Saves $$$
• Improves environmental performance
• Reduces risk
Who’s Doing It?

• 129,000+ corporations ISO 14001 certified
• Federal agencies (EO 13148, 13423)
• State and local government
  – Cities and Counties
  – Water/wastewater utilities
  – Transit agencies
  – Colleges and universities
EMS Examples and Benefits
Results?

Benefits of EMS Implementation

• Environmental Performance Improvement
• Enhanced Compliance Management, Reduced Risk
• Increased Employee Awareness and Morale
• Operational Cost $avings
• Pollution Prevention
• Enhanced Public Image
Environmental Accomplishments

City of Scottsdale, AZ

ENERGY: more than 350,000 KwH reduced (within the first two years)

GREEN BUILDING: In 2005, Scottsdale became the first city in the nation to adopt a LEED Gold policy

NATURE PRESERVE: City’s goal is to preserve 36,400 acres McDowell-Sonoran Preserve

GREEN WASTE: 6,819 tons diverted

VOC: Reduction goal was 3,525 lbs.; achieved 22,000 lbs. reduction
Cost Savings

Tri-County Metropolitan Transportation District of Oregon

Savings: $300,000

-- Operational savings, $66,000 in energy conservation
Environmental Improvement & Awareness

Jefferson County, Alabama

* Conservation --8% reduction in water use, 12% reduction in electricity
* Increased environmental awareness and involvement among employees
* Operating procedures improved efficiency and sensitivity to environmental concerns
* Jefferson County first county in US registered to the ISO 14001 Standard
Over a four-year period, our EMS helped us reduce our solid waste disposal costs by 16 percent, save $26,000 per year in chemical waste disposal costs, and save an estimated $20,000 per year in energy reduction projects.” – Dr. Harvest L. Collier, Vice Provost, University of Missouri-Rolla

- 2001, **University of Missouri - Rolla** became the FIRST university in US to earn ISO 14001 certification for campus-wide EMS
- EMS process raised awareness, improved regulator relationship, improved compliance
- Significant cost savings through recycling and energy conservation (upgrading hoods)
Improved Bond Ratings

Charleston Water Systems

Regional water & wastewater provider, serving 400,000
FIRST public utility in US to earn
ISO 14001 certification (1999)

• 2001, Moody’s went from A1 to Aa3, $100,000/yr savings
  • 2006, S&P Fitch ratings went from AA- to AA, $170,000/yr savings
• Fuel reduction savings $48,000/yr
Kent County WWT

- 16 MGD, Class A biosolids
- EMS goals: reduce emissions, electricity usage, sewer overflows

**Environmental/Biosolids Policy**

- Comply with regulations and NBP Code of Good Practice
- Have an environmental/biosolids vision
- Improve continuously
- Readily share information
- Practice pollution prevention
Fort Lewis

Sustainability Management System

• Fort Lewis Public Works was third-party ISO 14001-certified in September 2000
  – expect to have all major garrison organizations ISO 14001 self-certified by April 2005

• Fort Lewis: 86,000 acres

• Facilities: 22 million square feet
Ft. Lewis Sustainability Goals

1. Reduce traffic congestion and air emissions by 85% by 2025
2. Reduce air pollutants from training without a reduction in activity
3. Reduce stationary source air emissions by 85% by 2025
4. Sustain all activities using renewable energy sources and generate all electricity on post by 2025
5. All facilities adhere to the LEED Platinum standard 2025
6. Cycle all material use to achieve zero net waste by 2025
7. Attain healthy, resilient Ft. Lewis and regional lands
8. Recover all listed and candidate federal species in South Puget Sound Region
9. Zero discharge of wastewaters to Puget Sound by 2025
10. Reduce Ft. Lewis potable water consumption by 75% by 2025
11. Ft. Lewis contributes no pollutants to groundwater and has remediated all contaminated groundwater by 2025
12. Develop effective regional aquifer and watershed management program by 2012
The Planning Steps

Ready, Aim …
Environmental Policy

- Environmental Policy should commit to
  1) Continual improvement
  2) Pollution prevention
  3) Environmental compliance

- Policy should identify EMS framework
- Policy should be publicly available
Legal and Other Requirements

- Your Environmental Policy Commits Your Organization to Compliance.
- “Other Requirements” may include industry standards, Executive Orders, agency directives, etc.
Gap Analysis

- A review of current environmental programs and systems compared against the criteria for your EMS to determine which elements of your current system need additional work.

Define Your Fenceline

- Drawing a “fenceline” around the department, activity to be covered by the EMS.
Core Team

- Appropriate staff and management personnel
  - from up, down, and across the organization
  - representing every function in the “fenceline”
  - chosen for their skills in problem solving and communication

- They will be the organization’s change agents
Challenges

• Lack of upper management support
• Unclear or insufficient authority
• EMS champion decides to do it alone
• Skimping on training
• Lack of time and/or resources
• Employees brought in at the last minute
• Neglecting to account for culture change issues
Mapping the Process
What is a Process Map?

• A “picture” of the operations, activities, and/or services, a graphic representation to help
  – Understand and agree on the inputs, outputs and processes
  – Visualize potential environmental “hotspots”
  – Assess training and competency needs
  – Understand the interfaces among functions and logical communication channels
Process Map

Resources → Operations → Products/Services

Operations → Waste → By-Products
Vehicle Maintenance Yard

Resources:
- New vehicles
- Vehicle fuel (B20 and gasoline)
- Lubricants
- Service parts
- Misc. shop supplies
- Tools and equip.
- Office supplies
- Water
- Electricity
- Nat. gas

Waste

Operations:
- Management & Procurement
- Facilities Management
- Fuel Islands
- Emergency Service
- Heavy Equipment
- Combustion gasses
- Used parts (some)
- Used spill clean up materials
- Trash
- Haz. Waste

Products:
- Transportation services, mobility
- Vehicles maintained
- Used vehicles
- Scrapped vehicles
- Used parts (rebuild)
- Used oils
- Scrap metal
- Cardboard, paper

By-products:
- Light Vehicles
- Fabrication
- Parts
- Make Ready
- Acquisition
- Remote Fueling

--Clark County WA process map
Earth Friendly Pizza Shop

• Task: Map the process of making and selling pizza
  • Operations
  • Resources
  • Products, Services
  • By-products
  • Waste
Determining Environmental Aspects
Identifying Environmental Aspects and Impacts

• Identify the main activities, products and services within the “fenceline”
  – Process flow diagrams
  – Footprint
  – Natural Step
  – Other sustainability assessments

• List the Environmental Aspects
  – Are they under your control and influence?
  – Are they significant:
Identifying Environmental Aspects and Impacts

• Most challenging task in developing an EMS
• Requires analysis of each activity, product or service conducted or provided by your organization
• Inventory of aspects helps an organization visualize its environmental footprint
What is an Environmental Aspect?

- An Element of An Organization’s Activities, Products or Services That Can *Interact* with the Environment
  - Aspects
    - Air Emissions (CO, NOx, etc.)
    - Energy Usage (Gas, Diesel, electricity)
    - Solid Waste Generation
Environmental Impact

• Any *Change* to the Environment, Whether Adverse or Beneficial, Wholly or Partially Resulting from An Organization’s Activities, Products or Services

**Impacts**

• Degradation of Air Quality
• Reduction in Natural Resources
• Conservation of Natural Resources
• Reduction in Landfill Space
Relationship: Aspect-Impact

ASPECT

• Air Emissions (CO, NOx)
• Energy Usage (Gas and Diesel)
• Used Oil Recycling
• Solid Waste Generation

CAUSE

IMPACT

EFFECT

• Degradation of Air Quality
• Reduction in Natural Resources
• Conservation of Natural Resources
• Reduction in Landfill Space
## Aspect/Impact Matrix: Earth Friendly Pizza

### Making pizza

<table>
<thead>
<tr>
<th>ACTIVITIES, OPERATIONS, SERVICES</th>
<th>ENVIRONMENTAL ASPECTS</th>
<th>POTENTIAL ENVIRONMENTAL IMPACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing ingredients &amp; supplies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing (cooking)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serving &amp; Delivering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities/Operations</td>
<td>Environmental Aspects</td>
<td>Environmental Impacts</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Purchasing ingredients / materials | Pizza boxes  
Styrofoam cups  
Paper cups  
Paper napkins  
Plastic spoons and forks  
Processed food – canned  
Processed food – frozen  
Fresh vegetables  
Fresh meat – processed meat, beef, chicken | Natural resource consumption  
Petroleum based, non degradable  
Natural resource consumption  
Natural resource consumption  
Chemicals?  
Transportation, storage, resources  
Transportation, storage, energy, resources  
Pesticides and fertilizers?  
Natural resource consumption |
| Processing (cooking)             | Energy use  
Water use  
Create waste – food, packaging  
Grease  
Air emissions  
Heat and odor emissions | Fuel consumption, emissions  
Resource consumption  
Resources, landfill  
Sewer systems, water quality  
Health effects?  
Nuisance, quality of life |
| Serving & delivering            | Cars used for delivery service  
Table décor  
Wiping, cleaning tables and floors | Fuel consumption, emissions  
Resource consumption  
Resource, toxic chemicals |

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...But what are the SIGNIFICANT ASPECTS?
What is a **Significant Aspect**?

- An environmental aspect that has or can have a significant environmental impact.

- **What is significant? You define it.**
  - *Each organization defines its own criteria to determine which impacts are potentially “significant” and which are not.*
  - Subjective - Not an exact science
  - Not based on a complex formula
What Criteria to Consider?

- Natural Resources Impact
- Cost
- Probability of Occurrence
- Volume
- Toxicity

- Regulated *(always significant)*
- Adverse Publicity
- Community Values
- Nuisance
- Health Impacts
- Frequency
### A Sample Matrix Approach

#### Key:  5 = high     3 = moderate     1 = low     0 = N/A

<table>
<thead>
<tr>
<th>ASPECT</th>
<th>Reg</th>
<th>Volume</th>
<th>Toxic</th>
<th>Health</th>
<th>Nuisance</th>
<th>Cost</th>
<th>Total</th>
<th>Sig?</th>
</tr>
</thead>
</table>

- *Everything regulated is significant*
- *Aspects with a total 12 or higher are significant*

You determine these criteria.
Objectives and Targets
Definitions: Objectives and Targets

**Objectives** are goals that are consistent with the organization’s environmental policy, significant environmental aspects, and applicable environmental regulations.

**Targets** are performance goals related to and supporting a specific objective. Targets should be quantitative, realistic, measurable, and related to a baseline or normalization metric.
Setting Objectives and Targets

The Objective is **Verbal**, the Target is **Quantitative**

- Objectives Indicate Intent or Action
  - Reduce, Improve, Control...

- The Target Says “How much, by When.”
  - X%, by December 2008
Sample Objectives & Targets

Significant Aspect 1: Hazardous Waste

Objective 1a: Reduce HW generation
Target: by 10% by December 2008

Objective 1b: Reduce chemical usage
Target: by 10% by June 2008
Sample Objectives & Targets

Significant Aspect 2: Greenhouse Gas Emissions

Objective 2a: Reduce GHG emissions
Target: by 20% by December 2008
Sample Objectives & Targets

Significant Aspect 3: Energy Use

Objective 3a: Reduce Energy Use in Office and Shop operations
Target: by 20% by December 2008
How to Accomplish Objective?

Significant Aspect 3: Energy Use

Objective 3a: Reduce Energy Use in Office and Shop operations

Target: by 10% by December 2008

Actions: install meters, install energy efficient equipment, explore alternative energy sources, employee education, etc…..
Identify Objectives & Targets

• Break into teams
• Discuss the significant aspect, **solid waste generation**
  – List at least three impacts related to SW generation
  – Select one of the impacts and **develop an objective and target to address the aspect and associated impact**
• Report back
Environmental Management Programs (EMP)
What’s an EMP?

- Environmental Management Program is the formal plan of how we address the significant impacts
  - Objective and target
  - Responsibilities
  - Action Items
  - Collaboration and consultation
  - Timing, accountability
  - Metrics
Environmental Management Programs (EMPs)

• Designate responsibility
  – At each relevant function and level

• Allocate resources
  – Human, technological, financial

• Establish a schedule
  – Overall timeframe
  – Objectives and targets schedule
  – Action item due dates
## ENVIRONMENTAL MANAGEMENT PROGRAM (EMP)

<table>
<thead>
<tr>
<th>Facility:</th>
<th>EMP No:</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMP Lead Person:</td>
<td>Dept/Position.</td>
</tr>
<tr>
<td>Aspect:</td>
<td>Objective:</td>
</tr>
</tbody>
</table>

### Category:
- [ ] Improve
- [ ] Control
- [ ] Study

### Issue background & Strategy:

### Actions to Achieve Objective

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Lead / Support / Target Date / Actual Date</th>
</tr>
</thead>
</table>

### Metrics (Environmental Performance Indicators)

### Resources Required
<table>
<thead>
<tr>
<th>Facility</th>
<th>Name the facility or organization covered or affected by this EMP. If only one department of an organization is affected, note that department</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMP Number</td>
<td>Number will be assigned by the EMS Coordinator</td>
</tr>
<tr>
<td>EMP Lead Person</td>
<td>Name the person responsible for the accomplishment of the EMP; i.e. overseeing the workplan, monitoring and reporting on progress, requesting changes to the workplan as appropriate</td>
</tr>
<tr>
<td>Aspect</td>
<td>The significant aspect (e.g. energy use, chemical usage, etc.)</td>
</tr>
<tr>
<td>Objective</td>
<td>Focusing on the impacts related to this significant aspect, state the goal. What is it you want to achieve? Use action words – reduce, improve, control, etc.</td>
</tr>
<tr>
<td>Target</td>
<td>State “how much and by when.” The target is the performance element and should be quantitative and measurable</td>
</tr>
<tr>
<td>Category</td>
<td>The categories identify and help to focus the EMP. The definitions of these categories are: Improve – improve the performance in this area Control – current environmental controls are sufficient, but EMP objective is to maintain and strengthen the level of control Study – the issue or area has been designated as significant, but historic or baseline data must be studied and compiled to determine the direction of future action</td>
</tr>
<tr>
<td>Issue Background and Strategy</td>
<td>In this section, describe the overall approach to the problem. Some of the questions to be addressed include: How much has or has not been already been accomplished in this area? Why is this important? Are there relevant drivers (regulations, directives, public pressure, etc.)? What are the impacts to be addressed in this EMP?</td>
</tr>
<tr>
<td>Actions</td>
<td>List the specific actions to be taken to achieve the objective and target. List the action and identify the responsible parties and dates by which the actions should be accomplished</td>
</tr>
<tr>
<td>Metrics</td>
<td>Metrics are the Environmental Performance Indicators, how you measure the accomplishments. List the specific, quantifiable measurements or metrics (percent of employees trained, kilowatt hours saved, tons of waste diverted, gallons of material, etc.)</td>
</tr>
<tr>
<td>Resources Required</td>
<td>Estimate the staff hours and/or dollars that may be required to accomplish the objective. While this is an optional field, it may be useful to consider this element in terms of the feasibility of your overall plan.</td>
</tr>
</tbody>
</table>
Sustainable pizza --
Hotlips in Portland, OR
Message to Customers

Hot Lips Pizza food sources

- Asparagus – Outback Farms in Parkdale, OR
- Basil pesto – basil is from Pocket Creek Farm (certified) and Hazelnuts from Meridian Farms II
- Beets – Persephone Farm in Sweet Home, OR
- Blackberries – Ayers Creek in Gaston, OR (certified)
- Blueberries – Skeeter Farm in Tualatin, OR
- Button Mushrooms – Yamhill County Mushroom
- Carrots – Prairie Creek in Joseph, OR (certified)
- Cheddar – Tillamook Creamery, Tillamook OR (new 100% RBST free)
- Chevre – Juniper Grove Farm in Redmond, OR
- Cilantro pesto – made with cilantro from Persephone Farm in Sweet Home, OR (certified organic)
- Corn – Various farms including Deep Roots in Corvallis, OR and Tenino Farm in Portland, OR
- Crimini Mushrooms – Hood River Organic in Hood River, OR (certified organic)
- Eggplant – Your Kitchen Garden, Canby, OR (in season)
- Greens – Swiss chard and kale from Your Kitchen Garden, Canby, OR and Persephone Farm in Sweet Home, OR (certified organic)
- Green Chilies – Your Kitchen Garden, Canby, OR
- Habanero peppers – Your Kitchen Garden, Canby, OR
- Hazelnuts – Meridian Farms in Aurora, OR (certified organic)
- House made chile – Spring Hill Farm in Alsea, OR (certified organic)
What gets measured gets managed; and what gets managed gets done

The Importance of Metrics

• How well are you doing?
• How do you know how well you are doing?
• How can you demonstrate to others how well you are doing?
Metrics: CO2 Reductions

Real data from a local federal agency EMP
What does that mean?

620 cars off the road

or

Energy for 550 California households
(370 US households)
Communication and Training
Communication & Training

• Communication -- EMS should include procedures for:
  – Communicating internally between levels and functions within the organization
  – Soliciting, receiving, documenting and responding to external communications.

• Training -- All employees should know
  – The environmental policy
  – Key EMS roles and responsibilities
  – The significant impacts of their work activities
  – The procedures and work instructions that apply to their work
  – Potential consequences of NOT following EMS requirements
Audience and Needs

- EMS Coordinator - *thorough knowledge* of EMS framework
- EMS Team - *working knowledge* of EMS framework
- Senior managers - knowledge of purpose and *management role* in EMS
- Employees with significant aspects – specific EMS responsibilities and *consequences of non-performance*
- All employees - basic environmental and EMS *awareness*
# Communication Matrix

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Interest</th>
<th>Message</th>
<th>How</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Mgmt</td>
<td>goals, budget</td>
<td>EMS accomplishments</td>
<td>Briefing</td>
<td>Annual</td>
</tr>
<tr>
<td>Field staff</td>
<td>Perform job function safely</td>
<td>Job instructions</td>
<td>Factsheet, tailgate mtg</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Neighbors</td>
<td>Noise, odors</td>
<td>Good faith efforts, EMS</td>
<td>newsletter</td>
<td>annually</td>
</tr>
</tbody>
</table>

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Structure and Responsibility
EMS Roles & Responsibilities

- EMS Coordinator
- EMS Team
- Senior manager
- Line managers
- Personnel specialists
- IT staff

- Functional experts
  - Engineers
  - Contracting officials
  - Purchasing officials
  - Energy managers

- Contractors, vendors
Incorporate EMS into Organizational Structure

• Revise organizational charts to reflect EMS
• Modify position descriptions to include EMS responsibilities
• Measure EMS performance in performance reviews
• Reassign personnel to EMS if necessary
• Allocate training and financial resources to EMS
Operation Requirements

• Define roles and responsibilities
• Establish operational controls for activities associated with significant aspects
• Ensure environmental issues (and consequences) are addressed
  – Communicate as needed with workers, with suppliers and contractors
• Integrate with emergency preparedness plans
Operational Controls

• Standard Operating Procedures (SOP)
• Contract language
• Labeling of materials
• Signage
• Log books
• Check lists
• Measuring equipment
• Preventive maintenance
• ,,,,,, other methods?
## Exercise: Operational Control

### Operational Control (OC) Worksheet

<table>
<thead>
<tr>
<th>Significant Aspect</th>
<th>KPI(s)</th>
<th>Associated Functions</th>
<th>Existing OCs</th>
<th>OC Develop. / Modification needed</th>
<th>Describe OC</th>
<th>Resp. for Checking</th>
<th>Location Posted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Use</td>
<td>Energy bills</td>
<td>All</td>
<td>Yes</td>
<td>Yes</td>
<td>Stickers for light switch</td>
<td>Office Mgr</td>
<td>On light switches</td>
</tr>
<tr>
<td>Waste Toner Cartridge(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contact Person:**

**Date Completed:**
### Documents vs. Records

**Documents** are materials that provide management directions:
- environmental policy
- internal standards and operating procedures
- process information
- emergency plans

**Records** include:
- training records
- incident reports
- complaints and responses
- audit results
- management review
- meeting minutes

<table>
<thead>
<tr>
<th>Documents</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Offer guidance</td>
<td>– Provide verification</td>
</tr>
<tr>
<td>– Can be changed</td>
<td>– Cannot be changed</td>
</tr>
</tbody>
</table>
Checking and Corrective Action
Checking & Corrective Action

• Conduct periodic monitoring of environmental performance
• Identify root causes of findings and conduct corrective and preventive actions
• Maintain environmental records
• Conduct periodic EMS audit
Monitoring and Measurement

- Regularly monitor and measure operations and activities with potential environmental impacts
- Track performance, relevant operational controls and conformance with the organization’s objectives and targets
- Calibrate and maintain monitoring equipment and retain records of these activities
- Establish procedures to evaluate compliance with relevant environmental legislation and regulations periodically
Nonconformance and Corrective and Preventive Actions

Establish and maintain procedures for

- handling and investigating nonconformance
- conducting root cause analysis
- taking action to mitigate impacts
- initiating and completing corrective and preventive actions

How can you tell how well your programs are working?
How do you fix it? Do you know what to fix? How do you prevent mistakes from happening?
EMS Audit

Internal audits of the EMS are conducted at planned intervals to determine EMS conformance

Audit procedures must be established, specifying:
- audit scope
- frequency and methodologies
- responsibilities and requirements for conducting audits
- reporting of results
Management Review

“Top management shall review the EMS at planned intervals to ensure its continuing suitability, adequacy and effectiveness.”

– Opportunity for improvement
– Audit results
– Communication
– Corrective actions
– Changing circumstances
EMS Core Elements

- Environmental policy
- Environmental aspects
- Legal and other requirements
- Objectives & targets
- Environmental management programs
- Structure and responsibility
- Training: awareness & competence
- Communication
- EMS documentation

- Document control
- Operational control
- Emergency preparedness and response
- Monitoring and measurement
- Nonconformance & corrective and preventative action
- EMS audit
- Management review
P – D – C – A

• A continual cycle of planning, implementing, reviewing and improving the actions that the organization takes to meet its environmental obligations
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