

What is an Environmental Management System?



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Sponsored by: The Texas Commission on Environmental Quality

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Culture Technologies, Inc.

Getting Started...

- ▶ Introductions
- ▶ Review regulatory issues causing pressures on municipalities
- ▶ What is it?
- ▶ Why should you implement an EMS?
- ▶ Elements of an EMS
- ▶ How to get started

Culture Technologies...

- ▶ Culture change combined with the use of technology and management systems to cause breakthrough performance on the environment
 - Organizational culture change methodology
 - Performance-based EMS programs
 - Pollution Prevention & Sustainability
 - Training & Management Tool Design
 - Operation facilitation
 - Multiple standards (TCEQ EMS, PTrack, ISO, Natural Step, etc.)



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Texas Manufacturers Assistance Center (TMAC)

- Part of the Manufacturing Extension Partnership sponsored by the National Institute of Standards and Technology (NIST). Formed in 1996 to improve and insure the competitiveness of small businesses in the state of Texas
- TMAC has reached over 300 companies, local governments, and other organizations to provide assistance with implementing Performance Based Environmental Management Systems



Regulatory Issues Impacting Local Governments

Stormwater
Sanitary Sewer Overflows
Air Quality
Utility Costs

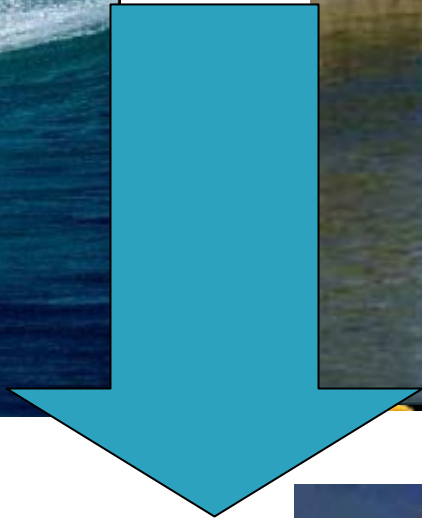
Why is Stormwater Important?

The most common cause of water pollution - STORMWATER

- **Most pollution into storm drains comes from the first flush of water (the first 15 minutes of a rain event) over impervious surfaces.**



40% of US waters are not fishable or swimmable (USEPA)





Biodegradable \neq Environmentally Safe

Applying fertilizer before rain...using lawn services...washing cars







Kent County, DE reduced their SSO's by 85% after implementing an EMS.

Sanitary Sewer Overflows

The Impact of SSO's

- ▶ Approximately 40,000 are happening per year due to aging sewer collection systems
- ▶ Create serious water quality and drinking water problems
- ▶ Can carry bacteria, viruses, protozoa, intestinal worms, molds and fungus
- ▶ Can cause cholera, dysentery, gastrointestinal problems, infectious hepatitis

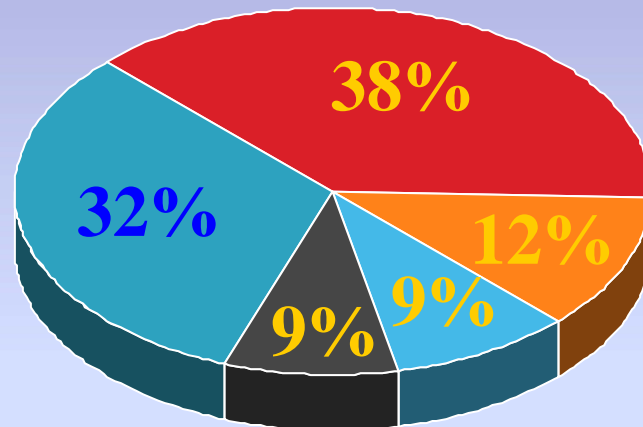
Air Quality

Energy Consumption

Energy Issues & Non-attainment / Near Non-attainment

- ▶ Air quality issues are driven by consumer habits not industry
- ▶ Standards may get more stringent
- ▶ Energy issues are due to wasteful consumption of consumers
- ▶ Municipalities bear the burden of these issues

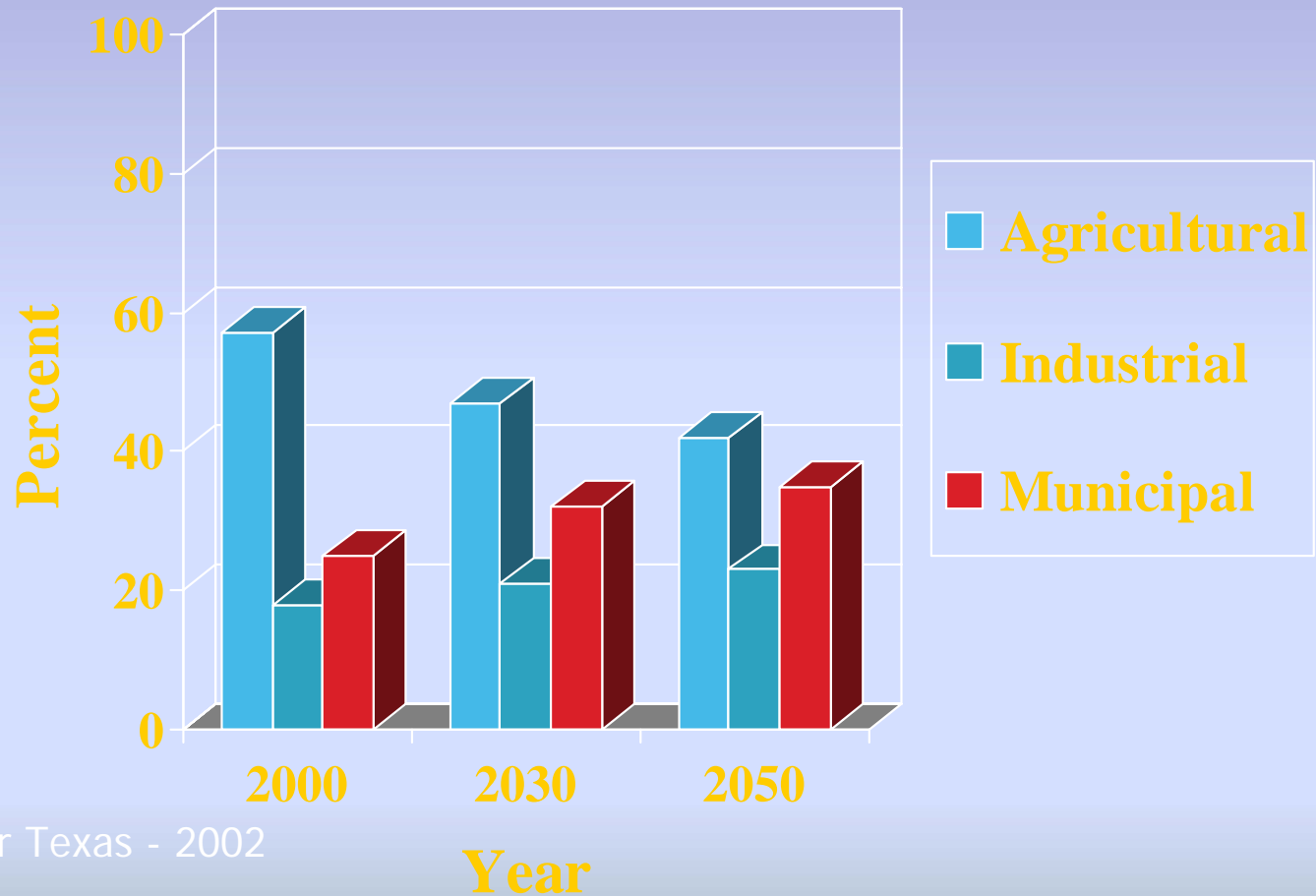
Total Air Emissions in Texas Non-Attainment Areas



- Anything on the road (32%)
- Anything off-road with an engine (38%)
- Small point sources like drycleaners (12%)
- Plants, animals, and people (9%)
- Industrial facilities (9%)

Other Issues

Water Demands in Texas



Water for Texas - 2002

**Business
Growth**

**Rising
Energy
Costs**

**Water
Availability**

**Bond Debt
& Taxes**

**Rising
Labor
Costs**

**Collection
System
Capacity**



**Population
Growth**

**Rising
Compliance
Costs**

**Landfill
Capacity**

**Reduced
Budgets**

**Wastewater
Treatment
Capacity**

**Air
Quality**

**What is the good news about
those of you who want to develop
an EMS?**

These issues have created an urgency to gain
management support for EMS!

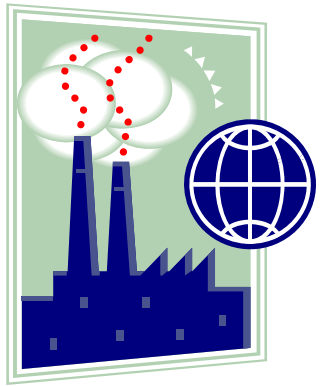
What is an EMS?

Save Money



Save the Environment



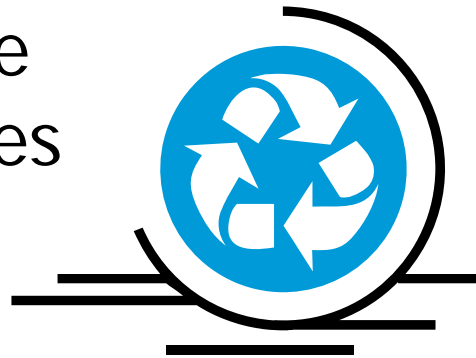


Reduce Waste



Reduce Costs

Conserve Resources



Preserve Quality of Life



Increase efficiency & productivity



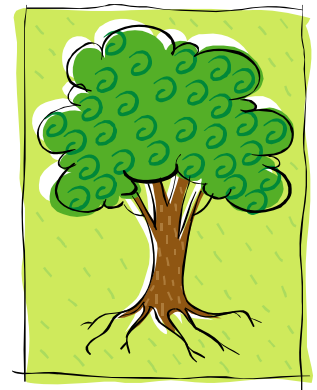
Keep the 'customer' happy

The Evolution of Environmental Management

- Fight / Hide
- Compliance – Follow the Rules
 - Reluctant Compliance
 - Environmental Department Driven Compliance (Audits)
- Pollution Prevention and Continuous Improvement – Be Efficient
- Sustainability – Do No Harm

Sustainability

- Maintaining biodiversity, renewability, and resource productivity over time
- Meeting human needs without diminishing the ability of other people, wild species, or future generations to survive
- Intersection of ecology, economics, and politics
- A way of life, behavior or practice that can be maintained indefinitely
- Living off interest, not consuming the principal
- Ability to maintain into perpetuity



Sustainability

- ▶ Living off the interest of the earth, not the principal
- ▶ Only producing waste that the earth can reabsorb and convert back into valuable materials

Beyond Sustainability

- ▶ Who wants a sustainable relationship with their spouse?
- ▶ Continuous improvement?
- ▶ What is beyond sustainability and continuous improvement?
 - Discontinuous improvement
 - Breakthrough performance

Environmental Management Systems

A tool/technology to deliver sustainability and breakthrough performance as well as support a cultural transformation

Environmental Management Systems (EMS)

- ▶ An EMS is just one type of Management System – You already have an EMS, FMS, PMS, RMS, etc.....
 - Financial Management System (FMS)
 - Human Resources/Personnel Management System (HR/PMS)
 - Risk Management System (RMS)
 - Environmental Management System (EMS)

Group Discussion

- ▶ Do you always read the instructions?
- ▶ Does everyone always do what you tell them to do?
- ▶ How do you know they did it?
- ▶ How do you know if they did it right?

What is an EMS? Part 1

- ▶ The way you make sure you know what is the most important thing to do (significant aspects),
- ▶ Know how you will do it (planning),
- ▶ Who is supposed to do it (responsibility),
- ▶ How you are supposed to do it (training), and
- ▶ Whether you did it right (metrics).

What is an EMS? Part 2

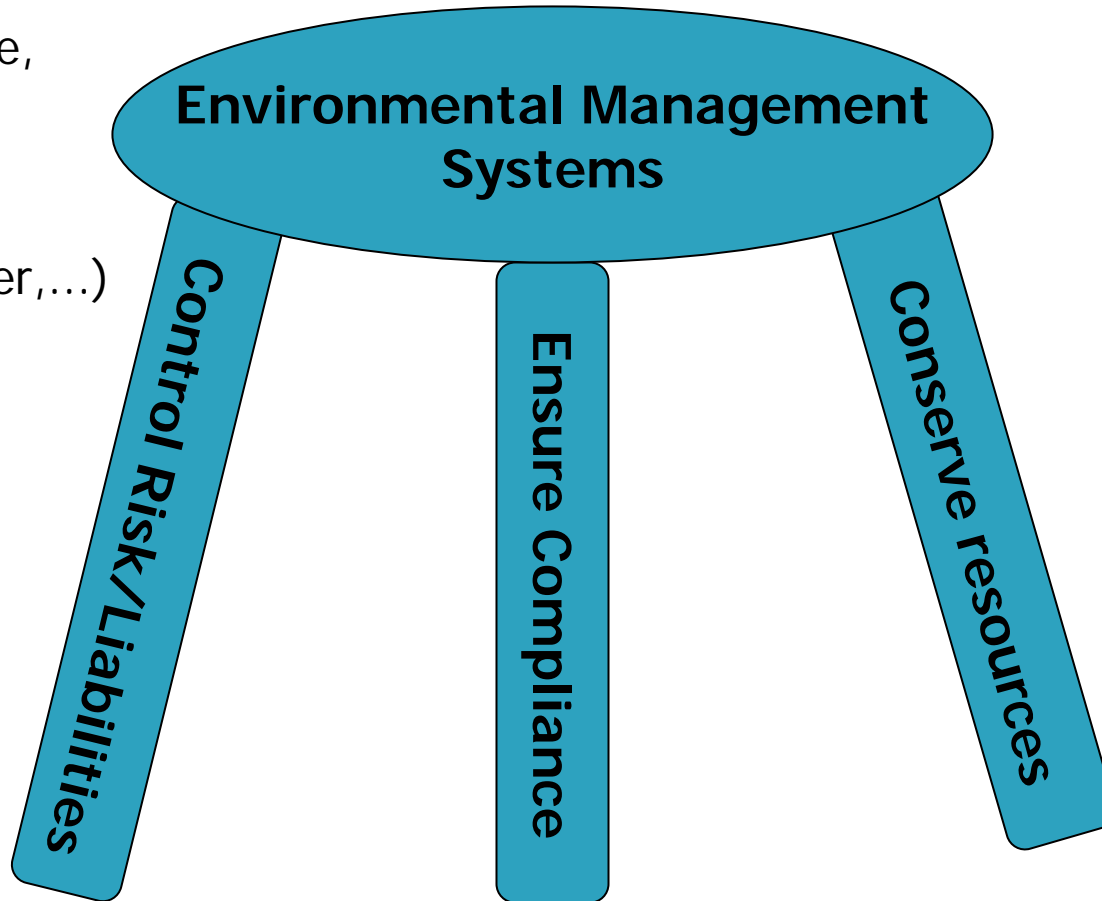
- ▶ The way to make sure if you do it wrong, you know it before someone else does (auditing),
- ▶ Fix the problem so it doesn't happen again (corrective action), and
- ▶ Improve how you do it so you can do it faster/better, easier/etc. (goals)

What is an EMS? Part 3

- ▶ The way you tell the right people what you are doing has value (management review) so they let you keep doing it (or allow you to do something else).

The three “legs” of a Performance-based EMS

Resources = Time,
\$\$\$\$'s and
Materials i.e.
expendables
(fuel, paper, water,...)



The facets of an environmental system

Environmental risk to the organization

- ❑ Creating conditions which could expose the organization to liability and unplanned costs (e.g. ground contamination, worker exposure, accidental release that could injure your neighbors, etc.)

Environmental compliance

- ❑ Do you know all of your environmental obligations?
- ❑ Are you in compliance with those obligations?
- ❑ If not, do you know the monetary impact of non-compliance?

Resource consumption / On-going impacts

- ❑ Do all daily activities and capital projects consider impacts on-site and off-site through consumption of raw materials, products, by-products, production processes, etc.

Results on an EMS

- ▶ **Increases** environmental performance on daily business activities (compliance & risk)
- ▶ **Reduces** operational costs by identifying risks and implementing best practices (resources/impacts)

How did EMS become widespread?

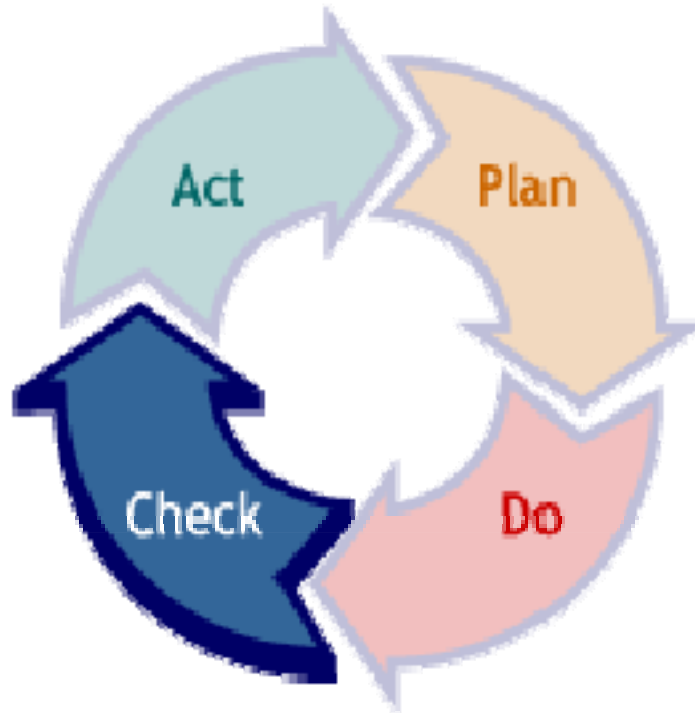
- ▶ Industrial/Business Application (ISO14001)
- ▶ Federal Agency Implementation & Enforcement (EO13148 & CFEMS)
- ▶ State Agency Recognition Programs (VEEP/Clean Texas)
- ▶ State/Local Government Adoption and/or Implementation

ISO 14001

ISO14001's Evolution

- ▶ ISO9000 (Quality)
- ▶ ISO14000 (Environment)
- ▶ Coming soon – ISO18000 (Safety & Health)

ISO14001...What is it?



What is in ISO14001 /ISO 14004...

- ▶ Environmental Policy
 - ▶ Environmental Aspects
 - ▶ Legal and Other Requirements
 - ▶ Objectives & Targets
 - ▶ Resources, Roles, Responsibility and Authority
 - ▶ Training, Awareness, and Competence
 - ▶ Records
 - ▶ Communication
- Environmental Management System Documentation
 - Document Control
 - Operational Control
 - Emergency Preparedness and Response
 - Monitoring and Measurement
 - Non-conformance and Corrective and Preventative Action
 - Evaluation of Compliance
 - Environmental Management System Audits
 - Management Review

ISO 14001 Broken Down...

▶ Planning Phase

- Environmental Policy, Significant Aspects, Legal Requirements, and Objectives and Targets

▶ Implementation Phase

- Resources, Roles, Responsibilities & Authority
Training, Awareness, and Competence
Documentation/Records/Control of Documents
Operational Control, Emergency Preparedness

ISO14001 Broken Down

- ▶ **Checking Phase**
 - Monitoring and Measuring
 - Evaluation of Compliance
 - Nonconformity & Corrective/Preventative Action
 - Control of Records
 - Internal Audit

- ▶ **Management Review**

Stormwater Program Elements in EMS Terms

- ▶ Your agency's policy on stormwater
- ▶ Identification of significant stormwater aspects due to your activities
- ▶ What regulations is your stormwater subject to?
- ▶ Setting goals/targets to comply with program and mitigate aspects:
 - Zero impacts to SW
 - 100% compliance at construction sites
 - 100% compliance at internal facilities
 - 100% of people educated on SW

Policy/Vision

Aspects/Impacts

Legal Requirements

Objectives, Goals & Targets

Stormwater EMS

- ▶ Assign who's job it is to get it done and give them authority
- ▶ Make sure they know how to do it and everyone is aware of the issues.
- ▶ Develop environmental management programs to reach your goals/targets and build into your operational controls
 - Public Education Program
 - Illicit discharge detection and elimination program
 - Construction program
 - Post-construction program
 - P2/Good housekeeping program

Roles, Responsibility, Structure and Authority

Training, Awareness, Competence

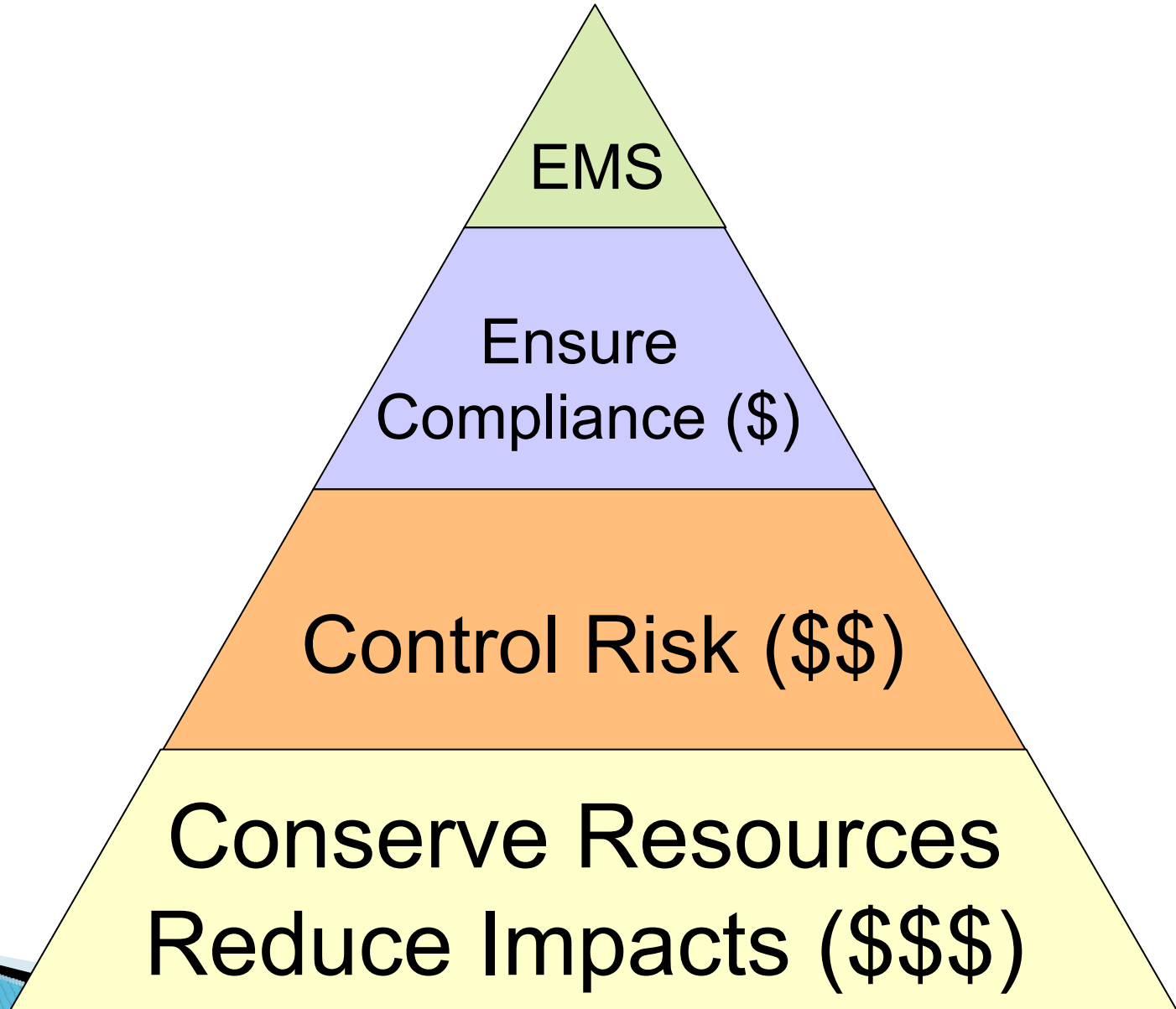
Communication
Operational Controls
Documents/Records

Stormwater and EMS (con't)

- ▶ Make sure everything is operating as it should be Monitoring and Measuring
- ▶ Check if we are in compliance Evaluation of Compliance
- ▶ Prepare for the Unexpected
- ▶ Audit and review to measure effectiveness Internal Auditing
- ▶ Identify potential problems and fix problems so they don't happen again Non-conformance & Corrective/Preventative Action
- ▶ Report to management /EPA/TCEQ on program Management Review

Why EMS for Local Governments?

Environmental Management Systems



Why do EMS work for local governments?

Where you spend your money is where you have the most environmental impact...Reduce spending, impact reductions follow.

Local Government Successes with EMS programs

Cost savings

We were able to develop 80% of our Asset management system by using our EMS processes. Rick Bickerstaff, CWS, SC



Charleston Water System

Serves 400,000 customers)

Improved bond rating from AA- to AA!

Meet 95% of strategic goals

Increased P/C Maintenance ratio (over 70%)

- **Savings: \$392,000/yr**

- Improved bond rating, preventative maintenance, fuel reduction, new technologies, hauling efficiencies

Cost savings



Utah Transit Authority

- **Savings: \$814,000/yr**
 - Operating procedures, reduced bus idling time, print shop issues

Cost savings



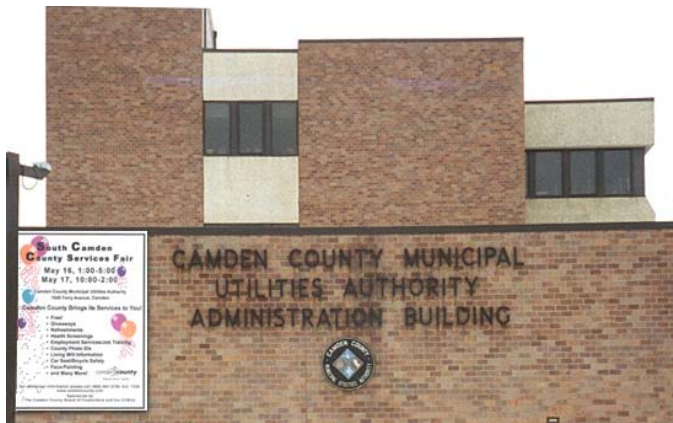
City of San Diego

- **Savings: \$5,053,000/yr**
 - Reduced equipment idling time (90,000+ gallons of diesel fuel saved), more efficient use of heavy equipment, fuel, and water

Cost savings



They reduced their rates to their customers as a result of EMS efforts



Camden County Municipal Utilities Authority, New Jersey (80 MGD Design Capacity WWTP)

- **Savings: > \$5,000,000/yr**
 - Operations & Maintenance efficiencies, 90% reduction in odor complaints, 20% increase in tonnage of sludge removed, meeting BOD discharge limit of 30 ppm (12-18 ave.)

Cost savings



**Massachusetts Bay
Transportation Authority
Boston, MA**

- **Savings: \$116,533/yr**
 - Bus idling monitoring campaign

Cost savings



Tri-Metropolitan Transportation District, Portland OR

- **Savings: \$300,000/yr**
 - Eight maintenance facilities involved
 - \$300,000 of operational savings in Year 1
 - \$66,000 of this total savings was energy conservation

Cost savings

Jefferson County Alabama

- **Savings: Loan rates**

- Rating agencies provide a $1/16^{\text{th}}$ to $1/8^{\text{th}}$ of a point improvement in rates
- Results in millions of dollars of savings when they borrow for capital improvement projects

Where did the savings come from?

- ▶ Looking at what they do every day with a different view and noticing every day activities that were completed
 - Improving chemical usage,
 - Increasing water conservation efforts
 - Recycling
 - Changing chemicals/paints,
 - Monitoring of oil conditions,
 - Better energy management,
 - Better use of expendable supplies, etc.

Why could they only see this when they implemented an EMS?

- ▶ The process, when done correctly, shines a spotlight on areas of risk, wasted resources, and compliance issues
- ▶ Valuable tool that provides a simple, proven, reproducible way to consistently deliver performance



Created by: The Texas Manufacturer's Assistance Center
And Practical Perspectives. Used with permission.

Identify process steps

-soap

-water

-electricity

-towels



Inputs



Washing hands

1. Turn on water
2. Put on soap
3. Rub hands
4. Rinse
5. Dry

Outputs



Identify wastes

Inputs



- soap
- water
- electricity
- towels



- Washing hands
1. Turn on water
 2. Put on soap
 3. Rub hands
 4. Rinse

Outputs



Now lets look at what leaves the fence line area. Remember to look at the process steps. These are your outputs. What do you think the Outputs are for this process.

Identify wastes

Did your list include items like....

- Spent water
- Spent soap
- dirty water (oil, grease)
- electricity (lighting)
- natural gas (heating water)
- paper towels



Don't forget to look in the trash can!

Why are government agencies like City of Dallas & TXDOT adopting EMS?

- Stay in compliance
- Prevent problems
- Prevent or reduce criminal liabilities
- “Avoid jail” for things they didn’t know about
- Get out in front of NPDES permits and other regulatory requirements
- Avoid costs associated with legal transactions
- Improve communications with regulators
- Better image

“An EMS allows us to sleep at night.”

Why are government agencies like City of Dallas & TXDOT adopting EMS?

- Goals are set and met
- Operational consistency and reliability
- Reduced employee stress and confusion due to multiple initiatives and programs
- Continual cost and performance improvement
- Coordinated city resources
- Streamlined people management
- Informed business decisions and strategic planning for growing communities

A better bottom line for local government

- ▶ Cost savings (Efficiencies)
- ▶ Resource Savings (Environment)
- ▶ Avoid future legal liabilities
- ▶ Reduce insurance premiums
- ▶ Improved bond ratings
- ▶ Communication

Insurance companies have indicated we can expect to see a 20% reductions in premiums as a result...Port of Houston Authority, TX



A better bottom line for local government

- ▶ TCEQ offers incentives for local governments who implement an EMS and have an independent party state it meets the Texas Statute
- ▶ Incentives can include:
 - Mitigating factor for Bronze and Silver EMS levels
 - Improvements in Compliance History score for Silver, Gold, Platinum Levels
 - Reductions in penalties for Silver, Gold, Platinum levels
 - Adjustment in frequency of scheduling and conducting compliance inspections (Gold & Platinum Levels)
 - Expedited permitting for administrative and technical review (Gold & Platinum levels)
 - Low EPA inspection frequency (Platinum level)

Average Resources Used

- ▶ Costs: \$95,275 over two years
- ▶ Labor: 3,074 over two years
- ▶ Consultant Use: Minimal
- ▶ Average of 12 hours per employee to integrate EMS into their daily activities

Based on data collected from 23 entities implementing an EMS at their local government.

Why EMS can fail to deliver

Conformance vs. Performance-based EMS



Keys to EMS Success...

1. Visible commitment of city management to the process
2. Diverse implementation team (not just environmental department)
3. Awareness to the individual level i.e. an informed/involved workforce

Management's Role in the Process

- EMS typically don't work if management do not support it...
 - “What interests my boss fascinates me...”
- Open a channel of routine communication with environmental staff
- Without your active interest and support, improvements will not occur.
- Support your staff in taking this on as an initiative
- Be open to doing it differently
- Be willing to see where management may have to participate in order for the EMS to work

What TCEQ is committing

- ▶ Funding for FY08 as training / implementation assistance through contractor
 - Identify those aspects and impacts that will conserve resources and save you critical budgets
 - Reduce the implementation costs of EMS through leveraging resources
- ▶ Local Government Peer Center
- ▶ Partnership with USEPA to cost share implementation with local governments

FY2008 training schedule will be posted by September 1, 2007....

Questions?

Registration for TCEQ EMS Support is at www.culturetechnologies.com

Click “EMS training for Local Governments” link in lower left hand corner