Cost Reduction (and other Benefits) of EMS Implementation

National Shipbuilding Research Program (NSRP) Environmental Panel Meeting

March 17, 2011

O'BRIEN & GERE

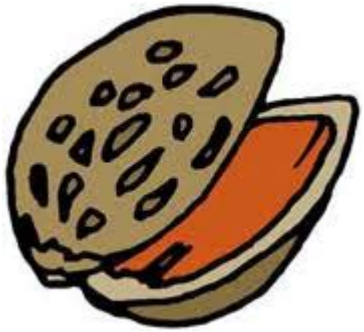
Agenda

- Introduction
- Overview of an Environmental Management System
- Options for Certification, Self-Declaration, Federal & State Recognition
- Costs of Implementing an EMS
- Benefits of Implementing an EMS
- Case Studies
  - CSX Transportation – Jacksonville, FL
  - Defense Supply Center Richmond (DSCR) – Richmond, VA

Introduction - What Is an Environmental Management System?

- An EMS provides a systematic way to review and improve operations to achieve better environmental performance.

- In a nutshell, an EMS is a system for planning and achieving responsible environmental management by identifying and controlling your environmental risks (aspects and impacts).



Introduction - What Is an Environmental Management System?

An EMS is based on the Plan-Do-Check-Act Model

- An EMS strives to improve the management of all environmental programs by promoting the tracking and completion of environmental objectives and targets
- Most EMSs are based on the ISO 14001 Standard
- Most facilities have an informal EMS in place

EMS versus ISO 14001 Certification

Any organization can develop an EMS; each element of the ISO 14001 Standard provides requirements for any organization that wishes to:

- **Implement**, maintain and improve an environmental management system;
- **Assess** its conformance with its stated environmental policy;
- **Demonstrate** such conformance to others
  - Make a **self-determination** or **self-declaration**
  - Seek **confirmation by interested parties** (*e.g.,* customers)
  - Seek **certification/registration** of its environmental management system **by an external organization**

EMS Versus ISO 14001 Certification

Most facilities choose ISO 14001 Certification if

- Mandated by Industry, Parent Organization or Executive Order (*e.g.*, automobile industry & suppliers, foreign-owned companies)
- Required by Customers; especially if conducting international business
- Recognized the value of certification by customers (to obtain competitive edge)
- Regulatory or Industry Requirements or Incentives
- Senior management recognizes the benefits of such certification
- Organizations that desire to be environmental leaders (*e.g.*, want to be the recognized in their industry, region, or market sector)

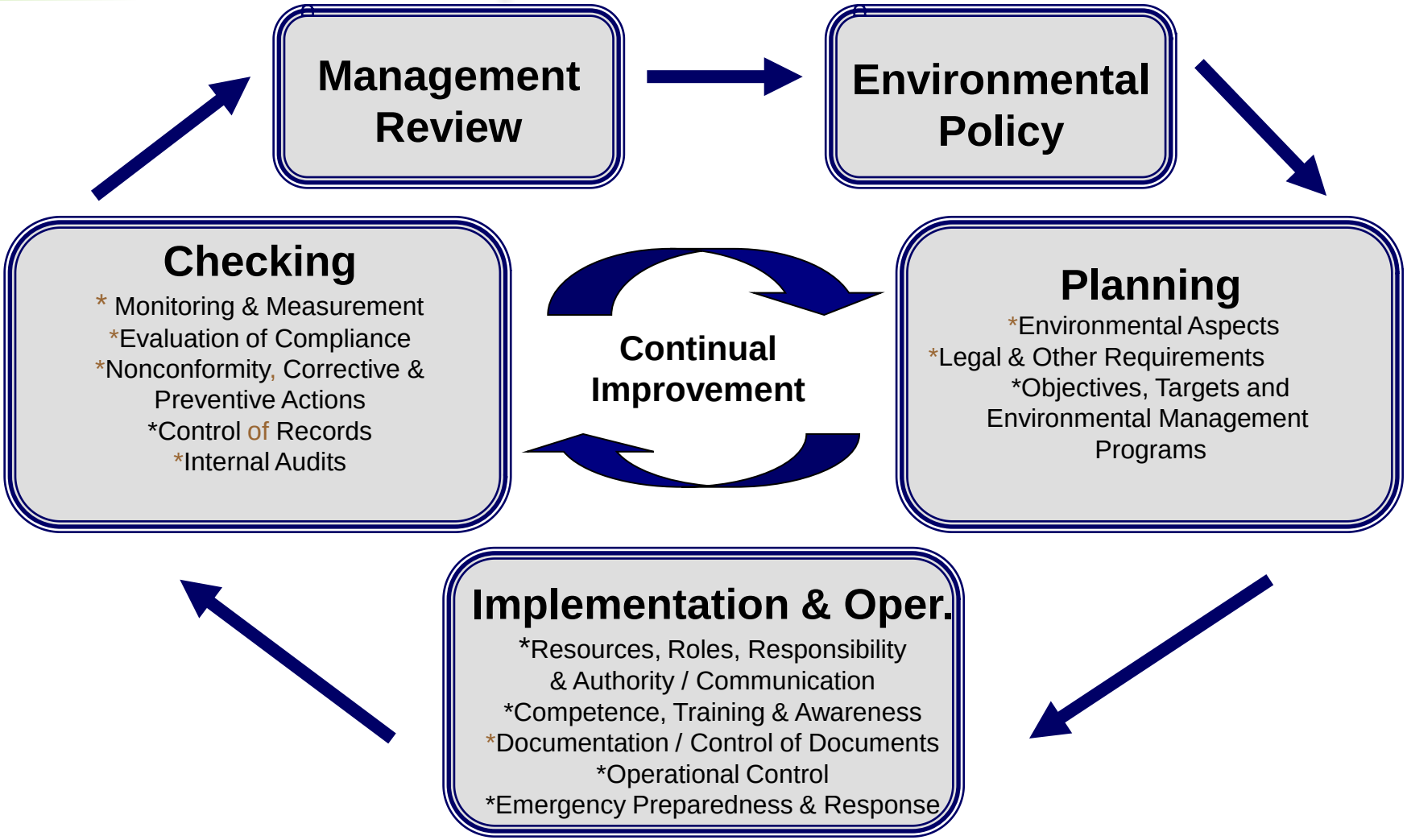
If not mandated; individual decision to be made by each organization

Elements of the ISO 14001 Standard

- 4.1 General Requirements
- 4.2 Environmental Policy
- 4.3 Planning
- 4.4 Implementation and Operation
- 4.5 Checking
- 4.6 Management Review

ISO 14001:2004 – *Environmental Management Systems – Specification with Guidance for Use*

Elements of an EMS



AN EMS IS A CONTINUING PROCESS NOT AN EVENT!

4.1 General Requirements

- The organization shall **establish, document**, **implement, maintain** and **continually improve** an environmental management system in accordance with the requirements of this International Standard and determine how it will fulfill these requirements.

- Define and document the scope of the EMS

The trend is clear – companies that get strategic about environmental performance are going to have a real advantage in an increasingly competitive global market.

4.2 Environmental Policy

- Sets the direction for the way the organization plans to manages its environmental impacts
- Endorsed by senior management
- Acts as the top level document (umbrella) of the EMS
- Includes commitments to prevention of pollution, compliance with legal and other requirements, and continual improvement
- Includes framework for objectives & targets
- Must be effectively communicated & maintained

4.3 Planning the EMS

- 4.3.1 Environmental aspects
- 4.3.2 Legal & other requirements
- 4.3.3 Objectives, targets & programs

4.3.1 Environmental Aspects

- Identify environmental aspects
- Determine aspects with *significant* environmental impact
- Document & maintain in an aspects register
- Maintain that significant environmental aspects are the focus of the rest of the EMS

ISO 14001 creates a common language and way of thinking about Environmental aspects which promotes communication and idea Sharing among facilities, industries, communities, & governments.

4.3.2 Legal & Other Requirements

- Identify environmental legal requirements
- Identify other environmental requirements
- Show how legal & other requirements apply to environmental aspects
- Keep up-to-date & incorporate them into other elements of the EMS

EMS provides a structured framework for identifying & meeting regulatory requirements – fewer fines and other complications over time.

Reduced insurance cost – Port of Houston

Improved bond ratings – Jefferson County, AL

4.3.3 Objectives, Targets & Programs

- *Objective:* overall goal consistent with environmental policy that the agency wants to achieve
- *Target:* detailed performance requirement to achieve objective
- Environmental program/action plan:
  - to achieve objectives & targets
  - Includes responsibility, means & timeframe

An EMS typically reduces operating costs through waste reduction, energy conservation, and other savings.

Typical payback period for an EMS is 9 months to 2 years.

4.4 Implementation & Operation

- 4.4.1 Resources, roles, responsibility & authority
- 4.4.2 Competence, training & awareness
- 4.4.3 Communication
- 4.4.4 Documentation
- 4.4.5 Control of documents
- 4.4.6 Operational control
- 4.4.7 Emergency preparedness & response

4.4.1 Resources, Roles, Responsibility & Authority

- Management provides appropriate resources
- Document roles, responsibilities & authorities within procedures
- Appoint Environmental Management Representative (EMR) to:
  - Coordinate establishment, implementation & maintenance of EMS
  - Report to top management on performance of EMS & recommend improvements

An EMS spreads environmental responsibility throughout the organization & places it with those directly associated with environmental impacts.

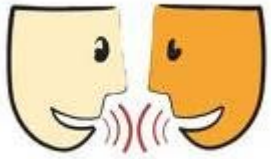
Increase in efficiency and effectiveness of regulatory compliance & pollution prevention initiatives.

4.4.2 Competence, Training & Awareness

- Identify positions & roles associated with significant environmental aspects
- Assess competence
- Identify training needs
- Document that training needs are met (general awareness, environmental, and significant aspect training)
- Promote awareness of the EMS

Regulatory and significant aspect training reduces waste & releases; awareness training encourages employee input in improvements.

4.4.3 Communication



- Develop internal communication process
- Provide method such that communication from external parties is appropriately managed and documented
- Decide how to proactively communicate externally about significant environmental aspects & the EMS

ISO 140001 requires a common terminology and approach which improves the communication of impacts, procedures & solutions.

Increased effectiveness in communication increases efficiency in decision-making.

4.4.4 Documentation

- Environmental policy, objectives and targets
- Description of the scope of the environmental management system
- Description of the main elements of the environmental management system and their interaction, and reference to related documents
- Documents and records required by the Standard
- Documents and records determined by the organization to be necessary to ensure the effective planning, operation and control of processes that relate to its significant environmental aspects

4.4.5 Control of Documents

- Document approval
- Document review, update and re-approval
- Identification of changes and current revision status
- Availability at points of use
- Legibility and identification
- Identification and distribution of external documents
- Management of obsolete documents

Procedures are in a consistent format; easier for employees to follow.

Procedures reviewed & updated to reflect process improvements.

Current version of procedure accessible to employees.

4.4.6 Operational Control

- Identify and plan operations (activities, functions, products and processes) associated with significant environmental impacts
- Operational control must include documented work instructions and operating procedures defining the manner in which control will be maintained, on a risk management basis
- Operational controls related to significant environmental aspects must be communicated to suppliers & contractors that provide goods & services to the organization

Tri-Met in Portland, Oregon identified $300,00 as operational savings; $66,000 of this for energy conservation.

4.4.7 Emergency Preparedness & Response

- Implement procedure(s) to identify the potential for accidents and emergency situations & appropriately respond to and minimize the environmental impact of accidents and emergency situations
- Test emergency response procedures periodically
- Review emergency preparedness & response procedures, especially after incidents or near misses

4.5 Checking

- 4.5.1 Monitoring & measurement
- 4.5.2 Evaluation of compliance
- 4.5.3 Nonconformity, corrective action & preventive action
- 4.5.4 Control of records
- 4.5.5 Internal audit

4.5.1 Monitoring & Measurement

- Monitor the activities, functions and processes that are associated with a significant environmental impact
- Monitor performance, operational controls, & conformity with environmental objectives & targets
- Calibrate or verify any monitoring & measurement equipment

An EMS can identify areas of redundancy; eliminating these makes the organization more efficient.

4.5.2 Evaluation of Compliance

- Periodically evaluate compliance with legal & other requirements
- Record the evaluations

4.5.3 Nonconformity, Corrective Action & Preventive Action

- Identify actual & potential nonconformities
- Take action to correct nonconformities and mitigate environmental impact
- Investigate nonconformities & determine root cause
- Take corrective action to avoid recurrence, & preventive action to prevent occurrence
- Review effectiveness of action taken
- Keep records

Problems that could be expensive to resolve (and damaging to the environment) can be identified earlier.

Early management awareness gives more opportunity for researching & implementing the most efficient solution.

4.5.4 Control of Records

- Retain environmental records required for the successful development, implementation and maintenance of the EMS
- Develop procedure that states how records are:
  - Identified
  - Stored
  - Protected
  - Retrieved
  - Retained
  - Disposed of

4.5.5 Internal Audit

- Establish & implement internal audit program to:
  - Evaluate conformity with requirements of EMS & Standard
  - Evaluate effectiveness of EMS

  provide information to senior management
- Develop and implement procedure that describes
  - Responsibility for planning and conducting audits, reporting results, and retaining records
  - Determination of audit criteria, scope, frequency, and methods

Regularly scheduled EMS reviews evaluate employee compliance with operational controls and if such controls are effective in improving environmental performance

4.6 Management Review

- Overall strategic evaluation, by senior management of EMS including:
  - Audit findings
  - Status of corrective and preventive actions
  - Degree to which objectives and targets are being met
  - Environmental performance

- Designed to have senior management provide input
  - Recommended changes to policy, objectives & targets, other elements
  - Statement as to the suitability, adequacy, and effectiveness of EMS

An EMS improves management's ability to understand what is going on in their organization and provide leadership.

Potential Costs of EMS Implementation

- Internal
  - Staff (Environmental Management Representative & Team)
    - First 9 to 12 months may take up to 30% of EMR's time
    - Team employees typically spend 4-8 hours per week
    - Internal audit team requires training and time to conduct audits
  - All Employees
    - General awareness training
    - Identifying aspects, significant aspect training, objective & targets
- External
  - Potential consulting assistance
  - Outside training of personnel
  - Contracting a registrar (Stage I & II audits and surveillance audits)

Benefits of EMS Implementation

- Improve environmental performance
  - Reduce / mitigate risk (releases, spills, emission)
    - Proactive planning means fewer surprises
    - Typically release incidences decrease w/effective EMS
  - Enhance compliance
  - Promote mindset of looking for ways to improve

Benefits of EMS Implementation

- Increase operational efficiency / reduce in costs
  - Procedures developed with employees input increases efficiency
  - Objectives & targets typically yield cost reduction
  - Pollution prevention typically reduces waste disposal costs
  - Material management practices reduce cost of materials

City of San Diego Solid Waste Division saved $700,000 in operating costs Through more efficient equipment use.

Tri-Met in Portland, Oregon identified $300,000 as operational savings; $66,000 of this for energy conservation.

Wire board manufacture achieved $32,500 annual savings through process change and material substitution in their permanganate bath maintenance procedure.

Benefits of EMS Implementation

- Increase awareness, responsibility, and morale
  - Employees typically want to get involved and do their part
  - Employees seek work places that practice environmental stewardship

Benefits of EMS Implementation

- Improve relationship with regulatory agencies
  - Federal and state agency awards and incentives
  - Recognition on websites and agency publications
  - Less frequent inspections & better permit terms

The Virginia Environmental Excellence Program (VEEP) has three levels of recognition for organizations with EMSs; benefits include reduced permit fees, reduced sampling requirements, and extended time between permit renewals.

The State of Pennsylvania reduces or mitigates fines, penalties, and surveillance schedules if an organization has an EMS.

Benefits of EMS Implementation

- Improve relations with stakeholders & community
  - Public image and community support
  - Promotes the facility as a good neighbor
  - Bridges the gap between where people live and work

- Increase customer business and markets
  - Customers seek ISO 14001-registered firms to do business with

A study by ICF Kaiser International shows that when public companies improve their corporate environmental practices, they are able to increase their shareholder wealth by up to 5 percent.

CSX Corporation – CSX Transportation – Jacksonville, FL

- CSX Transportation
  http://www.epa.gov/ems/resources/casestudies/csx.htm
  - Freight transportation in 23 states & two Canadian provinces
  - Employs 41,000 (CSX Corporation and subsidiaries)
  - Serves following industries
    - Automobile
    - Metals
    - Agricultural
    - Chemical
    - Forest
    - Waste
  - Serves waste treatment and disposal facilities

CSX Corporation – CSX Transportation (CSXT) – Jacksonville, FL

- CSX Transportation Waste Streams
  - Air emissions
    - Nitrogen oxides
    - Volatile organic compounds (VOCs)
    - Particulate matter
    - Carbon monoxide
    - Carbon dioxide
  - Steel
  - Batteries
  - Used oil
  - Paper
  - Aluminum

CSX Corporation – CSX Transportation – Jacksonville, FL

- CSX Stresses Importance of Environmental Training & Awareness
  - Environmental Certification Program
    - Developed for mechanical operations & engineering employees
    - Environmental training specific to their job functions
  - Emergency Response/Community & Customer Outreach Programs
    - Developed for Hazardous Materials System Group
    - Training provided to employees, customers and the public
    - Focuses on prevention and response to incidences
  - Training programs frequently reviewed and updated due to regulatory and procedural changes

CSX Corporation – CSX Transportation – Jacksonville, FL

- CSXT Jacksonville, FL - EMS implementation reuse and recycling metrics
  - **Reclaimed** 611,000 lbs of signal/rechargeable batteries (annually)
  - **Reconditioned** 75% of replaced locomotive engine batteries
  - **Recycled** 2.1 million gallons of oil
  - **Converted** 2.12 million used cross ties into a fiber fuel source/timber
  - **Recycled** old locomotives rail cars, rails, and other equipment
- CSXT Headquarters – EMS landfill avoidance metrics
  - **Recycled** more than 400 tons of office paper and aluminum annually
- CSXT's safety record metric for transporting hazardous materials
  - CSX transported 445,000 carloads of hazardous materials in 2001; only 17 carloads spilled contents due to derailment

CSX Corporation – CSX Transportation – Jacksonville, FL

- CSX initiatives through objectives & targets (continual improvement)
  - Wastewater treatment facility upgrades
  - Aboveground storage tank upgrades
  - Replacing underground fuel-delivery pipelines with aboveground lines
  - Purchase of more efficient locomotives
  - Addition of Auxiliary Power Units (APUs) to locomotives dramatically reduced fuel usage and associated air emissions during idling
    - APUs reduced the following emissions during idling:
      - Nitrogen oxides by 91 percent
      - Hydrocarbons by 94 percent
      - Carbon monoxide by 96 percent
      - Particulate matter by 84 percent

CSX Corporation – CSX Transportation – Jacksonville, FL

- CSX Green Spike Award
  - Recognizes environmental excellence on individual basis
  - Employees selected based on personal environmental achievements
- CSX Employees nominated for national awards
- Association of American Railroads (AAR) John H. Chafee Environmental Award for outstanding environmental achievement
  - Two CSX employees received this award
  - Each year since 1996, a CSX employee has been nominated
- CSX Employee received EPA's Clean Air Excellence Award
  - 2001 Award to designer of the Auxiliary Power Unit (APU) for reducing emissions during idling in railroad locomotives

Defense Supply Center Richmond – Richmond, VA

- Defense Logistics Agency (DLA) site to supply DoD and other agencies
  - Supplies 850,000 parts/supplies & 1,300 weapons
  - Employs 3,000 civilians, service members and contractors
  - Extends over 600 acres with 120 buildings
- EMS Development & Implementation
  - Initial driver EO 13148 –ISO 14001-compliant EMS by 2005
  - Obtained 3rd party registration in November 2005
  - Began Virginia Regional EMS (V-REMS) partnership in 2006
- DSCR Achievements
  - First DLA agency to be externally ISO 14001-registered
  - First DLA agency to join EPA's Performance Track

Defense Supply Center Richmond – Richmond, VA

- Reduction of Air Emissions –
  - Reduced sulfur emissions from 100 to 7 tons/yr
    - Boiler retrofit and enhancement
    - Switched to cleaner burning fuel
  - Increase of spray paint application efficiencies to 90%
    - Purchased high-volume, low-pressure (HVLP) spray-paint guns
    - Paint delivery rate at 10 psi reduced overspray loss
    - Reduction in paint usage
    - Reduction in paint overspray (air emissions, disposal costs)
  - Switched to water –based paint
    - Significantly reduced VOCs and HAPs emissions

Defense Supply Center Richmond – Richmond, VA

- Solid Waste Recycling
  - Revenue from recycling - $48,200
  - Recycled the following items:
    - White office paper
    - Mixed paper
    - Laser toner cartridges
    - Cardboard
    - Plastics
    - Scrap Metal
  - Cost avoidance – saved $360,000 in solid waste disposal costs

Overview of EMS Implementation Process

- Secure senior management commitment & define the scope
- Select the EMS Management Representative & Implementation Team
- Determine the timeline and secure external resources
- Provide training for EMR and Implementation Team
- Identify legal & other requirements
- Identify environmental aspects and impacts & determine significance
- Select objectives and targets; develop environmental programs
- Develop EMS documentation and procedures
- Identify training needs and conduct general awareness training
- Train the Internal Audit Team and conduct an internal audit
- Identify and implement corrective and preventive actions
- Conduct a management review

Pitfalls to Avoid in EMS Implementation

- Not securing senior management support and resources
  - EMS is most successful when totally integrated within organization
  - Frustration results when funds not in place to finish
  - Those without authority cannot gain support to implement the EMS
- Not clearly defining the scope and timeline
  - Must focus resources and effort to activities within the scope
  - Recommend 12-18 months timeframe – otherwise lose momentum
- EMS not tailored to the organization
  - Too detailed an EMS results in getting lost in paperwork
  - Not adapting to the culture of the organization makes it irrelevant
- Organization depending on software systems or pre-packaged EMSs

QUESTIONS?

THANK YOU

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