An Environmental Management System (EMS) Primer for Ports:

Advancing Port Sustainability

SectorStrategies

AAPA American Association of Port Authorities

Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

January 2008

U.S. Environmental Protection Agency

An Environmental Management System Primer for Ports: Advancing Port Sustainability

January 4, 2008

Prepared for:
U.S. Environmental Protection Agency
Office of Policy, Economics, and Innovation
Sector Strategies Division
Kathleen Bailey, Port Sector Liaison
Tel (202) 566-2953
Bailey.Kathleen@epamail.epa.gov

In partnership with:
American Association of Port Authorities

Prepared by:
ICF International
9300 Lee Highway
Fairfax, VA 22031
(703) 934-3000

In cooperation with:
Global Environment & Technology Foundation

Table of Contents

[This page intentionally left blank]

List of Acronyms

AAPA	American Association of Port Authorities
AMP	Alternative marine power
BMP	Best management practice
C&M	Construction & maintenance
CAA	Clean Air Act
CEO	Chief executive officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIF	Continual Improvement Form
CFT	Cross-Functional Team
COO	Chief operating officer
COOP	Continuity of operations plan
CWA	Clean Water Act
DOC	Diesel oxidation catalyst
DVD	Digital versatile disc or digital video disc
EA	Environmental agent
EA	Environmental aspect
EBIT	Earnings before interest & taxes
EH&S	Environmental, health, and safety
EI	Emission inventory
EI	Environmental impact
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EP&R	Emergency preparedness and response
FEMA	Federal Emergency Management Agency
FRP	Federal Response Plan
FSP	Facility security plan
GETF	Global Environment & Technology Foundation
GHG	Greenhouse gas
GRI	Global Reporting Initiative
ha	Hectare
HMTA	Hazardous Materials Transportation Act
HNE	Harbors, Navigation, and Environment [AAPA Sustainability Working Group]
HVAC	Heating, ventilating, and air conditioning
ICP	Integrated Contingency Plan
ILO	International Labour Organization
ISO	International Organization for Standardization
ISPS	International Ship and Port Security
JAXPORT	Jacksonville Port Authority
JRRF	James River Reserve Fleet
LEED	Leadership in Energy and Environmental Design
LNG	Liquefied natural gas
MARAD	Maritime Administration
MARSEC	Maritime Security
Massport	Massachusetts Port Authority
MFM	Marine Facility Management
MOA	Memorandum of agreement
MPRSA	Marine Protection, Research, and Sanctuaries Act
MTSA	Maritime Transportation Security Act

List of Acronyms

NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act
NIT	Norfolk International Terminals
NOV	Notice of violation
NOx	Nitrogen oxides
NRAMP	Natural resources assessment and management plan
PAS	Publicly available specification
PCCA	Port of Corpus Christi Authority
PDX	Portland International Airport
PM	Particulate matter
RCRA	Resource Conservation and Recovery Act
SAFE	Security and Accountability for Every [Port Act of 2006]
SEA	Significant environmental aspect
SMS	Security Management System
SOLAS	Safety of Life at Sea
SOP	Standard operating procedure
SPCC	Spill Prevention, Control and Countermeasure
3Es	Economic, environmental, and social (equity)
3Ps	Profit/prosperity, planet, and people
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
VIT	Virginia International Terminals
VPA	Vancouver Port Authority
VPA	Virginia Port Authority
V-REMS	Virginia Regional Environmental Management System

Acknowledgements

The EPA Sector Strategies Division would like to thank the following individuals and organizations for review and comment on draft versions of this document:

Meredith Martino, American Association of Port Authorities

Scott Skinner, Jacksonville Port Authority (FL)

Jenna Newcomb and Deborah Hadden, Massachusetts Port Authority

Tom Wakeman, Port Authority of New York & New Jersey

Sarah Kowalski and Paul Carangelo, Port of Corpus Christi Authority (TX)

Aston Hinds, Port of Houston (TX)

Peter Ressler, Port of Seattle (WA)

Sue Mauermann, Port of Tacoma (WA)

Heather Mantz, Virginia Port Authority

Lynn Corson, Purdue University

Jim Kruse, Texas Transportation Institute

Virginia Fox-Norse, U.S. Environmental Protection Agency, Office of Water

Introduction

Waterborne commerce is increasing rapidly and presenting ports with challenges that could not have been imagined even two decades ago. By 2020, the total volume of cargo shipped by water is expected to be double that of 2001 volumes.[1] At the same time, the cruise industry is the fastest growing segment of the travel industry, achieving more than 2,100 percent growth since 1970.[2] To accommodate the growth in trade volume, increases in the size of cargo and cruise ships, and new security requirements, many U.S. ports are investing billions of dollars in infrastructure improvements such as deeper channels, larger cranes, and other property enhancements for both existing and new facilities. At the same time, the communities surrounding ports are raising their expectations for reducing negative impacts of port-related activities, e.g. pollution and traffic congestion. Increasingly too, major shippers are asking ports and their business partners to reduce the carbon footprint of goods movement and help reduce the risks of climate change. Balancing economic, environmental, and social considerations (i.e., growing "sustainably") is a challenge, even for those ports that have traditionally viewed themselves as environmental stewards of coastal resources and waterways.

To manage their growth more responsibly, ports are addressing their environmental and related socioeconomic responsibilities through the development of Environmental Management Systems (EMSs). An EMS is a formal system for proactively managing the environmental footprint of a port. Over the last several years, the U.S. Environmental Protection Agency (EPA) has been involved in a wide range of activities to help businesses and government agencies use EMSs to move beyond regulatory compliance to continuous improvement in environmental performance. EPA's Sector Strategies Program, for example, promotes the use of EMSs at ports in voluntary partnership with the American Association of Port Authorities (AAPA).[3]

Purpose

The purpose of this primer is to provide a general introduction to EMSs, through the use of the Plan-Do-Check-Act framework, in order to help ports develop these systems and understand how they can also advance port efficiency, security, and other aspects of sustainability. Sustainability, in short, can be defined as a balance of economic prosperity, environmental quality, and social responsibility in development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Some ports already have begun to plan and implement "green port" policies that build on, but extend beyond, their environmental stewardship initiatives. In fact, it can be hard to distinguish between actions resulting from implementation of an EMS and actions otherwise taken to improve a port's sustainability. The common thread is often the use of the Plan-Do-Check-Act framework, which was first used by companies to develop quality management systems, e.g., the International Organization for Standardization's ISO 9000. Generically, the framework requires organizations to *Plan*, *Do* what they planned, *Check* their progress, and *Act*, through senior management, to make further changes needed to enhance performance. This framework now is being used to address not only environmental protection but also security and a range of other activities. This primer shows how ports can extend their EMS efforts to address broader aspects of sustainability and thereby look at their business operations more holistically.

---

[1] See www.aapa-ports.org/Industry/content.cfm?ItemNumber=1022&navItemNumber=901.

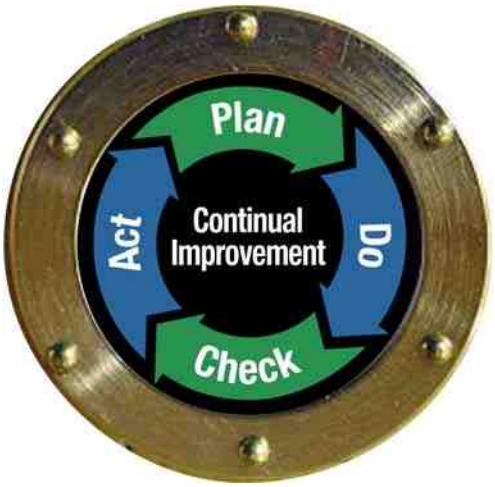
[2] See www.cruising.org/press/sourcebook2006-midyear/profile_cruise_industry.cfm.

[3] See www.epa.gov/sectors/ports/ for information on port participation in EPA's Sector Strategies Program. EPA has also implemented EMSs at its own facilities and assists other government agencies in developing theirs. For example, on October 16, 2006, EPA restated its commitment to integrating and utilizing EMS at its facilities nationwide; see "Commitment to the Integration and Utilization of Environmental Management Systems," a copy of which is available at www.peercenter.net/ewebeditpro/items/O73F9817.pdf.

Overview of EMSs

An EMS incorporates environmental considerations and decision-making into a port's day-to-day operations and into its strategic planning. Additionally, an EMS provides a structured framework designed to achieve continual environmental improvement beyond regulatory compliance. An EMS can help ports improve efficiency, reduce costs for asset management and operations, and minimize negative impacts on human health and the environment.

While each EMS is unique to an organization's culture and priority issues, most follow the Plan-Do-Check-Act framework. This framework provides a methodology to examine and prioritize the environmental aspects of an organization; then develop, implement, monitor, review, and revise environmental programs and procedures to continually promote sound day-to-day management and improvement. Many ports already have components of an EMS in place, such as written and unwritten procedures, best management practices (BMPs), and regulatory compliance programs. An EMS naturally leverages and builds upon existing good practices and the practical knowledge base of employees throughout the organization.



The following U.S. ports have an EMS in place:

- Massachusetts Port Authority (Massport), Port of Boston;[4]
- Port Authority of New York and New Jersey;
- Port of Corpus Christi Authority, TX;
- Port of Houston Authority, TX;
- Port of Los Angeles, CA;
- Port of Portland, OR;
- Port of Seattle, WA;
- Port of Vancouver, WA; and
- Virginia Port Authority.

Domestic ports developing an EMS include the following:

- Jacksonville Port Authority (JAXPORT), FL;
- Maryland Port Administration, Port of Baltimore;
- Port Everglades, FL;
- Port of Cleveland, OH;
- Port of Everett, WA;
- Port of Freeport, TX;
- Port of Long Beach, CA;
- Port of New Orleans, LA; and
- Port of Oakland, CA.

These and other ports worldwide have found important benefits from developing EMSs:

"We see the EMS as a valuable tool to help us meet the environmental challenges facing our port." — Ralph G. Appy, Ph.D., Director of Environmental Management, Port of Los Angeles

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving your Performance: Ports Sector*, September 2004.

"The EMS has really empowered our employees to think creatively for ways to improve operations and their impacts on the environment. We're recycling more than 35 tons of paper each year, we've gone to biodegradable products throughout our organization, and we've created an Environmental Compliance Assessment tool for starters. We're dedicated to the program and will continue along this path." – Geraldine Knatz, Ph.D., Executive Director at the Port of Los Angeles

Source: September 28, 2007, press release re. ISO 14001 certification.

[4] Massport also has developed an EMS at Hanscom Field, the Tobin Memorial Bridge, and Field Maintenance at Logan Airport.

- Improved environmental awareness, compliance, and performance;
- Reduced risk and liability, and improved security and emergency response capability;
- Improved internal communication and cooperation, including between port authorities and terminal operators; and
- Enhanced credibility, public image, and public confidence, as ports monitor and report performance and position themselves as leaders in environmental protection and management.

How an EMS Advances Port Sustainability

In addition to environmental compliance requirements, ports continue to face daunting challenges in this time of significant growth. Among them are heightened community concern about port expansion plans; issues associated with keeping channels clear through dredging, and the environmental impacts of this dredging; concerns over port-related greenhouse gas and other air emissions and their impacts on global climate change; the magnitude of anticipated resource and capital investments; rising costs of energy resources and waste management; and continuing need to meet stakeholders' expectations in order to protect port licenses to operate and meet long-term industry viability goals. To meet these challenges, many ports are looking for an all-inclusive, Plan-Do-Check-Act management systems-based approach to planning and operations. Increasingly, ports see value in looking holistically at their overall business practices with a view toward "sustainability."

Since first introduced in the mid-1970s, the concept of sustainability as a business concern has evolved to equate to the "Triple Bottom Line" or "sustainability trinity," i.e., an organization's performance in three areas:

- 3Es – Economic, Environmental, and social Equity; or
- 3Ps – Profit/Prosperity, Planet, and People.[5]

Common Principles of Sustainability

- Dealing transparently and systemically with risk, uncertainty, and irreversibility
- Ensuring appropriate valuation, appreciation, and restoration of nature
- Integration of environmental, social, human, and economic goals in policies and activities
- Equal opportunity and community participation
- Conservation of biodiversity and ecological integrity
- Ensuring inter-generational equity
- Recognizing the global integration of localities
- A commitment to best practice
- No net loss of human capital or natural capital
- The principle of continuous improvement
- The need for good governance

Source: Hargroves, K. and M. Smith (Eds.) 2005. *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. Earthscan/James&James.

The American Association of Port Authorities (AAPA) is currently working to develop and implement a sustainability framework for its members. AAPA represents the 80+ largest public ports in the United States and is a partner in EPA's Sector Strategies Program. At its 2007 Annual Convention, AAPA members approved a new Resolution, "Embracing the Concept of Sustainability as a Standard Business Practice for Ports and the Association," and ratified a set of seven Sustainability Guiding Principles as a standard business practice for port operations; full text follows:

> ***WHEREAS**, Sustainability involves the simultaneous pursuit of economic prosperity, environmental quality and social responsibility; and*
> ***WHEREAS**, Ports hold a unique role in transportation, logistics and infrastructure development; and*

[5] In its 1987 Report, *Our Common Future*, the United Nations-convened Brundtland Commission dealt with sustainable development, which it defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." See www.ringofpeace.org/environment/brundtland.html for an easy-to-read version of the Brundtland Report.

***WHEREAS**, Ports must be financially viable in order to achieve their missions and contribute to the economic prosperity of their regions and nations; and*
***WHEREAS**, Ports recognize that their activities may impact the environment and natural resources; and*

***WHEREAS**, Ports recognize that they have responsibilities as members of the communities in which they operate; and*
***WHEREAS**, Ports recognize that a long-term balanced approach is required;*

***NOW THEREFORE BE IT RESOLVED** that AAPA embraces the concept of sustainability as a standard business practice for ports and the Association. For ports, sustainability means business strategies and activities that meet the current and future needs of the enterprise and its stakeholders, while protecting and sustaining human and natural resources; and further*

Recognizing that each port operates within a unique business, political, environmental and social context, we further our sustainability resolve by putting forth guiding principles for consideration by member ports.

SUSTAINABILITY GUIDING PRINCIPLES

In accordance with Resolution D-11, ports should consider the following principles and implement them as appropriate:

1. *Communicate the goals of sustainability across the organization and allocate resource requirements for implementation;*
2. *Integrate sustainability throughout port activities and in both near-term and long- term planning processes;*
3. *Build upon and share existing sustainability best practices, keys to success, lessons learned and approaches for implementation;*
4. *Communicate and engage with internal and external stakeholders to encourage open dialogue, accountability and collaboration;*
5. *To the extent possible, use appropriate data and metrics as part of the process for implementing sustainability;*
6. *Evaluate the total life cycle costs of projects and decisions; and*
7. *Recognize that sustainability is a dynamic effort requiring flexibility and continuous improvement.*[6]

Sustainable Ports Keep Things Moving

The results and benefits from these efforts are anchored in the triple-bottom-line demands of:

- **Stewardship** of economic, ecological and social resources;
- Progress toward **Sustainability** as an ultimate goal; and
- **Social responsibility** as corporate citizens.[7]

[6] See http://aapa.files.cms-plus.com/PDFs/sustainability%5Fresolutions.pdf.

[7] *Sustainability task force grasps pressing realities*, Aston A. Hinds, Ph.D., Environmental Affairs Manager, Port of Houston Authority, and Chairman, Sustainability Task Force, AAPA, Winter 2007-2008 issue of *Seaports Magazine*.

A key tenet of sustainability is that it is not limited to environmental stewardship. Rather, sustainability focuses on understanding the interconnections among the economy, society, and environment, and the equitable distribution of resources and opportunities – both now and in the future. Sustainable ports look at their operations in an all-inclusive manner, enhancing their profitability while existing responsibly within the larger community. They are able to meet today's economic, environmental, and social needs without compromising the ability of future generations to meet theirs.

Ports are beginning to define broader sustainability policies that extend beyond environmental stewardship. The Port of New York and New Jersey has developed the following Triple Bottom Line statement:

> *Success won't be measured by simple market-based metrics like cargo volume or market share alone. In fact, as it serves its maritime customers, the Port of New York and New Jersey must also meet a Triple Bottom Line. It must be: (1) an engine of regional prosperity; (2) secure and environmentally sustainable; and (3) financially self-sustaining. Those are key components of the region's quality of life – and that is the benchmark of success for the bi-state Port.*[8]

"At the Port of Long Beach, we subscribe to the triple bottom line, which incorporates economics, the environment, and the community. We strive for that balance – to continue to improve the strong economic benefit to the region, to be true environmental stewards, and to work cooperatively with our community partners. Our continued license to operate depends on our commitment to each of these elements." – Dick Steinke, Executive Director at the Port of Long Beach

Source: December 14, 2007, e-mail from GETF to ICF.

Other ports, including the Port of Oakland, also define sustainability in terms of the "3E trinity" of economic, environmental, and social equity. These and other examples suggest that ports worldwide are working toward and committed to sustainability, with promising potential and possibilities.

Senior Management Support and Leadership Are Crucial for Success

Clearly, senior management support and leadership are crucial – both for an EMS and its environmental stewardship activities, and for broader sustainability principles and practices. The decision to implement an EMS entails a commitment of time and monetary resources. On average, it takes a year to set up an EMS, although individual systems can vary from three months to two years depending on project scope (i.e., its "fenceline") and resources.[1] Senior management plays an active role in the EMS, continually assessing the organization's progress toward its goals, looking for ways to improve management and performance, effectively allocating resources and personnel, and maintaining commitment to the system through annual reviews and revisions. Costs vary, but ports that have implemented an EMS have found they are able to recover their upfront costs quickly through early identification of energy and water conservation opportunities, pollution prevention initiatives, potential liabilities, and opportunities to reduce risks.[2]

[1] Conversation with EPA Sector Strategies Program staff, April 2, 2007.

[2] EPA, AAPA & GETF. *Environmental Management Systems: Systematically Improving Your Performance: Ports Sector*, September 2004. Also see 1st Ports EMS/SMS Assistance Project, Final Report, May 2006, for information on average resource commitments over a 2-year project period at 11 ports.

[8] Statement provided by Joseph Monaco, March 8, 2007, e-mail to AAPA's Harbors, Navigation, and Environment (HNE) Sustainability Working Group.

Elements in Developing an EMS

Within the Plan-Do-Check-Act framework, there are a number of elements that comprise an EMS. The most commonly used approach for an EMS is the one developed by the International Organization for Standardization for its ISO 14001 Standard.[9] For ease of presentation, several ISO elements have been reordered and combined in this primer, resulting in a set of 13 elements:

1. Define scope of EMS and assign responsibilities;
2. Create environmental policy statement;
3. Identify relevant legal and other requirements;
4. Identify significant environmental aspects;
5. Establish objectives, targets, and action plans;
6. Develop operational controls;
7. Develop emergency preparedness and response program;
8. Set up a training program for competence and awareness;
9. Create a communications strategy;
10. Set up documentation for the EMS;
11. Monitor, measure, evaluate, and record performance;
12. Conduct audits and correct problems; and
13. Conduct management review.

From Element 1, determining the scope of the effort, to Element 13, performing a management review, there are numerous opportunities for ports to integrate broader sustainability concepts into their EMSs.

Primer Layout and Data Sources

To help ports understand EMS and sustainability, this primer provides the following information on each of the 13 EMS elements:

- A brief overview of the element in the context of an EMS to provide ports with general EMS concepts;
- One or more real-life examples of how ports have implemented the element within their operations; and
- A discussion of how each element can be extended to include facets of broader sustainability, which often can be documented within the Plan-Do-Check-Act framework.

Many of the examples in this primer come from the 1st Ports Environmental Management Systems/Security Management Systems Assistance Project (January 2004 – December 2005),[10] developed by AAPA in partnership with EPA's Sector Strategies Program and the Global Environment & Technology Foundation (GETF). Through this project, nine ports and two federal maritime facilities worked together over two years to develop EMSs. In addition, the Port of Houston Authority, which had previously developed an EMS, applied the management systems approach to develop a Security

Additional Rounds of EMS/SMS Assistance

A 2nd Ports EMS/SMS Assistance Project began in February 2006, with four of the seven participating ports developing EMSs, and three using the management systems approach to develop SMSs. This 2nd round of EMS/SMS assistance will be completed by March 2008. See press release on 2nd round participants at www.resourcesaver.com/file/toolmanager/CustomO73C230F82182.pdf.

AAPA is considering additional rounds of the Ports EMS/SMS Assistance Project. For more information, visit www.aapa-ports.org.

[9] ISO 14000 Essentials, at www.iso.org/iso/iso_14000_essentials.

[10] See Final Report, May 2006, at www.peercenter.net/ewebeditpro/items/O73F8587.pdf. Contacts at each of the participating ports are listed on p.1 of that publication.

Management System (SMS). Following the discussion of EMS elements, this primer provides an overview of how Houston and other ports are using the Plan-Do-Check-Act framework to address security issues through SMSs.

Additional examples of ports that are working on EMSs, SMSs, and broader sustainability programs come from AAPA members and from ports located outside the Americas.

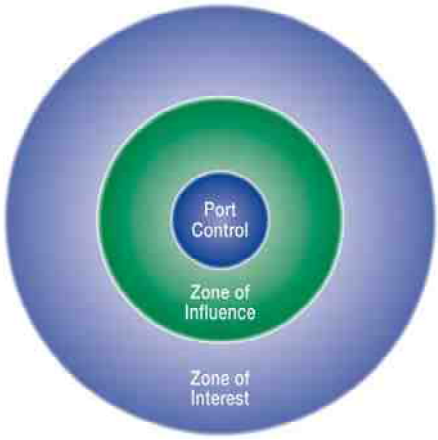
To begin developing your port's own customized EMS, refer to numerous online resources, including a list of Technical Assistance Providers, sample documents, and other EMS tools, by visiting www.epa.gov/ems and www.peercenter.net. Additional resources for getting started are included as an Appendix to this primer.

Element 1: Define Scope of EMS and Assign Responsibilities

A first step in EMS planning is to establish the "fenceline" by documenting the **scope** of port facilities and activities that the EMS will address. As shown in the adjacent graphic:

- There are facilities and activities over which a port has direct control.
- There are other facilities and activities that a port does not directly control but over which it has some influence (e.g., tenant operations).
- Finally, there are facilities and activities within a port's zone of interest that could be brought into its zone of influence if the port is proactive (e.g., regional intermodal transportation planning).

Zones of Port Control, Influence, and Interest



Most ports start with facilities and operations over which they have direct control; then, they later expand their EMSs to address broader areas of influence. While "land-side" operations are commonly included in the fenceline, dredging and maintenance of navigation channels or other port and harbor operation and maintenance activities also may be included. When defining the scope of its EMS, a port should also consider practical constraints and timing.

EMS **responsibilities** should be assigned to individuals who can competently complete and fulfill their **roles**. At a minimum, you should describe responsibilities for EMS Core Team members, designate people for these roles, establish lines of **authority**, and create an organization chart for your EMS. Documentation and communication of roles, responsibilities, and authority throughout the port will facilitate effective implementation and management.

Example EMS Core Team Members

- *Environmental Management Representative (EMR):* Could be a Project Manager and/or member of port's top management.
- *EMS Coordinator:* Leads the Team, ensures support for the EMS, and makes sure all EMS tasks are completed.
- *Cross-Functional Team (CFT):* Comprises members who represent each major operation within the port and serve as an information resource; may include risk management, public affairs, operations, human resources, etc.

Note that the ISO 14001 Standard states that as part of the commitment to an EMS, top management should designate a specific management representative with defined responsibility and authority for implementing the EMS. Thus, an Environmental Management Representative, in particular, is critical to an EMS, as this designated person serves as a liaison between senior management and the Core Team and employees in the organization. The EMR is responsible for facilitating the program and carries out important functions of the program outside of the Core Team.

Resources are essential for implementation and control of an EMS. They include training, human resources, specialized skills, financial resources, and technical and informational services. Port management must ensure the availability of such resources to the EMS.

Element 1 in the Field

Ports select their EMS fencelines based on many considerations. For example, the U.S. Maritime Administration (MARAD) selected the James River Reserve Fleet (JRRF), a federal anchorage on the James River Fort Eustis Army Transportation Center in Newport News, VA, as the fenceline for its 1st EMS/SMS Assistance Project. MARAD believed that an EMS could enhance its credibility as a federal environmental steward on the James River. Over the last couple of years, National Defense Reserve Fleet ships at JRRF awaiting disposal and/or reefing had been under intense scrutiny by regulatory agencies, including the Virginia Department of Environmental Quality and the U.S. Coast Guard (USCG). A number of ships built in the 1950s, 1960s, and 1970s contained fuel and oil that could pose a threat to the James River ecosystem if an oil spill were to occur. JRRF was chosen as the EMS site because of its diverse environmental consequences, including its position as a tenant at Fort Eustis.[11]

Ports across the country have developed EMS Core Teams that are right-sized for their situations, accessing staff from across operations and divisions within (and sometimes outside) their EMS fencelines.[12]

- *Port of Virginia:* Because of its size, operational impact on the environment, and public presence, Norfolk International Terminals, one of four facilities comprising the port, was chosen as the facility for an EMS assistance project. This facility is owned by the Commonwealth of Virginia and operated by Virginia International Terminals, an operating affiliate of the Virginia Port Authority. The EMS Core Team included six staff: two members from the Virginia Port Authority (Chief Engineer and Director of Environmental Affairs as EMR) and four members from Virginia International Terminals (Director of Engineering and Maintenance, Facilities Maintenance Supervisor, Vehicle Maintenance Supervisor, and Crane and Straddle Carrier Supervisor).

- *Portland District, U.S. Army Corps of Engineers (USACE):* The Corps' Portland District selected the U.S. Government Moorings shipyard (which includes a number of maintenance facilities and offices for personnel who operate and maintain the ships), two hopper dredges, and associated survey and support vessels as the fenceline for its EMS assistance project. The EMS Core Team comprised 11 members: the Environmental Compliance Coordinator as EMR, as well as plant maintenance and dredge operations chiefs, four dredge captains, the shipyard superintendent, two senior port engineers, and the lead hydrographic survey technician.

- *Port of Los Angeles:* The port selected the Construction and Maintenance (C&M) Division as the fenceline for its EMS assistance project. C&M provides craft and maintenance services to all port-owned facilities and consists of offices, equipment storage, and shops for craftspeople, including electricians, equipment operators, gardeners, painters, laborers, mechanics, machinists, plumbers, roofers, crane mechanics, pile drivers, and carpenters. The EMS Core Team included 25 C&M personnel, 4 representatives from the Environmental Management Division, 1 representative from Public Affairs, and 1 representative from Risk Management. In September 2007, the C&M Division celebrated the official ISO 14001 certification of its EMS. The overall program took a team of C&M and Environmental Management staff two years to implement and customize to the Port's particular needs and operations.[13]

- *Port of Seattle:* The Port of Seattle piloted an EMS at its Fishermen's Terminal. Wayne Grotheer, Director of Seaport Finance and Asset Management, noted, "We decided to pilot this program at Fishermen's Terminal because it is a microcosm of the larger port. At Fishermen's we have large and small moorage customers; retail, office, and industrial tenants; and open public access. If a more

[11] Example from the 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

[12] Unless otherwise indicated, these examples are from the 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

[13] See press release at www.portoflosangeles.org/News/news_092807iso.htm.

systematic and formalized approach to managing environmental issues works at Fisherman's Terminal, the port may adopt a similar approach at other facilities." Seattle established an EMS Core Team that includes a cross-section of staff members from its Harbor Services, Health & Safety, Risk Management, and Environmental Divisions.[14]

Enhancements for Sustainability

One way for a port to incorporate sustainability into its EMS is to widen the **scope** of the EMS to include more facilities and activities. Rather than focusing solely on its own operations, a port can include the environmental impacts of all entities over which the port exercises **control** or **significant influence** with regard to financial and operating policies and practices.

- As part of its Green Port Policy,[15] the Port of Long Beach is developing a tiered Sustainability Implementation Plan, which is taking a step-wise approach to defining the port boundary for the purposes of sustainability:

  - First, considering areas that are within the port's direct control;
  - Then, extending to tenants; and
  - Finally, extending to the region in which the port is located.

  Long Beach has identified, institutionalized, and budgeted for a Sustainability Practice Manager to coordinate development and implementation of its Sustainability Implementation Plan. This management position crosscuts port operations.

- The Virginia Port Authority is participating in the Virginia Regional Environmental Management System (V-REMS), a partnership of more than 50 federal, state, and local public and private organizations that collaborate to address regional community and environmental issues. Through the V-REMS partnership, participants leverage the collective knowledge and best practices of more than 45 public and private organizations that are working to improve their environmental performance and cost efficiency. Accordingly, by serving as a crucial resource for information and collaborative opportunities, the V-REMS partnership helps its participants save time and money while they contribute to a cleaner regional environment.[16]

In looking at its location in a watershed, a port may also participate in upstream watershed management to reduce the amount of sediment and contaminants that may potentially enter a port. Such upstream activities are also important components of advancing port sustainability, especially as the effects of climate change impact watersheds and urban areas.

---

[14] Intranet newsletter entitled "New Environmental Program Tests the Waters (And More) At Port Of Seattle's Fishermen's Terminal," Port of Seattle, submitted by Wayne Grotheer to EPA's Sector Strategies Program via e-mail, May 10, 2006. Here is a January 2007 update: "Today, about 18 months after the terminal's 11 employees implemented their EMS, the docks stay cleaner longer. Tenants now dump about 3,000 pounds of scrap metal each month into a new metal recycling bin, which has lowered the terminal's garbage bill… 'This is all an outgrowth of our EMS,' [Richard] Krug [harbor operations supervisor] says. 'I truly believe everybody's doing a better job of protecting the environment. We've just started, really. We have a bit and a piece of what this will grow into. Over the years, more will get added and fine-tuned. We're getting real production and better results for the same amount of money.' " Source: "EMS - Environmental Management Systems" by Dean Paton, *Washington CEO*, January 25, 2007, http://www.washingtonceo.com/news-article-display/article/77/ems-enviro.html?tx_ttnews%5BsViewPointer%5D=1&cHash=fd35479fa2.

[15] See www.polb.com/environment/green_port_policy.asp.

[16] See www.vrems.org.

Element 2: Create Environmental Policy Statement

Once your port has its Core EMS Team trained and in place, the next step is to define, develop, and communicate your facility's environmental policy. As your Team moves forward, the policy will do the following:

- Serve as the foundation for implementing and improving the EMS;
- Provide a unifying vision of environmental commitments and principles that will guide the actions of employees and top management; and
- Demonstrate your port's proactive environmental performance commitments to your workforce, customers, and the public.

Element 2 in the Field

Ports with EMSs have developed environmental policy statements to guide their efforts. The following example comes from the Virginia Port Authority's participation in the 1st Ports EMS/SMS Assistance Project;[17] note its references to commonwealth laws and the inclusive nature of its list of port stakeholders.

Minimum Port Commitments in EMS Policy Statement

- Compliance with legal requirements and voluntary commitments
- Pollution prevention
- Continuous improvement in environmental performance, including nonregulated areas
- Communications with your community about the port's environmental performance and the operation of the EMS

The Virginia Port Authority and Virginia International Terminals, Inc., are committed to conducting Port operations and managing resources in an environmentally sensitive and sound manner, as prescribed by Article XI, Section 1 of the Constitution of Virginia. It is the intent of each organization to:

1. *Meet or exceed all applicable Federal, State, and Local environmental laws and regulations.*
2. *Employ management systems and procedures specifically designed to prevent activities and conditions that pose a threat to human health, safety, and the environment through proactive environmental leadership and compliance.*
3. *Integrate environmental costs, risks, and impacts into port project development and facility improvements and to continually evaluate and improve operational efficiency and practices to achieve our established environmental and business objectives.*
4. *Promote pollution prevention and environmental awareness through communications with employees, customers, tenants, suppliers, contractors, other terminal users, regulatory agencies, neighboring communities and environmental organizations.*

The Virginia Port Authority and Virginia International Terminals, Inc., are committed to the spirit and intent of this policy and the laws and regulations, which give it foundation.

REF: Constitution of Virginia, Effective July 1, 1971, with Amendments – January 1, 2005.

Adopted 24 May 2005, Virginia Port Authority, Board of Commissioners

Massport's environmental policy is available on the Internet; it, too, addresses a broad set of stakeholders and promotes sustainable design principles:[18]

[17] See Final Report, May 2006.

[18] See www.massport.com/business/pic/c_envmgmt.pdf.

Massachusetts Port Authority (Massport) is committed to operate all of its facilities in an environmentally sound and responsible manner.

Massport will strive to minimize the impact of its operations on the environment through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, both to the extent feasible and practicable in a manner that is consistent with Massport's overall mission and goals. To successfully implement this policy, Massport will develop and maintain management systems that will:

- *Ensure that the environmental management policy is available to staff, tenants, customers, and the general public.*
- *Ensure compliance with all applicable environmental laws and regulations.*
- *Ensure that environmental considerations are included in business, financial, operational, and programmatic decisions, including feasible and practicable options for potentially exceeding compliance with applicable regulatory requirements.*
- *Define and apply sustainable design principles in the planning, design, operation, and decommissioning of its facilities.*
- *Define and establish environmental objectives, targets, and best management practices and monitor performance.*
- *Provide training to and communication with staff and affected tenants regarding environmental goals, objectives, and targets and their respective roles and responsibilities in fulfilling them.*
- *Incorporate monitoring of Massport and Massport tenants' environmental activities.*
- *Include the preparation of an annual environmental performance report which will be made available to staff, tenants, customers, and the general public.*

Enhancements for Sustainability

Some ports are developing **sustainability mission statements** or **value statements**. For example, in January 2005 the Board of the Port of Long Beach adopted a Green Port Policy that serves as a guide for decision-making and establishes a framework for environmentally friendly port operations. Below are the policy's five guiding principles:

- Protect the community from harmful environmental impacts of port operations;
- Distinguish the port as a leader in environmental stewardship and compliance;
- Promote sustainability;
- Employ best available technology to avoid or reduce environmental impacts; and
- Engage and educate the community.[19]

Outside the United States, the Port of Brisbane, Australia, has posted its environmental policy statement on the Internet.[20] This statement addresses broader port sustainability, including economic resources and stakeholder involvement:

Our environmental policy is to develop and implement best-practice strategies and systems to minimize the environmental impacts of our operations and promote the development of a sustainable port.

The Port of Brisbane Corporation is a commercial port operator whose corporate purpose is to be a world class facilitator of integrated solutions for the logistics and business development requirements of its customers. To achieve this, its prime objectives are:

[19] See www.polb.com/environment/green_port_policy.asp.

[20] See www.portbris.com/health/environment/environmental_management_systems/environmental_policy.

- *Adopting leading planning principles and management systems;*
- *Working cooperatively to ensure a safe and secure port environment;*
- *Providing world-class infrastructure; and*
- *Behaving at all times in line with our corporate values.*

A successful port is an essential part of the economic resources of the national, regional, and local communities. In operating as a successful port business, the Port of Brisbane Corporation is committed to ensuring that the activities of the Corporation are conducted in an ecologically sustainable manner with a high standard of environmental performance. This will be achieved while ensuring that the needs of the community and the values attached to natural and physical resources are taken into account in corporation planning and the way in which business is conducted.

To achieve environmental performance consistent with this policy, the Port of Brisbane Corporation will employ the following principles:

Planning

- *To include environmental considerations in the Corporation's decision-making.*
- *To provide adequate resources for employees at all levels to fulfill their responsibilities as directed under this policy.*
- *To implement procedures to enable activities to be carried out in an environmentally responsible way.*
- *To set environmental objectives and targets for Corporation activities and to review these on an annual basis.*
- *To conduct regular review of the Corporation's environmental performance and act on the results.*
- *To continuously improve the environmental performance of the Corporation.*
- *To continuously improve the environmental management system of the Corporation.*

Practices

- *To meet environmental standards in the Corporation's key activities.*
- *To assess the environmental impacts of the Corporation's activities.*
- *To plan, design, operate, and complete any operation in a manner that reduces environmental risks.*
- *To monitor environmental compliance in a professional manner.*
- *To abide by and comply with the Environmental Protection Act 1994 and all other applicable environmental laws, regulations, policies, standards, and codes of practice.*
- *To comply with the codes of practice of appropriate industry representative organizations.*
- *To prevent pollution from Corporation activities.*

People

- *To appoint staff and contractors on criteria which include that they have the appropriate skill and experience to carry out work in a way that is compatible with good environmental performance and this policy.*
- *To train staff to have the appropriate skill and experience to ensure that operations are completed with the utmost respect for the environment.*
- *To specify the need for all contractors to carry out their work in accordance with this Environmental Policy and to supervise such compliance.*
- *To communicate with affected individuals, community, and Government bodies about the Corporation's activities as relevant.*
- *To give due consideration for local culture and custom.*

The Port of Brisbane Corporation will hold employees and contractors accountable for their implementation of this Environmental Policy.

This Policy will be reviewed annually.

Jeff Coleman, Chief Executive Officer

Similarly, the Ports Corporation of Queensland, Australia, has also posted its commitment to sustainable development and operation of its ports on the Internet:[21]

ENVIRONMENTAL POLICY

The Ports Corporation of Queensland is committed to the environmentally responsible management of its ports and the provision (planning and construction) and maintenance of port infrastructure, with minimum adverse impact on the natural and social environment.

Our environmental policy is to:

- *Comply with all relevant environmental legislation and government policies and aim for best industry practice in all aspects of our operations.*
- *Monitor the impact on the natural and social environment surrounding our ports.*
- *Minimise the environmental impacts of our port operations and developments and seek continual improvement in the environmental performance of all of our ports. The Corporation is committed to the prevention of pollution of the environment.*
- *Use resources efficiently and minimise wastes.*
- *Strive for usage and development of Corporation ports to be consistent with the concept of ecologically sustainable development.*
- *Aim to enhance our reputation as a business and port authority through our high environmental standards and performance.*
- *Develop and maintain effective Environmental Management Plans and Emergency Response Plans to protect the environment under our control.*
- *Communicate openly and honestly on the environmental performance of our ports to key stakeholders, government and the general community.*
- *Work cooperatively with other organisations, or provide appropriate support, where it will help achieve the environmental objectives of the Corporation. Share any outcomes from the Corporation's own research work.*
- *Hold all employees accountable for environmental performance in their area so that they carry out their duties in accordance with legislation and company requirements.*
- *Require contractors engaged by the Corporation to meet the Corporation's environmental standards and requirements and to comply with relevant legislation.*
- *Encourage port tenants/lessees to meet the Corporation's environmental standards and requirements.*

Brad Fish, Chief Executive Officer
Monday, 8 August 2005

[21] See www.pcq.com.au/environment.cfm.

Element 3: Identify Relevant Legal and Other Requirements

Compliance with legal requirements is one of the main pillars upon which your environmental policy (Element 2) should be based, because the potential costs of noncompliance (e.g., possible damage to the environment, revenue loss, and impact on public image) can be very high. Therefore, your port should develop a procedure to identify, access, analyze, and communicate applicable legal and other requirements and ensure that these requirements are factored into the organization's management efforts. In addition to federal regulations, be sure to check with your state and local authorities to determine other applicable requirements and permitting conditions. Other requirements might include industry or trade group codes of practice, or neighborhood or community association requirements. Because legal and other requirements change over time, your process should ensure that you are working with up-to-date information.

Commonly Applicable Federal Environmental Laws

- **Clean Air Act (CAA):** Establishes ambient and source emission standards and permit requirements for conventional and hazardous air pollutants
- **Clean Water Act (CWA):** Establishes ambient and point source effluent standards and permit requirements for water pollutants; also includes storm water management requirements; Section 40 governs the discharge of dredged and fill material into U.S. coastal and inland waters
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund):** Establishes a program for cleaning up contaminated waste sites, establishes liability for cleanup costs, and provides reporting requirements for releases of hazardous substances
- **Emergency Planning and Community Right-to-Know Act (EPCRA):** Establishes a program (the "Toxic Release Inventory") to inform the public about releases of hazardous and toxic chemicals
- **Hazardous Materials Transportation Act (HMTA):** Establishes standards for the safe transport of hazardous materials
- **Marine Protection, Research, and Sanctuaries Act (MPRSA):** Governs transport of dredged material for the purpose of disposal in ocean waters
- **Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA):** Requires implementation of ballast water management practices to prevent transport and release of nonindigenous aquatic nuisance (i.e., invasive) species into U.S. waters
- **Resource Conservation and Recovery Act (RCRA):** Establishes regulations and permit requirements for hazardous waste management; creates standards for underground storage tanks that hold oil or hazardous substances
- **River and Harbor Act** and the **Water Resources Development Act:** Assign to USACE the responsibility for ensuring the navigability of the nation's rivers and harbors and providing flood protection; primary laws governing dredging; support beneficial reuse of dredged materials
- **Toxic Substances Control Act (TSCA):** Regulates the use, development, manufacture, distribution, and disposal of chemicals

Element 3 in the Field

Many ports are controlled by cities and localities – for example, the City of Houston, the Harris County Commissioners Court, the Harris County Mayors and Councils Association, and the City of Pasadena govern the Port of Houston Authority; the City of Long Beach has control over the Port of Long Beach.

Additionally, some states, such as Massachusetts and Maryland, require their agencies to have EMSs. In fact, Massport/Port of Boston had already embarked on EMS development prior to the state requirement and had the first airport in the country certified to the ISO 14001 Standard. The Maryland Port Administration/Port of Baltimore is currently participating in the 2nd Ports EMS/SMS Assistance Project, through which it will comply with state EMS requirements.

Enhancements for Sustainability

Many states, cities, and localities have issued sustainability statements or have construction requirements that may impact port development.

- Oregon has issued several Executive Orders (EOs) regarding sustainability for the 21st century, including its most recent EO 06-02.[22] Oregon ports, including the Port of Portland and USACE-Portland District, operate with full awareness of these state-level EOs. The state also established Toxics Use and Hazardous Waste Reduction Program requirements; development of its EMS helped USACE-Portland District comply with these newly mandated requirements.[23]

- Sustainable Seattle is a nonprofit organization dedicated to enhancing the long-term quality of life in the Seattle/King County area. Senior staff at the Port of Seattle serves on Sustainable Seattle's Board of Directors and Advisory Council.[24]

- In 2006, the Baltimore City Green Building Task Force recommended that Baltimore establish green building standards for city-funded construction and offer incentives to private developers of commercial buildings to build to green building standards.[25] Although these recommended standards would not directly apply to the Port of Baltimore, the growing interest of the community in green buildings could easily manifest itself in calls for the port to adhere to similar standards.

Over time, the federal government has also issued a number of EOs to "green" the government's operations. Most recently, EO 13423 of January 24, 2007, Strengthening Federal Environmental, Energy, and Transportation Management, sets goals for the federal government in the areas of energy efficiency, acquisition, toxics reductions, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. In addition, this EO requires more widespread use of EMSs as the framework in which to manage and continually improve these sustainable practices.

These and other EOs[26] impact port facilities managed by federal agencies, such as MARAD, USACE, and USCG operations. For example, USACE began integrating an EMS into its civil works operating facilities in response to EO 13148.[27] Portland District's Channels and Harbors Project was selected, along with 11 other Corps projects, to be among the first to begin implementing an EMS.[28] MARAD also was proactive in setting its Strategic Plan and vision of implementing EMSs at facilities under EO 13148.[29]

To the extent that a port extends its EMS to look at links between environmental and security, labor, or social equity issues, additional requirements may apply. For example, the Maritime Transportation Security Act of 2002 (MTSA) defines a "transportation security incident" as a "security incident resulting in significant loss of life, environmental damage, transportation system disruption, or economic disruption in a particular area." MTSA, USCG Regulations 33 CFR Part 105 (regarding USCG's jurisdiction and responsibilities for security planning and execution in and around U.S. waterways), and the general provisions of Chapter XI-2 of the International Convention for the Safety of Life at Sea (SOLAS) and the International Ship and Port Security Code (ISPS Code) address security considerations at ports.

---

[22] See www.oregon.gov/ODOT/SUS/Sustainability_Mandates.shtml, for additional information on Oregon's sustainability mandates.

[23] From 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

[24] See www.sustainableseattle.org for additional information on Seattle's mission, vision, and history, as well as its staff, Board of Directors, and Advisory Council members.

[25] Baltimore City Green Building Task Force, Report on Sustainable Building Guidelines and Standards for Public and Private Construction and Renovation Projects, April 2006, www.ci.baltimore.md.us/government/planning/images/GreenBuilding.pdf.

[26] EO disposition tables are found at www.archives.gov/federal-register/executive-orders/disposition.html.

[27] EO 13148, Greening the Government through Leadership in Environmental Management, available at www.epa.gov/EMS/position/eo13148.htm.

[28] From 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

[29] From 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

Element 4: Identify Significant Environmental Aspects

In Element 1 you defined the scope of your port's EMS (including entities over which the port exercises control/significant influence), in Element 2 you wrote your port's environmental policy (including commitments for continual improvement and prevention of pollution and waste), and in Element 3 you made sure to identify all relevant legal and other requirements—at the federal, regional, state, and local levels. In Element 4, you use all that information as guideposts to:

- Identify environmental "aspects" of operations that fall within the scope of the port's EMS. Environmental aspects are characteristics of a facility's activities, products, or services that either impact the environment or could potentially impact the environment.
- Link these aspects to their actual or potential environmental impacts, quantified to the extent possible. These associated environmental impacts could occur during normal, abnormal, accidental, or emergency situations.
    - Air emissions from a tugboat are an example of an environmental aspect, with the impact being degradation of air quality.
    - Similarly, spills from chemical storage facilities are also an environmental aspect, with the impact being degradation of air and/or water quality.
    - Sediment loads and pollutants from port activities may impact aquatic resources, e.g., wetlands, submerged aquatic vegetation, kelp beds, reefs, essential habitats.
- Determine the subset of aspects that have significant impacts. Such environmental aspects may be **significant environmental aspects** (SEAs) due to legal requirements, port goals or policies, community concerns, potential release to the environment, pollution prevention potential, or other rationale. Once selected, SEAs form the basis for the rest of the EMS.

Categories Commonly Used to Determine Significance of Environmental Aspects

- Regulatory concerns
- Pollution
- Risk, including effects of chemicals and materials on workers, impacts on the surrounding community, and impacts on the environment, safety, and noise
- Natural resource use

"Our port's EMS is helping us identify and prioritize environmental issues, especially those with the greatest impact. It is also helping us document procedures and stay on top of every regulation out there." — Gary P. LaGrange, President & CEO, Port of New Orleans

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving Your Performance: Ports Sector*, September 2004.

Beneficial Reuse of Dredged Material

The Port Authority of New York and New Jersey reports that nearly all of the more than 49 million cubic yards of dredged material from its Harbor Deepening Project (HDP) is slated for beneficial reuse. If the material is suitable for ocean placement, it will be used to cap the Historic Area Remediation Site. If unsuitable for this purpose, the Port Authority plans to have it cleaned and used in support of brownfield remediation, mine reclamation, or landfill closure. The Port Authority has already worked with private firms to use treated dredged material in capping a brownfield in Elizabeth, NJ, a former landfill, which was then developed into the Jersey Gardens Mall. Treated dredge material also has been used in the development of a golf course in Bayonne, NJ, that sits on a former brownfield site. Rock excavated during the harbor deepening will be used to help create an artificial reef and fish habitat.

Source: www.panynj.gov/DoingBusinessWith/seaport/pdfs/New_Environ.PDF.

Note that environmental aspects can be positive as well as negative. For example, recycling is a positive environmental aspect with positive environmental impacts – a reduction in the amount of landfill space consumed, and a reduction in the amount of natural resources

needed for manufacturers to create new products. Further, high-quality dredged sediments may be beneficially used. Therefore, when identifying environmental aspects and impacts, ports should consider both positive and negative features. Where things are being done well, opportunities may exist for expanding successful activities into other areas within the fenceline.

Element 4 in the Field

Many ports have catalogued their environmental aspects (e.g., by diagramming their activities in terms of inputs, outputs, or processes), determined associated environmental impacts, developed and applied significance determination methods using a variety of ranking criteria, and selected SEAs on which to target their EMSs. Prioritizing their environmental aspects has helped port management focus on controlling those aspects that have the greatest current or potential negative impact on human health and the environment. For example, many U.S. ports are in counties that are in noncompliance with air quality standards for ozone and particulate matter (PM). For those ports and others that want to be proactive, diesel emissions from both ships and landside sources are likely an SEA.

Common aspects and impacts within typical marine transportation fencelines (e.g., marine terminals and maintenance shops) address not only air quality, but also impacts on land and water quality from ships and shoreside operations. Typical activities within the fenceline may include electrical repair, building maintenance, painting, boat building/repair, truck and fleet maintenance, fueling operations, waste disposal, recycling, snow removal, wharf repair, plumbing, pavement repair, equipment maintenance, roofing, landscape maintenance, property renovation, and storm water management.

For example, after selecting its wellhead protection area as its fenceline, operations and maintenance staff at the Port of Vancouver, WA, brainstormed on all environmental aspects that occur within this area and then ranked those individual activities according to their impacts using the following significance criteria:

- Human health;
- Natural resources;
- Frequency;
- Volume;
- Toxicity;
- Public perception;
- Costs;
- Probability; and
- Legal requirements.

Based on this ranking of aspects and impacts against these criteria, the port selected the following SEAs upon which to build its EMS:

- Proximity of existing contamination to wellhead area;
- Illegal dumping within wellhead area;
- Tenant chemical use;
- Proximity of rail tracks (and potential for spills and leaks);
- Chlorine transportation, storage, and changing tanks;
- Installation of backflow prevention devices; and
- Drinking water operational procedures.

The following table provides examples of environmental aspects and impacts the Port of Brisbane, Australia, identified in its audit of all work sites and activities:[30]

[30] See www.portbris.com/health/environment/environmental_management_systems/aspect_and_impacts.

Environmental Aspect	Environmental Impact
Hosing down the deck of a vessel resulting in the discharge of sediments, oils, and greases into the waterway	Contamination of the waterway through increased turbidity and contaminants
Spills of fuels and oils from parked vehicles entering the waterway or paved areas through storm water flows	Contamination of the soil, groundwater, and surface waters
Purchase of materials and equipment without due consideration for environmental sustainability (i.e., excessive packaging, hazardous waste byproducts, and excessive noise generation)	Depletion and inappropriate use of natural resources

Enhancements for Sustainability

Environmental aspects and their impacts may cover universally accepted performance related to inputs (e.g., materials, energy, and water) and outputs (e.g., emissions, effluents, and waste), as well as performance related to biodiversity, environmental compliance, environmental expenditures, transport of products, and the lifecycle impacts of products or services.

For example, the Gijón Port Authority, Spain, participated in a 2006 research study assessing the port's "ecological footprint" as a macroindicator of sustainability.[31] Until that time, this macroindicator had been applied to cities, regions, or countries, but not entities such as ports. Ecological footprints account for the consumption of natural resources by converting them into hectares (ha) of "nature" or consumed productive land. Parameters analyzed included consumption of energy, fuel, material, paper, wood, water, built land, and green areas, and residues generated by the port. The results showed a net ecological footprint of 3,279.84 ha,[32] comprising primarily construction works and electricity usage. Studies of this kind may enable ports to design sustainable development plans to reduce consumption as well as develop green services and create "natural capital," as the scope of impact is better understood.

The Port of Portland developed and implemented a natural resources assessment and management plan (NRAMP), a management and planning tool that provides port staff with a single source of all natural resource data (including inventories and maps) about port and surrounding properties. In addition, NRAMP contains modeling, alternatives analysis, and adaptive management features that allow port staff to evaluate the potential effects of management actions on the resources.[33]

The exchange of ballast water in ships may not be something over which a port has direct control. However, ports are concerned about this activity, for it may introduce invasive species that threaten native species (and pose major economic impacts at the port and to commercial and sports fishing). To supplement its Green Port initiatives, for example, the Port of New York and New Jersey, in collaboration with New Jersey Sea Grant, published a "Ballast Water" brochure to educate port tenants and the general maritime community about the impacts of the introduction of invasive species into local ports and harbors via ballast water. Environmentally protective measures include ballast water exchange at sea before entering the port, along with a host of other precautions that reduce the toxic introduction of foreign species.[34]

[31] See abstract at http://trb.metapress.com/content/f824177j8502q777.

[32] Equivalent to 8,104 acres.

[33] See AAPA award to this port at www.aapa-ports.org/Programs/content.cfm?ItemNumber=748&navItemNumber=696.

[34] See www.panynj.gov/DoingBusinessWith/seaport/pdfs/New_Environ.PDF.

Other broader aspects of sustainability may already be captured through an EMS. For example, social aspects, such as occupational health and safety, training and education, security practices, community relations/involvement, and compliance, may be addressed within an EMS (e.g., through Element 2, Environmental Policy Statement, or through subsequent elements).

The Global Reporting Initiative (GRI) has developed a 3E framework for sustainability reporting that is now used by nearly 1,000 organizations from over 60 countries. The GRI Framework addresses environmental reporting as well as economic and social equity performance indicators identified below:

Economic:
- Flow of capital among different stakeholders
- Main economic impacts of the organization throughout society (e.g., economic performance, market presence, indirect economic impacts)

Social: Labor Practices and Decent Work
- Employment
- Labor/management relations
- Occupational health and safety
- Training and education
- Diversity and equal opportunity

Social: Human Rights
- Investment and procurement practices
- Nondiscrimination
- Freedom of association and collective bargaining
- Complaints and grievance practices
- Security practices

Social: Society
- Community
- Corruption
- Public policy
- Anti-competitive behavior
- Compliance

Social: Product Responsibility
- Customer health and safety
- Customer privacy
- Compliance

Source: GRI Web site, www.globalreporting.org/ReportingFramework/G3Online/PerformanceIndicators.

Element 5: Establish Objectives, Targets, and Action Plans

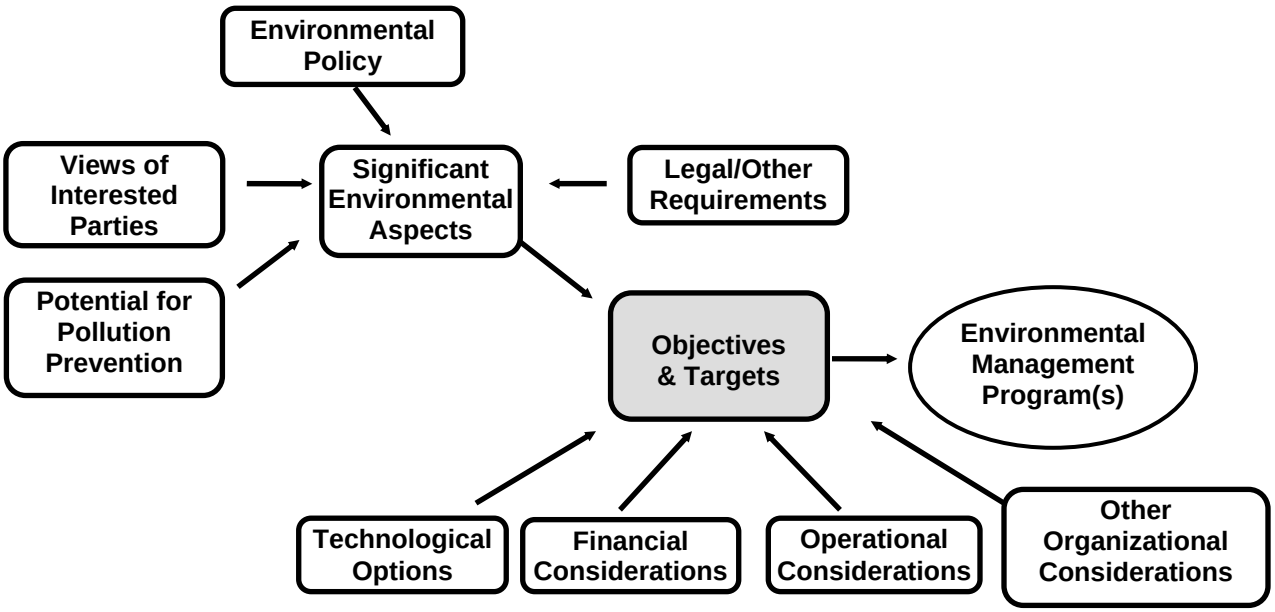
Once you have identified your SEAs, you are ready to set environmental objectives and targets. Objectives and targets help your port continuously improve its environmental performance. An environmental **objective** arises from your port's environmental policy statement (Element 2). Environmental **targets** are detailed performance requirements that are based on an environmental objective and are quantified whenever practicable, e.g., reduce X by Y date by Z percent. While all SEAs need operational controls, which are further described in Element 6, not all need objectives and targets. In setting objectives and targets, the port should consider its environmental policy commitments to prevent noncompliance, prevent pollution at its source, minimize cross-media pollutant transfers, and continuously improve its environmental performance.

Action plans document SEAs, operational controls, objectives, and targets. Action plans, also known as **Environmental Management Plans** (EMPs) or **Implementation Plans**, translate your policy commitments into concrete actions – they form the bridge between concept and application. EMPs should define: (1) the responsibilities for achieving the objectives (i.e., who will do it); (2) the means for achieving objectives (i.e., how they will do it); and (3) the timeframe for achieving the objectives (i.e., when). Keep in mind that EMPs should be dynamic. For example, consider modifying your programs when objectives and targets are modified or added; relevant legal requirements are introduced or changed; substantial progress in achieving your objectives and targets has been made (or has not been made); your services, processes, or facilities change; or other issues arise.

In Setting Objectives and Targets, Keep Your Environmental Policy Commitments in Mind While Also Considering the Following Factors:

- SEAs
- Legal and other requirements
- Statewide environmental initiatives
- External trends and influences
- Stakeholder concerns/views
- Business/operational needs and financial concerns
- Organizational considerations
- Technological options
- Port's ability to control, track, and measure
- Cost to track and measure
- Progress reporting

Considerations for Developing Objectives and Targets



Element 5 in the Field

Targeting their SEAs and considering other factors, ports have developed general objectives (e.g., minimize impacts on air quality, minimize impacts on water resources, reduce waste generation and hazardous materials use, minimize impacts and seek opportunities to enhance natural resources, reduce energy consumption, purchase energy from sustainable sources) as well as detailed, specific targets. Three examples are provided below from the 1st Ports EMS/SMS Assistance Project.

The Port of New York and New Jersey selected public berthing areas, maintenance facilities, and dredging operations as its fenceline, identified 10 SEAs within the fenceline, developed operational controls for all 10 (see Element 6), and set objectives and targets for 3:

1. Reduce water loss at the public berthing facilities in New York and New Jersey in volume and cost by 20% by December 2006. Due to the nature of the water distribution system configuration at the New Jersey Marine Terminal, the scope of this effort was expanded to cover the entire New Jersey facility.
2. Reduce solid waste from fender system repairs at the public berthing facilities in New York and New Jersey by 25% by May 2007 by specifying the use of more structurally resilient material and recycling old fenders.
3. Reduce NOx emissions from dredging operations for the Harbor Deepening Project to a net zero on an annual basis starting June 2005 and ending by December 2014.

The Port of Portland, which selected two facilities for its fenceline—Marine Facility Management (MFM) and Portland International Airport (PDX) General Maintenance—established the following objectives and targets for 2004/2005 maintenance operations:

1. *Objective:* Minimize Impacts to Air Quality. *Targets:* Reduce idling/transaction time by 50% at PDX parking toll plaza by June 2005; take five actions by June 2005 to reduce diesel particulate emissions; and identify air quality improvements through energy source changes for PDX gate and ground service equipment by completing preliminary engineering and economic evaluations by June 2005.
2. *Objective:* Minimize Impacts to Water Resources. *Targets:* Complete water efficiency evaluations for three port water systems by June 2005 and reduce the amount of treated timber chocks at T6 container yard by 20% by June 2005.
3. *Objective:* Reduce Waste Generation and Hazardous Materials Use. *Targets:* Assess environmental and safety impacts of chemical products used at Aviation and Marine maintenance facilities and eliminate or substitute at least six products at PDX by June 2005 and another six at MFM by March 2006.
4. *Objective:* Minimize Impacts and Seek Opportunities to Enhance Natural Resources. *Targets:* Organize a weekend event for port staff to clean up port-owned shorelines by June 2005.
5. *Objective:* Reduce Energy Consumption. *Targets:* Evaluate new technology to determine financial and technical viability of the Eco-start motor energy controller [*placeholder target until evaluation is completed*] and conduct three building energy audits at port facilities and implement viable projects by June 2005.
6. *Objective:* Purchase Electric Energy from Sustainable Sources. *Targets:* Purchase 3% of PDX's, 5% of Marine's, and 5% of the Port Building's electric power from sustainable wind-generated sources in 2004/2005.

The Port of Virginia identified 45 SEAs and then chose to address its remote fueling operations, corrective and preventive maintenance processes, container/strad wash area operations, and the facilities' lighting replacement program at Norfolk International Terminals (its fenceline) as follows:

1. *Objective:* Reduce potential for fuel spills from remote fueling operations. *Target:* Upgrade remote fueling equipment and implement procedures with the target of reducing spill frequency by 10%.
2. *Objective:* Reduce use of energy inefficient F-40 lamps and magnetic ballasts in office areas. *Target:* Replace 75% of all F-40 light fixtures with T-8 fixtures by 2007.

3. *Objective:* Establish methods to decrease the waste products from performing corrective and preventive maintenance and to ensure that these byproducts are properly disposed of or recycled. *Target:* Benchmark the amount of recyclable waste and develop goals that will increase recycling efforts by June 2006.
4. *Objective:* Reduce the zinc level in waste water from container and straddle carrier wash down operations. *Target:* Reduce the monthly sampled zinc levels in the waste water stream by 25% from calendar year 2005 average level at the Container and Straddle Carrier Wash Area by December 2006.

Enhancements for Sustainability

In developing its Green Port Policy, the Port of Long Beach conducted a gap analysis to document what it was doing as well as what more it needed to do, and then used that information to set objectives and targets. The resulting Green Port Policy includes six basic program elements (four specific environmental elements as well as broader social and overarching sustainability elements), each with an overall goal:

- Wildlife – Protect, maintain, or restore aquatic ecosystems and marine habitats;
- Air – Reduce harmful air emissions from port activities;
- Water – Improve the quality of Long Beach Harbor waters;
- Soils/Sediments – Remove, treat, or render suitable for beneficial reuse contaminated soils and sediments in the Harbor District;
- Community Engagement – Interact with and educate the community regarding port operations and environmental programs; and
- Sustainability – Implement sustainable practices in design and construction, operations, and administrative practices throughout the port.

In addition to overall principles and the goals for each component, the Port of Long Beach's policy includes metrics (scientific measurements of the port's environmental progress) and a commitment to regular reporting. The port has been developing metrics for various elements; those that have been developed are presented in periodic updates as well as the Green Port Annual report.[35] Note that the port has not developed numerical goals or metrics for either community engagement or sustainability; rather, progress on those two elements is reported as it occurs.

Massport also has developed sustainable design goals. They address the following:

- Asset Management – Increase value and revenue generating potential of projects, demonstrating to developers/investors that the port is a competent partner;
- Environmental Benefits/Permitting Strategy – Reduced impacts and permitting time;
- Citizenship – Positive community impact by demonstrating that the port is actively reducing environmental impacts; and
- Design Excellence – Innovative, aesthetic, and responsible design.[36]

In 2006, Massport achieved certification as the world's first Leadership in Energy and Environmental Design (LEED)-certified airport terminal, Boston Logan International Airport's Terminal A.[37] The LEED Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high-performance green buildings.[38]

---

[35] See www.polb.com/environment/green_port_policy/default.asp.

[36] Why Build Green? ACI-NA Environmental Affairs Committee Meeting, May 15, 2005; www.aci-na.org/docs/41%20SAN%2005%20Catherine%20Wetherell%20Massport%20LEED.pdf.

[37] See www.massport.com/about/press_news_taleed.html.

[38] For more on LEED, see U.S. Green Building Council's Web site at www.usgbc.org/.

Element 6: Develop Operational Controls

Operational controls are documented procedures, work instructions, BMPs, posted placards, and action plans that ensure that operations and activities (such as wastewater discharge monitoring, waste management, and environmental performance improvement) are carried out effectively. At least one operational control should be in place for each SEA identified in Element 4 to ensure compliance with legal requirements and company policies or to achieve improvement objectives.

Sample Activity Areas and Operational Controls for a Port

Water Quality Management:

- Connect floor drains to sanitary sewer or dead-end sump.
- Provide adequate space for storage of chemicals and waste products.
- Provide oil/water separators on floor drains.
- Pave fueling areas with concrete rather than asphalt.
- Design fueling areas to prevent the run-on of storm water and the runoff of spills.
- Use sand filters to capture spills and runoff of paint stripping operations.
- Ensure adequate secondary containment for catastrophic failures of bulk liquid storage facilities.
- Ballast water exchange at sea.

Air Quality Management:

- Install and maintain vapor recovery systems for fueling operations and for storage and handling of bulk liquids.
- Install dust suppression mechanisms for dry bulk storage and handling activities.
- Provide paint booths to contain overspray and treat air emissions when painting equipment.
- Cover painting/stripping area.
- Minimize the quantity of soil exposed at one time during construction activities.

Source: AAPA. *Environmental Management Handbook.* www.aapa-ports.org/Issues/content.cfm?ItemNumber=989 and www.panynj.gov/DoingBusinessWith/seaport/pdfs/New_Environ.PDF.

Element 6 in the Field

Ports may already document most of the operational controls needed at the facility, so it is likely you would not have to start from scratch. Ports that have implemented EMSs have documented operational controls to address compliance assurance and environmental improvement objectives. The following examples are from the 1st Ports EMS/SMS Assistance Project.

- The Port of Los Angeles, for example, developed operational controls as part of its EMS, establishing standard operating procedures (SOPs) for SEAs. Documenting these operational controls promoted "buy-in" from all employees into the EMS, ownership from employees of the significant activities, transfer of institutional knowledge from long-time staff to new employees, and assurance that all shifts conduct the activities under SOPs.

- The Port of Vancouver, WA, also saved operator institutional knowledge by clearly documenting, through its EMS, procedures for drinking water system operation and compliance management. Formalizing previously informal processes ensures that institutional knowledge of long-time port employees is captured.

There are a number of ways that ports can ensure that operational controls are implemented by those with whom the port does business.

- The Port of Houston Authority is putting environmental performance expectations for air emissions in construction contracts and in tariffs with stevedores. The port also has documented "roll down" clauses in its contracts; if tenants, vendors, or contractors cause a notice of violation (NOV), they may be fined or fired by the port.

- The Port of Seattle came to an agreement with the member cruise lines of the NorthWest CruiseShip Association to write into the tariff and vessel berthing agreements that the cruise ships will use low-sulfur fuels and shoreside electric power for auxiliary power needs at dock at the two Terminal 30 cruise berths.[39]

- The Ports of Los Angeles and Long Beach have supplemented the requirements in their tenant leases. Although it is common practice for ports to articulate in their leases that their tenants must comply with applicable environmental laws and regulations, these two ports have used additional "green lease" language with some of their marine terminal tenants. These ports are in a position to do this because of the scarcity of highly desirable land available for marine terminals in the country's busiest import market, and because of severe air pollution and extreme pressure from regulators and other stakeholders to reduce the human health risk of port-related operations.[40] The lease agreement signed by the Port of Los Angeles and P&O Nedlloyd in January 2006 requires that the following operational controls be used:

    - Switch to low-sulfur (1.5% or less) fuel in main and auxiliary engines of container ships when within 40 nautical miles of the port;
    - Reduce vessel speed when within 40 nautical miles of the port;
    - Outfit ships for alternative marine power (AMP), i.e., ship to shoreside power—30% by the end of the 2nd year, 70% by the end of the 3rd year;
    - Use alternative fuel, e.g., liquefied natural gas (LNG), in yard tractors;
    - Use emulsified fuel and diesel oxidation catalysts on older yard equipment, where feasible;
    - Use on/near dock rail;
    - Use non-ozone depleting compounds in refrigerated containers; and
    - Use housekeeping/maintenance procedures that limit water use and minimize discharges.[41]

Enhancements for Sustainability

Operational controls extend to other sustainability measures, including community relations. For example, reporting a release or oil spill to the federal, state, or local government (see Element 7) entails following documented procedures. A port also may develop BMPs to convey such information to the public as well as crisis communication plans to address media inquiries (see Element 9).[42]

[39] E-mail from Peter K. Ressler, Manager of Environmental Compliance and Program Development, Seaport Division, at the Port of Seattle, to AAPA and EPA Sector Strategies Program, July 17, 2007.

[40] For further information, see the *San Pedro Bay Port Clean Air Action Plan*, one of the most comprehensive strategies to cut air pollution and reduce health risks ever produced for a global seaport complex; www.portoflosangeles.org/environment_air.htm.

[41] Port of Los Angeles press release entitled, *Port of Los Angeles Harbor Commissioners Certify Environmental Impact Report with Landmark Environmental Measures*, dated January 19, 2006, www.portoflosangeles.org/Press/REL_BHC%20Approves%20206-209%20EIR.pdf.

[42] See www.aapa-ports.org/search/browseResults.cfm?MetaDataID=27 for several presentations on communications and the media; AAPA's 2006 seminars. The Port Manatee Crisis Communications Plan is also provided as a best practice manual on AAPA's Web site; see www.aapa-ports.org/Issues/IssueDetail.cfm?ItemNumber=1146.

Element 7: Develop Emergency Preparedness and Response Program

> "Morale is high. When we presented the EMS initiative to our maintenance and facility personnel, we stressed that the suits are not coming down and telling you what to do. We all work side by side, and when we start identifying procedures, everyone is involved in the process." — Rick Larrabee, Director, Port Commerce Department, Port Authority of New York & New Jersey
>
> Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving your Performance: Ports Sector*, September 2004.

Despite a port's best efforts, accidents and other emergency situations may occur. Effective preparation and response can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, reduce asset loss, and minimize downtime. An effective emergency preparedness and response program (EP&R) should include provisions for (1) assessing the potential for accidents and emergences, (2) preventing incidents and their associated environmental impacts, (3) responding to incidents through emergency plans and procedures, (4) testing emergency plans and procedures periodically, and (5) mitigating impacts associated with accidents and emergencies. Like Element 6, Operational Controls, this is another area where you should not have to start from scratch, since several environmental, health, and safety (EH&S) regulatory programs require emergency plans and/or procedures, for example:

- Clean Air Act Amendments: Risk Management Program;
- Clean Water Act: Spill Prevention, Control, and Countermeasure Plan (SPCC) and Storm Water Pollution Prevention Plans;
- Emergency Planning and Community Right-to-Know Act: Community Right-to-Know Reporting and Coordination with Local and State Emergency Response Committees;
- Oil Pollution Act: Facility Response Plan (portions of port not subject to USCG contingency plan requirements) and SPCC;
- Resource Conservation and Recovery Act: Contingency Plan (for large quantity generators) and Preparedness and Prevention Plans (for large quantity and small quantity generators); and
- USCG: Facility Response Plan (FRP).

The Occupational Safety and Health Act also requires Process Safety Management controls.

Improving port operational efficiency, safety of operations, and planning and implementation of contingency plans in the event of accidents or other incidents (e.g., collisions, spills, leaks, explosions), all contribute to environmental protection and port sustainability.

Element 7 in the Field

Some ports address these numerous EH&S requirements through Integrated Contingency Plans (ICPs), which combine the requirements of numerous regulatory programs into one plan. The federal government has issued guidance for such a plan, known as the "One Plan." To access information on the One Plan, use the following Web site link to EPA—http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/sta-loc.htm—and scroll down to the section entitled: "The National Response Team's Integrated Contingency Plan Guidance (One Plan)."

Enhancements for Sustainability

Following up on enhancements noted in Element 3, Legal Requirements, and FRP requirements noted above, ports should be in compliance with new USCG security regulations, which are in place to protect commerce, port assets, and personnel since the terrorist attacks in September 2001. The federal government is also funding other port security and supply chain pilot programs. For example, the Ports of

Seattle and Tacoma, the Port Authority of New York and New Jersey, and the Ports of Los Angeles and Long Beach are leaders in Operation Safe Commerce, a federal program designed to create the knowledge base required for international standards for containerized shipping.

Regarding lessons learned in recovering economically from natural disasters, including keeping the community informed:[43]

- Ports have developed business Continuity of Operations Plans (COOP)—advance procedures that allow critical business functions to continue during a disaster.[44]

- Following Hurricane Katrina, however, the Port of New Orleans noted that its comprehensive Hurricane Preparedness Plan simply could not envision the extent of the storm's aftermath, which affected 96,000 square miles—an area larger than the British Isles.[45] The plan, for example, provided for (1) preparation and cleanup, but not how to provide housing for employees; (2) a communications network based on cell phones, but no provisions for 300 cell towers being destroyed; and (3) a short-term evacuation, but not for extended evacuation of 90 days or more. Following Katrina, port staff improvised by:

  - Establishing two headquarters: an operational headquarters in New Orleans staffed by key personnel led by President and CEO Gary LaGrange, as well as an administrative headquarters in Atlanta, led by COO Dave Wagner, and eventually moved to Ponchatoula, LA, courtesy of Port Manchac;
  - Establishing lines of communication with key senior staff;
  - Remotely accessing mainframe computers; and
  - Arranging housing through MARAD.

  The port summarized its lessons learned as follows:

  - Chain of command – Know where staff are and provide for multitasking;
  - Communications – Establish guidelines for worst case scenarios;
  - Lines of responsibility – Back up chains for major catastrophes;
  - Housing – Establish temporary quarters;
  - FEMA – Rely on FEMA as a partner rather than a leader; and
  - Media relations – Be accessible, be positive, and lead the way.

- Shortly after the devastating hurricanes of 2005, AAPA convened a working group that sponsored five workshops over six months to collect member experiences with emergency planning and disaster recovery. With the information gathered from these workshops, AAPA developed an emergency preparedness and COOP planning manual for its members.[46] AAPA also provides seminars on key security and emergency management challenges confronting public seaports.[47]

---

[43] See www.aapa-ports.org/search/browseResults.cfm?MetaDataID=27 for several presentations on lessons learned regarding emergency management, disaster recovery, and security; AAPA's 2006 seminars.

[44] See, for example, "Business Continuity Port Operations," Cosmo Perrone, Director of Security, Port of Long Beach, presentation at 2006 AAPA Emergency Preparation and Response Seminar, http://aapa.files.cms-plus.com/SeminarPresentations/06%5FEmergency%5FPerrone.pdf.

[45] "Crisis Management and How Hurricane Katrina Changed the Dynamics," J. Robert Jumonville, Sr., Director of Cruise and Tourism, Port of New Orleans, presentation at AAPA 2006 Cruise Seminar, www.aapa.files.cms-plus.com/SeminarPresentations/06%5FCruise%5FJumonville.pdf.

[46] AAPA, Emergency Preparedness and Continuity of Operations Planning Manual for Best Practices, www.aapa-ports.org/Issues/IssueDetail.cfm?itemnumber=1161.

[47] See, for example, the 2007 Port Security Seminar and Exhibition (see www.aapa-ports.org/Programs/PastDetail.cfm?itemnumber=3361) and 2006 Emergency Preparation and Response Seminar (www.aapa-ports.org/Programs/PastDetail.cfm?itemnumber=762).

Element 8: Set Up a Training Program for Competence and Awareness

Each person and function within a port can play a role in environmental management. Employees, tenants, and managers should be aware of the environmental policy, the SEAs and related procedures that apply to their work, key EMS roles and responsibilities, and the importance of meeting EMS requirements. Employees also should understand what might happen if they don't meet EMS requirements, such as spills, releases, and fines or other penalties.

All employees will need **environmental awareness training** that covers an introduction to EMSs, the port's environmental policy, SEAs, and environmental goals. Employees whose jobs are associated with SEAs also will need appropriate **task-specific training** and support to be competent in their work. Training is just one element of establishing competence, which is typically based on a combination of education, training, and experience.

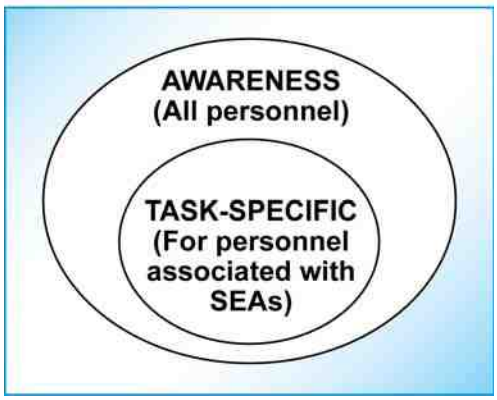
Examples of Areas Where Training Is Needed

- Legal and other requirements
- Ability to recognize new problems
- Technical skills needed to solve problems
- Procedures to implement operational controls
- Any new procedures or needs related to SEAs
- Awareness of the port's environmental policy, EMS, and objectives

Element 8 in the Field

Improved environmental awareness on the part of employees, as well as tenants and other contractors, is a benefit of EMS programs. Unless otherwise noted, the following examples are from the 1st Port EMS/SMS Assistance Project.

Types of Personnel Training



- The Port of Los Angeles conducted EMS General Awareness training sessions, which increased communication of environmental issues and, in turn, broadened port-wide awareness of issues within the fenceline. Its EMS Internal Auditor training also reinforced the concept that the results of internal audits drive the continual improvement of an EMS and, as a result, improve environmental performance.

- The Port of Houston conducts environmental training for its tenants twice per year. These sessions started out as awareness training, but as the knowledge level of the tenants has increased, the training has become more detailed and now focuses on changes or potential changes to applicable regulations. If the port's tenant audit program identifies any widespread weaknesses, the port will arrange training on those topics.[48]

- The Port of Corpus Christi Authority conducts extensive environmental training for its employees and places posters and brochures in areas where employees will see them. The port customized its training by type of employee and developed wallet-sized cards that list significant aspects for each job (e.g., painting crew, welding crew, and mechanics). In 2007, PCCA implemented semiannual basic training on its EMS. Approximately 10–15 employees attend each session, beginning with those who

[48] Phone conversation with Aston A. Hinds, Environmental Affairs Manager, Port of Houston Authority, April 20, 2007.

could be selected as future participants as Core Team members and auditors. One day of the workshop focuses on leadership training to encourage problem solving and identifying and dealing with issues. Ideally, over time, all PCCA employees will participate in the training, even if they are not active participants on the EMS Core Team. The objective is to equip all employees to identify and solve potential environmental issues. Training employees to be proactive goes hand in hand with teaching employees the concept of sustainability.[49]

- Under its voluntary Green Ports Tenant Environmental Awareness Program, the Port Authority of New York and New Jersey developed and presented an environmental awareness program for the port's Seaport tenant community. This program, free of charge to tenants, presented a comprehensive review of environmental aspects affecting tenant business operations including legal regulatory requirements, BMPs, pollution prevention, "green" design and construction, permitting requirements, and grants and financial incentives.[50]

Enhancements for Sustainability

Ports are beginning to look more broadly at sustainability training. For example, the Port of Long Beach developed a sustainability training DVD for employees at the port. Ports may include LEED certification in their sustainability training. As previously noted in Element 5, Massport is pursuing LEED certification for many of its green building efforts.

AAPA itself has already started providing training on sustainability for its members. For example, in ratifying its Resolution and Sustainability Guiding Principles at its 2007 Annual Convention, the association offered a session on port sustainability.[51] Prior to this, a June 2006 seminar on port sustainability was held by AAPA's Harbors, Navigation, and Environment Committee.[52]

[49] Phone conversations with and e-mail comments from Sarah Kowalski, Environmental Compliance Manager, Port of Corpus Christi Authority, April 20, 2007, and July, 16, 2007.

[50] See AAPA award to the port at www.aapa-ports.org/Programs/content.cfm?ItemNumber=748&navItemNumber=696.

[51] See www.aapa-ports.org/Programs/PastDetail.cfm?itemnumber=4050.

[52] See www.aapa-ports.org/Programs/PastDetail.cfm?itemnumber=954.

Element 9: Create a Communications Strategy

An EMS should define the process for proactive, two-way, internal and external communication.

Internal communication should provide information about environmental requirements and voluntary commitments to all employees, on-site service providers, and contractors whose work could affect your ability to meet those requirements and commitments.

External communication should provide information on your environmental programs and accomplishments to other stakeholders and include a way for them to provide feedback. Stakeholders include anyone who has a stake in your facility's environmental performance.

You may appoint a community liaison to manage external communications concerning environmental aspects at your facility, for example, responding to inquiries from interested parties and regulatory agencies, sending current copies of the environmental policy to interested parties, and responding to media inquiries.

Internal Stakeholders Include: Employees, shareholders, customers, suppliers, investors and insurers, and trading partners.

External Stakeholders Include: Neighbors, community organizations, environmental groups, local and regional planning teams, regional dredging teams, national estuary programs, external companies, the media, and the public.

Element 9 in the Field

Through communications programs, ports are able to convey their EMS policy, objectives, targets, and progress to date. EMS improves cross-functional communications and cooperation. The following examples are from the 1st Ports EMS/SMS Assistance Project:

- EMS Core Team meetings at the Port of Los Angeles and Port of Portland, for example, created a forum where employees from different divisions could discuss specific environmental topics. Use of these forums increased the ports' communications on environmental issues and, in turn, broadened awareness of port-wide issues.

- Creation of the EMS at Los Angeles also included a Continual Improvement Form (CIF) that was widely distributed throughout the facility and continues to be available for all employees. This form has acted as a communications tool for employees to identify and record environmental concerns as they are observed, and for management to respond to issues identified.

"Because a residential area abuts our port, outreach to the surrounding community is a priority. At Massport, we strive to be good corporate citizens as well as good neighbors. Informing the local community about various Massport programs and initiatives at our facilities helps us to accomplish this. Our efforts to implement more sound environmental policies, such as those outlined in the EMS, are certainly appreciated and in this case applauded." — *Michael A. Leone, Port Director,* Massport

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving your Performance: Ports Sector*, September 2004.

- The Port of Vancouver, WA, increased staff, tenant, and contractor awareness of potential impacts on its wellhead protection area (its fenceline) by preparing voluntary drinking water quality confidence reports for tenants and other water users, installing wellhead signage, and creating an Automotive Hazardous Waste Disposal Flyer for tenants.

- The Port of Seattle issued a news story highlighting the unveiling of its new logo, which features the port name and three symbolic horizontal lines. The three bars suggest air (top, light blue), land (middle, green), and sea (bottom, navy

Port of Seattle

blue)—the three realms within which the port operates. According to Port of Seattle CEO Tay Yoshitani, the lines also represent the three components of sustainability: economic development, social responsibility, and environmental stewardship. Yoshitani says the logo will help demonstrate to the community the port's commitment to sustainability, and also inspire port employees to incorporate sustainable practices in everything they do.[53]

- The Port of Long Beach has also adopted a new logo whose design encompasses the various facets of the Port's mission: trade, wildlife, people, and the greater community. "The Port of Long Beach has been a leader in environmental stewardship, community engagement and economic vitality; and the new look and logo reflect this," said Harbor Commission President Mario Cordero. "It shows our commitments to multiple, diverse constituencies: the trade and shipping community, the local and regional community, and the wildlife that shares our harbor."[54]

Enhancements for Sustainability

Some ports are expanding their community relations as part of their ongoing EMS programs.

- Massport's approach to sustainability includes a goal of developing an EMS for each facility. These EMS projects are showing Massport's leadership and corporate citizenship by going beyond one-way public relations to two-way dialogues. "By pledging our commitment to public service leadership, we accept Massport's obligation to serve multiple stakeholders, each of whom should be considered in the development of our policies and our day-to-day decision-making. We acknowledge that only through open communication and with an open mind, weighing equally all sides of an issue, can we find resolutions that will benefit the greater public good."[55]

- Other ports, such as the Port of Long Beach, are looking at a tiered approach to sustainability communications—first looking within their organizations, i.e., at their employees, over whom they have direct control (see discussion of scope in Element 1) and then developing a strategy to involve tenants and the broader community. The port's Sustainability Video won an Honorable Mention at AAPA's 2007 Communications Awards for video; other elements of the port's Green Ports campaign, including its environmental brochure and open house, won awards in 2006.[56]

What Communities Sometimes Fear Or Don't Like About Ports

- Air and water pollution, and potential health effects
- Road congestion
- Destruction of wetlands, habitat
- Land contamination, including brownfields
- Noise during construction and operation
- Dust
- Visual impacts (e.g., "ugly" cranes, bright lights)
- Competition with recreational uses of water/land
- Disturbance of cultural resources

What Communities Want From Ports (Aside from Jobs and Goods)

- A say in decisions that affect their lives
- A transparent decision-making process, especially for new projects
- Monitoring and reporting on environmental issues, e.g., ambient air and water quality monitoring
- Objectives/targets for continuous improvement in environmental performance

[53] From article, "A Change to Inspire: New Port of Seattle Logo," October 12, 2007, www.portseattle.org/news/stories.

[54] See press release at www.polb.com/news/displaynews.asp?NewsID=300&targetid=15.

[55] Massport Sustainability Plan, October 2004, www.mass.gov/envir/Sustainable/pdf/massport_sustainability_plan.pdf.

[56] See www.aapa-ports.org/Programs/content.cfm?ItemNumber=692&navItemNumber=697 for additional information on AAPA's Annual Communication Awards.

- The Port of Brisbane, Australia, developed a Community Consultative Committee, which comprises representatives from conservation, business, and community groups with an interest in the port's activities and its impact on neighboring communities. This committee provides a link to stakeholders and local communities through which the port raises awareness about its activities, development, and plans for the future. The committee meets quarterly.[57]

As part of their external communication strategy to engage the community in decisions that affect them, ports can become attuned to operational improvements that, while seemingly minor, make a large, positive difference to the surrounding community.

- To minimize noise pollution, some ports have been able to reduce the noise from the backup alert beeper on trucks and equipment to a level that ensures safety while also reducing decibels.

- To reduce their visual impacts, ports have painted their cranes blue or gray so they blend better in with the sky and water; others have purchased cranes that can partially retract when not in use.

- Fremantle Ports-Western Australia funded the planting of 4,805 trees over three years in the Lake Chinocup catchment area in the Great Southern. Not only are these trees visually pleasing, but they also offset the greenhouse gases emitted by the port's vehicle fleet.[58]

[57] See www.portbris.com.au/community/thecommunity/community_consultative_committee.

[58] See www.fremantleports.com.au/environmentsafety/index.asp.

Element 10: Set Up Documentation for the EMS

Documentation is a requirement of an EMS, but it should not be the main emphasis. Limit your documentation efforts to the minimum necessary. EMS documentation is different than EMS records. **EMS documentation** describes what you do and how you do it, while **EMS records** demonstrate that you are doing what the documentation said you would do.

Some sort of EMS Manual, either electronic or hard copy, can be your EMS documentation and should do the following:

- Describe the core elements of your EMS and how the elements interact and
- Provide direction to related documentation.

Documentation Should Be Available for All EMS Components, Including:

- Environmental policy
- Organization chart or lists/tables of key responsibilities
- Description of how the port satisfies the EMS requirements
- System-level procedures (e.g., procedures for corrective and preventive action)
- Activity- or process-specific operational controls (e.g., SOPs, work instructions)
- Other EMS-related documents (e.g., emergency preparedness and response plans, training plans)

Records You Might Maintain Include:

- Legal, regulatory, and other code requirements
- Results of environmental aspect identification
- Reports of progress toward meeting objectives and targets
- Permits, licenses, and other approvals
- Job descriptions and performance evaluations
- Training records
- EMS audits and regulatory compliance audit reports
- Reports of identified nonconformities, corrective action plans, and corrective action tracking data
- Hazardous materials spill/other incident reports
- Communications with customers, suppliers, contractors, and other external parties
- Results of management reviews
- Sampling and monitoring data
- Maintenance records
- Equipment calibration records
- Tracking of material dredged and disposed or placed

Element 10 in the Field

Record keeping and document management improve port scheduling, tracking, and funding projections, and establish a systematic record for tracking environmental initiatives and developments. As noted in the 1st EMS/SMS Assistance Project Final Report:

- Through its documented system, the Portland District-USACE has been able to share EMS information with other projects and USACE leadership.

- The Port of Corpus Christi Authority's EMS program has changed the way the Port manages its environmental affairs. Employees have seen the many benefits of the EMS program, including documented procedures, and are extending the consistent approach of the EMS program beyond the EMS fenceline.

As part of the Ports EMS Assistance Project, GETF conducted a neutral analysis of "off the shelf" software products specifically designed to support an organization's development, implementation, and subsequent management of its EMS. Ports and other EMS implementers often seek such tools to efficiently manage EMS implementation and maintenance tasks, such as project scheduling and management, training and training records, documentation management, and internal auditing and corrective/preventative actions. The results of this 2004 assessment may be found at www.peercenter.net/ewebeditpro/items/O73F4044.pdf.[59] EMS software packages can offer the following benefits to users: better communication between environmental and project staff at multiple installations; easy access to routine environmental and EMS documents and records; access to regulations and other

[59] "EMS Software Comparison," March 15, 2004, updated April 21, 2004, and June 23, 2004.

requirements; enhanced management of permits, reporting, and compliance; database query, reporting, and updating; document repositories; enhanced project management; e-mail based notification systems with escalation functions; calendar and EMS milestone and progress functions; EMS report generation tools; and information access security controls.

Enhancements for Sustainability

Strong documentation and records management should be part of any port's BMPs. For example, tracking dredged material used beneficially should be part of the documentation effort. Documenting broader stewardship efforts in the areas of social responsibility and economic prosperity may require new procedures. Clearly, EMS tracking systems are optimized if they integrate with other management systems, such as a port's financial tracking software.

The recent San Pedro Bay Ports Clean Air Action Plan, approved November 20, 2006, by the Port of Long Beach and the Port of Los Angeles, sets a precedent for documentation.[60] San Pedro Bay is currently in non-attainment with federal air quality standards and, without a comprehensive strategy, would never reach attainment given projected growth in container freight through these two ports. The plan sets specific goals and targets, with documentation systems, and report backs to stakeholders on all elements of plan implementation. Specific activities include the following:

- A truck replacement program to phase out all "dirty" diesel trucks from the ports in five years, replaced with a new generation of clean or retrofitted vehicles and driven by people who earn at least the prevailing wage;
- Aggressive milestones with measurable goals for air quality improvements;
- Recommendations to eliminate emissions of ultra-fine particulates;
- A technology advancement program to reduce greenhouse gases; and
- A public participation process with environmental organizations and the business communities.

[60] For further information, see the *San Pedro Bay Port Clean Air Action Plan*, one of the most comprehensive strategies to cut air pollution and reduce health risks ever produced for a global seaport complex, visit: www.portoflosangeles.org/environment_air.htm.

Element 11: Monitor, Measure, Evaluate, and Record Performance

> "What gets measured is what gets done."
> —Thomas J. Peters, coauthor of *In Search of Excellence*

Building on Element 4 where you identified SEAs, your port needs to know what it is monitoring and measuring and to have established a solid baseline against which to gauge process. Monitoring and measurement helps you manage your port better by allowing you to gauge environmental performance, analyze root causes of problems, and assess compliance with legal requirements. This element means that your port does the following:

- Monitors operations and activities that can have significant environmental impacts and/or compliance consequences;
- Tracks performance (including your progress in achieving your goals);
- Measures and reports on continuous improvement in environmental performance via the EMS;
- Calibrates and maintains monitoring equipment; and
- Periodically evaluates compliance with applicable laws and regulations through compliance evaluations.

Real-time information, together with adequate knowledge of local environmental conditions and large scale forcing factors (e.g., storms, fronts, winds, currents) can be used for improving navigation and safety, monitoring, and adaptive environmental management – for example, Physical Oceanographic Real Time System, integrated with navigational aids such as buoys, charts, electronic charts, Global Positioning System, Electronic Navigation Charts, Vessel Automated Identification System, vessel traffic separation schemes, etc. Real-time environmental monitoring can be used in adaptive management systems to protect sensitive habitats, for example, from impacts of dredged material discharges.

Element 11 in the Field

Ports that have implemented EMSs have reported substantial benefits through systematic monitoring and measurement programs.

Earlier in this primer, Element 5 provided objectives and targets for the Port of New York and New Jersey, including activities around water loss and reduced NOx emissions. Adoption of an EMS generated the following quantifiable benefits at the port:

- In 2005, repaired several water leaks that reduced the average daily water loss by 640,000 gallons and saved approximately $655,000 in cost at New Jersey Marine Terminals. These actions resulted in saving and conserving 134 million gallons of water during 2005 and will contribute to substantial water savings for years to come.

- Signed an agreement with New York City Department of Transportation to retrofit the Staten Island Ferry Fleet and executed contracts in the Marine Vessel Engine Replacement Program that will achieve

Typical Performance Indicators

Management:
- Training
- Resource allocation
- Purchasing
- Funding

Operational:
- Inputs (quantity of materials processed versus recycled, or energy or water used, etc.)
- Operation and maintenance
- Emergency events and non-routing operations
- Outputs (e.g., waste, emissions, noise, heat, light)
- Service provided by activity

Management/Operations:
- Safety (e.g., frequency of injuries, seriousness of injuries)
- Customer delivery (e.g., complaints, targets met)
- Production costs
- Sales and price
- Environment (e.g., Notices of Violations)
- Human resources (e.g., training days, employee turnover rates)
- Financial performance (e.g., earnings before interest and taxes, working capital)

substantial air quality improvements. Reduction of NOx emissions resulting from these programs could exceed 400 tons per year and exceed that required to meet the General Conformity Requirements for the Harbor Deepening project.

Other measurable benefits identified by ports that participated in the 1st Ports EMS/SMS Assistance Project include the following highlights:[61]

- Port of Virginia—Cargo handling equipment purchasing program reduced air emissions by 30% over three-year period; received AAPA award;
- Port of Portland—Reduced vehicle idling at parking gates by 79%; purchased 5% of marine electric power from sustainable, wind-generated energy sources; and
- Port of Corpus Christi Authority—Through its port-wide recycling program, saved $29,000 and diverted 143,000 pounds of waste materials from entering the local landfill; received local environmental conservation and stewardship award. The port also improved energy efficiency at its cold storage facility by reconfiguring the operation in the refrigeration system such that significantly less power is required during peak seasons. These operational improvements subsequently reduced the demand for electricity – a decrease of 454,171 kilowatt-hours at its cold storage facility from January through May 2007 compared to the same timeframe in 2006 – and resulted in a cost savings of $6,000 per month.[62]

Ports also have conducted inventories to estimate emissions from mobile sources such as oceangoing vessels, harbor craft, cargo-handling equipment, locomotives, and on-highway vehicles.[63] An inventory provides the baseline from which to create and implement emissions mitigation strategies and track performance over time. Not all of the ports that have conducted these inventories have an EMS. However, the ports that do have EMSs in place will be able to systematically use the emissions data to develop, implement, and monitor emissions reduction strategies.

Enhancements for Sustainability

Environmental performance indicators are flexible enough to address indicators of broader sustainability.

- With regard to economic indicators, for example, sustainability looks not only at financial performance but also the port's contribution to the sustainability of the larger economic system (e.g., regional economy). Ports are major economic drivers in their localities; many are accustomed to tracking their market presence and both direct and indirect regional economic impacts. The Port of Tauranga, New Zealand's 2006 Sustainability Report, for example, notes that "As the commercial heart of the Bay of Plenty region, and a major economic player in the New Zealand economy, the Port of Tauranga impacts significantly on the broader social environment. As a responsible corporate citizen, we appreciate that our long-term sustainability and continued ability to create economic wealth is dependent on the overall environment in which we operate."[64]

"Port Everglades operates in a sensitive environment and in an area that is very dependent on tourist-related dollars. We have to be environmentally proactive. Our EMS is formalizing our practices and establishing an operating philosophy that will sustain itself."
— Ken Krauter, Port Director, Port Everglades

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving your Performance: Ports Sector*, September 2004.

[61] 1st Ports EMS/SMS Assistance Project, Final Report, May 2006.

[62] Email from Sarah Kowalski, Port of Corpus Christi Authority, to AAPA & EPA Sector Strategies Program, July 16, 2007.

[63] In January 2006, EPA's Sector Strategies Program released a guide on current methodologies and best practices for preparing port emissions inventories; see www.epa.gov/sectors/ports/bp_portemissionsfinal.pdf.

[64] See www.port-tauranga.co.nz/images.php?oid=858.

- Paying more attention to community concerns is a key attribute of a sustainable port. Through public outreach and communications efforts, ports also focus on their impacts on the communities in which they operate and involve citizens in decisions that affect them. The Ports Corporation of Queensland, Australia, for example, produces an annual Sustainability Report, which highlights its commitment to a sustainability framework covering environmental, social, and economic performance.[65]

- Through training, emergency preparedness and response, and other EMS elements, ports may already track a number of potential social indicators associated with labor practices.

[65] See www.pcq.com.au/downloads/2005_PCQ%20Sustainability_WEB3.pdf.

Element 12: Conduct Audits and Correct Problems

Through measurement or other activities under Element 11, or through internal audits, you can assess whether your EMS is adequate and verify that your EMS plans are being followed. Internal auditing is a well-defined process that ensures that:

- Problems are identified and investigated;
- Root causes are identified;
- Corrective and preventive actions are assigned and implemented; and
- Actions are tracked and their effectiveness is verified.

Audit Procedures Typically Describe:

- Audit planning
- Audit scope
- Audit frequency
- Audit methods
- Key responsibilities for the audits
- Reporting mechanisms for the audits
- Recordkeeping for the audit results

EMS Problems Typically Include:

- Poor communication
- Faulty or missing procedures
- Equipment malfunction or lack of maintenance
- Lack of training
- Lack of understanding of requirements
- Failure to enforce rules
- Corrective actions that fail to address root causes of problems

Audits are pivotal to maintaining a viable system in the face of accidents, emergencies, changing rules, staff turnover, etc. By identifying and reporting EMS nonconformities and deficiencies to your management, you are able to do the following:

- Maintain management's focus on the environment;
- Reassess, refine, and improve the EMS and its performance, including anticipation and prevention of future problems;
- Ensure the cost effectiveness of the system.

Element 12 in the Field

Many ports have developed internal auditing programs as part of their EMSs. EMS Internal Auditor Training at the Port of Los Angeles, for example, had the added benefit of reinforcing the concept that the results of internal audits drive the continual improvement of the EMS and, as a result, improve environmental performance.

Ports such as the Port of New York and New Jersey have used the results of internal audits to improve the effectiveness of their EMSs and enhance conformity with the ISO 14001 Standard. The Port of New York and New Jersey is currently working toward ISO 14001 certification, as is the Virginia Port Authority. According to Jerry Bridges, head of the Virginia Port Authority, being certified to the standards by the Switzerland-based non-government organization would help the state-controlled authority run more efficiently, serve customers better, and gain a marketing credential.[66]

ISO 14001 Certification

An organization can receive certification that its EMS complies with the requirements of the ISO 14001 standard by undergoing an audit from a qualified, independent third party. When deciding whether to have an independent audit of your system, a port should consider whether:

- It is a contractual, regulatory, or market requirement;
- It meets customer preferences;
- It is part of a risk management program; or
- It will motivate your staff by setting a clear goal for the development of the EMS.

Source: International Standards Organization, www.iso.org/iso/en/ISOOnline.frontpage.

Several domestic ports have already achieved ISO 14001 certification, including the Conley Terminal at Massport's Port of Boston; the Barbours Cut Terminal and central maintenance areas at the Port of Houston Authority; the Construction and Maintenance Division at the Port of Los Angeles; and the Port of

[66] Article in the *Virginia-Pilot* (Norfolk, VA), March 29, 2007; see www.highbeam.com/doc/1G1-161177079.html.

Corpus Christi. According to Sarah Garza, the Port of Corpus Christi's Environmental Compliance Manager, the certification and new system improves customers' confidence in the port and might help the port obtain permits faster, as state and federal governments often offer incentives to certified organizations.[67] Ports worldwide are also meeting this international standard, including the Port of Altamira, Mexico, and the Port of Halifax, Canada.

Enhancements for Sustainability

If a port has established a sustainability program or plan that extends beyond environmental activities, auditing port performance against sustainability metrics would be a natural extension of EMS auditing. Element 4 identifies sustainability performance indicators used by the Global Reporting Initiative; ports routinely report on their financial operations, employment figures, human resources and training programs, community outreach, and other economic and social aspects of their operations. An audit would evaluate whether the program or plan is being implemented as intended, and whether it is adequate in meeting the port's sustainability objectives.

[67] Article in Scripps Newpaper Group-Online, September 13, 2007, www.caller.com/news/2007/sep/13/port-better-on-environment.

Element 13: Conduct Management Review

Management reviews are critical to continual improvement and to ensure that the EMS will meet your port's needs over time. A management review answers the question, "Is the system working?" (i.e., is it suitable, adequate, and effective, given the port's needs?).

Your port's top management should review and evaluate your EMS at defined intervals, such as quarterly. Although the scope of the review should be comprehensive, not all elements need to be reviewed at once. Review of the policy, goals, and procedures should be carried out by the level of management that defines them. The management review should include the following:

- Results from assessment, including internal audits, and status of preventive and corrective actions;
- Progress in meeting objectives and targets;
- The continuing suitability of the EMS in relation to changing conditions and information (for example, the viability of expanding the EMS fenceline over time to encompass larger areas of port operations and influence);
- Concerns of relevant interested parties;
- Follow-up actions from previous management reviews; and
- Recommendations for improvement.

Management reviews may lead to expansion of the EMS fenceline over time because of the regional, transregional and possibly national prominence of port facilities; their operations, economic development drivers, and intermodal connections; and their wide spheres of influence and interest.

Management involvement ensures that the EMS is integrated not only in the port's day-to-day operations but also into its strategic planning process.

Element 13 in the Field

Ports involve their top management in periodic reviews of EMS projects. The Port of New York and New Jersey, for example, established a Management Review Team comprising nine members who represent top level management: the Directors of Port Commerce Department and the Office of Environmental Policy, Programs, and Compliance; Assistant Port Commerce Directors for Operations and Port Planning and Development; Managers for Strategic Support Initiatives, Strategic Analysis and Industry Relations, Regional Programs, and Administration; and the Chief Environmental Engineer. Management reviews demonstrate full commitment to EMS implementation and are certainly critical in helping a port achieve ISO 14001 certification for its EMS.

"One of the greatest benefits of having an EMS comes from the confidence that it provides. We know we are managing our environmental responsibility and lessening the potential of environmental problems." — John P. LaRue, Executive Director, Port of Corpus Christi Authority

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving your Performance: Ports Sector*, September 2004.

Enhancements for Sustainability

Reviewing systems for broader sustainability is an extension of EMS reviews. Such continuous improvement evaluations allow a port to improve its day-to-day operations, activities, and services to achieve all desired objectives and targets. These reviews also can dovetail with a port's strategic planning. Once a port has established this Plan-Do-Check-Act systems approach, its management and employees are more apt to think holistically and "outside the box" about solutions to business challenges, e.g., using solar or wind as sources of energy for the port and to sell back to the grid, or using porous pavement instead of installing a traditional storm water management system.

For example, in the 1st Ports EMS/SMS Assistance Project, the Port of Houston Authority applied the Plan-Do-Check-Act approach to security management and developed a Security Management System. Subsequently, ISO issued a new security standard, ISO 28000, *Specification for Security Management Systems for the Supply Chain*. Under the ongoing 2nd round of EMS/SMS assistance, additional ports are working on their SMSs, which are based on both the ISO 14001 and ISO 28000 approaches to risk management. Since an SMS is a significant new development in the port industry, the following two pages are devoted to an overview of an SMS.

Security Management Systems (SMSs) Based on the Plan-Do-Check-Act Model

The Port of Houston Authority, having previously implemented an ISO 14001-certified EMS, successfully tested the use of the Plan-Do-Check-Act framework for managing security risks and vulnerabilities as part of the 1st Ports EMS/SMS Assistance Project. Similar in general structure to an EMS, an SMS helps ports identify vulnerabilities, establish action plans, and ensure continuous monitoring and measuring—all in coordination with a port's strategic objectives and legal requirements. The following highlights demonstrate how EMS elements can be modified to reflect SMS realities.

- *Plan – Element 1:* With regard to **scope**, the SMS fenceline may be set as all entities over which the port exercises **control** or **significant influence** with regard to operating policies and practices. Thus, in setting boundaries for its SMS, Houston selected its Barbours Cut Container and Cruise terminals as its SMS fenceline, because these facilities were managed by the port's Police/Security Force and were within the port's direct operational control.

- *Plan – Element 5:* Ports have already incorporated security **objectives and targets** into their **action plans**. Houston's SMS program allowed its police department to analyze security risk and other significant vulnerabilities for establishing program goals. By establishing these goals, the port maintained a method for monitoring and tracking successful implementation and completion of security projects.

"The requirements and demands of port security literally have changed overnight. Using a systems approach allows us to manage the rapidly changing security regulations and deadlines. Today, the approach is helping the Port of Houston identify and prioritize vulnerabilities and risks so that we can make security better, faster." — James T. Edmonds, Chairman, Port of Houston Authority

Source: EPA, AAPA, and GETF. *Environmental Management Systems: Systematically Improving Your Performance: Ports Sector*, September 2004.

"We developed a security management system based on ISO 14001: 2004. The Plan-Do-Check-Act model has already verified that we are in compliance with security requirements and provided us with organizational structure and responsibility for more efficient use of resources. It has also provided an ongoing process to monitor and measure key security parameters, and guided us to reallocate resources to highest security priorities." — Russell Whitmarsh, Chief of Police, Port of Houston Authority

Source: "U.S. Ports Set Sail for ISO/PAS 28000," *ISO Focus*, July/August 2006, www.peercenter.net/ewebeditpro/items/O73F9006.pdf.

Security Risk Area	Significant Vulnerability	Objective	Target
Key control	Access control	Develop a key control system at container and cruise terminal	50% by June 2006
Vessel stores	Vessel stores and bunkers	Develop a vessel stores communications program	100% complete by June 2006
Cargo handling	Cargo handling	Establish an exit process for cargo handling	100% complete by June 2006
Security equipment maintenance	Security equipment maintenance	Develop a quality control program for security equipment maintenance	50% complete by December 2005
SMS program development	SMS implementation	Implement SMS program for container and cruise terminals	100% complete by June 2006

- *Do – Element 6:* **Operational controls** extend to security. The Security and Accountability for Every (SAFE) Port Act of 2006, for example, includes port safety measures that require 100% of imported

containers to be scanned for radiation, which will entail the deployment of appropriate monitoring devices, as well as the creation of standards for operating procedures.

- *Do – Element 7:* Regarding **emergency preparedness and response** and SMS implementation, the ISO 28000 Standard specifies the requirements for a security management system, including those aspects critical to assuring the security of the supply chain. These aspects include, but are not limited to, financing, manufacturing, information management, and the facilities for packing, storing, and transferring goods between modes of transport and locations. Security management is linked to many other aspects of business management. These other aspects should be considered directly, where and when they have an impact on security management, including transporting these goods along the supply chain.

- *Do – Element 8:* As part of its SMS, the police department at the port developed a **comprehensive tiered training program**, which was used as a tool to communicate roles and responsibilities, regulatory requirements, and appropriate response actions pertaining to current U.S. Coast Guard Maritime Security (MARSEC) conditions. Using a tiered approach allowed the department to communicate the SMS program to both internal and external stakeholders—expanding into social performance indicators of community involvement.

    - Tier I Competence Training is provided to personnel with police/security duties and discusses the Facility Security Plans (FSPs) in detail, including MARSEC level response actions.

    - Tier II Tenant Security Officers are select tenants that are not incorporated within an FSP. This training is provided to ensure that the tenant security representative is aware of the federal regulatory requirements and the port's programs and policies.

    - Tier III General Awareness Training is provided to all Port of Houston Authority employees, contractors, visitors, and vendors. This course provides a general overview of security practices and general MARSEC level awareness.

- *Do – Element 10:* To meet the confidentiality requirements pertaining to the law enforcement documents and records, the police department at the port created a **document management** structure. This written procedure describes the SMS document control/approval process for monitoring newly developed forms, records, and reports.

- *Check-Act – Element 12:* **Auditing** for security considerations is an extension of EMS auditing. For its SMS, for example, the police department at the Port of Houston Authority developed an internal compliance auditing program to ensure regulatory compliance. The department's internal auditing team consists of employees from the port's environmental affairs, engineering, risk management, operations, marine, and port police departments. This diverse team worked together in creating auditing protocols, including a written audit plan, a schedule, a questionnaire, a report, and corrective action processes. Additionally, the SMS core team worked together in creating a training program. The internal audit was conducted in July 2005, as a preparation exercise for the external USCG audit. As a result of this audit, Houston successfully completed the external audit and subsequently received noteworthy remarks regarding this proactive management practice.

Additional ports are now developing SMS as part of the 2nd Port EMS/SMS Assistance Project, including the Port of Corpus Christi Authority, the Port of Long Beach, the Port of Portland, and the Port of New York and New Jersey.

Conclusion

Organizations around the world, both public and private, are facing increasing scrutiny regarding their environmental "footprints." EMSs enable organizations such as ports to systematically and continuously identify, measure, and manage the environmental impacts of their activities. Regulatory compliance is the foundation of an EMS, not the end goal. EMSs help organizations go beyond compliance to become better neighbors and to make their operations more sustainable.

If ports are to remain competitive on a global scale, sustainability needs to become a cornerstone of business models. Sustainability is about more than the environment—it involves economic, social, and institutional factors as well. EMSs are a valuable tool that ports can use to frame sustainability within the context of a business model and perpetuate bottom-line results and benefits.

Many business partners in marine transportation are recognizing the value of adopting EMSs. Freight carriers such as Atlantic Container Line, American Presidents Line, Hanjin Shipping Company, Hapag-Lloyd Container Line, "K" Line, Matson Navigation, Mitsui O.S.K Lines, and NYK Group, and cruise lines such as Holland America and Royal Caribbean have received ISO 14001 certification for EMSs covering their ships and/or facilities. Also, a long list of major shippers now have ISO 14001 certifications.

The Business for Social Responsibility's Clean Cargo Working Group is also working to "green" transportation and supply chains by addressing the environmental and social impacts of transporting products.[68] Members include leading multinational manufacturers, retailers (shippers), and freight carriers and forwarders (carriers), including APL; Chiquita Brands & Great White Fleet; CMA-CGM; Cosco Container Lines; Gap; Hanjin Shipping; Hapag-Lloyd AG; Hyundai Merchant Marine; IKEA; "K" Line; Maersk

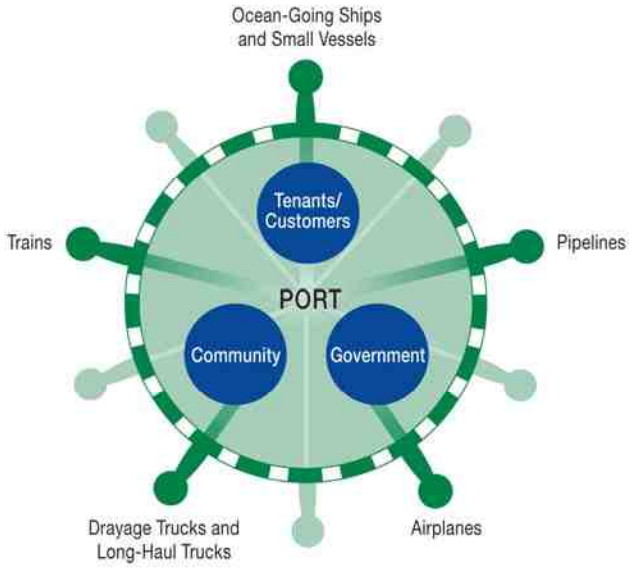
'We must realize we are no longer unconnected. Our success — all of us in an integrated global supply and demand chain — depends on the success of the whole. The success of the entire world economy and the well-being of all of the world's people depend on our ability to succeed as sustainable businesses at this critical juncture in our industry's history." — Chang Kuo-Cheng, Chairman, Evergreen Marine Corporation

Source: "Evergreen Chairman Urges Cooperation," *Traffic World*, March 6, 2006.

"Sustainable operations are key to continued growth and prosperity in the cruise industry. Carnival Corporation & plc is committed to protecting the health, safety, and security of our passengers, guests, employees, and all others working on behalf of the company, as well as protecting the environment, including the marine environment in which our vessels sail and the communities in which we operate. We naturally share many common aspects of sustainable operations with the ports from which we operate and in which we call. Only through open communication and creative partnerships between cruise shipping and port management can we work together to maximize the sustainable operations to which both industries are committed." — James Hunn, Vice President, Maritime Policy & Compliance, Carnival Corporation & plc

Source: December 11, 2007, e-mail from Mr. Hunn to GETF.

Steering Toward Sustainable Port Communities



[68] See www.bsr.org/membership/working-groups.cfm.

Line; MSC-Mediterranean Shipping Company; NYK Line; OOCL; Schenker AG; Shell Marine Products; Starbucks; Coca-Cola; Home Depot; Timberland; Toyota Motor Europe; UPS; Wal-Mart; and Yang Ming Marine Transport Corporation.

It is critical for ports to work with their business partners and other stakeholders to find sustainable solutions to increasingly complex challenges around climate change, energy, and land use. By participating in the sustainable development movement, ports can influence and help to shape a favorable future, not just for seaports but for the world.

Appendix: Resources for Getting Started

The following web sites and literature on EMS in general, ISO 14001 specifics (including registrar selection and the certification process), and sample procedures may be helpful in getting started. Many were specifically recommended by external reviewers of this primer. Note that these entries are not exhaustive, nor do they necessarily represent formal endorsement by EPA. Instead, they highlight a handful of the numerous information sources that are available to help you think about EMS design, development, and implementation at your port.

- *EMS Library*, Joint Service Sustainability Technical Library, a Web site funded by the Joint Services, the Defense Logistics Agency, and the U.S. Coast Guard; available at http://p2library.nfesc.navy.mil/ems/tree/index.html.

- *Guidance Manual: Implementing ISO 14001*, U.S. Army; available at http://p2library.nfesc.navy.mil/ems/tools/ISO14000guidancemanual_FINAL.pdf.

- *ISO 14001, International Organization for Standardization*; available at www.iso.org.

- Public Entity EMS Resource (PEER) Center, a Web site developed by the Global Environment & Technology Foundation through a cooperative agreement awarded by EPA's Office of Water; available at www.peercenter.net/sector/ports/emstoolbox.cfm. As noted in Element 10, GETF conducted a neutral analysis of "off the shelf" software products specifically designed to support an organization's development, implementation, and subsequent management of an EMS. The results of this 2004 assessment may be found at www.peercenter.net/ewebeditpro/items/O73F4044.pdf.

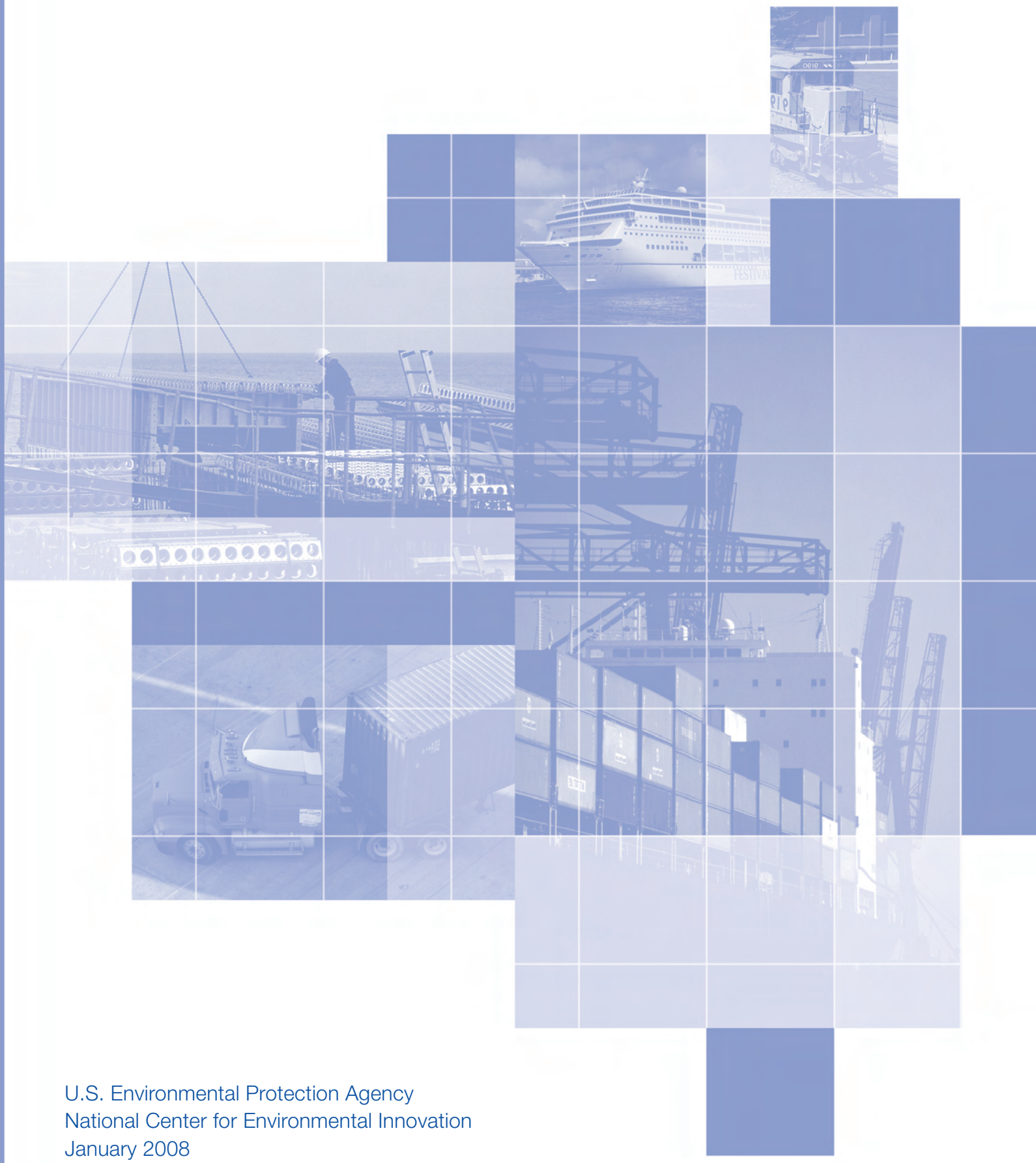
- Stapleton, Philip J., Margaret A. Glover, and S. Petie Davis, *Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations*, Second Edition, NSF International, 2001; available at www.epa.gov/owm/iso14001/ems2001final.pdf.

- *U.S. Army Commander's Guide for Mission-Focused Environmental Management Systems*, U.S. Army, Version 2.0, March 2007; available at www.sustainability.army.mil/tools/docs_ems/EMS%20Web%20Page%20Items/EMS_Commanders_Guide.pdf.

Information on AAPA's EMS/SMS Assistance Projects and its Harbors, Navigation, and Environment Committee may be found at www.aapa-ports.org. AAPA's *Environmental Management Handbook* may be found at www.aapa-ports.org/Issues/content.cfm?ItemNumber=989.

For more information about the port-related activities of EPA's Sector Strategies Program, visit www.epa.gov/sectors/ports. The "business case" for EMS at ports is detailed in *Environmental Management Systems: Systematically Improving Your Performance, Ports Sector*, EPA Sector Strategies Program, September 2004; available at www.epa.gov/sectors/ports/ports_bizcase.pdf. For additional information on EPA's progress in implementing EMSs at its laboratories and offices nationwide, please visit www.epa.gov/ems/epaown/index.htm. One way that EPA assists other federal agencies develop EMSs is by providing information through the FedCenter Web site; see www.fedcenter.gov/programs/EMS.

Numerous organizations promote sustainability. See www.globalreporting.org/ReportingFramework, for example, for information on the Global Reporting Initiative's 3E framework for sustainability reporting, which is now used by nearly 1,000 organizations from over 60 countries. For European port-related environmental activities, visit the EcoPorts Foundation Web site at www.ecoports.com.



U.S. Environmental Protection Agency
National Center for Environmental Innovation
January 2008