

Section 3

Port Environmental Management Practices

As environmental regulations become more stringent, and as the pressure mounts to minimize the impact of port development and operations on the surrounding community and natural resources, ports are faced with the task of implementing stronger environmental protection controls. However, ports are also faced with increased competition and pressure from tenants to reduce costs, increase services, and streamline development and expansion. In order to balance these competing needs, AAPA conducted a detailed on-site survey at over 30 US ports to identify environmental management practices (EMPs) that are currently in place and have a proven track record. This section presents the most effective and commonly used EMPs at ports across the country.

This section is intended to stand alone and be separated from the main document for use both by environmental managers and on-site operations coordinators and staff. It is also intended for use both by port staff and tenants alike. It is the intention of AAPA and the HN&E Committee to review this section annually, and add to or modify the EMPs based on improvements and new technologies developed within the industry.

The section is divided into two main areas:

- Development-related EMPs. For the most part, these EMPs focus on preventing adverse impacts to environmental media through construction activities.
- Operations-related EMPs. These EMPs are practices or controls placed on operational activities. They are focused on low cost solutions, but in some cases may involve large capital expenditures.

The EMPs cover both source controls and treatment controls where feasible.

3.1 Description of the EMP Format

An environmental management practice (EMP) is any technology, process, operating method, or device that eliminates or controls the release of pollutants to the environment through one or more of the pathways described in Section 2. In developing the EMPs, each activity identified in Section 2 was evaluated to:

- Determine the pathways that lead to impacts to the environment
- Define, in broad terms, the extent of potential environmental impact for each activity
- Identify currently employed EMPs used within the port industry

From this evaluation, EMPs were selected that provide cost-effective methods that focus on eliminating the environmental impact pathways for each activity.

EMPs can be divided into two main categories:


- **Source control EMPs.** These EMPs are operational practices designed to prevent pollutants from entering a pathway and impacting an environmental media. For example, overspray of coal piles is a source control EMP that reduces the emission of particulates during storage and handling activities. Other source controls could include product substitution where less toxic chemicals are used instead of current chemicals.
- **Treatment control EMPs.** Treatment control EMPs remove pollutants after they have entered the pathway but before they impact the environment. For example, an oil/water separator can be considered a treatment control EMP because an oily waste can be discharged from a variety of sources, but is treated before discharge to surface waters or the ground.

The format for the EMPs has been developed to provide a useful and easily understood tool for use by managers as well as field personnel. The EMP format developed for this document, shown in **Figure 3-1**, contains the following information:

1. **Description.** This section provides a brief description and the potential environmental effects of the activity.
2. **Potential Pollutants.** This part identifies the type of pollutants, e.g., hydrocarbons in the form of fuels or oils, that should be targeted for pollution prevention and control. Control measures vary depending on whether the pollutant can be easily separated from or dissolved within a waste stream.

3. **Targeted Activities.** This section defines in more detail the activity covered in the EMP.

**Figure 3-1
Representative EMP Format**

Environmental Management Practices	
EMP No.	<div style="text-align: center; border-bottom: 1px solid black;"> Activity: Building and Grounds Maintenance </div> 
Description: ①	Potential Pollutants: ②
Targeted Activities: ③	Target Environmental Media: ⑤
Development EMPs/Operational EMPs ⑥ ⑦	US Regulatory Requirements & Available Guidance ④
Considerations: ⑧	

4. US Regulatory Requirements and Guidance. This presents the references to US federal laws and regulations and includes a list of guidance documents available from federal, state, and local governments and trade organizations.
5. Target Environmental Media. This section summarizes the environmental media that are likely to be affected by the activity.
6. Development EMPs. This section includes practices that should be considered when new facilities or major renovations to existing facilities are considered.
7. Operational EMPs. This section identifies practices that may be used on existing facilities to reduce the impact of current operations.
8. Considerations. This section includes discussions on effectiveness, cost, and the need for staff/tenant training.

3.2 Development EMPs

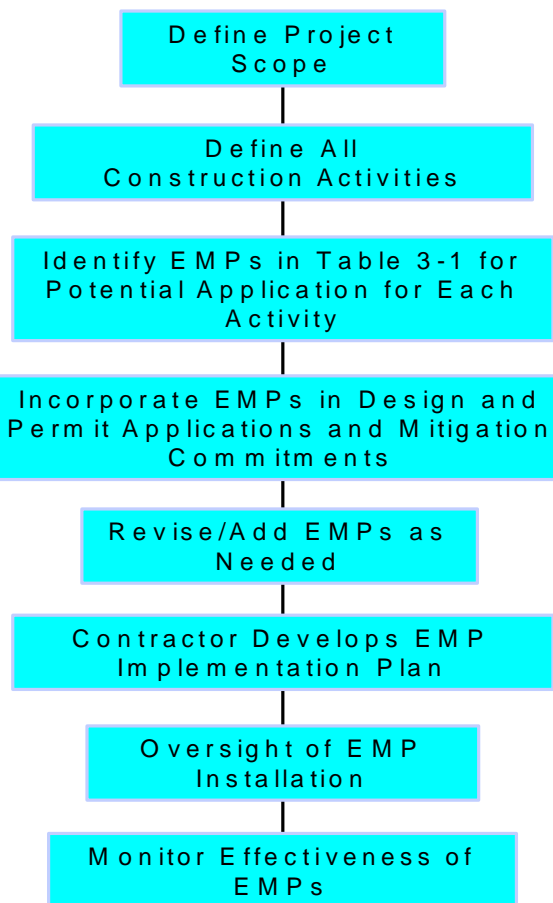
Since EMPs are, by their nature, intended to be specific to an individual or group

of activities, this section only focuses on the construction-related aspects of development projects and the following section focuses on operations issues. Construction projects at ports range from demolition of existing facilities, and rehabilitation of structures such as buildings and bulkheads, to construction of new buildings, paved areas and rail yards as well as dredging and dredged material disposal. Each major construction project has a wide range of construction “activities” such as building/surface demolition, site grading, and new construction. The number of possible pollutants and impact pathways can be extensive for even the smallest project. Thus, this section focuses on identifying potential pathways and utilizing proven and cost-effective construction EMPs for the most common construction projects and activities. At the end of this section are references for additional resources related to construction EMP development.

3.2.1 Identification and Implementation of Construction EMPs

Identification of construction EMPs early in the planning and design stages of a development project is essential, and final design plans should include specific EMPs to cover all activities. Throughout the course of construction, EMPs should be inspected and their effectiveness evaluated to ensure that the environment is protected. **Figure 3-2** presents a suggested approach for selecting and implementing construction EMPs. **Table 3-1** presents a guide for the selection of EMPs for construction and operations activities.

**Figure 3-2
Development EMP Selection and
Implementation Process**



**Table 3-1
Guide to Selection of Environmental Management Practices**

Activity	Environmental Management Practices																	
	D-1	D-2	D-3	O-1	O-2	O-3	O-4	O-5	O-6	O-7	O-8	O-9	O-10	O-11	O-12	O-13	O-14	O-15
Construction																		
- Building Demolition		•						•	•	•				•	•			
- Building Renovation	•	•						•	•	•				•	•			
- Bulkhead Installation	•		•					•	•	•		•		•	•			
- Contamination Remediation	•							•	•	•				•	•			
- Dredge Material Disposal								•	•	•		•		•	•	•	•	
- Dredging								•	•	•		•		•	•		•	
- Landfilling	•							•	•	•				•	•			
- New Building Construction	•							•	•	•				•	•			
- Pavement Installation	•							•	•	•				•	•			
- Pavement Removal	•							•	•	•				•	•			
- Pier & Dock Construction	•		•					•	•	•		•		•	•			
- Site Cleaning	•							•	•	•				•	•			
- Utility Construction	•							•	•	•				•	•			
Operations																		
Automobile Transport																		
- Offloading				•	•				•					•				
- Storage				•	•				•					•	•			
Building and Grounds Maintenance/Landscaping	•	•			•				•	•	•	•		•	•			
Cargo Handling																		
- Dry Bulk						•												•
- Liquid Bulk							•		•	•								•
- General Cargo						•			•	•								•
- Containers						•			•	•								•
- Breakbulk						•			•	•								•
Chemical Storage and Handling								•	•	•								
Fueling																		
- On-Loading								•		•								
- Storage								•		•								
- Off-Loading								•		•								
Painting																		
- Building					•				•									
- Anti-Fouling									•		•							
- Service Vehicles									•		•							
Paint Stripping									•		•						•	•
Public Access and Recreation																		
- Cruise Lines									•	•	•		•	•			•	•
- Fishing Piers									•	•	•		•	•			•	•
- Moorings/Slings									•	•	•		•	•			•	•
- Public Recreational Access	•								•	•	•		•	•			•	•
Rail Maintenance	•	•	•		•				•	•				•	•			
Ship liquid discharges																		
- Ballast Water									•			•	•		•		•	
- Tank Cleaning									•			•	•		•		•	
- Bilge Water									•			•	•		•		•	
- Sewage									•			•	•		•		•	
Solid Waste																		
- Ship-Generated												•	•					
- Shore-Generated												•	•					
Vehicle and Equipment Maintenance									•	•	•		•	•		•	•	
Vessel Repair and Maintenance		•							•	•	•		•	•		•	•	
Ship Breaking		•							•	•	•		•	•				•

3.2.2 Other Available Construction EMP Documents

EMPs for construction activities have been developed and implemented at many transportation facilities across the country. Three useful guidelines related to construction EMPs include:

- Storm Water Management for Construction Activities - Developing Pollution Prevention Plans and Best Management Practices. Developed by EPA, 1992
- California Stormwater Best Management Practices Handbooks. State of California, 1993

- Storm Water Quality Best Management Practices for Construction Activities. Developed by the North Central Texas Council of Governments, 1992

3.2.3 Construction EMPs

Three construction EMPs are presented on the following pages including:

- Sediment and erosion control - D-1
- Building renovation and demolition - D-2
- Bulkhead, pier, and dock construction - D-3

3.3 Operations EMPs

Operations EMPs address daily port operations and activities that may affect the environment. These activities range from management of bulk liquid and dry storage to routine vehicle maintenance. The key to successfully reducing or eliminating pollutants from daily port operations entering the environment is proper implementation of EMPs. This section covers nearly all common port operations with three notable exceptions: catastrophic fuel spills, bilge water management, and ballast water management. Catastrophic fuel spills are infrequent and can be covered in a port's contingency plan. Bilge and ballast water are discharges covered by the MARPOL convention and Coast Guard regulations. The HN&E Committee will continue to review developments in each of these areas and consider their incorporation at a future date. To ensure effective implementation of EMPs, ports should:

- Properly train personnel responsible for implementation, as discussed in Section 4.
- Make environmental consideration an integral part of the port's decision-making process (including development and expansion), as discussed in Section 6.
- Include environmental policies concerning EMPs in leases and contracts, as discussed in Section 4.
- Include elements of these EMPs in maintenance work orders. When a port uses a computerized work order system for their maintenance staff, elements of the EMPs could be printed on the individual work order as a reminder for staff.
- Periodically review port operations where EMPs are implemented, as discussed in Section 4.

3.3.1 Environmental Monitoring

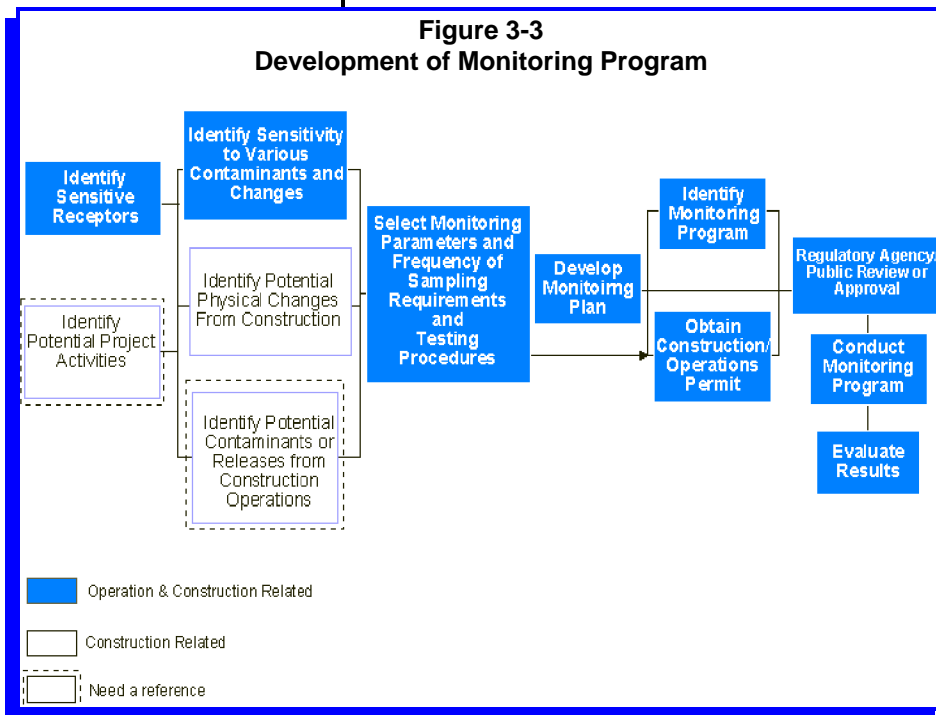
One of the central aspects of EMP implementation is monitoring their effectiveness in reducing/eliminating environmental impacts. Following is a discussion on developing and implementing a monitoring program designed to assess the ability of EMPs to protect the environment, and to select new or improve existing EMPs, as necessary. Monitoring involves the collection of data, including visual characteristics, odors, chemical quality, and biological characteristics of uplands or waterways. Typically, monitoring is conducted

after a construction activity or an operation is brought on-line to determine the long-term impacts to the surrounding environment. However, pre-construction/operations monitoring can also be conducted to assess the baseline conditions of the study area.

Pre- and post-construction/operations monitoring is used to select controls or EMPs that will prevent or reduce the degree of impact, and later to assess the actual impacts resulting in improvements in, or selection of, new EMPs. The type and extent of the monitoring program is dependent on:

- Types of potential contaminants that may be discharged during or after construction.
- The species and/or habitats of concern in the surrounding environment. (This information may be obtained from NMFS, USFWS, or local and state regulatory agencies.) This may relate to the season when monitoring is necessary and the substances a species may be sensitive to (e.g., fuels, metals, air emissions, etc.)
- The pathway that carries the pollutant to a sensitive species.
- Atmospheric conditions.
- Geologic and geographic conditions.
- Public concern.
- Regulatory requirements.
- Mitigation commitments.

Figure 3-3 presents an overview of the process generally used to select a monitoring program. Pre-construction/operations monitoring programs generally require substantial forethought and careful planning including:



- Identification of Potential Project Activities. If a project is expected in the future, the types of activities and the potential discharges to the air or water should be characterized.
- Identification of Sensitive Receptors. This involves determining the sensitive receptors that may be affected by each activity (e.g., endangered species).
- Identification of Receptor's Sensitivity to Contaminants or Changes. Once the species are identified, research to determine what physical changes and/or emissions/release may impact their habitat life cycle

should be determined. Much of this data is likely to be readily available in published literature or through local universities.

- **Selection of Monitoring Parameters.** The selection of monitoring parameters is dependent on the species of concern, potential physical changes, types of releases, and known or suspected reaction to these changes.
- **Development of Monitoring Plan.** The monitoring plan should be designed to determine baseline conditions including seasonal and temporal fluctuations, as necessary, and to evaluate reactions to change. The monitoring plan should be discussed with regulatory and resource agencies, as well as the public, to ensure that the results will be acceptable.
- **Implementation of Monitoring Program, Evaluation of Results and Reporting.** Once agreement is reached, the monitoring program would be conducted and the results evaluated on a seasonal, semi-annual, or annual basis. Trends would then be identified and baseline conditions established. The results should be discussed with the regulatory agencies to achieve concurrence.

The value of monitoring is two-fold: to establish a clear understanding of environmental conditions and trends, and to implement and improve upon EMPs that will enhance the environmental quality in the area.

3.3.2 Selection of Operations EMPs

Table 3-1 presented a guide to the selection of operations EMPs. Operational EMPs are generally selected on a port-wide basis and often become part of an overall environmental management program as described in Section 6.

Figure 3-4 presents a summary of the process used to select EMPs and incorporate them into a port's environmental program. First, a port would identify through the use of a compliance or inventory audit, as discussed in Section 4, all of the activities conducted at their facilities as presented along the left-hand columns of Table 3-1. Then the port would identify which EMPs would be applicable to their activities using the 19 EMP columns. The port would then select the most appropriate elements of the EMPs. Finally, the port would prioritize EMP implementation based on a variety of factors including:

- Cost
- Ease of implementation
- Ability to achieve the greatest degree of risk reduction
- Complexity
- Impact on operations

The operations EMPs are presented on the following pages.

