Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and University of Minnesota Duluth Consortium

Manual of Best Management Practices For Port Operations

And

Model Environmental Management System

[redacted]

AMERICAN GREAT LAKES PORTS ASSOCIATION

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Introduction

In recent years, there has been increased public scrutiny of the maritime industry and its environmental impacts. Such scrutiny has not only come from environmental organizations, local governments, and media, but also from the industry's customers.

The nation's marine transportation system provides an efficient means of moving large quantities of cargo with the least environmental impact. For example, a single 1000-foot Great Lakes vessel can move the same quantity of cargo as 2800 trucks, or seven 100-car unit trains, resulting in less fuel consumption, fewer air emissions, and a smaller number of accidents.

Despite these benefits, a variety of environmental challenges warrant attention. These include aquatic nuisance species, air emissions, storm water runoff, spill response planning and dredge material disposal. As competing transportation modes (such as highway and rail) improve their own environmental performance, the maritime sector will need to engage in a process of continual improvement if it is to remain the most environmentally friendly mode of transportation.

Ports are a key component of the nation's marine transportation industry. As the owners and managers of prime waterfront property, port authorities and port terminal operators have a unique responsibility to adopt sustainable practices that preserve natural resources while ensuring economic growth.

Background

Many industries have found it helpful to utilize environmental management systems (EMS) to enhance environmental performance. An EMS is a management tool that helps companies/organizations integrate environmental considerations into everyday operations. In 2003, the American Association of Port Authorities (AAPA) and the U.S. Environmental Protection Agency (EPA) launched an EMS assistance project for ports. Managed by the Global Environment and Technology Foundation (GETF), the project provides assistance to public port agencies in developing comprehensive environmental management systems.

While meritorious, the project is ill-suited to the small public port agencies on the Great Lakes - some which have as few as four staff. Its cost ($55,000) is beyond the budgetary resources of many Great Lakes port authorities. For these reasons, only one Great Lakes port has participated in the program to date.

This project seeks to address the need for a simplified environmental management system approach for small port entities on the Great Lakes.

Objectives

This project was initiated to accomplish several objectives:

1) identify dominant environmental issues at Great Lakes ports
2) catalogue best management practices (BMPs) for each issue
3) design a simplified "EMS-like" tool for small ports with limited staff and budgetary resources
4) catalogue examples of environmental "success" stories at Great Lakes ports

The examination of port environmental issues was intentionally restricted to land-based operations; therefore, issues pertaining to vessel operations were not included in the project.

Funding

This project is a collaboration between the Clean Manufacturing Technology Institute (CMTI), located at Purdue University in West Lafayette, Indiana and the American Great Lakes Ports Association (AGLPA), located in Washington, DC. It was funded by two grants from the Great Lakes Maritime Research Institute (GLMRI), a University of Wisconsin-Superior and University of Minnesota-Duluth Consortium. GLMRI is a National Maritime Enhancement Institute, so designated by the U.S. Secretary of Transportation.

Methodology

The core activity of the project team has been a series of site visits and interviews with port officials at 12 locations in both the United States and Canada. Each visit included a briefing on port operations, a physical tour of the port area, interviews with port authority staff, and interviews with private terminal operators.

Time and resources did not allow site visits to all Great Lakes harbors. Locations selected were based on membership in - or affiliation with - the American Great Lakes Ports Association. Further, a specific effort was made to visit both large and small ports whose operations were typical of those throughout the Great Lakes. Site visits were made to the following locations:

Chicago, Illinois - June 26, 2007
Hamilton, Ontario - July 16-17, 2007
Duluth, Minnesota - July 23-25, 2007
Superior, Wisconsin - July 23-25, 2007
Milwaukee, Wisconsin - October 10, 2007
Cleveland, Ohio- May 13, 2008
Erie, Pennsylvania - May 14, 2008

Green Bay, Wisconsin - August 13, 2008
Toledo, Ohio - September 3, 2008
Windsor, Ontario - October 7, 2008
Detroit, Michigan - October 8, 2008
Toronto, Ontario - October 20, 2008

Seaports in the Great Lakes Region

From the earliest days of European settlement, the Great Lakes have been utilized for waterborne transportation. Many Great Lakes cities were founded as trading posts and evolved as a direct consequence of their proximity to water transport. Maritime commerce has played an important role in the historic development of the region's economy and remains an important source of jobs today.

There are 75 active ports on the U.S. side of the Great Lakes and an additional 29 on the Canadian side. These facilities serve as the interface between waterborne transportation and surface transportation such as highway and rail. In this regard, port facilities facilitate the movement of goods within the region, and between the Great Lakes region and the world.

Each year, roughly 220 million tons of cargo moves through Great Lakes ports. These products include iron ore, coal, limestone, salt, cement, fertilizer, asphalt, petroleum products, agricultural commodities, steel products and large equipment.

What is a Port?

In general, a port is one or more docks surrounded by a natural or man-made harbor. Such harbors include a variety of infrastructure, such as breakwaters to protect the harbor from excessive wave action, aids to navigation such as lighthouses and buoys, and an improved navigation channel to allow adequate underwater clearance for the passage of vessels. A dock is a facility along the water's edge at which ships are loaded or unloaded. Dock facilities would typically include an improved seawall to delineate the edge between land and water and provide a stable location to which a vessel can secure itself during cargo handling operations. Dock facilities would also typically include equipment such as cranes, conveyors, fork-lifts and other equipment to facilitate the loading and unloading of cargo.

Dock facilities might be exclusively committed to the business of cargo handling, or they may exist in support of a larger economic activity. For example, steel mills and power plants often have their own dock facilities.

Due to their unique geographic characteristics, historic development, local political structure, constituent commodities, and ever-changing trade patterns, no two ports are the same. To illustrate the variety of port facilities on the Great Lakes, the following section briefly describes the locations visited as a part of this project.

Port of Duluth

- dock facilities are located along the St. Louis River on the Minnesota side of Duluth/Superior Harbor on the western tip of Lake Superior
- dock facilities are both publicly and privately owned
- the Duluth Seaway Port Authority serves as the local port agency
- cargoes include: coal, grain, iron ore, limestone, steel, general cargo/machinery, forest products

Port of Superior

- dock facilities are located along the St. Louis River on the Wisconsin side of Duluth/Superior Harbor on the western tip of Lake Superior
- dock facilities are privately owned
- the City of Superior serves as the local port agency, primarily engaged in planning activity
- cargoes include: coal, iron ore, grain

Port of Green Bay

- dock facilities are located along the Fox River west of Green Bay on Lake Michigan
- dock facilities are privately owned
- Brown County Port and Solid Waste Department serves as the local port agency, primarily engaged in planning, port development, promotion, and public policy advocacy
- cargoes include: coal, asphalt, salt, cement, pig iron, machinery, fuel oil, limestone, wood pulp/forest products, tallow

Port of Milwaukee

- dock facilities are located along the Milwaukee River, Kinnickinnic River and on Lake Michigan
- dock facilities are publicly and privately owned
- the City of Milwaukee serves as the local port agency
- cargoes include: coal, asphalt, salt, cement, grain, steel, machinery, passenger/auto ferry service

Port of Chicago

- dock facilities are located along the Chicago River in downtown Chicago, along the Calumet River on Chicago's south side and along Lake Calumet.
- dock facilities are publicly and privately owned
- the Illinois International Port District serves as the local port agency
- cargoes include: coal, limestone, salt, grain, cement, petroleum products, steel, general cargo/machinery

Port of Detroit

- dock facilities are located along the Detroit River and Rouge River
- dock facilities are publicly and privately owned

- the Detroit-Wayne County Port Authority serves as the local port agency
- cargoes include: iron ore, limestone, coal, general cargo/machinery, salt, petroleum products, cement

Port of Toledo
- dock facilities are located along the Maumee River on the western edge of Lake Erie
- dock facilities are publicly and privately owned
- the Toledo-Lucas County Port Authority serves as the local port agency
- cargoes include: iron ore, limestone, coal, grain, general cargo/machinery, cement, petroleum products

Port of Cleveland
- dock facilities are located on Lake Erie and along the Cuyahoga River
- dock facilities are publicly and privately owned
- the Cleveland-Cuyahoga County Port Authority serves as the local port agency
- cargoes include: iron ore, limestone, general cargo/machinery, salt, cement, sand/gravel

Port of Erie
- dock facilities are located on Presque Isle Bay on Lake Erie
- dock facilities are publicly and privately owned
- the Erie-Western Pennsylvania Port Authority serves as the local port agency
- cargoes include: limestone, general cargo/machinery, sand/gravel

Port of Windsor
- dock facilities are located along the Detroit River
- dock facilities are publicly and privately owned
- the Windsor Port Authority serves as the local port agency (under federal law)
- cargoes include: salt, cement, grain, general cargo/machinery

Port of Hamilton
- dock facilities are located on Hamilton Harbour at the western end of Lake Ontario
- dock facilities are publicly and privately owned
- the Hamilton Port Authority serves as the local port agency (under federal law)
- cargoes include: coal, iron ore, salt, sand/gravel, steel, grain, petroleum products

Port of Toronto
- dock facilities are located along Toronto Harbour on Lake Ontario
- dock facilities are publicly and privately owned
- the Toronto Port Authority serves as the local port agency (under federal law)
- cargoes include: cement, asphalt, salt, sand/gravel, general cargo/machinery

Port Governance

The issues of governance, control and ownership are critical to any discussion of environmental management.

The vast majority of Great Lakes harbors are characterized by privately owned dock facilities located along a federally maintained navigation channel. In these instances, control of property and operations lie with each private property owner.

In a handful of locations (typically major cities), a local public port agency has been established to promote maritime commerce and related economic development for the benefit of the local community. While most port agencies own and develop real property, they seldom own the entire port. In these instances, control of dock facilities and operations lie in part with private property owners, and in part with the public agency.

Public port agencies in the Great Lakes region take one of three forms:

A. Unit of Local or State Government
Some local port agencies are a division of state, county or municipal government. For example, the port agency at Burns Harbor, Indiana is state owned; the port agency in Green Bay, Wisconsin is a division of county government and the port agency in Milwaukee, Wisconsin is a division of municipal government.

B. Independent Agency Created by State Statute
Many local port agencies are an independent public entity created by the state legislature and endowed with a variety of powers consistent with their mission to foster maritime commerce and related economic development. For example, port agencies in Duluth, Minnesota; Chicago, Illinois; Detroit, Michigan; and Erie, Pennsylvania all take this form.

C. Independent Agency Created by Federal Statute
A number of Canadian port agencies are authorized under federal law. The Canada Marine Act designates 17 federal ports throughout Canada, of which four are in the Great Lakes. These include the ports of Thunder Bay, Ontario; Windsor, Ontario; Hamilton, Ontario; and Toronto, Ontario. Non-federal ports in Canada are owned by provincial governments, municipal governments or private companies.

BEST MANAGEMENT PRACTICES

MANUAL

Best Management Practices Manual

Some operations on property owned or leased by Great Lakes ports have the potential to contribute pollutants to land, water, and air unless preventive measures are implemented.

These preventive measures, categorized as best management practices (BMPs), often require nothing more than "common-sense," seldom are "high-tech" approaches required.

This Best Management Practices Manual is a reference document that can be used by ports seeking to implement operational controls to reduce the actual or potential environmental impacts of an aspect of a port operation. The terms underlined here are those used in the ISO 14001 Environmental Management System (EMS) Standard.

An Environmental Management System (EMS) is a body of management tools that can be used by an organization to allocate resources, assign responsibility and continuously evaluate the practices, procedures and processes needed to integrate environmental concerns into its daily operations. The International Organization for Standardization (ISO) is a world-wide federation of national standards bodies. ISO 14001 was first promulgated as a voluntary standard in 1996 and was revised and re-issued in 2004.

A fully-developed EMS-formatted document and a simplified Environmental Management Program form have been prepared for use by port personnel to organize and "manage" their port operations with consideration of the environment in which those operations occur. These are found in Section 4 of this Manual.

The port operations included in this Manual for which operational controls (BMPs) are described include –

1. Dry Bulk Storage & Handling
2. Liquid Bulk Storage & Transfer (Loading/Unloading)
3. Non-bulk Chemical Storage & Handling
4. Port Cargo Handling Equipment & Rail/Truck Operations Powered by Diesel Engines
5. Vehicle & Equipment Fueling
6. Port Authority Oversight of Tenant Activities through Lease Agreements
7. Management of Hazardous and Non-hazardous Waste Generated by Port/Tenant Activities
8. General Operations that can Impact Neighboring Areas: Noise, Light, Odor, Trash, Dust
9. Building & Grounds Maintenance

Operation: Dry Bulk Storage and Handling

Commodities: coal, coke, lime, salt, sand, gravel, aggregate, fertilizer, taconite, other materials

Description: a storage pile is any outside storage of a raw, intermediate, final product or by-product of a material. The storage site may be subject to federal and state NPDES stormwater permit regulations. Fugitive particles (dust) may be generated during handling or by wind causing the operation to also be subject to air quality regulations.

Potential Environmental Impacts:

- Leaching and run-off of contaminants in stormwater. Run-off and the percolation of run-off can cause adverse environmental impacts on the surface of the storage area, adjacent land, surface water and groundwater and create contaminated sediments causing problems for future dredging.
- Generation of dust from handling dry bulk materials and blowing of dust from piles.

Best Management Practices:

- Controlling stormwater run-off: the size and shape of the storage pile will dictate the amount of run-off and resulting concentration of pollutants. A compacted pile with steep sides and sloping top will cause more run-off from the surface of the pile during rain events, but the pollutant load will be minimized. A loosely

constructed pile with a wide base, gently sloping sides and a flat or slightly sloped top will retain more rainwater, which will infiltrate throughout the pile, but will result in a higher pollutant load when the water eventually migrates from the pile. The size and shape of the pile should be dictated by the stormwater controls in place at the site, such as –

- diverting stormwater around the pile with channels or impermeable perimeter berms or by raising the storage area above the surrounding terrain;
- constructing impermeable storage pads or storing only on impervious surfaces. Compacted clay is preferred over either concrete or asphalt as it is less likely to crack, which allows groundwater infiltration;
- installing a run-off detention basin with a retention time sufficient to allow settling of pollutants so discharge will be below effluent limits;
- installing screens in drainage channels to filter suspended solids and attached heavy metals. Periodically clean the screens and properly dispose of the sediment;
- locating storage piles at a distance from the shore of the waterway to avoid the potential of run-off contamination [e.g., Wisconsin requires that salt storage piles be at least 50 feet from any surface water - - the distance may be greater in other states.] Where location is dictated by the size of the conveyor or other unloading equipment, controls such as filter strips, impermeable berms, “housekeeping” (cleaning/sweeping) practices and storage sites that slope away from the water need to be employed;

- covering the pile with an impervious tarpaulin as soon as possible after unloading and adjusting the cover as material is removed form the pile;
- maintaining the working face on the shore side of the pile, to continually increase the distance that stormwater run-off must migrate to reach the water; (This requires an awareness of the need to maintain the preferred slope of the pile to reduce either run-off or infiltration and how subsequent additions to the pile can alter this.)
- inspecting storage areas after rainfall or snowmelt to observe run-off or stormwater migration and implement preventive measures, if required;
- maintaining an accurate, up-to-date inventory of materials delivered and stored on-site.

- The generation and dispersion of dust can be controlled by -
  - using enclosed conveyors or chutes and telescoping arm loaders to reduce spillage and dust; also, minimize the distance between the working face and trucks/trains being loaded to reduce the area that has to be swept/cleaned;
  - suspending unloading and handling operations during unfavorable weather conditions (precipitation, wind) that could, otherwise, increase run-off or blowing dust;
  - spraying a light mist for dust control during handling operations; however, caution is required to prevent run-off from occurring;
  - maintaining pile size/volume consistent with customer demand, transportation schedules and materials cost to reduce the amount of material exposed to weather conditions;

- using dust suppression, bag house, screw conveyors and vacuum collecting equipment wherever practical in the handling of fine, granular or powdery material;
- regularly inspecting dry bulk storage piles, facilities and handling equipment to ensure proper operation is maintained;
- scheduling regular mechanized sweeping of the bulk storage and access/egress areas. [Note: relatively "clean," sweepings should be "returned" to the storage pile; otherwise, sweepings should be screened to remove "trash" and the remainder stored under cover in a bermed area for future use as fill, but only at a distance from waterways necessary to prevent any environmental impacts from stormwater runoff.]
- wash down or spray the underside and tires of trucks transporting dry bulk materials on to public roads to reduce dust and "track out."

Regulatory Requirements:

- 15 CFR Part 923, Coastal Zone Management Program (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR 122.6 EPA, National Pollutant Discharge Elimination System [NPDES], Program Requirements for Storm Water Discharges (www.gpoaccess.gov/cfr/retrieve.html)
- Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40 (www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm)

- Fugitive Dust Emissions are generally regulated by state authorities (e.g., see Indiana 326 IAC 6-4)

Sources of BMP Information:

- Storage Pile Best Management Practices, Wisconsin Department of Natural Resources, Bureau of Watershed Management, Publication # WT-468-96 (November, 1996) Contact: Bureau of Watershed Management WT/3, 101 South Webster Street, PO Box 7921, Madison, WI 53707, Phone: 608-267-7694, Fax: 608-267-2800
- California Stormwater BMP Handbook, California Stormwater Quality Association (January, 2003) (www.cabmphandbooks.com/Municipal.asp)
- Salt Institute Voluntary Salt Storage Guidelines for Distribution Stockpiles: "Salt Stockpile Area Best Practice Evaluation" (January 3, 2003) (e-mail: info@saltinstitute.org)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment (March 2003) (www.ene.gov.on.ca/envision/gp/4329e_preface.pdf)

Operation: Liquid Bulk Storage and Transfer (Loading/Unloading)

Commodities: petroleum and chemical products

Description: liquid bulk product is transferred to/from vessels and stationary bulk tanks and truck and rail tank cars at many Great Lakes ports. The transfer and storage of these products is strictly regulated by state/provincial and federal agencies. The operations require the implementation of interrelated BMPs by port authorities and terminal operators.

Potential Environmental Impacts:

- A leak or spill of liquid bulk product directly to the waterway or to a stormwater collection system discharging to the waterway will pollute the waterway, contaminate sediment and could adversely affect marine life; public drinking water intakes could also be affected;
- Leaks or spills to land will cause contaminated soil/vegetation and could result in groundwater contamination;
- Volatile organic compounds (VOCs) and other air pollutants can be released in emissions resulting from transfer of liquid bulk product between transportation modes (ship to rail, ship to truck, rail to truck) or in transfer to fixed bulk storage tanks.

Best Management Practices

Storage

- Regularly inspect fixed and mobile tanks, transfer equipment and piping for drip marks, tank discoloration, puddles of leaked liquid, puddles of water with a sheen (indicating petroleum product), corrosion, localized dead vegetation and stains on the ground, leaks/seepage from valves and seals, deformities (e.g., bulges, cracks, bends) in pipes and tanks;
- Regularly inspect secondary containment structures for cracks, discoloration, corrosion, erosion (of inside walls and outside perimeter), valve leaks, loose mortar, sealer, sizing or grouting used to construct walls, presence of leaked or spilled material within the containment area, debris within the containment area, and the operational status of drainage valves [closed];
- Periodically conduct integrity testing of above ground storage tanks and leak testing of valves and piping;
- Ensure that secondary containment holds the volume of the largest storage container plus sufficient freeboard for precipitation;
- Inspect and record inspection results of stormwater released from any drainage system in the bulk tank storage area directly to waterways;
- Regularly inspect and test liquid level sensing devices and audible alarms on each storage tank to ensure proper operation;
- Inspect valves that permit the outward flow of tank or secondary containment contents to ensure that they will remain closed when not operating;

- Prepare a spill prevention and emergency response plan for the facility and all storage/transfer operations and submit it to the federal and/or state/provincial environmental regulatory authority for approval;
- Provide initial and follow-up training to employees responsible for facility operations and for emergency spill response;
- Locate spill clean-up materials and equipment in known and convenient locations.

Transfer (Loading/Unloading)

- Inspect starter controls for pumps within secondary containment to ensure that they will remain locked in “off” position when not operating;
- Inspect loading/unloading connections of pipelines to ensure that they are securely capped or blank flanged when not in service;
- Inspect valves and valve operation, piping, flange joints, expansion joints, valve glands, catch pans, pipeline supports and metal surfaces;
- Ensure that the loading/unloading area drains to a catchment basin or other similar containment structure; the capacity of the containment structure must be equivalent to the largest compartment of a tank car or truck loaded/unloaded;
- Use physical barriers, warning signs, wheel chocks or vehicle brake interlock systems to prevent tank cars/trucks from departing before complete disconnection of transfer lines;
- Inspect drains and outlets on tank cars/trucks prior to filling and departure and tighten, adjust or replace as necessary;

- Use pans or containers to catch drips/spills when making or breaking connections with hoses, nozzles or other transfer equipment;
- Ensure that buried piping has protective wrapping or coating and is catholically protected or otherwise meets corrosion protection requirements;
- Install and maintain vapor recovery systems for product transfer to bulk tanks;
- Ensure that transfers are supervised by facility employees who are thoroughly familiar with normal and emergency operations procedures.

Regulatory Requirements:

- 40 CFR Part 112.7, EPA Oil Pollution Prevention (General requirements for Spill Prevention Control and Countermeasures Plan) (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Part 280 (Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks) (www.gpoaccess.gov/cfr/retrieve.html)
- 33 CFR Part 154, "Facilities Transferring Oil or Hazardous Materials in Bulk" (www.gpoaccess.gov/cfr/retrieve.html)
- "Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations" (SOR/2008-195), pursuant to Section 209 of the Canadian Environmental Protection Act (1999) (http://laws.justice.gc.ca/en/ShowFullDoc/cr/SOR-2008-197///en)

- "Response Organizations and Oil Handling Facilities Regulations" (SOR/95-405), pursuant to the Canada Shipping Act (1995) (www.tc.gc.ca/acts-regulations/GENERAL/C/csa/regulations/100/csa101/csa101.html)

Sources of BMP Information:

- U.S. EPA "SPCC Field Inspection and Plan Review Checklist," in "Spill Prevention, Control, and Countermeasure (SPCC) Guidance for Regional Inspectors (www.epa.gov/emergencies/content/spcc/spcc_guidance.htm).
- California Stormwater Quality Association, "Municipal Handbook" [for selecting BMPs to reduce pollutants in runoff from municipal operations] (2003) (www.cabmphandbooks.com/Municipal.asp). Each BMP description references these three other sources:
    - King County Stormwater Pollution Control Manual – http://dnr.metrokc.gov/slr/dss/spcm.htm
    - Orange County Stormwater Program – www.ocwatersheds.com/stormwater/swp_introduction.asp
    - San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) – www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf
- "Stormwater Pollution Prevention Handbook," for Ontario Ministry of the Environment, by Totten Sims Hubicki Associates, Donald G. Weatherbe

Associates, Elizabeth Leedham, 2001

(www.ene.gov.on.caenvision/water/stormwater/pph.htm (Implementation))

- Canadian Council of Ministers of the Environment, “Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (PN 1326) (2003)

(www.ccme.ca/assets/pdf/pn_1326_eng.pdf)

Operation: Non-bulk Chemical Storage and Handling

Description: Drums, totes and various-sized containers of chemicals and chemical products may be loaded/off-loaded and stored on port/tenant property. Federal and state/provincial regulations control these procedures to prevent damage to the containers that could result in releases or spills.

Potential Environmental Impacts:

- Spills/releases directly to waterways from storage areas will pollute water and contaminate sediments;
- Contained spills/releases within containment areas can mix with stormwater runoff and migrate to waterways;
- Land and groundwater are subject to contamination from spills/releases if not immediately recovered.

Best Management Practices:

General

- Locate outdoor storage areas on impervious surfaces with no storm drains and within berms low enough to permit equipment access but capable of containing spills/releases;
- Outdoor storage areas can be constructed with a slightly sloping surface to a dead-end sump to collect precipitation. Sump pumps should be manually operated. Some precautions should be observed –

- collected precipitation should be closely examined and tested, if necessary, to ensure there is no contamination from the contents of stored drums;
- if no contamination is observed or analyzed, collected precipitation can be pumped to the stormwater collection system;
- if contamination is suspected or analyzed, the collected precipitation should be pumped to a drum or other container and managed as a hazardous waste [Note: the collected precipitation can be discharged to the local wastewater treatment plant if the port facility has a permit for the discharge];
- for outdoor storage areas for containers of petroleum product, pumping the precipitation through an oil-water separator will then allow the water portion to be discharged to the stormwater collection system [Note: oil-water separators will not remove chemical pollutants from water].

- Locate long-term storage areas under cover and within a secondary containment structure capable of holding the contents of the largest container plus at least 10 percent of its volume;
- Erect barriers at the perimeter of storage areas to prevent vehicle collisions, but that will permit access by loading/unloading equipment;
- Frequently inspect equipment used to unload/load containers off/on vessels, trains and trucks;

- Employees handling chemical containers should ensure labels, placards and other identification affixed to containers is not removed or defaced;
- Segregate chemicals and chemical products by compatibility; store flammables in a separate area and usually, per local codes, at a greater distance from the property line;
- Do not dispense product from containers in the storage area - - this should not be necessary or permitted for cargo in transit.

Drums

- Store drums upright (bungs-up), not horizontally, to prevent leaks from improperly closed or poorly fitted bungs and possible movement (rolling) on the storage area surface or from a horizontal storage rack;
- Palletized or un-palletized drums should not be stacked more than two high within a storage area;
- Forklifts equipped with drum grapplers should be used to move individual drums; pallets of drums should be moved only when the drums are securely banded together;
- Move single drums only with a drum dolly, never roll drums on their side or bottom edge;
- Locate “overpak” drums (usually 80 gallons) with spill response equipment into which leaking drums can be placed and their contents contained.

Totes

- Restrict double-stacking plastic totes to those with a volume of 300 gallons or less;

- Forklift drivers need to employ caution in lifting and moving totes and be particularly observant of the location and configuration of the top fill portal and (on some totes) a discharge valve near the bottom;
- Frequently inspect tote storage areas for leaking valves (if totes are equipped with these).

Regulatory Requirements

- 40 CFR Part 279, "Standards for the Management of Used Oil" (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Parts 122-124, "NPDES Regulations for Storm Water Discharges" (www.gpoaccess.gov/cfr/retrieve/html)
- 40 CFR Parts 262, et seq., "Standards Applicable to Generators of Hazardous Waste" (www.gpoaccess.gov/cfr/retrieve/html)
- Ontario Environmental Protection Act (1990), Regulation 347 "General-Waste Management" (www.e-laws.gov/on/ca/html/regs/english/elaws_regs_900347_e.htm)
- 49 CFR Parts 171-173, "Hazardous Materials Regulations" (www.gpoaccess.gov/cfr/retrieve.html)

Sources of BMP Information

- American Association of Port Authorities (AAPA), "Environmental Management Handbook" (September 1998) (www.aapa-ports.org)

[Note: the following source is included as Appendix A in the AAPA Handbook: U.S. EPA Office of Compliance Sector Notebook Project, "Profile of the Water Transportation Industry" (September 1997)]

- California Stormwater Quality Association, "California Stormwater BMP Handbook" (January 2003) (www.cabmphandbooks.com)
- Center for Watershed Protection, "Municipal Pollution Prevention/Good Housekeeping Practices, Manual 9" (September 2008) (www.cwp.org)
- U.S. EPA, "Pollution Prevention/Good Housekeeping for Municipal Operations" (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=6)

Operation: Port Cargo Handling Equipment and Rail/Truck Operations Powered by Diesel Engines

Description: the Best Management Practices cited here are restricted to land-based operations including port and tenant-owned cargo handling equipment and stationary sources and locomotives and heavy-duty trucks operating within the port area. Emissions from vessels, including ships, tugboats, pushboats and other harbor vessels are beyond the scope of this report.

Potential Environmental Impacts:

- Diesel emissions contain particulate matter (PM), nitrogen oxides (NOx), sulfur oxides (SOx) and hydrocarbons which increase ozone levels, form acid rain and are likely carcinogenic to humans;
- Smog and haze created by diesel emissions often impact neighboring areas and can be a source of risk for those with asthma and other respiratory problems;
- Diesel emissions contribute to non-attainment of the EPA health-based 24-hour outdoor air quality standard for fine particles (soot). The $PM_{2.5}$ standard is exceeded in six U.S. counties where Great Lakes ports are located.

Best Management Practices: The sources cited below include a thorough description of the technology and operational practices that can be implemented by port authorities and terminal operators. These are summarized below for convenient reference:

Technology Practices (www.epa.gov/cleandiesel/ports/technologies.htm)

- Clean Fuel: change to advanced clean diesel fuel, such as low or ultra low sulfur diesel (LSD) (ULSD), emulsified diesel, bio-diesel, compressed natural gas, liquefied natural gas, liquefied petroleum gas (propane, which requires a dedicated engine);
- Retrofit: install "after treatment" devices on existing equipment, such as diesel particulate filters, oxidation catalysts, closed crankcase ventilation, selective catalytic reduction, lean NOx catalyst, exhaust gas recirculation, idle reduction devices;
- Rebuild and properly maintain engines;
- Replace an older engine with a newer, cleaner engine, especially one that can use alternative fuels and/or has been manufactured to stricter on-road emission standards;
- Replace older vehicles or machines with one built to stricter emissions standards;
- Investigate the feasibility of using hydraulic hybrid vehicles as replacements for diesel engine equipment.

Operational Practices (www.epa.gov/cleandiesel/ports/portauthorities.htm)

- Conduct an emissions inventory to quantify air quality impacts of the current operations and assess potential impacts of port expansion and/or growth in port activities;
- Implement an anti-idling policy and distribute information to tenants and transportation providers about idle reduction technologies;

- Implement an educational program for tenants to inform them of strategies and options for reducing diesel emissions;
- Include incentives for emissions reduction in leases and contracts with tenants, contractors and transportation service providers;
- Expand operating hours to reduce truck queuing, idling and traffic congestion;
- Promote "short sea shipping" and increase rail and barge transportation of cargo that would normally be transported by truck, to reduce traffic congestion and emissions.

Regulatory Requirements:

- 40 CFR Parts 60, 85, 89, 94, 1039, 1065 and 1068: EPA Standards of Performance for Stationary Compression Ignition Internal Combustion Engines [stationary diesel engines]. Federal Register: July 11, 2006 (Vol. 71, No. 132) (www.epa.gov/fedrgstr/EPA-AIR/2006/July/Day-11/a5968.htm)
- 40 CFR Parts 9, 69, 80, 86, 89, 94, 1039, 1048, 1051, 1065 and 1068: EPA Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel. Federal Register: June 29, 2004 (Vol. 69, No. 124) (www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293a.htm)
- Canadian Environmental Protection Act, 1999 regulations, including –
  - Off-Road Compression-Ignition Engine Emission Regulations (SOR/2005-32);
  - On-Road Vehicle and Engine Emission Regulations (SOR/2003-2);

- Ozone-Depleting Substances Regulations, 1998 (SOR/99-7);
- Sulfur in Diesel Fuel Regulations (SOR/2002-254)

(http://laws.justice.gc.ca/en/showtdm/cs/C-15.31///en)

Sources of BMP Information:

- Clean Ports USA (www.epa.gov/diesel/ports): this is the main website for numerous links to other sites (including the two websites above) that are sources of information about reducing diesel emissions;
- EPA Sector Strategies Program – Ports (www.epa.gov/ispd/ports): includes a description of the six themes of the strategy, including Clean Air and Affordable Energy. The website also includes cross-referenced links with those at the Clean Ports USA website (above) on the subjects of preparing port emissions inventories and emissions reduction incentives.

Operation: Vehicle and Equipment Fueling

Description: the BMPs below pertain primarily to vehicle and equipment fueling on port property. Vessel fueling requirements, promulgated by the U.S. Coast Guard and comparable Canadian authorities, are very detailed and must be adhered to by terminal operators engaged in these operations. Port authorities can cite the regulations in leases to ensure tenants and lessees engaged in vessel fueling are aware of their responsibilities. [33CFR Part 154: Coast Guard, "Facilities Transferring Oil or Hazardous Material in Bulk" (www.gpoaccess.gov/cfr/retrieve.html)]

Potential Environmental Impacts:

- Spill/releases of petroleum fuels will pollute water and contaminate sediments and spills to land can pose a threat to groundwater;
- VOCs emitted from fueling operations without vapor recovery systems or from large spills will impact air quality.

Best Management Practices:

- Use commercial (retail) fuel dispensing stations for port and fleet vehicles whenever possible;
- Install overflow protection devices on tank systems to (1) warn the operator to shut down transfer pumps or (2) automatically shut down transfer pumps, when the tank reaches full capacity;
- Install vapor recovery systems to control emissions;

- Restrict vehicle fueling to as few areas as possible that have containment berms, no storm drains, impervious surfaces and, preferably, are covered and (for vehicles) are located as great a distance from waterways as practical;
- Install automatic shut-off devices on dispensing hoses to prevent fuel discharge if dropped or severed;
- Enforce “No topping-off” policy with fuel dispensing attendants and vehicle operators;
- Post clear written instructions for attendants and vehicle operators on correct dispensing procedures;
- Install underground storage tanks and piping only with appropriate spill and overfill protection, release detection and corrosion protection systems; perform frequent monitoring of these systems and maintain required records;
- Locate clean-up materials (absorbent pads and drying material, brooms, plastic bags, etc.) for drips and small spills near fuel dispensing station; ensure that attendants and vehicle operators know how to clean-up <u>small</u> spills and that “washdowns” of spills are not permitted;
- Install steel, concrete or other barriers around dispensing stations to prevent vehicle or mobile equipment damage;
- Locate drip pans and larger containment vessels for immediate access to be placed under vehicle fuel tanks if leaks occur;
- Inspect, daily, pumps, dispensing hoses, fittings and all related equipment for leaks and situations that could result in leaks;

- Restrict mobile fueling operations to the extent practicable and require vehicles/equipment to be fueled at the fixed fueling station(s); where this is impractical (e.g., fueling stationary or tracked crane), mobile fueling operations should employ all of the safety/environmental protection practices described here for a fixed fueling facility, especially automatic shut-offs, spill containment vessels and materials,, vapor recovery systems, etc.;
- Prohibit any vehicle maintenance operation (e.g., fluid changes) in the fueling area.

Regulatory Requirements

- 40CFR Part 280 "Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks" (www.gpoaccess.gov/cfr/retrieve.html)
- "Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197), pursuant to Section 209 of the Canadian Environmental Protection Act (1999) (http://laws.justice.gc.ca/en/ShowFullDoc/cr/SOR-2008-197///en)

Sources of BMP Information

- U.S. EPA, "Preventing Underground Storage Tank Systems From Leaking" (www.epa.gov/OUST/prevleak.htm)
- Canadian Council of Ministers of the Environment, "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing

Petroleum and Allied Petroleum Products" (PN 1326) (2003) (www.ccme.ca/assets/pdf/pn_1326_eng.pdf)

- "Industry Codes and Standards for UST Systems," U.S. EPA (www.epa.gov/swerust1/cmplastc/standard.htm)
- California Stormwater Quality Association, "Municipal Handbook: SC-20: Vehicle and Equipment Fueling" (www.cabmphandbooks.com/Municipal.asp)

Operation: Port Authority Oversight of Tenant Activities through Lease Agreements

Description: A legally constructed lease agreement is an appropriate port document for providing oversight of and requiring accountability for tenant and lessee activities that could cause environmental impacts. The lease agreement should provide a clear demarcation of the rights and responsibilities between the port authority and the lessees and clarify the liability of each.

Potential Environmental Impacts:

- Potential degradation from tenant activities - - long term or short term - - of the environmental quality (air, water, land, groundwater) on and surrounding port property and adjacent waterways.

Best Management Practices (in lease provisions):

- A Phase I or, preferably, Phase II Environmental Site Assessment (ESA) should be performed pursuant to the lease, before a tenant vacates the property and before the next tenant occupies the property and at other times as the port authority would decide [See ASTM E-1527 (Phase I), ASTM E-1903 (Phase II) and comparable Canadian Standards];
- Incorporate environmental protection provisions in the lease agreement or in a separate environmental agreement;
- Lease agreements should reference permitted activities of the tenants, citing all relevant local/state/provincial/federal statutes, as well as all other activities the

tenant could possibly undertake within the purview of its agreement (also, citing relevant statutes) and impose strict prohibitions on other activities;

- Agreements should declare whether sub-leases, land rental agreements, provision of temporary space (e.g., for contractors) and other uses of the leased space are permitted and if so, the pertinent statutory provisions and restrictions;
- Port authority should retain the right to enter upon the leased property, with reasonable notification, for the purpose of conducting environmental audits/inspections;
- Cite the federal and/or state/provincial statutes containing the appropriate definition of terms used in the lease, such as “chemicals,” “petroleum products,” “toxics,” “hazardous materials,” “hazardous substances” or “hazardous waste;”
- Fully address the possible disposition of chemical substances through tenant usage, production or storage as they could negatively impact the environment, such as through spills, releases, discharges, disposal, emissions, etc.;
- Require tenants to forward copies of all notices of violation and other communication from regulatory authorities pertaining to compliance/enforcement matters;
- The tenant must be required to indemnify and hold the port authority harmless from all liabilities associated with all tenant acts or operations performed on or associated with the leased property;
- The tenant must be barred from entering into any consent decree or settlement agreement with any party concerning the probable or actual environmental impact on the leased property resulting from its operation without, first, notifying the port

authority and allowing the port authority to consider participating in the proceedings;

- Specify the alterations to the leased land, buildings and equipment that are not permitted without first conducting an environmental assessment and submitting the report to the port;
- Ensure that the tenant assumes financial responsibility for environmental problems discovered following the expiration of the lease which can be attributed to the tenant's operation during the lease period; require financial assurance for a defined period to cover costs of environmental remediation, if required;
- The lease should specify the amount of public liability and property damage insurance, including environmental insurance, per occurrence and annual aggregate;
- General appearance factors (trash/debris collection), transportation right-of-way improvement/maintenance (access roads, railroad trackage), and potential community impacts (odors, emissions, noise, light, dust) should also be addressed in the agreement;
- Amending or reviewing a current lease agreement provides the port authority an opportunity to require or encourage the lessee to adopt or implement strategies and technologies for better protection of the environment (e.g., reducing diesel air emissions, controlling stormwater runoff, etc.).

Regulatory Requirements

[Note: there may be state/provincial statutes governing various provisions of lease agreements, such as limitations on environmental liability, which need to be observed in drafting agreements.]

Sources of BMP Information

- American Association of Port Authorities (AAPA), "Environmental Management Handbook" (September, 1998), pp. 4-3 – 4-5. (www.apa-ports.org)

  [Note: this reference includes a citation for the American Association of Airport Executives document titled, "Tenant Environmental Liability Handbook" (www.airport.org). The handbook is not available online – its cost is $169.99 for the CD-Rom. The Handbook is also available by calling AAAE's fax-on-demand service at 800-470-2778 and requesting document 3015.]
- The lease agreements provided by port authorities visited during this project were an invaluable source of information.

Operation: Management of Hazardous and Non-hazardous Waste Generated by Port/Tenant Activities

Description: most port and tenant maintenance and operations activities and some cargo handling/storage activities generate hazardous or non-hazardous wastes that need to be managed in compliance with federal and state/provincial regulations.

Operations generating hazardous waste can include –

- landscaping/grounds maintenance (fuel, pesticides, herbicides);
- vehicle/equipment maintenance (vehicle fluids, fuel, paint, paint stripping chemicals, solvents, washing liquids, hydraulic fluid, grease);
- construction and facility maintenance (buildings, piers, paved surfaces, etc.) (lead and other metals, sediments, petroleum products, asbestos, paint, treated lumber, deicing compounds).

The management of ship-generated waste is beyond the scope of this manual.

Potential Environmental Impacts:

- Spills, releases and emissions of liquid and semi-liquid non-hazardous and hazardous waste can cause pollution of surrounding air, water, groundwater and soil;
- Improperly managed accumulations of non-hazardous waste can create safety hazards for employees and visitors and detract from the appearance of port/tenant property; improperly managed waste can also “migrate” to neighboring properties;

Best Management Practices:

Hazardous Waste (Note: ports should examine applicable federal and state/provincial regulations to determine how used oil, batteries, fluorescent lamps/ballasts, thermostats and mercury-bearing switches are regulated.)

- Designate a permanent storage facility constructed and operated per regulatory requirements, including –
    - covered area with impervious base and secondary containment;
    - signage designating "Hazardous Waste Storage" and restricting entry by unauthorized persons;
    - sufficient space to allow the segregation of non-compatible wastes and to permit movement of persons within the facility;
    - use of containers that are compatible with their waste contents; ensuring that containers are closed, except when adding waste;
    - required fire, emergency, communication and security measures implemented;
    - Locate drums for the collection of hazardous waste in the operations areas where the waste is generated ("satellite accumulation areas," per U.S. EPA regulations; drums must be moved to the permanent storage facility within three days of being filled);

Non-hazardous Waste

- Locate waste collection areas on impervious surfaces with a bermed perimeter; use covered dumpsters or roll-offs as the primary waste collection receptacles;
- Conduct a waste minimization study, to include the identification of –

  - opportunities to recycle wastes (markets, reuse of materials, costs compared to disposal);
  - alternatives to current operations practices/procedures that would reduce the number and volume of wastes generated;
- Publish a "Used Materials Exchange" for distribution to tenants and lessees advertising used materials that potentially could be re-used at another facility.

Regulatory Requirements:

- 40 CFR Part 279, "Standards for the Management of Used Oil" (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Parts 262, et seq., "Standards Applicable to Generators of Hazardous Waste" (www.gpoaccess.gov/cfr/retrieve.html)
- Ontario Environmental Protection Act (1990), Regulation 347, "General-Waste Management" (www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900347_e.htm)
- 40 CFR Part 372, "Toxic Chemical Release Reporting: Community Right-to-Know" (www.gpoaccess.gov/cfr/retrieve.html)
- 49 CFR Parts 171-173, "Hazardous Materials Regulations" (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Part 264-265, Subpart CC, "Tanks and Containers" (www.gpoaccess.gov/cfr/retrieve.html)

Sources of BMP Information:

- Center for Watershed Protection, "Municipal Pollution Prevention/Good Housekeeping Practices, Manual 9" (September 2008) (www.cwp.org)
- U.S. EPA, "Guidance specifying Management Measures for Sources of Non-point Pollution in Coastal Waters" (www.epa.gov/owow/nps/MMGI) [Note: a comprehensive bibliography on Non-point Source Pollution, "Management Measures for Marinas and Recreational Boating" is found at www.epa.gov/OWOW/NPS/MMGI/Chapter5/ch5-4.html. Many of the management measures are applicable to port/tenant operations other than marinas.]
- U.S. EPA, "Pollution Prevention/Good Housekeeping for Municipal Operations" (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=6)
- U.S. EPA, "Protocol for Conducting Environmental compliance Audits of Hazardous Waste Generators Under the Resource Conservation and Recovery Act" (1998) (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=50000B9I.txt)
- U.S. EPA, "Understanding the Small Quantity Generator Hazardous Waste Rules: A Handbook for Small Business" (1987) (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=100018QN.txt)

Operation: General Operations that can Impact Neighboring Areas: Noise, Light, Odor, Trash, Dust

Description: The location of some ports near residential and business areas and the development of property, often adjacent to or overlooking port property, requires port authorities and tenants to implement measures to identify and reduce the negative impacts of general operations.

Potential Environmental Impacts

- Dust from dry bulk storage piles, cargo loading/unloading and maintenance/use of dirt/gravel roads on port and tenant property;
- Odor from diesel exhaust emitted by land-based equipment and vessels and vapors from transfer of liquid bulk products;
- Noise from land-based equipment and vessels;
- Light from equipment, vessel operation and parking lots, work areas, buildings and piers;
- Trash from port/tenant activities “deposited” outside port/tenant property by visitors, service providers, employees, others;
- Traffic congestion from truck queuing, security checks, service deliveries, etc.

Best Management Practices

General

- Distribute and advertise contact information (phone/fax numbers, e-mail addresses, mailing addresses, websites) of the port authority to encourage inquiries and reporting complaints; assign a port authority employee as the contact person to receive/follow-up on inquiries/complaints;
- Actively participate in neighborhood, community and business organizations to foster better community relations;
- Develop rapport with the municipal code (ordinance) enforcement staff to learn about the codes and the level of compliance expected.

Dust

- (See "Dry bulk Storage and Handling " BMPs)
- Implement a dust suppression program for unpaved roads on port/tenant property, including spraying water (not chemical or petroleum products) at frequent intervals during use and regulating road use (hours and types of vehicles/equipment permitted);
- Request results of periodic air monitoring by local or state agencies to evaluate the effectiveness of the dust suppression program;

Odor

- (See "Port Cargo Handling Equipment and Rail/Truck Operations Powered by Diesel Engines" and "Liquid Bulk Storage and Transfer (Loading/Unloading") for BMPs);
- Adopt a policy requiring port/tenant employees to report odors they detect to a port manager (odors detected on port/tenant property will be detected on adjacent property);

- Investigate the applicability/effectiveness of air pollution control equipment (e.g., "scrubbers") for fixed sources of emissions contributing odors;

Noise

- Conduct noise abatement (decibel reduction) study to measure noise from fixed and mobile sources and at the port/tenant fenceline;
- Issue policies regulating the activation of sirens, horns, vehicle warning "beepers" and other sources of noise from port/tenant and transport (ship, rail, truck) operators, to the extent practicable;
- Consider erecting noise attenuation barriers at critical fenceline areas (e.g., solid or mostly solid walls; trees are <u>not</u> effective);
- Alter operations schedules to avoid noise pollution during nights and weekends [this may conflict with BMPs implemented to reduce traffic congestion and truck/train idling emissions during weekdays];

Light

- Conduct light distribution study, including locations <u>outside</u> the perimeter of port/tenant property;
- Incorporate energy efficiency study in lighting study to reduce/eliminate unnecessary lighting and change fixtures to more cost-efficient ones;
- If study results or complaints warrant, replace overhead (pole) lighting fixtures with "sharp-cutoff" or "down-shoot" fixtures that focus illumination on the ground;
- Issue a policy restricting ship/rail/truck lights from illuminating areas outside the port/tenant property perimeter when they are not moving;

- Alter operations schedules to avoid light pollution during night hours [this may conflict with BMPs implemented to reduce traffic congestion and truck/train idling emissions during weekdays];

Trash

- Conduct a reduce/recycle/reuse (waste minimization) study to identify sources of current waste streams and alternatives to disposal; include a perimeter (and beyond) survey of trash to identify its origins;
- Place marked trash containers at locations convenient to visitors, truck operators and employees;
- Cover and berm trash collection areas and containers (e.g., roll-offs, barrels) to avoid dispersion by wind and stormwater;
- Ensure proper management of ship waste, if deposited on port property;

Traffic Congestion

- Direct truck traffic to queue on port/tenant property, only; if necessary, remind rail operators of local/state laws restricting street blocking at railroad crossings;
- Survey port/tenant employees' interest in car pooling, to reduce congestion and vehicle emissions;
- Cooperate with local officials in preparing plans to alleviate congestion in the port area;
- Ensure that signage, traffic controls and pavement markings on streets/roads near the port and at its entrances conform to state and federal requirements.

Regulatory Requirements

Dust: See citations in Dry Bulk Storage & Handling

Odor: regulations controlling odor do not exist at the federal or state level; some municipalities may have ordinances that regulate odor. State agencies that attempt to "regulate" odor do so through their authority to regulate emissions and thereby can examine the components of the activity or process that generate emissions odor (e.g., requiring vapor recovery devices on fuel dispensing equipment reduces emissions and the odor of the fuel being dispensed);

- See citations in "Port Cargo Handling Equipment & Rail/Truck Operations Powered by Diesel Engines" and "Liquid Bulk Storage & Transfer (Loading/Unloading)"
- See "Proposed Revisions to Odour-based Ambient Air Quality Criteria and Development of an Odour Policy Framework," (Regulation 346) Ontario Ministry of the Environment (March 2005) (www.searchontario.gov.on.ca [search "odour"]

Noise: regulations controlling noise are common to municipal ordinances; there are no known federal or state regulations;

- Ontario Provincial Guidelines are used where municipal by-laws do not exist: See "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban) (Publication NPC-205)

Light: regulations controlling light are found in some municipal ordinances but are not as common as noise and odor;

Trash: "litter laws" are more common to municipal ordinances; however, the proper management and disposal of solid non-hazardous and hazardous waste is required by federal and state/provincial regulations;

Traffic Congestion: municipal ordinances embracing state traffic laws are most common and public authorities ~ like many Great Lakes ports ~ are subject to the enforcement of these laws.

Sources of BMP Information

- American Association of Port Authorities (AAPA), "Environmental Management Handbook" (September 1998) (www.aapa-ports.org) [Note: the following source is included as Appendix A in the AAPA Handbook: U.S. EPA Office of Compliance Sector Notebook Project, "Profile of the Water Transportation Industry" (September 1997)]
- Center for Watershed Protection, "Municipal Pollution Prevention/Good Housekeeping Practices, Manual 9" (September 2008) (www.cwp.org)
- U.S. EPA, "Pollution Prevention/Good Housekeeping for Municipal Operations" (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=6)

Operation: Building and Grounds Maintenance

Description: the performance of "normal" maintenance/repair activities on port/tenant property can produce unintended impacts on the environment. Employees need to follow work practices and observe operational controls to ensure that impacts are minimized.

Potential Environmental Impacts:

- The application of pesticides, fertilizers and herbicides can contaminate soil, water and groundwater directly and via stormwater runoff;
- Painting/paint removal and the use of solvents to clean surfaces and paint application equipment can become sources of air and stormwater pollution;
- Soil disturbance/removal activities (e.g., landscaping, road construction) can cause erosion and sedimentation of waterways;
- Vehicle/equipment maintenance/repair products (e.g., fluids, solvents) can contaminate soil and water and pollute stormwater, if improperly managed;
- Exposure of uncovered, used construction materials (wood, sheet metal, concrete, asphalt roofing) to precipitation can cause leaching of pollutants into stormwater;
- Improper management and disposal of building maintenance, including janitorial, supplies creates hazardous waste streams that can potentially pollute waterways through stormwater runoff.

Best Management Practices:

Pesticide/Herbicide and Fertilizer Application

- Follow label instructions for mixing and storing pesticides/herbicides to reduce generation of a hazardous waste stream; apply only at recommended rates and only when needed;
- Pesticides/herbicides should be applied only by trained, certified applicators or by personnel under their direct supervision;
- Use pesticide/herbicide container rinsate on the area to be treated; do not empty or clean containers except over or in other containers located in areas with impermeable surfaces and secondary containment or perimeter berms;
- Purchase pesticides/herbicides in bulk containers, concentrated form or in packaging that dissolves in solution;
- Ensure that pesticides/herbicides are applied only to areas that will not cause damage to native habitat or threaten indigenous species;
- Avoid pesticide/herbicide application on surfaces sloped to waterways or where groundwater is close to the surface or where it can contaminate stormwater runoff;
- Replace or supplement use of chemical pesticides/herbicides and fertilizers with compost, bio-solids and other non-toxic substitutes;
- Use integrated pest management practices to eliminate pest access to food, water and shelter or use biological controls;
- Calibrate fertilizer application equipment to avoid excessive amounts;

- Do not activate watering/irrigation systems for a week following pesticide/herbicide application;
- Prioritize chemical reduction over grounds appearance by letting grass grow longer, pulling weeds by hand, allowing “natural areas,” etc.

Paint Removal/Repainting

- The assessment and management of lead-based paint on surfaces to be scraped/painted and on structures to be demolished should be conducted by a certified lead-abatement professional; dust, paint chips and other debris need to be controlled using tarpaulins, hand-held tools with vacuum attachments, sweepers with vacuum attachments and other similar equipment; debris must be collected, stored in properly labeled containers and managed as hazardous waste;
- Substitute hazardous paint stripping chemicals (e.g., containing methylene chloride) with non-toxic water-based, vegetable-based or citrus-based products;
- Repaint surfaces with coatings free of mercury and lead and use water-based paint wherever practical;
- Use secondary containment (plastic) pallets at maintenance/construction sites to store drums of liquid products used at the site; keep drums upright and use manually-operated pumps to remove content;

Soil Disturbance/Removal

- Review the port’s or its municipality’s EPA/state stormwater pollution prevention plan and NPDES permit requirements, especially pertaining to erosion and sediment control, and implement the applicable structural and non-structural BMPs described therein;

- Cover disturbed soil with natural ground cover, mulch, river stone or manmade material that will not require chemical/mechanical (mowing) management;
- Design construction and landscape projects to conform to site conditions such as soils, ground cover, terrain, depth to water table, distance to waterway, stormwater drainage area and pathways, etc.;
- Employ simple and inexpensive erosion control BMPs during construction, such as straw mulch, straw bales, silt fence, erosion control blanket, riprap and sediment traps;
- Install permanent, post-construction BMPs, if suitable, such as a detention or retention pond, swale or constructed wetland, infiltration basin, filter strips, permanent native grass seeding, etc.;
- Provide suitable storage for "clean" dirt/gravel piles (preferably covered and bermed) to prevent migration with stormwater to the waterway increasing sediment loading; contaminated soil needs to be treated before reuse or properly stored and disposed of according to local/state/provincial/ federal regulations;

Vehicle and Equipment Maintenance

- Use off-site facilities and personnel for vehicle/equipment maintenance/repair work when the port/tenant facility cannot adequately prevent potential impacts to the environment;
- Plug or block floor drains in repair shop areas to prevent migration of spilled vehicle fluids, cleaning products and fuels to the stormwater drains; berm vehicle and people entrances in the shop area to prevent escape of spilled material;

- Store drums of vehicle fluids and cleaning materials on plastic secondary container pallets; keep drums upright and remove contents with manually operated pumps;
- Control the purchase/use/disposal of vehicle fluids and cleaning materials rather than allowing employees (or tenants) to use the toxic chemicals customarily used in vehicle/equipment repair;
- Ensure that repair shop areas have spill response plans specific to their operation, facility configuration, available response equipment and that employees are trained on response procedures, use of equipment, etc., as well as how to prevent spills/releases from occurring;
- Ensure that outdoor areas used to maintain/repair cargo handling equipment have impervious surfaces, are bermed and provide some type of stormwater collection (e.g., dead-end sump) system; portable plastic secondary containment structures can be erected beneath and around large equipment to capture spills/releases and provide a barricade to stormwater;
- Recycle oil filters, used oil, used antifreeze, used tires and batteries on a regular basis ~ do not allow recyclables to collect in or outside the repair shop;
- Schedule all vehicles/equipment for preventive maintenance to avoid leaks of fluids, ensure optimal operations and extend vehicle/equipment life;
- Vehicle/equipment painting should be performed using efficient spray equipment (e.g., HVLP spray guns) to reduce overspray and emissions; painting should be performed indoors, if possible, with an air exhaust system to capture/filter paint spray and emissions; the equipment being painted outdoors should have

windscreens (tarpaulins) erected around the perimeter and a plastic containment structure placed beneath to catch overspray and drips;

- Replace CFC products in air conditioners with non-CFC products; replace mercury switches;

Management of Used Construction Materials

- Identify and contract with recyclers of used construction materials or properly dispose in a permitted construction materials landfill;
- Store materials that can be recycled/reused on-site under cover in a bermed, impervious-surfaced area;
- Segregate asphalt roofing materials and dispose in a permitted construction landfill;
- Material containing or enclosed in asbestos should be removed/managed only by trained and certified personnel; store asbestos in properly labeled containers and manage as waste asbestos;
- Waste material containing lead (e.g., from sand blasting equipment/piers/buildings) must be separated from other waste streams and managed as hazardous waste;
- PCB-containing hydraulic fluid and transformer/capacitor/generator oil should be disposed of as PCB hazardous waste;

Management of Maintenance/Janitorial Supplies

- Replace chemical-based cleaners with less or non-toxic cleaners whenever possible;
- Manage spent chemical-based cleaners as hazardous waste;

- Store drums of cleaners upright on plastic secondary containment pallets and remove contents using manually-operated pumps;
- Instruct port/tenant employees and instruct or require proof of training for contract maintenance/janitorial service personnel in the proper use and disposal of chemical-based products;
- Designate chemical storage areas indoors, at a distance if possible, from vehicle traffic and employee work areas and with the proper safeguards to ensure that leaks/spills/releases will not migrate to the outdoors and possibly impact the environment.

Regulatory Requirements:

- 40 CFR Part 279, "Standards for the Management of Used Oil" (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Parts 262, et seq., "Standards Applicable to Generators of Hazardous Waste" (www.gpoaccess.gov/cfr/retrieve.html)
- Ontario Environmental Protection Act (1990), Regulation 347, "General-Waste Management" (www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900347_e.htm)
- 49 CFR Parts 171-173, "Hazardous Materials Regulations" (www.gpoaccess.gov/cfr/retrieve.html)
- 40 CFR Part 152-180, "Pesticide Programs" (www.gpoaccess.gov/cfr/retrieve.html)

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- California Stormwater BMP Handbook, California Stormwater Quality Association (January, 2003) (www.cabmphandbooks.com/Municipal.asp)
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- Clean Ports USA (www.epa.gov/diesel/ports): this is the main website for numerous links to other sites (including the two websites above) that are sources of information about reducing diesel emissions;
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Notable Environmental Projects

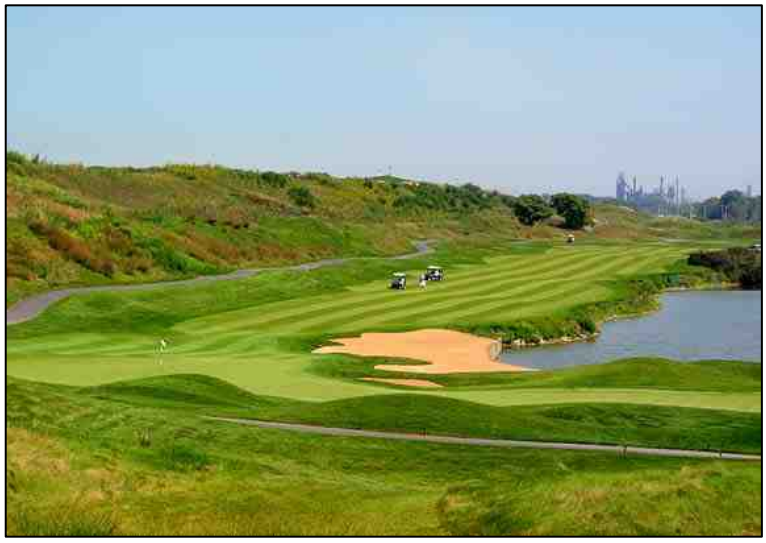
At

Great Lakes Ports

NOTABLE ENVIRONMENTAL PROJECTS AT GREAT LAKES PORTS

A number of Great Lakes ports have sponsored or cosponsored notable projects to improve the environment. While it is by no means a comprehensive list, the following section illustrates unique initiatives at five Great Lakes ports.

Harborside International Golf Course
Chicago, Illinois



Formerly a 220 acre garbage dump, this property on the south side of Chicago was converted in the early 1990s to recreational use by the Illinois International Port District (Port of Chicago). The facility is now home to Harborside, a popular 36-hole public golf course, golf teaching facility and clubhouse. The project is built on lands within Port properties on the shoreline of Lake Calumet. The landfill had been historically used by other local agencies for refuse disposal, fly ash disposal, wastewater sludge and had been a source of undocumented dumping for decades. The entire project covers a total of 458 acres.

With normal industrial/commercial development not being technically feasible, the Port District developed an innovative solution for a recreational/income producing concept for the site. Before development, it was necessary to provide an impervious clay cap for the landfill. Geotechnical investigations identified the lake bottom of nearby Lake Calumet as a source for this material. Before the over 600,000 cubic yards of clay could be removed, the lake had to be partially diked-off and drained. Approximately 200,000 fish were removed from the lake and 25,000 of the higher quality fish were relocated. In addition, construction was staged to avoid nesting season for migratory birds. Approximately 5.5 acres of mitigated wetlands were created and approximately 15,000 feet of shoreline were planted and vegetated. Stormwater management included detention for a ten-year storm and included a network of ponds, vegetated swales and storm sewers to reduce impact to overloaded sewers in the surrounding communities.

The construction of Harborside also utilized 500,000 cubic yards of wastewater sludge from the nearby Metropolitan Water Reclamation District of Greater Chicago. This material was used for mounding and land formation and was also used as the substrate for the fairways and rough areas. Additional sludge was relocated within the site. An estimated total soil moved on-site was over 2 million cubic yards. Sand was blended with the sludge to function as the "topsoil" for the site. Lake Calumet is the source for irrigation water. No potable drinking water is used for irrigation. The sophisticated irrigation system minimizes the amounts of waters used and assures that the water stays within the Lake Calumet watershed.

Harborside has improved the local environment, eliminated a visual eyesore and source of noxious odors, and has helped to diversify and stimulate Chicago's south side economy. Total cost of the project was well over $20 million. Today, golf course fees provide the Port District with an important source of revenue. It is also a source of jobs and tax revenue to an area of the City of Chicago which has experienced high unemployment. The golf course receives no funding from taxable entities within the State, County or City.

Erie Pier Confined Disposal Facility
Duluth, Minnesota

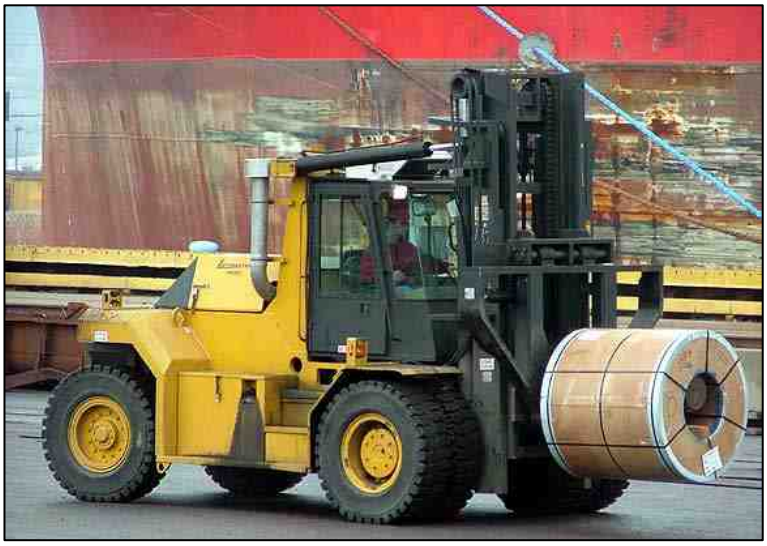
To maintain adequate depth of shipping channels, the U.S. Army Corps of Engineers must periodically remove sand and silt that naturally accumulate. Typically, this material is stored in large landfills known as confined disposal facilities (CDFs). Like many landfills, locating and constructing new CDFs is difficult and expensive. In cooperation with local stakeholders including the Duluth-Superior Interstate Council, a bi-state planning organization, the Duluth Seaway Port Authority has implemented an innovative project to reuse clean dredge material and extend the life of "Erie Pier," an 89 acre CDF on the Duluth side of Duluth/Superior harbor. Reused material is suitable for highway construction, habitat restoration and mine land reclamation projects.

To prepare dredged material for reuse, it must be sorted to separate fine and course material and drained to reduce moisture content. A processing facility has been constructed on the Erie Pier site to accomplish that goal. Marketing of the material for sale and reuse will be focused on recovering processing costs. This project benefits the community in a variety of ways. For example, it provides a cost effective means of dredged material disposal - one that might last indefinitely. The project minimizes the amount of land that must be committed to dredged material disposal. It creates a source of fill material without requiring mining or excavating of other sites. The project also returns sand and silt - much of which has eroded from up-river sources - to productive use.

Great Ships Initiative
Superior, Wisconsin

A collaboration between the American Great Lakes Ports Association and the Northeast Midwest Institute, the Great Ships Initiative (GSI) was launched in 2004 with the goal of facilitating the development of environmental technology to treat/clean ships' ballast water and eliminate the threat of aquatic invasive species. The project assists technology vendors by offering research and testing services. More than $4.2 million has been raised from a variety of sources including U.S. and Canadian Great Lakes ports, the U.S. Department of Transportation, the National Oceanic and Atmospheric Administration and the U.S. and Canadian Seaway agencies. Research services are provided by the University of Wisconsin-Superior and the University of Minnesota-Duluth. The project manages a $1.6 million technology test center constructed in Superior, Wisconsin. The facility is one of only two such facilities in the United States (the other is located in Key West, FL). It is the only fresh water ballast treatment technology test center in the world.

Clean Diesel Technology Project
Cleveland, Ohio



Land-based equipment, including forklifts, tow motors and cranes, contribute to diesel emissions at ports. In October 2005, the Cleveland~Cuyahoga County Port Authority, Federal Marine Terminals, Caterpillar and the US EPA-Midwest Clean Diesel Initiative partnered to retrofit three cranes, six light-duty forklifts and seventeen heavy-duty forklifts with diesel oxidation catalysts (DOCs). The DOCs are designed to reduce diesel pollution through a retrofit of the diesel exhaust systems. The DOCs are expected to reduce vehicle hydrocarbon emissions by 50%, monoxide emissions by 40% and particulate matter emissions by 20%.

This retrofit initiative was the result of efforts by all of the partners to identify and implement emission reduction solutions to help Northeast Ohio reach attainment of the National Ambient Air Quality Standards (NAAQSs) – health standards - for ozone and fine particulates.

In early 2005, the Cleveland-Cuyahoga County Port Authority was invited to participate in a regional air quality planning effort to identify emission reduction strategies that could assist the region in reaching attainment. The port authority, along with the Lake Carriers Association, assisted the regional process by actively participating and providing sector assessments of the region's emissions inventory as determined by US EPA.

Caterpillar, through a consent decree with US EPA, was required to improve air quality through the retrofits, resulting in the donations of the equipment and installation. Estimated cost of the retrofits was $1000-$1500, for a total project cost of $26,000-$39,000. Federal Marine Terminals (FMT), which owns the cranes and forklifts and is the port's operating agent, worked with Caterpillar to install the retrofits. FMT, with help from Cummins (equipment manufacturer), provided valuable technical vehicle information to assist Caterpillar in selecting the appropriate technology.

Hamilton Harbour Remedial Action Plan
Hamilton, Ontario

The Hamilton Harbour Remedial Action Plan (commonly called "RAP") is a detailed strategy to clean up Hamilton Harbour, which would result in the "delisting" of the harbour as an “Area of Concern”. Remediation of contaminated sediment is one of the priorities of the Hamilton Harbour RAP.

Hamilton Harbour is one of 43 Areas of Concern identified in the *Great Lakes Water Quality Agreement* between Canada and the United States, and under the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem*. Randle Reef is considered to be one of the more complex and highly contaminated sediment sites throughout the Canadian Areas of Concern. The Randle Reef sediments contain elevated levels of polynuclear aromatic hydrocarbons (PAHs) and heavy metals. Environment Canada and its partners (Ontario Ministry of the Environment and Hamilton Port Authority) have developed a multi-partnered team for the Randle Reef Contaminated Sediment Remediation engineering design.

The proposed remediation of Randle Reef involves the construction of an engineered containment facility about 18.5 acres in size. This would cover *in-situ* about 130,000 m3 of sediments contaminated with PAHs and contain in total about 500,000 m3 of contaminated sediments from the immediate surrounding project area.

The sediment containment and cap facility will be multi-purpose. This new facility will perform an important environmental function by eliminating a dead zone at the bottom of the harbour and by preventing further water contamination. The facility will provide new habitat for nature along one edge and a marine terminal on the other. The entire facility will be owned and operated by the Hamilton Port Authority.

The Hamilton Port Authority plays an important supporting role by providing the oversight and financial assistance to engineering design work of the containment facility.

The Hamilton Port Authority invested $1.1 million in financial and service contributions to the Hamilton Harbour Remedial Action Plan from 2001 to 2004. These contributions were applied to projects such as public access, educational activities and habitat restoration. In addition, since 1986, the port authority participated as a stakeholder in the groundbreaking work of developing and implementing the Hamilton Harbour RAP report

and recommendations.

Since 1991 the Hamilton Port Authority has been active in the Bay Area Implementation Team (BAIT) and the RAP Forum (1998 to 2002). The Forum concluded that Hamilton Harbour could be cleaned up, and that with sufficient effort, the work could be completed by 2015. The port authority also contributes time and expertise to a number of RAP committees including:

- Randle Reef Contaminated Sediment Remediation
- Sherman Inlet Restoration
- Fish and Wildlife Habitat Restoration
- Wildlife Management
- Aquatic Plant Control
- Watershed Planning Network.

ENVIRONMENTAL MANAGEMENT

SYSTEM MODEL

Bibliography of Selected Environmental Management Sources

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Environmental Management System Model

for

Great Lakes Ports

This Environmental Management System model was adapted from “Understanding and Implementing an Environmental Management System, A Step-by-Step Guide for Small and Medium-Sized Organizations,” New York State Department of Environmental Conservation, Pollution Prevention Unit (March 2002).

R-16: EMS Manual Revisions

Revision Date	Description	Sections Affected	Revised By (Initials)	Approved By (Initials)

[Insert Organizational Chart - Be sure to note key staff and their role in the EMS development and implementation]

Environmental Policy
(Port Name)

[the Port] is committed to managing environmental matters as an integral part of our business. In particular, it is our policy to assure the environmental integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:

Compliance

We will comply with applicable laws and regulations and will implement programs and procedures to assure compliance. Compliance with environmental standards will be a key ingredient in the training, performance reviews and incentives of all employees.

Risk Reduction, Prevention and Resource Management

We will seek opportunities, beyond compliance requirements, for reducing risk to the environment and we will establish and meet our own quality standards where appropriate.

We will employ management systems and procedures specifically designed to prevent activities and/or conditions that pose a threat to the environment. We will look for ways to minimize risk and protect our employees and the communities in which we operate by employing clean technology, including safe technologies and operating procedures, as well as being prepared for emergencies.

We will strive to minimize releases to the air, land or water through use of cleaner technologies and the safer use of chemicals. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.

We will manage scarce resources such as water, energy, land and forests in an environmentally sensitive manner.

Communication

We will communicate our commitment to our employees, vendors and customers. We will solicit their input in meeting our EMS goals.

Continuous Improvement

We will continuously measure our progress. We will review our progress at least on an annual basis. We will continuously seek opportunities to improve our adherence to these principles and will periodically report progress to our stakeholders.

_____ _____

(President) **(Date)**

1.0 Purpose of This Manual

In order to improve upon the environmental performance of [the Port], an environmental management system (EMS) has been implemented. This EMS manual defines the scope of [the Port] EMS. This Environmental Management System (EMS) has been developed to conform to the ISO 14001: 2004 Environmental Management System Standard and covers all operations at [the Port].

The principal elements of the EMS described in this manual are:

- Environmental Policy
- Environmental Aspects
- Legal and Other Requirements
- Objectives, Targets and Programs
- Resources, Roles, Responsibility and Authority
- Competence, Training and Awareness
- Communication
- Documentation
- Control of Documents
- Operational Control
- Emergency Preparedness and Response
- Monitoring and Measurement
- Evaluation of Compliance
- Nonconformity, Corrective Action and Preventive Action
- Control of Records
- Internal Audit
- Management Review

The EMS provides a mechanism for environmental management throughout all functional areas of our facility. The EMS is designed to cover environmental aspects that a facility can control and directly manage as well as those aspects it does not control or directly manage but can be expected to influence. The EMS Representative will control the manual. This individual will be responsible for maintaining an up-to-date manual that includes all revisions and modifications. The EMS Representative is also responsible for ensuring that all applicable employees receive copies of this document and subsequent revisions. The EMS Representative is responsible for the functioning of the EMS Team, as described in this Manual.

2.0 Statement of Purpose

The following sections present a statement of purpose for each of the elements covered in the EMS. These statements explain why [the Port] needs to conform to the particular element and assigns responsibility for implementation of each element. Each statement of purpose is quite general but references standard operating procedures and other reference material that will assist in the implementation of the element.

2.1 Environmental Policy

A copy of [the Port] Environmental Policy is included at the beginning of this manual. This policy is endorsed by the highest level of management at the facility. The policy covers all activities at the facility and states in broad terms [the Port's] commitment to protecting the environment. Specifically, the policy includes a commitment to continual improvement and prevention of pollution, as well as a commitment to meet or exceed relevant environmental legislation, regulations and other requirements. The policy will be reviewed annually by the EMS Team in compliance with the Environmental Policy procedure (**P-03)**. The initial policy and all subsequent activities will be communicated to all persons working for or on behalf of [the Port] and made available to the public in accordance with the Communication (**P-02**) and Environmental Policy (**P-03**) procedures.

Applicable Procedures:
P-02: Communications
P-03: Environmental Policy

Reference Material:
ISO 14001 Standard (4.2)

2.2 Environmental Aspects

The EMS Team has identified all environmental aspects and related impacts that the facility controls or over which it can be expected to have an influence. The EMS Team has further determined those aspects that are considered significant. This activity has been completed in compliance with the Environmental Aspects Identification procedure (**P-04**). Information pertaining to the environmental aspects identified is included in Appendix A: Aspects, Objectives and Targets.

The EMS Representative is responsible for ensuring that all functional units are aware of the significant environmental aspects that were identified. Further, each department manager is responsible for ensuring that these significant environmental aspects are considered in setting their environmental objectives and targets. This should be accomplished in compliance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**).

The EMS Team shall be responsible for re-evaluating the list of environmental aspects and related impacts whenever the facility changes or implements a new activity or function or makes major changes to facility equipment or infrastructure. At a minimum, the environmental aspects will be re-evaluated on an annual basis.

Applicable Procedures:
P-04: Environmental Aspects Identification
P-05: Legal and Other Requirements
P-06: Setting and Tracking Environmental Objectives and Targets

Reference Material:
ISO 14001 Standard (4.3.1)
Appendix A: Aspects, Objectives and Targets

2.3 Legal and Other Requirements

[the Port] has established an environmental procedure for the purpose of identifying, accessing and communicating legal and other requirements that are applicable to the facility. The EMS Team has developed a list of the facility's legal and other requirements. This information is included in Appendix B: Legal and Other Requirements.

The EMS Representative will be responsible for ensuring that all department managers have an updated list of all the facility's legal and other requirements. This will be done in accordance with the Legal and Other Requirements (**P-05**) and the Communications procedure (**P-02**). The department managers will be responsible for ensuring that their staff is appropriately trained on these requirements. This will be done in accordance with the Training procedure (**P-07**). At least annually the EMS Representative, along with the EMS Team and department managers, will review the most current national, regional, provincial, state and local legal and other requirements as applicable to [the Port]. In addition, the current list will be reviewed and revised as appropriate, whenever a new requirement that is applicable to the facility is adopted.

Applicable Procedures:
P-02: Communications
P-05: Legal and Other Requirements
P-07: Competence, Training and Awareness

Reference Materials:
Appendix B: Legal and Other Requirements
ISO 14001 Standard (4.3.2)

2.4 Objectives, Targets and Programs

The EMS Team has set objectives to improve upon the environmental performance of [the Port]. The appropriate operational managers have assisted with the development of targets and action plans to meet those objectives. [the Port] management has approved of these objectives. More information on the objectives can be found in Appendix A - Aspects, Objectives and Targets.
Objectives and targets are developed considering significant environmental aspects; technological options; prevention of pollution; financial, operational and business plans; legal and other requirements; and the views of interested parties. These objectives and targets will be documented and maintained in accordance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**).

On at least an annual basis the EMS Representative and the EMS Team will be responsible for evaluating the progress made toward meeting existing objectives and for considering the need to develop new objectives. The findings from this annual evaluation should be incorporated into the management review. These activities will be completed in accordance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**) and the Management Review procedure (**P-14**). In addition, the EMS Team will be responsible for amending objectives and targets, if deemed necessary, as a result of new or revised operations, activities, and/or regulations.

The EMS Team establishes environmental management programs (EMPs) as a means for achieving objectives and targets. These programs define the principal actions to be taken, those responsible for undertaking those actions and the scheduled times for their implementation. The EMS Team develops the EMPs with input provided by managers of relevant functional units. The EMPs will be developed following the Setting and Tracking Environmental Objectives and Targets Procedure (**P-06**). The EMPs will be placed in Appendix C - Environmental Management Programs.

The specific roles associated with the implementation of the EMP will be included in the EMP documentation. Aside from these specific responsibilities, the EMS Representative will coordinate the effort to ensure that the EMP is being implemented, monitored and maintained in an appropriate fashion. On an annual basis, the EMS Team will evaluate the progress of the EMP and document their findings and recommendations. Management will consider these findings and recommendations during the EMS management review. These activities will be conducted in accordance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**), and the Management Review procedure (**P-14**).

Applicable Procedures:
P-06: Setting and Tracking Environmental Objectives and Targets
P-14: Management Review

Reference Material:
ISO 14001 Standard (4.3.3)
Appendix A: Aspects, Objectives and Targets
Appendix C: Environmental Management Programs

2.5 Resources, Roles, Responsibility and Authority

Environmental management system roles, responsibilities and authorities are defined at relevant functions and levels within [the Port]. [the Port] management jointly provides the resources essential to the implementation and control of the EMS, including: training, human resources, specialty services, financial resources, and technical and informational services. The EMS Representative has primary responsibility for establishing, operating and maintaining the EMS. In this capacity the EMS Representative will report on the performance of the EMS to management

and delegate authority to complete tasks to other facility personnel. The EMS Team provides routine EMS support as directed by the EMS Representative. Documentation of the EMS structure and various responsibilities of personnel are included in Appendix D - Structure and Responsibilities. The structure and responsibilities of the EMS will be developed in accordance with the Structure and Responsibility procedure (**P-01**).

Applicable Procedures:
P-01: Resources, Roles, Responsibility and Authority

Reference Material:
ISO 14001 Standard (4.4.1)
Appendix D: Structure and Responsibilities

2.6 Competence, Training and Awareness

All employees within [the Port] will be provided with introductory training on the EMS. In addition, the EMS Team, with input from the operational managers, will develop an Environmental Training Plan (ETP) that identifies, plans, monitors and records training needs for personnel whose work may create a significant impact upon the environment. The training plan will also document specific competence levels required for certain key positions at the facility. The development of the ETP will be done in accordance with the Training procedure (**P-07**).

The ETP will be updated on an annual basis by the EMS Team when they evaluate the facility's list of environmental aspects. In addition, the EMS Team will be responsible for amending the ETP, if deemed necessary, as a result of new or revised operations, activities, and regulations. An ETP is included in Appendix E - Environmental Training Plan.

Applicable Procedures:
P-07: Competence, Training and Awareness

Reference Material:
ISO 14001 Standard (4.4.2)
Appendix E: Environmental Training Plan

2.7 Communications

[the Port] has developed a Communications Plan (CP) to ensure that information regarding its environmental aspects and EMS is appropriately communicated to internal personnel and external stakeholders. The CP has been developed to handle internal communications between various levels and functions of the facility, and to receive, document and respond to relevant communications from external stakeholders. The CP is included in Appendix F - Communications Plan.

In general the EMS Representative is responsible for communicating information relevant to the EMS to the facility's management. As authorized by the EMS Representative, the EMS Team and operational managers will communicate information to their staff and to other external stakeholders. All communications relevant to the EMS and the development of the CP will be conducted in accordance with the Communications procedure (**P-02**).

Applicable Procedures:
P-02: Communications

Reference Material:
ISO 14001 Standard (4.4.3)
Appendix F: Communications Plan

2.8 Documentation

To ensure effective operation of the EMS, [the Port] is committed to documenting the EMS and the records associated with its activities. This Manual identifies all documents relevant to the EMS. A copy of EMS documents, other than visual aids and records, can be obtained from the EMS Representative. The EMS documentation system is organized along a three-tier structure that includes:

- Statement of Purpose for each EMS Element (Tier 1)
- Standard Operating Procedures (Tier 2)
- Forms, Records and Plans (Tier 3)

Applicable Procedures:
P-11: Control of EMS Documents
P-12: Control of Records

Reference Material:
ISO 14001 Standard (4.4.4)
EMS Manual

2.9 Control of Documents

[the Port] has established the Control of EMS Documents procedure (**P-11)** for controlling all documents related to the EMS. This procedure describes where documents are located and how and when they are reviewed. The procedure gives the EMS Representative the responsibility of ensuring that current versions are available and that obsolete documents are promptly removed from use or are suitably identified.

Applicable Procedures:
P-11: Control of EMS Documents

Reference Material:
ISO 14001 Standard (4.4.5)

2.10 Operational Control

The EMS Team, along with the managers of specific facility operations, will identify operations and activities related to facility compliance and the identified significant environmental aspects. If applicable, operational controls will be developed or existing controls will be evaluated for each identified operation and activity.

The EMS Representative will delegate authority to a member of the EMS Team for the development of each of the operational controls that are determined to be necessary. The EMS Team member will work with the manager in the specific operational area to draft the operational control. The operational control will take the form of explicit work instructions that set forth the required steps or measures to maintain compliance and move closer to meeting the objectives of the EMS. These operational controls will be developed along with the Environmental Management Programs and in accordance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**). The operational controls will be included in Appendix C: Environmental Management Programs.

Applicable Procedures:
P-06: Setting and Tracking Environmental Objectives and Targets

Reference Material:
ISO 14001 Standard (4.4.6)
Appendix C: Environmental Management Programs

2.11 Emergency Preparedness and Response

[the Port] has developed the Emergency Preparedness and Response procedure (**P-10**) to identify the potential for and to respond to accidents and emergency situations, and to prevent and mitigate the environmental impacts that may be associated with them. Emergency Preparedness and Response plans are reviewed by the EMS Team on an annual basis and after the occurrence of accidents or emergency situations.

Applicable Procedures:
P-10: Emergency Preparedness and Response

Reference Material:
ISO 14001 Standard (4.4.7)
Emergency Preparedness and Response Plans

2.12 Monitoring and Measurement

[the Port] has established the Monitoring and Measurement procedure (**P-08)** to monitor and measure the key characteristics of its operations and activities that can impact compliance and that have a significant impact on the environment. This procedure includes calibration and maintenance requirements and ensures that records will be retained. Data that is relevant to performance that is obtained from these monitoring and measurement efforts will be utilized in the management review in accordance with the Management Review procedure (**P-14**).

Applicable Procedures:
P-08: Monitoring and Measurement
P-14: Management Review

Reference Material:
ISO 14001 Standard (4.5.1)
Compliance Audit Procedures and Documentation

2.13 Evaluation of Compliance

[the Port] will periodically evaluate compliance with applicable legal and other requirements following the Monitoring and Measurement Procedure (**P-08**). *See section 2.12: Monitoring and Measurement.*

2.14 Nonconformity, Corrective Action and Preventive Action

[the Port] has developed the Preventive and Corrective Action procedure (**P-09**) to define responsibility and authority for handling and investigating nonconformity, for taking action to mitigate impacts, and for initiating and completing corrective and preventive action. Any changes in procedures resulting from corrective and preventive actions are implemented and recorded.

Applicable Procedures:
P-09: Preventive and Corrective Action

Reference Material:
ISO 14001 Standard (4.5.3)

2.15 Control of Records

[the Port] has a Records procedure (**P-12**) for the identification, maintenance and disposition of environmental records. These records include training records and the results of audits and reviews. These records are kept to demonstrate conformance with the EMS and applicable regulations. The EMS Representative is responsible for maintaining records that are relevant to the EMS. The functional

units are responsible for maintaining their own environmental records that are not applicable to the EMS.

Applicable Procedures:
P-12: Control of Records

Reference Material:
ISO 14001 Standard (4.5.4)

2.16 Internal Audit

[the Port] incorporates the Internal Audit Procedure (**P-13**) to ensure that the EMS has been properly implemented and maintained. The EMS audits are coordinated by the EMS Representative and conducted on an annual basis. The results are provided to management in accordance with the Management Review procedure (**P-14**). Audits are performed according to a schedule that is based on the environmental importance of an activity and the results of previous audits. All auditors are trained and audit records are kept with the EMS Representative.

Applicable Procedures:
P-13: Environmental Management System Audit
P-14: Management Review

Reference Material:
ISO 14001 Standard (4.5.5)

2.17 Management Review

[the Port] management reviews all elements of the EMS annually to ensure its continuing suitability, adequacy and effectiveness. This review is conducted in accordance with the Management Review procedure (**P-14**). The management review will address the need for changes to the environmental policy, objectives, and other EMS elements. All applicable observations, conclusions and recommendations that result from the management review will be documented and used by the EMS Team to modify the EMS as necessary.

Applicable Procedures:
P-14: Management Review

Reference Material:
ISO 14001 Standard (4.6)

3.0 Standard Operating Procedures

A statement of purpose has been developed for each of the EMS elements and presented in section 2.0 of this manual. In order to properly implement each of these

EMS elements, [the Port] has developed Standard Operating Procedures (SOPs). The SOPs that have been developed to implement [the Port] EMS are included in this section.

STANDARD OPERATING PROCEDURES

Standard Operating Procedure
P-01: Resources, Roles, Responsibility and Authority

1.0 Purpose/Scope

This procedure is used to determine the organizational roles and personnel responsibilities for the company's EMS.

2.0 Definitions

EMS Representative - a management representative who will be responsible for leading the implementation of the EMS

EMS Team - a group of supervisors and employees from major groups or areas within the facility who will assist with the development and implementation of the EMS

3.0 Responsibilities

The EMS Representative has the primary responsibility for assuring that the appropriate structure is in place to develop and implement the EMS. As needed, the EMS Representative will assign responsibility for specific tasks and make assignments to EMS Team members and other facility personnel.

4.0 Procedure

A. The company will first designate an EMS Representative whose role is to provide general oversight of the implementation of the EMS. The EMS Representative and other facility personnel selected by the EMS Representative are responsible for implementing the EMS.
B. The EMS Representative, with input provided from facility management, will select personnel to participate on the EMS Team. The EMS Team will represent key management functions and all operational areas.
C. The EMS Representative will develop and assign EMS roles and responsibilities and document them using standard correspondence and/or the following records:
    1. R-01: Persons Responsible for EMS Development (see Appendix D)
    2. R-02: EMS Development Schedule and Resources Worksheet (see Appendix D)
D. The EMS Representative will communicate EMS roles and responsibilities to all employees.
E. The EMS Representative and other facility personnel will review and update the EMS roles and responsibilities on an annual basis, or as needed.
F. Roles and responsibilities documentation will be retained in Appendix D: Structure and Responsibility of the EMS manual.

5.0 Frequency

The EMS Representative along with the EMS Team will evaluate the applicability of the assigned roles and responsibilities on an annual basis, or as required. If necessary the assigned roles and responsibilities will be modified.

6.0 Related Documents

Records
R-01: Persons Responsible for EMS Development
R-02: EMS Development Schedule and Resources Worksheet

References
Appendix D: Structure and Responsibilities

Standard Operating Procedure
P-02: Communications

1.0 Purpose/Scope

The purpose of this procedure is to ensure effective and timely communication of EMS-related information within the facility and to external entities. This procedure describes processes for communications on various elements of [the Port] EMS.

A variety of processes are used for communication on environmentally related matters. The effectiveness of these communication processes is evaluated on an ongoing basis, through employee surveys, environmental training programs, audits and inspections and informal discussions.

Major topics of communication include:

- Environmental policy, objectives, and targets
- Environmental management roles and responsibilities
- [the Port] performance compared to environmental compliance requirements
- [the Port] performance compared to environmental objectives and targets
- Environmental policies and procedures
- Hazards and emergency situations
- Response to queries, comments, or complaints from stakeholders, including significant environmental aspects.

2.0 Definitions

Internal Communication - all forms of communications between individuals and units within the organization

External Communication - all forms of communication between the organization's personnel and external stakeholders

Stakeholders - individuals or groups concerned with or affected by the environmental performance of an organization

3.0 Responsibilities

A. The EMS Representative is responsible for communicating the organization's environmental policies and procedures to all employees. The EMS Representative is also responsible for communicating roles and responsibilities for environmental management and the results of facility monitoring and measurement activities.
B. Area and functional managers are responsible for communicating environmental targets (and performance vs. objectives and targets) to employees in their areas or functions, as well as to the management team. They are also responsible for communicating environmental procedures (and any changes to the procedures),

results of accident and "near miss" investigations in their areas and other significant environmentally-related information (such as upcoming training classes). In addition, the area and functional managers will be responsible for responding to communications from external stakeholders when requested to do so.

4.0 Procedure

A. General

The EMS Team, with input from area and functional managers, will develop a Communications Plan. At a minimum, the Plan should address the following:

- Targets of Communication - What needs to be communicated to internal personnel, and external stakeholders?
- Means of Communication - What is the most effective means to efficiently communicate to our personnel and stakeholders?
- Frequency of Communication - How often do you need to communicate specific information?
- Communication Objectives - What do you expect to achieve through improved communication?

The Communications Plan will be documented in Appendix F, using the forms R-03: Communications Work Plan, R-04: Communications Form, R-05: Communications Channels, and R-06: Identification of Stakeholders.

B. Internal Communication

All internal communication will be conducted in accordance with the Communications Plan located in Appendix F. At a minimum, internal communications should be conducted as follows:

- All communications with internal personnel that are relevant to the EMS should be initiated and coordinated by the EMS Representative.
- The EMS Representative will ensure that all employees are aware of the facility's environmental policy, the results of the facility's compliance audit and other monitoring and measurement results. The EMS Representative will also ensure that applicable area and functional managers are aware of relevant significant aspects, legal requirements, objectives and targets, environmental management programs and all information required to ensure that the EMS is being implemented correctly.
- The EMS Representative will ensure that facility management is communicating the vision reflected in the company environmental policy to all employees on a regular basis.
- At their discretion, the EMS Representative will delegate authority to communicate some of the items listed above to EMS Team members or other facility personnel.
- Area and functional managers will communicate to their staff all relevant procedures, operational controls, objectives and targets that

they should be familiar with in order to meet the requirements of the EMS.

C. External Communication

All external communication will be conducted in accordance with the Communications Plan located in Appendix F. At a minimum, external communications should be conducted as follows:

- The EMS Representative will ensure that facility management is communicating the vision reflected in the company environmental policy to all external stakeholders on a regular basis.
- All communications relevant to environmental issues should be forwarded to the EMS Representative.
- The EMS Representative will document the receipt of the correspondence on R-07: External Communications Log.
- The EMS Representative will respond to the external communication or forward the communication to an applicable area or functional manager to prepare a response.
- If an area or functional manager is asked to respond to external communications, the EMS Representative should receive a copy of the response.
- The EMS Representative will be responsible for tracking all external communications on R-07: External Communications Log. This information will be included in Appendix F along with the Communications Plan.

5.0 Frequency

The EMS Team will evaluate the Communications Plan on an annual basis or as required.

6.0 Related Documents

Records
R-03: Communications Work Plan
R-04: Communications Form
R-05: Communications Channels
R-06: Identification of Stakeholders
R-07: External Communications Log

References
Appendix F: Communications Plan

Standard Operating Procedure
P-03: Environmental Policy

1.0 Purpose/Scope

This procedure is used to develop, evaluate and continually improve the company's environmental policy.

2.0 Definitions

Environmental Policy- statement of intentions and principles in relation to the overall environmental performance that provides a framework for action and for setting environmental objectives and targets

3.0 Responsibilities

The EMS Representative and the EMS Team are responsible for the development and evaluation of the environmental policy. Facility management will ultimately approve the initial policy and subsequent changes.

4.0 Procedure

A. Environmental Policy Development

1. The EMS Representative will form an EMS Team responsible for developing and writing the environmental policy. The policy will address, at a minimum, compliance, pollution prevention and continual improvement.
2. Once the EMS Team drafts an environmental policy, management will approve the content prior to adoption.
3. The policy will be communicated to all employees and introduced to new employees in accordance with the Communications procedure (**P-02**); the policy will be available in other languages (as appropriate), to the public (on request) and to customers (as appropriate).
4. The EMS Representative will ensure that a current copy of the environmental policy is located at the front of the EMS Manual.

B. Environmental Policy Evaluation and Improvement

1. The EMS Team will evaluate the applicability of the environmental policy on an annual basis or as specific situations warrant.
2. If any changes to the environmental policy are required as a result of this evaluation, the EMS Team will document their recommendations.
3. The recommended changes to the environmental policy that have been documented by the EMS Team will be considered during the management review in accordance with the Management Review procedure (**P-14**).

4. If changes are made to the environmental policy, the modified policy will be communicated to all employees in accordance with the Communications procedure (**P-02).**

5.0 Frequency

The environmental policy will be evaluated on an annual basis or as specific situations warrant.

6.0 Related Documents

Applicable Procedures
P-02: Communications
P-14: Management Review

References
Environmental Policy

Standard Operating Procedure
P-04: Environmental Aspects Identification

1.0 Purpose/Scope

Identify the environmental aspects of the organization's activities, operations and services in order to determine those which may have a significant impact on the environment.

This procedure covers those environmental aspects of activities, operations and services that the organization can control or over which it can be expected to have an influence. Significant environmental aspects identified through this process are considered in the setting of environmental objectives and targets.

A baseline evaluation will be conducted of existing activities, operations, services and compliance requirements. The need for follow-up evaluations is determined based on changes in evaluation methodology or significant changes in the organization's mission, activities or operations.

2.0 Definitions

Environment - surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

Environmental Aspects - element of an organization's activities, operations or services that can interact with the environment

Significant Environmental Aspect - an environmental aspect that has or can have a significant environmental impact

Environmental Impact - any change to the environment, whether adverse or beneficial, wholly or partially resulting from the activities, operations or services of the organization

3.0 Responsibilities

The EMS Representative and the EMS Team are responsible for maintaining a list of environmental aspects and determining which of the aspects are considered significant. Facility management will be responsible for approving the list of significant environmental aspects that are developed by the EMS Team.

4.0 Procedure

A. The EMS Team will evaluate the list of compliance requirements that have been developed in accordance with the Legal and Other Requirements procedure (**P-05),** in order to ensure that compliance requirements are given consideration when developing a list of environmental aspects.

B. The EMS Team will solicit input from all organizational units in order to develop a list of environmental aspects. Separate teams may be formed to evaluate particular groups of operations, activities and services. The EMS Team may call upon other individuals in [the Port], as needed.

C. The Team will consider each of the stages in the life cycle of the organization's operations, activities and services, including (where appropriate):

1. Pre-operation or service strategy (design, procurement, etc.)
2. Operations function (regular)
3. Operations function (periodic or emergency)
4. Use of vendor products and contractor services
5. Disposal/waste management

Operations, services or activities may be "grouped" so that those with similar characteristics can be evaluated concurrently (for instance, energy use can be included as a single aspect even though numerous facility activities consume energy).

D. Results of EMS Team findings are documented. If the EMS Team determines that additional information is needed to evaluate a particular product or activity, the EMS Representative assigns the responsibility for collecting that information to an appropriate team member.

E. The EMS Representative will be responsible for maintaining the list of environmental aspects on form R-08: Identifying Environmental Aspects. A completed copy of this form should be included in Appendix A: Aspects, Objectives and Targets.

F. After developing a list of environmental aspects, the EMS Team will determine which aspects are significant. This determination will be conducted as follows:

1. Any environmental aspects that are associated with non-compliant activities will be considered significant.
2. Once the EMS Team has identified those aspects associated with non-compliant activities, the EMS Team will rate the remaining environmental aspect with respect to the following criteria: regulatory concerns, pollution, risk and natural resource use.
3. Using form R-09: Criteria to Determine Significant Aspects, the EMS Team will develop a total score by scoring each environmental aspect with respect to the criteria noted above.
4. Using form R-09; each aspect can be assigned a relative value of L (lowest impact), M-L (lower impact), M (medium impact), M-H (more impact), and H (most impact). Based on the relative values assigned a total score for each aspect can be derived using the following numerical values: L=1; M-L= 2; M=3; M-H=4; and H=5.
5. The EMS Team can then focus on the environmental aspects that have the highest scores and determine which should be considered significant aspects.

G. Once the EMS Team determines which environmental aspects are significant, the EMS Representative will document the list of significant aspects and obtain approval of the list from facility management. Documentation of the list of significant environmental aspects for each year should be included in Appendix A of the EMS Manual.

H. The EMS Representative is responsible for working with area and functional managers to ensure that significant environmental aspects identified by the team are considered in setting environmental objectives and targets for the site. This should be conducted in accordance with the Communications (**P-02**) procedure and the Setting and Tracking Environmental Objectives and Targets (**P-06**) procedure.

I. The EMS Team should repeat this process on an annual basis. Changes to assessment methodologies or major changes to [the Port]'s mission, operations, and processes may require the EMS Team to repeat this process more frequently than on annual basis. The EMS Team should document their recommended changes to the list of significant environmental aspects. These recommendations will be submitted to facility management and considered as part of the annual management review in accordance with the Management Review procedure (**P-15**).

5.0 Frequency

This procedure should be repeated on an annual basis or as circumstances require.

6.0 Related Documents

Records
R-08: Identifying Environmental Aspects
R-09: Criteria to Determine Significant Aspects

Applicable Procedures
P-02: Communications
P-05: Legal and Other Requirements
P-06: Setting and Tracking Environmental Objectives and Targets
P-14: Management Review

References
Appendix A: Aspects, Objectives and Targets

Standard Operating Procedure
P-05: Legal and Other Requirements

1.0 Purpose/Scope

To ensure that the organization identifies, has access to and evaluates laws, regulations and other requirements that apply to the environmental aspects of its activities, operations and services.

This procedure covers laws, regulations and other requirements established at the federal, state, and local level that apply to the environmental aspects of the organization's activities, services and operations. The organization takes these requirements into account when developing a list of significant environmental aspects in accordance with the Environmental Aspects Identification procedure (**P-04**) and setting its environmental objectives in accordance with the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**). This procedure will ensure that all the facility's compliance requirements are documented.

2.0 Definitions

Applicable laws and regulations - legal requirements promulgated by federal, state or local government authorities that apply to environmental aspects of the organization's products, activities and services

Other requirements – requirements of non-regulatory entities that apply to the environmental aspects of the organization's operations, activities and services (e.g., trade association code of practice)

3.0 Responsibilities

The EMS Representative is responsible for maintaining a current listing of applicable laws, regulations and other requirements and communicating this information to area and functional managers. The area and functional managers are responsible for ensuring that their staff is aware of the laws and regulations that are applicable to their work assignments and that their activities are in compliance with applicable requirements.

4.0 Procedure

A. The EMS Representative is responsible for maintaining a list of applicable legal and other requirements. A current list of applicable laws and regulations will be documented on form R-10: Applicable Legal and Other Requirements and included in Appendix B: Legal and Other Requirements. The EMS Representative will utilize internal personnel resources such as members of the EMS Team, as well as area and functional managers, to assist with this effort and to identify how these legal and other requirements impact specific facility functions.

B. The EMS Representative will utilize a variety of information sources to maintain a current listing of applicable legal and other requirements. These include, but are not limited to: commercial services/databases, information provided by the organization's trade association, communications with federal and state regulatory agencies, company environmental meetings and periodic environmental refresher training. The EMS Representative monitors these information sources on a regular basis to ensure that new issues are identified on a timely basis.

C. As necessary, consultants and attorneys may be called upon to assist the EMS Representative in evaluating applicable laws and regulations or in developing programs in response to applicable laws and regulations. Where consultants and attorneys are used in this manner, the organization's EMS Representative coordinates such efforts through the organization's management.

D. The EMS Representative will be responsible for ensuring that all department managers have an updated list of all the facility's legal and other requirements. This will be done in accordance with the Communications procedure (**P-02**).

E. The area and functional managers will be responsible for ensuring that their staff is appropriately trained on these requirements. This will be done in accordance with the Training procedure (**P-07**).

F. At least annually, the EMS Representative along with the EMS Team and department managers will review the most current national, regional, provincial, state and local legal and other requirements as applicable to [the Port]. In addition, the current list will be reviewed and revised as appropriate whenever a new requirement that is applicable to the facility is adopted.

5.0 Frequency

This listing of applicable laws and regulations and other requirements will be evaluated and updated on an annual basis or whenever new requirements applicable to the facility are adopted.

6.0 Related Documents

Records
R-10: Applicable Legal and Other Requirements

Applicable Procedures
P-02: Communications
P-04: Environmental Aspects Identification
P-06: Setting and Tracking Environmental Objectives and Targets
P-07: Competence, Training and Awareness

References
Appendix B: Legal and Other Requirements

Standard Operating Procedure
P-06: Setting and Tracking of Environmental Objectives and Targets

1.0 Purpose/Scope

The purpose of this procedure is to ensure that the organization establishes and maintains documented environmental objectives and targets. This procedure applies to environmental objectives and targets set at all relevant levels within the organization.

The organization establishes environmental objectives and targets in order to implement the environmental policies. Objectives and targets also provide a means for the organization to measure the effectiveness of its environmental efforts and improve the performance of the environmental management system.

2.0 Definitions

Environmental Objective - overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve and that is quantified where practicable

Environmental Target - detailed performance requirement, quantified where practicable, this is applicable to the organization or parts thereof, that arises from the environmental objectives, and that needs to be set and met in order to achieve those objectives

Environmental Management Program - a program that is linked directly to your objectives and targets by providing a description of the how the goals will be translated into concrete actions so that environmental objectives and targets will be achieved

Operational Controls - work instructions that outline how processes, activities or steps can be controlled in order to mitigate the impact of significant environmental aspects and to ensure that objectives and targets are achieved

3.0 Responsibilities

The EMS Representative is responsible for providing facility management with a preliminary set of environmental objectives. Facility management is responsible for approval of the objectives. The EMS Representative and EMS Team are responsible for authorizing specific targets and developing environmental management programs to achieve each objective.

4.0 Procedure

A. The EMS Representative is responsible for initiating the development of environmental objectives. The EMS Team will begin this process by considering input from area and functional managers, assessing legal requirements and evaluating significant environmental aspects. The EMS Team will then develop a preliminary set of objectives and distribute them to the area and functional

managers for review. After weighing commentary from area and functional managers, the EMS Team will modify the preliminary list of environmental objectives as necessary.

In establishing environmental objectives, the organization considers:

1. Applicable laws, regulations and other requirements
2. Significant environmental aspects of the organization's activities and operations
3. Technological, financial, operational and other business requirements
4. The views of employees and other interested parties.

B. The preliminary list of environmental objectives will be forwarded to the facility's management for review. The organization's top management is responsible for approving environmental objectives.

C. The EMS Representative is responsible for communicating the list of environmental objectives to all area and functional managers. This will be accomplished in accordance with the Communications procedure (**P-02).** The EMS Representative will document the environmental objectives on form R-11: Environmental Objectives and ensure that a current version of this form is included in Appendix A: Aspects, Objectives and Targets.

D. Once environmental objectives are finalized, each area and functional manager identifies the impacts of the objectives in their function or area, establishes targets to achieve the objectives and develops appropriate measures to track progress toward meeting the objectives and targets.

E. The targets identified by the area and functional managers will be evaluated and approved by the EMS Team.

F. Once targets are finalized, the EMS Representative will document the targets for each environmental objective on form R-12: Targets to Achieve Environmental Objectives. These forms will be updated as necessary and included in Appendix A: Aspects, Objectives and Targets.

G. The area and functional managers will identify the need to develop operational controls to achieve the objectives and targets. The development of these controls will be the responsibility of the area and functional managers.

H. The EMS Representative will use the targets and operational controls developed by all the functional areas to develop an Environmental Management Program for each objective. The Environmental Management Program for each objective should be summarized on form R-13: Environmental Management Program. The operational controls that are applicable to each Environmental Management Program should be included with the summary sheets. The EMS Representative will ensure that current copies of this material are available in Appendix C: Environmental Management Programs.

I. Each area and functional manager is responsible for communicating objectives, targets and operational controls to employees and others in their section of the organization.

J. Each area and functional manager is responsible for ensuring that their staff has received appropriate training for each operational control that they have developed. This will be conducted in accordance with the Training procedure (**P-07).**

K. The EMS Team reviews progress toward the objectives and targets on an annual basis. The progress is also communicated to plant employees via bulletin boards, newsletters and other similar means.
L. The EMS Team considers the need for new objectives or modifying existing objectives on an annual basis. This information, along with a report discussing the progress toward meeting the objectives and targets, is provided to management on an annual basis. Management will consider this material during their management review in accordance with the Management Review procedure (**P-14**).

5.0 Frequency

The objectives and targets will be evaluated and modified if necessary, on an annual basis.

6.0 Related Documents

Records
R-11: Environmental Objectives
R-12: Targets to Achieve Environmental Objectives
R-13: Environmental Management Program

Applicable Procedures
P-02: Communications
P-07: Competence, Training and Awareness
P-14: Management Review

References
Appendix A: Aspects, Objectives and Targets
Appendix C: Environmental Management Programs

Standard Operating Procedure
P-07: Competence, Training and Awareness

1.0 Purpose/Scope

This procedure is used to develop and implement a training program that (1) complies with environmental regulations requiring training and (2) addresses environmental aspects and objectives and targets.

2.0 Definitions

Competence – possessing the skill, ability and knowledge to adequately perform an assigned task

Training – a prescribed program during which instruction conveying information about the skills, abilities and knowledge required to adequately perform a task is provided

Awareness – usually, the term applied to training intended to provide employees with basic information about a program, not to increase their level of performance

3.0 Responsibility

The EMS Team, in conjunction with the area and operational managers, will be responsible for the development of an environmental training plan. The area and functional managers are responsible for ensuring that the appropriate employees receive training required under the plan. Area or functional managers or a human resources representative will be responsible for ensuring that all employees receive introductory training on the EMS.

4.0. Procedure

A. Task-Specific Training
    1. A training program will be developed to ensure that employees are capable of accomplishing the tasks required to meet EMS objectives and targets. This program will identify training topics, who should receive the training, when training should be given and the training method. The program will also distinguish between training conducted to comply with environmental regulations and other training.
    2. A critical first step in developing a training program is to assess employee training needs. The EMS Representative, the EMS Team and area and functional managers will review past training and the nature of the employee's work. Based on this review, specific training requirements for each employee or employee classification will be documented.
    3. The EMS Representative will document the training plan on form R-14: Training Plan and include a copy in Appendix E: Environmental Training Program.

4. The area and functional managers will implement the training plan. Upon completion of training by employees, the area and functional managers shall make the EMS Representative aware of the training completed.
5. The EMS Representative will document the training completed on form R-15: EMS Training Log and include a copy in Appendix E: Training Program.
6. Specific documentation pertaining to training received will be maintained by the operational work areas for a minimum of two years, or as required by regulation.
7. Training effectiveness will be evaluated to ensure that the EMS is being implemented effectively when changes are made to significant environmental aspects, objectives, targets or operational controls. Improvements to the training plan will be made accordingly.

B. General EMS Training
   1. All employees shall receive introductory training to make them aware of the EMS.
   2. A management or human resources representative shall be responsible for coordinating the effort to ensure that all new and existing employees have received suitable training.

5.0 Frequency

The training plan shall be updated whenever changes are made to the significant environmental aspects, objectives, targets or operational controls. General EMS training shall be made available on a continual basis to ensure that new employees are made aware of the EMS.

6.0 Related Documents

Records
R-14: Training Plan
R-15: EMS Training Log

References
Appendix E: Training Program

Standard Operating Procedure
P-08: Monitoring and Measurement

1.0. Purpose/Scope

This procedure is used to implement a monitoring and measurement program designed to support the EMS and specific EMS objectives and targets.

2.0 Definitions

Monitoring – a systematic process of watching, checking, observing, inspecting, keeping track of, regulating or otherwise controlling key parameters and characteristics of an organization's management activities to determine conformance with a specific standard or other performance requirement, or to measure progress toward attaining its environmental objectives and target.

Measurement – a systematic method for estimating, testing or otherwise evaluating key parameters and characteristics of an organization's management activities to determine conformance with a specific standard or other performance requirement

3.0 Responsibility

The area and functional managers will be responsible for providing data and monitoring operations that are specific to their functions. The EMS Representative will be responsible for consolidating all the data and conducting facility-wide monitoring.

4.0 Procedure

A. Measurement
    1. The area and functional managers will track the following facility metrics by collecting and charting data relevant to the metric at the frequency indicated below. The EMS Representative shall be responsible for consolidating the data from each functional unit and shall document the following metrics on a facility-wide basis.

Facility Metric	**Data Collection Frequency**

2. The area and functional managers will measure unique parameters that were developed during the Setting and Tracking Environmental Objectives and Targets procedure (**P-06**).
3. The area and functional managers will measure the instances of non-compliance in their areas. The EMS Representative will consolidate this data in order to assess facility-wide compliance.
4. The developed metrics shall be evaluated and revised as objectives and targets are modified and/or added.

B. Monitoring

1. The EMS Representative, the EMS Team and key facility staff will review facility and target-specific measurement and monitoring data every 3 months to identify trends, evaluate progress toward meeting EMS objectives and targets and discuss overall environmental performance.
2. The area and functional managers will ensure that data obtained to monitor their specific activities is continually evaluated to ensure compliance with applicable environmental statutes and regulations.
3. The EMS Representative will be responsible for providing an annual summary of the results of the facility-monitoring program to facility management. The EMS Representative will also be responsible for ensuring that the results of the facility-monitoring program are broadly communicated to all employees in accordance with the Communications procedure (**P-02)**.
4. Facility management will review the annual monitoring report during its management review in accordance with the Management Review procedure (**P-14**).

5.0 Frequency

The monitoring and measurement aspects will be evaluated as objectives and targets are modified or added. A Facility Monitoring Report shall be developed on an annual basis.

6.0 Related Documents

Applicable Procedures
P-02: Communications
P-05: Legal and Other Requirements
P-06: Setting and Tracking Environmental Objectives and Targets
P-14: Management Review

References
Annual Facility Monitoring Report

Standard Operating Procedure
P-09: Preventive and Corrective Action

1.0 Purpose/Scope

The purpose of this procedure is to establish and outline the process for identifying, documenting, analyzing and implementing preventive and corrective actions. Preventive or corrective actions may be initiated using this procedure for any environmental problem affecting the organization.

2.0 Definitions

Preventive Action - is generally a proactive process intended to prevent potential problems before they occur or become more severe

Corrective Action - is generally a reactive process used to address problems after they have occurred

3.0 Responsibility

The EMS Representative is responsible for ensuring that actions are taken to prevent and correct identified problems. The EMS Representative shall delegate responsibility for dealing with individual problems to specific individuals. These individuals are responsible for the development and implementation of the preventive and corrective actions.

4.0 Procedure

A. General
    1. Corrective action is initiated using the Corrective Action Notice (CAN) document as the primary vehicle for communication. Corrective action may be triggered by a variety of events, including internal audits and management reviews. Other items that might result in a CAN include customer or neighbor complaints, results of monitoring and measurement or a finding of non-compliance by a government regulatory agency.
    2. Preventive action is initiated using the Preventive Action Notice (PAN). Preventive action focuses on identifying negative trends and addressing them before they become significant. Events that might trigger a PAN include monitoring and measurement, trends analysis, tracking of progress on achieving objectives and targets, response to emergencies and near misses and customer or neighbor complaints, among other events.
    3. Preventive and corrective action notices are prepared, managed and tracked using the preventive and corrective action log.
    4. The EMS Representative is responsible for reviewing issues affecting the EMS, the application and maintenance of this procedure and any updates to EMS documents affected by the preventive and corrective actions.

5. The EMS Representative is responsible for documenting the CAN or PAN on the preventive and corrective action log and tracking and recording submission of solutions. The requester and recipient of the CAN or PAN are responsible for verifying the effectiveness of the solution. The EMS Representative is responsible for overall tracking and reporting on preventive and corrective actions.
6. Personnel receiving CANs and PANs are responsible for implementing the required corrective or preventive action, reporting completion of the required action to the EMS Representative and assuring sustained effectiveness.
7. The EMS Representative maintains completed records of CANs and PANs for at least two years after completion of the corrective or preventive action.

B. Issuing a CAN or PAN
   1. Any employee may request a CAN or PAN. The employee requesting the CAN or PAN is responsible for bringing the problem to the attention of the manager of their functional area. The area manager then consults with the EMS Representative to determine whether a CAN or PAN is appropriate and enters the appropriate information into the corrective and preventive action log. Responsibility for resolving the problem is assigned to a specific individual ("the recipient").
   2. The EMS Representative, working with the recipient, determines an appropriate due date for resolving the CAN or PAN.

C. Determining and Implementing Corrective and Preventive Actions
   1. The CAN or PAN is issued to the recipient, who is responsible for investigation and resolution of the problem. The recipient is also responsible for communicating the corrective or preventive action taken.
   2. If the recipient cannot resolve the problem by the specified due date, the recipient is responsible for determining an acceptable alternate due date with the EMS Representative.

D. Tracking CANs and PANs
   1. CANs or PANs whose resolution dates are overdue appear as such on the preventive and corrective action logs. The EMS Representative is responsible for notifying the recipients of any overdue CANs or PANs.
   2. Records of CANs and PANs are maintained for at least two years after completion of the corrective or preventive action.

E. Tracking Effectiveness of Solutions
   1. The recipient of a CAN or PAN, in conjunction with the requester, is responsible for verifying the effectiveness of the solution. If the solution is not deemed effective, the CAN or PAN will be reissued to the original recipient.

5.0 Frequency

Corrective or preventive actions shall be initiated whenever the need to take action arises.

6.0 Related Documents

Records
R-17: Preventive/Corrective Action Notices (PANs) (CANs)
R-18: Preventive and Corrective Action Log

Standard Operating Procedure
P-10: Emergency Preparedness and Response

1.0 Purpose/Scope

This procedure is used to anticipate, document, prepare and review emergency events and preparedness plans.

2.0 Definitions

Emergency Preparedness and Response – the preparation and activation of a plan with specific procedures describing the actions of facility employees and others in response to an abnormal event at or involving the facility

3.0 Responsibility

The EMS Representative is responsible for coordinating the development of a facility Emergency Response Plan and developing Emergency Incident Reports for all emergency response activities.

4.0 Procedure

A. The EMS Representative, the EMS Team and other facility personnel are responsible for identifying dangers, taking proactive steps to prevent emergency incidents and completing tasks in preparation for emergencies.
B. The EMS Representative will coordinate the preparation and upkeep of an Emergency Response Plan that contains all emergency procedures required by local, state and federal regulatory agencies.
C. The EMS Representative will require the area and functional managers to prepare an Emergency Response Plan relevant to their activities.
D. The area and functional managers will familiarize and train employees and emergency personnel on the procedures described in the Emergency Response Plan. This shall be accomplished in accordance with the Training procedure (**P-07**).
E. For each emergency incident, the EMS Representative, area and functional managers and the involved employees will determine the cause of the emergency, evaluate the response to the incident and identify actions to be taken to minimize its recurrence. The EMS Representative shall be responsible for documenting this information in an Emergency Incident Report.
F. At least annually, the EMS Representative, the EMS Team and other facility personnel will review the Emergency Response Plan and any emergency incidents that occurred since the last review. This activity will be conducted on a more frequent basis if facility conditions warrant.
G. The EMS Representative will maintain documentation on emergency response and preparedness and emergency incidents for at least five years.

5.0 Frequency

The Emergency Response Plan will be evaluated on an annual basis or as conditions warrant. Emergency incidents will be documented in compliance with this procedure as they occur.

6.0 Related Documents

Records
Emergency Incident Reports

Applicable Procedures
P-07: Competence, Training and Awareness

References
Emergency Response Plan

Standard Operating Procedure
P-11: Control of EMS Documents

1.0 Purpose/Scope

This procedure establishes a process for the review, distribution and implementation of documents that describe and control the EMS. The procedure applies to the following documents (and any changes to them) that must be controlled: the EMS manual, facility-wide environmental procedures, process-specific or activity-specific procedures and work instructions and forms, checklists and drawings used for EMS purposes.

2.0 Definitions

Document – information and its supporting medium, which may be paper, electronic, optical, photographic or a combination

3.0 Responsibility

The control of the EMS manual and all facility-wide procedures and records is the responsibility of the EMS Representative. The control of process or activity specific procedures and records is the responsibility of the applicable area or functional manager.

4.0 Procedure

A. General
    1. Distribution lists are maintained by the EMS Representative. Document distribution may be either controlled or uncontrolled.
    2. Depending on the type of document, controlled copies are identified by stamp, signature or other similar means.
    3. Uncontrolled copies of documents may exist for illustrative, instructional, knowledge preservation or external distribution purposes only.
    4. All controlled documents are approved prior to issue and are marked with the revision number and date.
    5. The originator of the document or the EMS Representative may determine initial distribution of documents.
    6. Unless otherwise specified, the originator of a document is responsible for review and approval of any subsequent changes to the document.
    7. The EMS Representative is responsible for removal of obsolete controlled documents from all points of issue and use.
    8. The EMS Representative is responsible for ensuring that changes to controlled documents are understood, distributed and communicated to the affected functions within the organization.
    9. All controlled documents are listed on the EMS Document Index. The Index shows the date(s) of any revisions and the person(s) initiating the revisions. The EMS Representative shall be responsible for maintaining this list.

10. All revisions to documents included in the EMS Manual shall be noted on form R-16: EMS Manual Revisions. This form shall be kept up-to-date by the EMS Representative and shall be located at the beginning of the EMS Manual.

B. EMS Manual
   1. Copies of the EMS Manual are numbered sequentially. Distribution of controlled copies is the responsibility of the EMS Representative.
      - Controlled copies are stamped “Controlled” with the distribution date.
      - Uncontrolled copies can be issued by the EMS Representative. All uncontrolled copies are stamped “Uncontrolled - For Reference Only."
   2. A Distribution List of controlled documents is maintained by the EMS Representative. Each recipient initials the Distribution List to indicate his/her receipt of the Manual.
   3. Each individual issued a controlled copy of the EMS Manual is responsible for its safekeeping.
   4. Uncontrolled copies of the EMS Manual may be distributed outside the organization (for example, to customers). All uncontrolled copies are stamped “Uncontrolled – For Reference Only.”

C. Facility-wide Procedures
   1. Revision of facility-wide procedures is controlled and is the responsibility of the EMS Representative.
   2. Distribution of facility-wide procedures is specified on the Distribution List.
   3. The EMS Representative is responsible for distributing new and revised procedures. A copy of the Distribution List is signed and dated by the EMS Representative and initialed by each recipient. This copy of this list is maintained for at least one year.
   4. When a new individual must be added to the controlled distribution of a procedure, the requester notifies the EMS Representative. The EMS Representative is then responsible for updating the Distribution List.
   5. Control of forms, checklists and drawings used for EMS purposes follows the same process as described in steps B.1. through B.4. (above).

D. Operations-Specific or Activity-Specific Procedures and Work Instructions
   1. Revision of operations-specific or activity-specific procedures and work instructions is the responsibility of the applicable area or functional manager.
   2. Distribution of operations-specific or activity-specific procedures and work instructions is specified on the Distribution List. Controlled copies are stamped “Controlled” with the distribution date.
   3. The area or functional manager is responsible for distribution of new or revised procedures and work instructions. A copy of the Distribution List is signed and dated by the area and functional manager and initialed by each recipient. This copy of the list is maintained for at least one year.

5.0 Frequency

This procedure shall be implemented on a continual basis.

6.0 Related Documents

Records
R-16: EMS Manual Revisions

Applicable Procedures
P-12: Control of Records

References
Distribution Lists
EMS Document Index

Standard Operating Procedure
P-12: Control of Records

1.0 Purpose/Scope

This procedure is used to identify, maintain and dispose of EMS records. The procedure is applicable to all facility operations and activities that create records associated with the EMS.

2.0 Definitions

Records - documented information that is evidence of an environmental activity or event that has been performed or that is required to be retained for future reference

3.0 Responsibility

The EMS Representative is responsible for identifying records that must be maintained as part of the EMS. The EMS Representative will maintain the records that pertain to the entire facility. The applicable area or functional manager will maintain the records that are specific to a process or activity.

4.0 Procedure

A. The EMS Representative, the EMS Team and other facility personnel are responsible for identifying records that will be maintained by the company as part of the EMS and ensuring compliance with environmental statutes and regulations.
B. The EMS Representative will maintain all records that pertain to the entire facility in a single location. The area or functional managers will be responsible for maintaining records that are applicable to their specific operations and activities.
C. The EMS Representative will maintain an EMS Document Index of all records that are maintained as part of the EMS. The EMS Document Index will note the person responsible for the last revision and the length of retention for each type of record.
D. The EMS Representative will identify and note on the EMS Document Index any restrictions on records necessary for security.
E. The EMS Representative, the EMS Team and other facility personnel will review the records and purge obsolete records at least every 3 months.

5.0 Frequency

This procedure shall be implemented on a continual basis.

6.0 Related Documents

Applicable Procedures

P-11: Control of EMS Documents

References
EMS Document Index

Standard Operating Procedure
P-13: Environmental Management System Audit

1.0 Purpose/Scope

The purpose of this procedure is to define the process for conducting periodic audits of the EMS. The procedure defines the process for scheduling, conducting and reporting of EMS audits.

This procedure applies to all internal EMS audits conducted at the site. The scope of EMS audits may cover all activities and operations comprising the EMS or selected elements thereof.

2.0 Definitions

Audit – a systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the environmental management system audit criteria established by the organization are fulfilled

Lead Auditor – an individual who is specifically trained to conduct internal audits pursuant to the EMS Standard

3.0 Responsibility

The EMS Representative is responsible for coordinating the completion of all audits and for maintaining relevant records. The Lead Auditor is responsible for conducting the audit and documenting the results. The area or functional managers are responsible for implementing any follow-up activities that result from the audit.

4.0 Procedure

A. General
    1. Internal EMS audits will focus on verifying that activities conform to documented procedures and that corrective actions are undertaken and are effective.
    2. Trained auditors conduct all audits. Records of auditor training are maintained in accordance with the Records procedure (**P-12**).
    3. When a candidate for EMS auditor is assigned to an audit team, the Lead Auditor will prepare an evaluation of the candidate auditor's performance following the audit.
    4. The EMS Representative is responsible for maintaining EMS audit records including a list of trained auditors, auditor training records, audit schedules and protocols and audit reports.
    5. EMS audits are scheduled to ensure that all EMS elements and facility functions are audited at least once each year.

6. The EMS Representative is responsible for notifying EMS auditors of any upcoming audits a reasonable time prior to the scheduled audit date. Areas and functions subject to the EMS audit will also be notified in a reasonable time prior to the audit.
7. The Lead Auditor is responsible for ensuring that the audit, audit report and any feedback to the plant areas or functions covered by the audit is completed per the audit schedule.
8. The EMS Representative, in conjunction with the Lead Auditor, is responsible for ensuring that Corrective Action Notices are prepared for audit findings, as appropriate. This shall be conducted in accordance with the Preventive and Corrective Action Procedure (**P-09**).

B. Audit Team Selection - One or more auditors comprise an audit team. When the team consists of more than one auditor, the EMS Representative will designate a Lead Auditor. The Lead Auditor is responsible for audit team orientation, coordinating the audit process and coordinating the preparation of the audit report.

C. Audit Team Orientation - The Lead Auditor will ensure that the team is adequately prepared to initiate the audit. Pertinent policies, procedures, standards, regulatory requirements and prior audit reports are made available for review by the audit team.

D. Written Audit Plan - The Lead Auditor is responsible for ensuring the preparation of a written plan for the audit. The EMS Audit Plan Summary form may be used as a guide for this plan.

E. Prior Notification - The plant areas and/or functions to be audited are to be notified in a reasonable time prior to the audit.

F. Conducting the Audit
1. A pre-audit conference is held with appropriate personnel to review the scope, plan and schedule for the audit.
2. Auditors are at liberty to modify the audit scope and plan if conditions warrant.
3. Objective evidence is examined to verify conformance to EMS requirements, including operating procedures. All audit findings must be documented.
4. Specific attention is given to corrective actions for audit findings from previous audits.
5. A post-audit conference is held to present audit findings, clarify any misunderstandings and summarize the audit results.

G. Reporting Audit Results
1. The Lead Auditor prepares the audit report, which summarizes the audit scope, identifies the audit team, describes sources of evidence used and summarizes the audit results.
2. Findings requiring corrective action shall be dealt with in accordance with the Preventive and Corrective Action procedure (**P-09**).

H. Audit Report Distribution
1. The EMS Representative is responsible for communicating the audit results to responsible area or functional managers. The EMS Representative makes copies of the audit report available.

2. The EMS Representative is responsible for ensuring availability of audit reports for purposes of the annual management review.

I. Audit Follow-up
   1. Management in the affected areas or functions is responsible for any follow-up actions needed as a result of the audit.
   2. The EMS Representative is responsible for tracking the completion and effectiveness of corrective actions.

J. Record Keeping
   1. Audit reports are retained for at least two years after the date of audit completion. The EMS Representative is responsible for maintaining such records.

5.0 Frequency

All EMS activities shall be audited on an annual basis.

6.0 Related Documents

Records
EMS Audit Report
Corrective Action Notices (CANs)

Applicable Procedures
P-09: Preventive and Corrective Action
P-12: Control of Records
P-14: Management Review

References
EMS Audit Plans

EMS Audit Plan Summary

Area or Function to be Audited	Lead Auditor	Audit Team Members	Target Date	Special Instructions

Sample Communication to Audit Team
ENVIRONMENTAL MANAGEMENT SYSTEM AUDIT

Lead Auditor:

Audit Team Members:

Audit Area: Target Due Date:

Listed above is the area to be audited. The due date given is the target to have the entire audit completed, including the report and follow-up meeting with the responsible area management. Listed below are the areas of EMS criteria that you are to assess. If you have any questions, please call me.

Special instructions, if any, are listed below. Thank you for your help. Effective audits help make an effective EMS.

__ Policy

__ Environmental Aspect Identification

__ Structure and Responsibility

__ Communication

__ Document Control

__ Emergency Preparedness

__ Evaluation of Compliance

__ Records

__ Management Review

__ Legal and Other Requirements

__ Objectives, Targets and Programs

__ Training, Awareness, Competence

___ EMS Documentation

__ Operational Controls

__ Monitoring and Measurement

__ Nonconformance / Corrective Action

__ Management System Audits

Special Instructions:

EMS Representative (signature) _____

Standard Operating Procedure
P-14: Management Review

1.0 Purpose/Scope

The purpose of this procedure is to document the process and primary agenda of issues to be included in the Management Review meetings for evaluating the status of the organization's EMS. This procedure applies to all Management Review meetings conducted by the organization.

2.0 Definitions

Management – the highest level of authority within the organization for which the environmental management system is applicable.

3.0 Responsibility

The EMS Representative shall be responsible for coordinating the Management Review and providing the data and information needed to accomplish the review. The EMS Representative shall also be responsible for action items that result from this effort.

4.0 Procedure

A. The Management Review process is intended to provide a forum for discussing needed improvements to the EMS. It provides management with a vehicle for making changes to the EMS that are necessary to achieve the organization's goals.
B. The EMS Representative is responsible for scheduling and conducting at least one Management Review meeting per year. The EMS Representative is also responsible for ensuring that necessary data and information are collected prior to the meeting.
C. At a minimum, each Management Review meeting will consider the following:
    1. The suitability, adequacy and effectiveness of the environmental policy
    2. The suitability, adequacy and effectiveness of the environmental objectives and targets (as well as the organization's current status against these objectives and targets)
    3. The overall suitability, adequacy and effectiveness of the EMS reflecting changing circumstances and overall environmental performance
    4. The status of corrective and preventive actions
    5. The results of any EMS audits and regulatory compliance evaluations conducted since the last Management Review meeting
    6. Communications from external interested parties, including complaints
    7. Recommendations for improvements
    8. The results of any action items from the previous Management Review meeting

D. Minutes of the Management Review meeting will be documented. These meeting minutes will include, at a minimum:
   1. A list of attendees
   2. A summary of key issues discussed
   3. Any actions items arising from the meeting

E. A copy of the meeting minutes will be distributed to attendees and to any individual assigned action items. A copy of the meeting minutes will also be retained on file.

F. The EMS Representative is responsible for ensuring that action items resulting from the Management Review receive appropriate attention. These action items shall be dealt with in accordance with the applicable standard operating procedures.

5.0 Frequency

A Management Review shall be conducted on an annual basis.

6.0 Related Documents

Records
Management Review Meeting Minutes

Applicable Procedures
P-03: Environmental Policy
P-06: Setting and Tracking Environmental Objectives and Targets
P-08: Monitoring and Measurement
P-09: Preventive and Corrective Action
P-13: Environmental Management System Audits

APPENDICES

Appendix A: Aspects, Objectives and Targets

Environmental Aspects

R-08: Identifying Environmental Aspects

Input/Output	Environmental Aspect	Environmental Impact

R-09: Criteria to Determine Significant Aspects

Criteria												
Aspect	Regulatory Concerns	Pollution	Risk							Natural Resource Uses	Score or Rank
			Effects of Chemicals and Materials		Workers (Exposure)	Community (Exposure)	Environment (Exposure)	Noise	Safety		
			Humans	Environment							

Listing of Significant Environmental Aspects - Year _____

Environmental Aspect	Facility Operation	Objectives & Targets Developed (Y/N)	Responsible Manager

Environmental Objectives and Targets

R-11: Environmental Objectives - Year_____

Objective	Applicable Significant Environmental Aspect	Related Environmental Policy Provision	Performance Measurement Indicator

R-12: Targets to Achieve Environmental Objectives

Environmental Objective #_____:_____	
Target	Description of Target

Appendix B: Legal and Other Requirements

R-10: Applicable Legal and Other Requirements

Regulatory Agency or Other Organization	Regulation and Specific Provision or Other Requirement	Operation to Which Provision Applies

Appendix C: Environmental Management Programs

R-13: Environmental Management Program

Objective:	Year: _____
Target #1	
Action Items	
Operational Controls	
Responsible Person(s)	
Schedule	
Budget	
Comments	
Target #2	
Action Items	
Operational Controls	
Responsible Person(s)	
Schedule	
Budget	
Comments	
Target #3	
Action Items	
Operational Controls	
Responsible Person(s)	
Schedule	
Budget	
Comments	

Appendix D: Structure and Responsibilities

R-01: Persons Responsible for EMS Development

Roles	Individual Responsible	% of Time Designated
"Management representative" having responsibility for implementing the EMS (in a small business, this person could be the owner)		
Identifying and determining applicability of legal and other requirements		
Competency-based training		
Operational controls		
Emergency preparedness and response		
Monitoring and measurement of "key characteristics" of operations and activities that can have significant environmental impacts (i.e., the "significant environmental aspects")		
Periodic evaluations of environmental compliance		
Handling and investigating nonconformance with the EMS		
Records management		
Internal EMS audits		

R-02: EMS Development Schedule and Resources Worksheet

Section	Participants	Budget	Target Completion
Getting Started: Management Commitment, Representative, Team, Employee Support, Preliminary Review, Schedule and Plan			
Intermediate steps: (Fill in)			
Identify Environmental Aspects			
Intermediate steps: (Fill in)			
Establish Objectives and Targets			
Intermediate steps: (Fill in)			
Develop Environmental Management Program			
Intermediate steps: (Fill in)			
Prepare Procedures and Documents			
Intermediate steps: (Fill in)			
Assess EMS Performance: Monitoring and Measurement, Nonconformance and Corrective and Preventive Action, Audits			
Intermediate steps: (Fill in)			
Establish Continuing Improvement: Management Review			
Intermediate steps: (Fill in)			
Date completed:	Contact person:		

Appendix E: Environmental Training Plan

R-14: EMS Training Plan

Jobs Affecting Environment	Training Needs	Training Method	Course Length	Budget	Completion Date	Who is Responsible?

R-15: EMS Training Log Year: _____

Topic Title	Attendees	Frequency	Training Method	Course Length	Comments	Date Completed

Appendix F - Communications Plan

R-03: Communication Work Plan

Target Audience	Subject to Communicate	Mode of Communication	Date	Cost	Person Responsible

Date Completed: _____ Contact Person: _____

R-04: Communications Form

Type of Information	Frequency of Communication	Audience	Training	Staff Meeting	Individual Meeting	Bulletin Board	Newsletter	Other
Company Environmental Policy								
Identification of Environmental Aspects								
Prioritization of Environmental Aspects								
Compliance Awareness								
Targets and Objectives								
Individual EMS Responsibilities								
Process Change								
Emergency Preparedness and Response								
Monitoring and Measurement								
Corrective and Preventive Action								
Results of Audits and Management Review								
Other								

R-05: Communication Methods

Method	Frequency	Recipients
Newsletter		
Bulletin Board		
Information Meetings		
E-Mail		
Pay Check Inserts		
Advertising		
Other:		

R-06: Identification of Stakeholders

Stakeholders	What you want to tell them	What you want them to tell you	How to communicate with/tell them

R-07: External Communications Log

Communication From	Type	Subject	Date Received	Response Needed (Y/N)	Who Will Respond	Response Type	Response Date	Follow Up Needed (Y/N)

Appendix G: Preventive and Corrective Action

R-17: Preventive/Corrective Action Notice

Check Box □ Preventive Action Notice No. _____Date: _____
□ Corrective Action Notice No. _____Date: _____

Department/Function:_____
Department Representative: _____
EMS Section No.: _____ EMS Procedure No.: _____

Issues to be Addressed: _____
_____
_____
_____
_____
_____

EMS Representative (signature): _____
Auditor (signature): _____
Originator (signature)_____

Preventive/Corrective Action: _____
_____
_____
_____
_____
_____

Target Date for Action: _____
Assigned to: _____ Date: _____
EMS Representative (signature): _____ Date: _____
Department Representative (signature): _____Date: _____

Approval of Preventive/Corrective Action
EMS Representative (signature): _____
Department Representative (signature): _____
Modification of Preventive/Corrective Action (if any):_____
_____
_____
_____
_____

Date of Implementation: _____

R-18: Preventive/Corrective Action Log

PAN #	Date	CAN #	Date	EMS Section #	EMS Procedure #	Dept.	Target Date	Implementation Date

Environmental Management Program

Documentation Form

Name of Port _____ Document Control No.: _____
Date: _____

Environmental Management Program

1. Program Name: _____

2. Lead Person: _____ Contact No.: _____

3. Environmental Aspect(s): _____
   _____
   _____

4. Potential Environmental Impact(s): _____
   _____
   _____

5. Legal & Other Requirements (applicable to the Aspect(s)):_____
   _____
   _____

6. Operational Controls
   A. Activity that exhibits the Environmental Aspect: _____
   _____
   Operational Controls (technical or administrative): _____
   _____
   Person Responsible for Controls: _____
   Monitoring & Measurement of Controls: _____
   _____
   Records Generated by Controls: _____
   _____
   Backup Strategies if Controls Fail: _____
   _____

[Repeat for additional Activities]

7. Environmental Management Program Description: _____
   _____
   _____

8. Objectives & Targets
   Objective A: _____
   _____
   Target Date to Achieve Objective: _____
   Progress Indicators: _____
   _____

Tasks Required to Achieve Objective: _____
_____
Date of Completion: _____
Person Responsible: _____
Resources Available: _____
_____

[Repeat for additional Objectives]

9. Other Related Records and Documents (title, reference or control no., storage location): _____
_____
_____

10. Authorization
Name: _____ Signature: _____
Title: _____ Date: _____

*Modified from "Inside Environmental Management Programs" by Joe Cascio, consultant with Booz Allen Hamilton, Tysons Corner, VA., in ESU-Environmental Systems Update, Vol. 17, No. 5, 2007