Environmental Considerations in Terminal Operations

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Marine Terminal Management Training Program

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Dead Whale Hitchhikes Up Bay After Hit By Ship

35-foot, 8 ½ ton , Sei Whale

“An Endangered Species”

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Laws and Regulations

- The Maine Mammal Protection Act (MMPA) – administer by NMFS (National Marine Fisheries Service – Part of NOAA)
- Many Other Laws, that Port/Terminal Operators Need to be Aware of:
  - The Clean Water Act
    - Section 404 of the Clean Water Act
  - The National Environmental policy Act (NEPA)
  - The Endangered Species Act (ESA),

New Terms Are Everywhere

"Green Port"

"No Net Increase"

"Sustainability"

"Environmental Management Systems" (EMS)

What Is A Green Port?

- A Port (or Terminal) that is Committed to Good, Sound Environmental Policies
- Port of Long Beach Green Port Policy:

1. Protect the local community and environment from harmful port impacts;
2. Employ the best available technology to minimize port impacts and explore advance technology solutions;
3. Promote sustainability in terminal design, development and operations;
4. Distinguish the Port as a leader in environmental stewardship and regulatory compliance; and,
5. Engage and educate the community about Port development and environmental programs.

Air Quality is The Big Issue of the Day

- " No Net Increase" – means being able to reduce total emissions, even as your business grows
- Emissions from vessels, cargo handling equipment and motor vehicles account for 80% of all air pollution at Ports

Air Pollution Sources

- For Ports, Focus is on Mobil Emission Sources
  - Oceangoing vessels (OGVs);
  - Harbor Craft
  - Cargo Handling Equipment (CHE)
- Other land-side Mobile emission sources at ports Include:
  - Locomotives
  - On-highway vehicles

Ways to Reduce Air Polluting Emissions

- Alternative Maritime Power, or “AMP,”
- Use of low-emission or non-polluting fuels in Vehicles and Cargo handling Equipment
  - Low Sulfur Fuels
  - Electricity
  - Natural gas,
- Institute Vessel Speed Reduction Programs
- Use Electric-Powered Cranes and Terminal Equipment
- Retrofit Older Vehicles and Vessels
- Provide for Off-Peak Truck Operations

Cold-Ironing or Alternative Maritime Power

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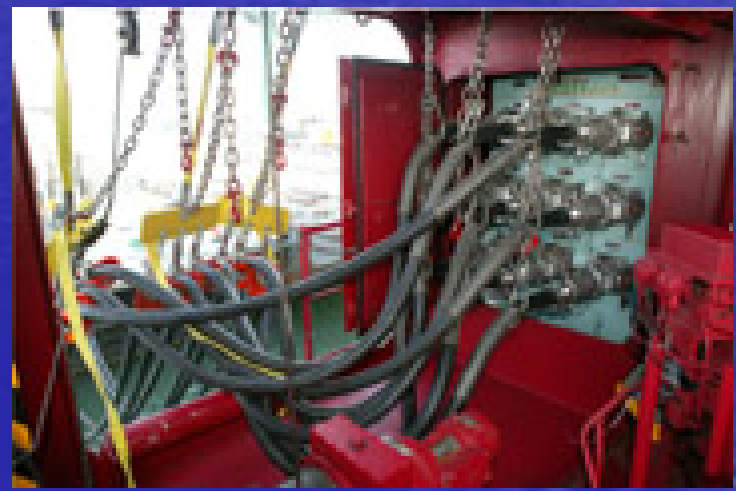
Cold-Ironing or Alternative Maritime Power (AMP)

- Cold-ironing refers to shutting down auxiliary engines on ships while in port and connecting to electrical power supplied at the dock,

  If all ships calling ports were cold-ironed, hotelling emissions would be reduced by 95 percent



Examples of APM Success

- Since implementing a AMP program the POLA:
  - received more than 50 vessel calls,
  - eliminated more than 80 tons of pollutants from the air,
  - average reduction of 95% in NOx, SOx, and PM per vessel call.
- The Port of Seattle has provided AMP facilities that allows cruise vessels to plug into shore power- reducing cruise ship air emissions by about 30 percent

Use of Alternative Fuels

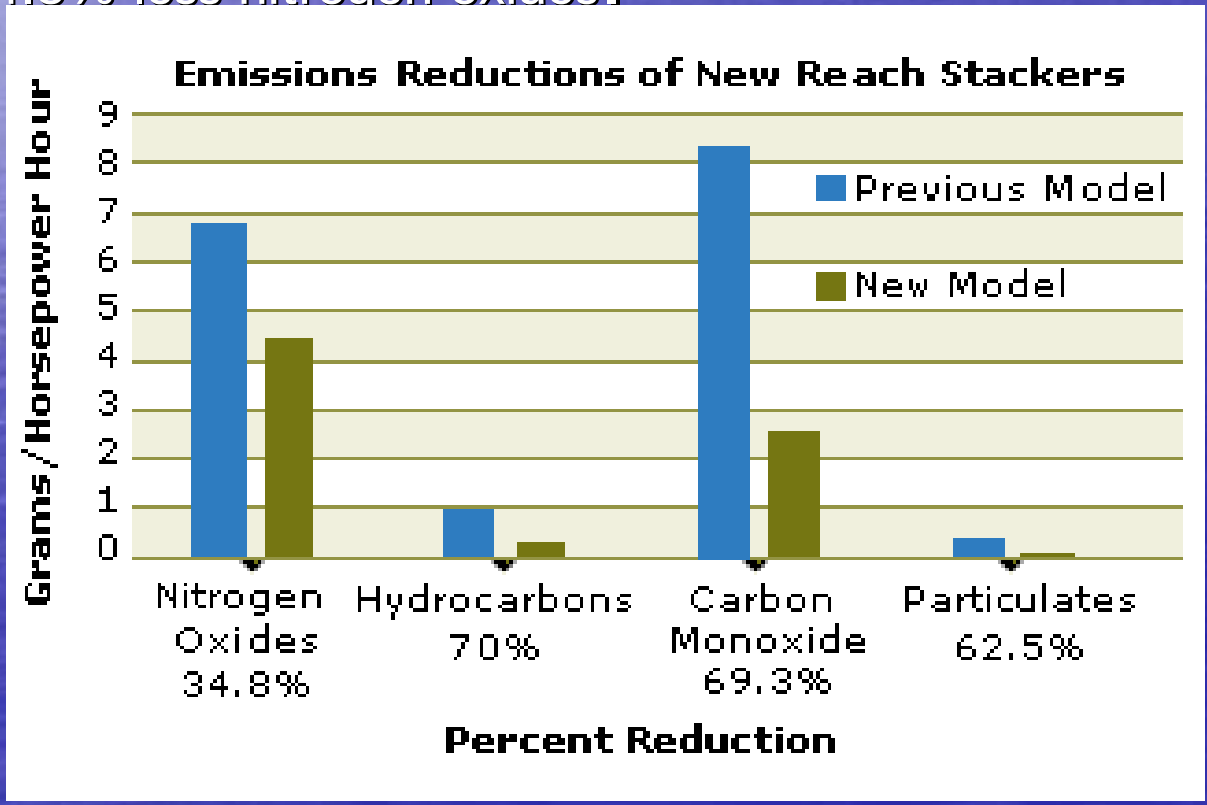
- Emissions from diesel engines using the alternative diesel fuel and outfitted with diesel oxidation catalysts produce 50 percent less particulate matter and 20 percent less nitrogen oxides.

Husky Terminal, Port of Tacoma

- Switched 31 yard tractors and all cargo handling equipment to the cleaner-burning, vegetable based biodiesel,
- Reduced sulfur oxides by as much as 99 percent, compared to standard diesel fuel.

Reach Stacker Replacement
Port of Portland

Purchased new reach stackers, which produce 62.5% fewer diesel particulates, 69.3% less carbon monoxide, 70% fewer hydrocarbons and 34.8% less nitrogen oxides.



Port of Tacoma Air Quality Improvement Measures

- Purchased and installed EPA-verified diesel oxidation catalysts on 30 straddle carriers.
- The Port is replacing Port-owned vehicles with hybrid vehicles.
- Four of the Port of Tacoma's six container terminals use ULSD (Ultra-Low Sulfur Diesel)
- Of the Port's 54 forklifts, 22 are powered by propane, a clean fuel.
- Low sulfur diesel is used in the locomotives for switching operations

Truck Traffic Improvements

- At the Ports of LA and LB, an Off-Peak program, that provides an incentive to use off-peak terminal gates has been implemented
- If a container is moved during one of the off-peak terminal gates or via rail, there is a “fee refund”
- Projected to increase off-peak gate usage to more than 40 percent,
- Has successfully reduced truck-waiting time inside port terminals and truck traffic during peak daytime commuting periods.

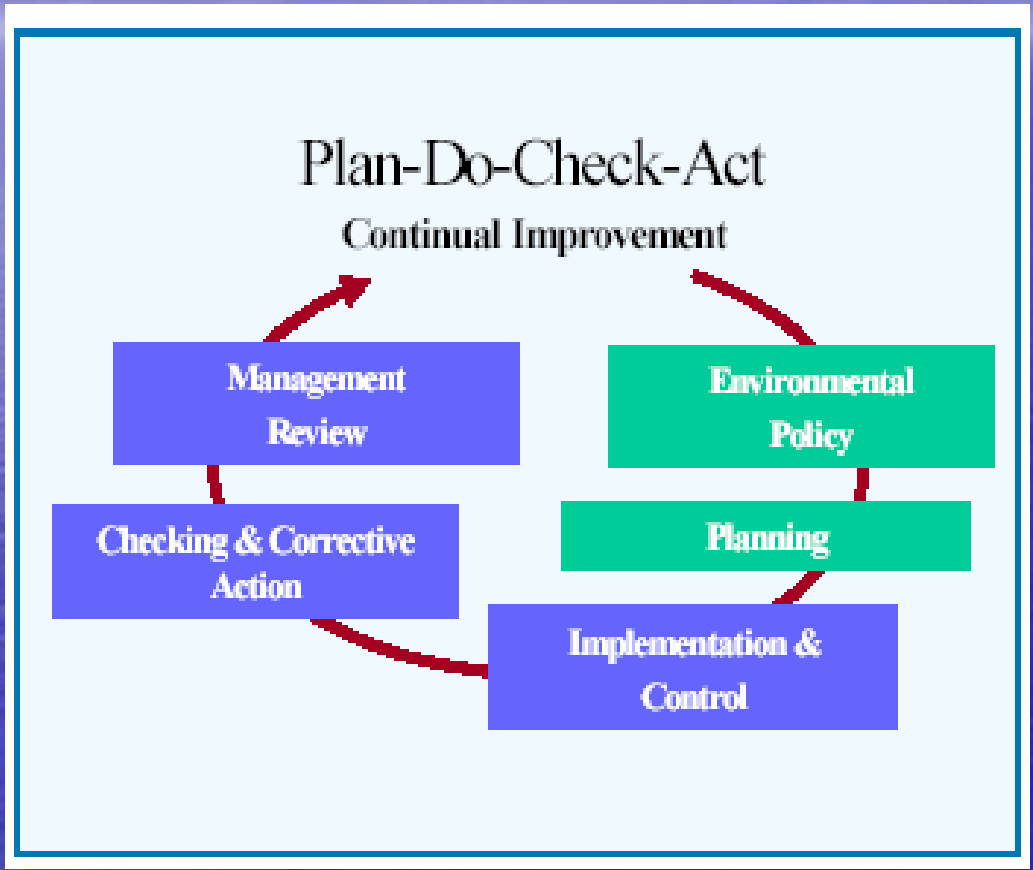
Environmental Management System (EMS)

- An EMS is the establishment of management processes and procedures that allow an organization to improve their environmental awareness and procedures.
- Benefits include:
  - improved overall environmental performance,
  - expanded pollution prevention opportunities
  - improved compliance, and
  - enhanced operational control and efficiency.

Key to Success

- Top management support
- Integration in Existing Port Management System
- Dedicated Resources
- Employee buy-in
- Access to most effective practices
- Strong core and implementation teams
- Training

Pan-Do-Check-Act



The Port of Houston Authority (PHA) EMS

- The Port of Houston Authority (PHA) implemented an the EMS effort focused on environmental issues in the following areas:
  - stormwater impacts,
  - air emission reductions, and
  - waste minimization.
- In two years, the PHA's EMS has
  - minimized stormwater impacts,
  - reduced absorbent disposal by 75% and nitrogen oxide emissions by 3 tons, and
  - completely eliminated the disposal of oily rags.

Community Relationships (Environmental Stewardship)

- Ports are recognizing that they are part of a larger urban community;
- They need to be attentive to public processes and issues beyond their boundaries.
- Ports must be recognized as good neighbors

Community Relationships (Environmental Stewardship)

Ports have responded to these issues by:

- Better management of their facilities and operations;
- Are starting to educate the general public on the importance and role of ports;
- Establishing Better Committee Outreach and Public Involvement Procedures

Community Relationships (Environmental Stewardship)

These efforts are not only yielding environmental improvements, they help to create a political climate that helps to support port development and operations within the community.

Port of Los Angeles Community Advisory Committee

- The Port of Los Angeles Community Advisory Committee was established as a standing committee of the Port of Los Angeles Board of Harbor Commissioners in 2001.
- The purposes of the Committee are:
  - (1) To assess the impacts of Port developments on the harbor area communities and to recommend suitable mitigation measures
  - (2) To review past, present and future environmental documents in an open public process
  - (3) To provide a public forum and to make recommendations to the Board to assist the Port so that the quality of life is maintained and enhanced by the presence of the Port.

Port of Baltimore Dredged Materials Management Program

- A Public-Government Management Team to Develop the Port's Dredging Program
- The Citizens Committee - include:
  - representatives from all counties,
  - conservation associations,
  - civic associations,
  - community associations and organizations,
  - Chambers of Commerce, and
  - watermens associations

Other Environmental Areas of Concern

- Brownfield Clean-Up and Development
- Dredge Material Disposal/ Contaminated Sediments
- Endangered and Threatened Species
- Habitat Restoration
- Land Based Water Pollution
- Ballast Water Management

Brownfield Clean-Up and Development

- Brownfields are commonly defined as:
  - Abandoned, Idled or under-used industrial property;
  - Usually port expansion and/or development opportunities exist
  - Always complicated by real or perceived environmental contamination
- Brownfield site contaminates can included:
  - Hazardous or Toxic material (under the Clean water Act)
  - Contamination of property is usually caused by past industrial or commercial activities

Cleaning and Reuse of Brownfields

- Can eliminate environmental and public health threats
- Can make good use of existing transportation facilities and other in-place utility systems;
- Brownfield reuse diminishes the pressure to develop “Greenfield” sites
- Ports have been the recipient of a number of brownfield suitable for Port/terminal development

Piers A and S
Port of Long Beach

- 725 acres used as oil and gas production, owned by Union Pacific Resources Company (UPRC)
- Site was declared a Superfund Site
- The port implemented a phased remediation program
  - Eliminate any human health risks; and
  - Minimize impacts to any groundwater
- Site has been developed into active marine terminals
  - Pier A (160 acres) was completed in 1997,
  - Pier S (175 acres) was completed in 2003

Southwest Harbor Redevelopment Port of Seattle

- Project required the rehabilitation, through cleanup and redevelopment, of five large contaminated sites (180-acres) including former shipbuilding and ship repair yard, municipal landfill, and others;
- Now – Terminal 5, a Major Container Terminal

Dredge Material Disposal and Contaminated Sediments

- Several hundred million cy of material is dredged from ports each year;
- Port dredging is essential to create and maintain required channel and berth depths;
- Disposal of the dredged material can be difficult and controversial, particular if the sediments contain toxic pollutants;

Dredged Material Disposal Options

- Open-water disposal;
- Confined disposal; and
- Beneficial use.

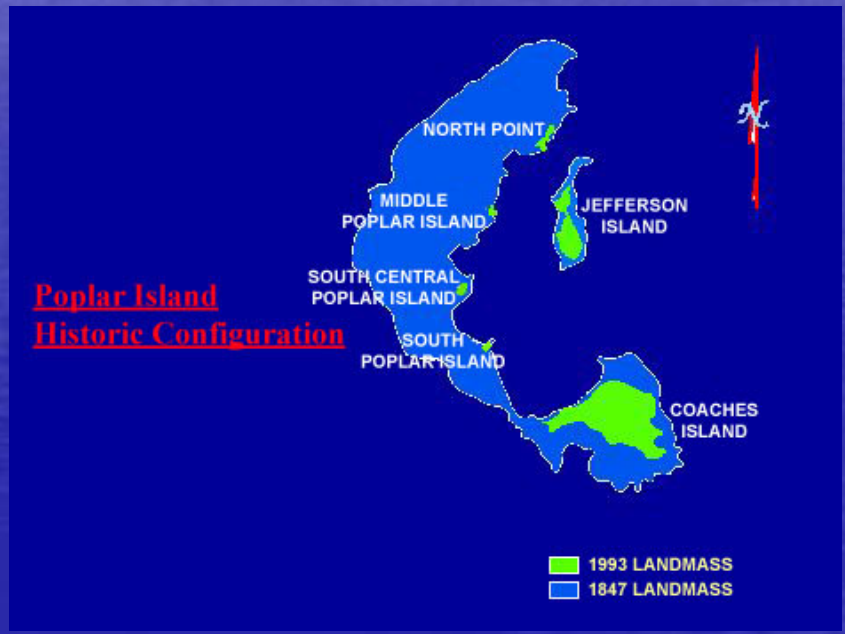
Beneficial Use Options

- Habitat restoration/recreation;
- Beach nourishment;
- Aquaculture;
- Parks and recreation;
- Strip mine reclamation and landfill cover;
- Shoreline stabilization and erosion control;
- Construction and industry uses

Beneficial Use of Dredged Material

- Environmental Enhancements –such as wildlife habitats, fisheries improvements and wetlands restoration.
- Engineered Uses – such as land creation, beach nourishment, capping, land development and berm creation.
- Agricultural/ Product Uses – such as construction material, aquaculture & topsoil.

Poplar Island Restoration Project Port of Baltimore



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Endangered and Threatened Species

- There are more than 1,000 species in the US listed as threatened or endangered and there is a backlog of species waiting to be listed
- Many animals find particular aspects of a port environment appealing;
- Others are frequent visitors to the highly industrial and heavily trafficked land and waters surrounding a port
- Applicable Federal Regulations include:
  - The Endangered Species Act (ESA), the Fish and Wildlife Coordination Act, the Marine Mammal Protection Act and the Migratory Bird Treaty Act

Port Everglades
Manatee Protection

For decades, manatees have made their winter homes annually in Florida Power & Light's warm discharge canal inside the Port.

The Port has actively participated in a variety of manatee protection programs to safeguard Florida's favorite marine mammal.

Port of Los Angles Least Tern Habitat

- The California Least Tern is a small migratory bird that nests along the southern California Coast;
- The port protects important shallow water feeding areas in the harbor,
- Created a 190-acre shallow water habitat region to serve as replacement for habitat lost during construction of various expansion projects

Habitat Restoration

- Ports are often required to restore adversely impacted habitats or create additional habitat as compensation for an expansion project
- Sensitive coastal habitats such as : wetlands, estuaries, mangrove forests and reefs are easily damaged by port activity through either construction or by the effects of pollution ;
- Wetlands comprise the largest portion of habitat projects in the US

Management Options

- Environmental laws require “proponents” of projects to restore degraded or create new habitat;
- If properly designed, new or restored wetlands can provide adequate replacement habitat;
- The use of dredge material has become a widely applied practice for restoring wetlands;
- The construction of artificial habitats using:
  - Habitat enhancement structures;
  - Fish aggregating devices and artificial reefs
  - They provide cover, shelter and a protected environment

Batiqitos Lagoon

- One of the nation's largest habitat restoration projects,
- Part of the Port of LA's mitigation program for developing Piers 300/400
- Several threatened and endangered bird species are nesting in record numbers and shorebirds are feeding on the newly created mud flats.

Oyster Reef Construction, Port of Houston

- The Deepening of the Houston Ship Channel would impact 118-acres of primary oyster reef habitat;
- Mitigation required the construction of six separate 20-acre oyster reefs in Galveston Bay
- The port developed a project to use combustion by-products to construct the reef
  - Fly ash, bottom ash, boiler slag, etc.
- Reefs were monitored and demonstrated to be highly successful

Land Based Water Pollution

- Water pollution can result from:
  - Major events – such as oil spills;
  - Or chronic point and non-point sources
  - An estimated 80% of pollutants in the marine environment are generated as a result of land-based activities, and enter into marine waters from point source discharge

Management Options

- Designing a comprehensive Water Quality Management Program
  - Evaluation of pollution sources;
  - Identification of best management practices
  - Proper maintenance of stormwater collection systems and combined sewer overflow systems to improve their water carrying capacity
  - Use of foliage buffer zones near water bodies to serve as natural water treatment for run-off;
  - Diversion of run-off to storm water retention basins;
  - Use of porous pipes to reduce overall volume of point-source discharge;
  - Redesigning the drainage system to accommodate pollutant removal

Oil Pollution

- Oil Pollution is one of the most serious environmental problems to the marine environment;
- Most oil pollution stems from non-catastrophic events;
- 70% of all oil pollution comes from:
  - municipal and industrial wastes or run-off,
  - Dunping of waste oil; release of oily bilge water, and
  - From other than tanker transportation
- Most chronic spills occurs in ports, from:
  - Loading, off-loading of product;
  - Tank washing and
  - Waste water discharge

Management Options

- Develop Oil Spill Prevention Plan
- Develop Best Management Practices (BMPs)
  - Design of Fueling Facilities
  - Use perimeter drains, etc;
  - Develop vessel fueling procedures
  - Have appropriate environmental/clean-up equipment
- Vessels and facilities need to develop
  - Vessel Response Plan
  - Facility Response Plan

Ballast Water Management Program

- Vessels to required to maintain a ballast water management plan that is specific for that vessel
  - Exchange ballast water only in waters more than 200 miles from shore and more than 2,000 meters in depth;
  - Retain ballast water aboard the vessel;
  - Use environmentally sound ballast water management plan/practices that have received prior USCG approval; and
  - Only discharge ballast waters into approved reception facilities or into USCG-approved waters.

Summary

- Environmental Issues are becoming an increasing important aspect of port operations
- Ports and Terminal Operators must be “pro-active” in identifying and solving key environmental concerns
- Ports can not work in a vacuum, but must be good neighbors and understand community and regional issues