



Great Lakes Maritime Research Institute

*A University of Wisconsin - Superior and
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Title Development of a Performance Evaluation Methodology for the Port/Terminal Sector Participation in the Green Marine Voluntary Environmental Program

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Executive Summary

The Clean Manufacturing Technology Institute at Purdue University partnered with the Hamilton (Ontario) Port Authority to research and propose two additional significant environmental issues and corresponding performance indicators relevant to the operations of ports and terminals that choose to join the Environmental Program of the Saint Lawrence and Great Lakes Maritime Industry, known as Green Marine.

The research was based on the findings and analysis of other research previously funded by the Great Lakes Maritime Research Institute, a literature review, including a thorough analysis of U. S. and Canadian environmental regulations, consultations with U. S. and Canadian regulatory authorities and discussions with port authority representatives.

As a result of this process, two environmental issues were proposed for the Green Marine Self-Evaluation matrix: (1) prevention of stormwater runoff and (2) prevention of spills of oil and chemicals. Performance indicators (criteria for self-evaluation) were proposed for each of the five levels of performance and through telephone conferences, electronic communications and a meeting of the Green Marine Great Lakes Environmental Committee. Some of the criteria for evaluating Best Management Practices (BMPs) were modified, others were re-assigned to a different level of performance and still others were added to the matrix at the meeting.

The Coordinator of the Green Marine program will prepare a final draft of the matrix for review by the Committee before submitting it to the Green Marine Corporation for approval.

Introduction

The project was intended to complement and supplement the work completed to date by Green Marine in the development of its voluntary Environmental Program of the Saint Lawrence and Great Lakes Maritime Industry.

The current environmental issues identified by ports and terminals include aquatic invasive species, greenhouse gases (CO & CO₂), cargo residues and conflicts of use (noise, dust, light and odor). Each issue is defined by a recommended action plan for both collective and corporate actions and each has performance indicators established to measure up to five levels of performance by participants in Green Marine that seek “to minimize the environmental impacts of their operations and to continuously improve their environmental performance.” (Executive Summary, Green Marine Environmental Program, “Guiding Principles”)

Members of the Great Lakes Environmental Committee (GLEC), one of two committees of the Green Marine program, and chaired by Co-Investigator Baxter, accepted the recommendation of the Principal Investigator that Prevention/Control of Stormwater Runoff and Prevention/Control of Oil and Chemical Spills be additional issues about which performance indicators should be developed.

Through meetings, correspondence and conference calls with Green Marine participants, its staff and other stakeholders, the project team helped to refine the definition and application of the indicators and levels of performance for the additional issues.

Background

The Green Marine Environmental Program of the Saint Lawrence and Great Lakes Maritime Industry is to “demonstrate and communicate the maritime industry’s commitment to playing a leading role in environmental matters.” (Executive Summary, “Context”) Members choosing to participate are “required to adopt practices and technologies that will have a concrete impact on the issue being addressed.” (Executive Summary, “Corporate Actions”)

Establishing standards of performance for an industrial sector, especially as it pertains to environmental protection is not uncommon; however, the bi-national and multi-various membership (ports, ship owners, ship operators, terminals, government agencies, economic development corporations, etc.) attest to the unique character of the Green Marine program. This diversity allows the solicitation and application of expertise from a variety of sources but also requires discipline ~ even for a voluntary program ~ in evaluating member conformance to the industry performance standards.

The third party evaluations intended for the second year of the program and, as well, the self-evaluations to be performed by members, require that the issues be accurately defined and the performance indicators be derived from expert knowledge of the industry, the capabilities of its members and a common understanding of the policies, procedures and practices that need to be in place for members to successfully meet the standard.

Research Approach

The research project was comprised of four distinct but interrelated phases: (1) research into the requirements of U. S. and Canadian laws and regulations governing practices and technologies associated with the Prevention/Control of Stormwater Runoff and the Prevention/Control of Oil and Chemical Spills; (2) a comprehensive literature search to identify the Best Management Practices (BMPs) associated with the two issues (in 1., above); (3) preparation of a “strawman” (proposed) performance evaluation matrix and performance indicators and (4) review of the “strawman” proposal with Green Marine staff and stakeholders.

The research objectives were:

- a. To refine the definition and application of the performance indicators and levels of performance for the additional port issues
Expected Outcomes or Deliverables
 - documented inventory of current port practices and research into best management practices pertaining to each issue;
 - sharing of a report of these practices (without port identification) with Green Marine stakeholders;
 - proposal of a performance indicator and level of performance “strawman” for review by Green Marine stakeholders;
 - agreement among stakeholders as to the definition of the additional port issues and the accompanying performance indicators and levels of performance.*Impact as a Result of the Research*
 - heightened awareness of port personnel as to the impact of their operations on the environment;
 - changes in port policies, procedures and practices to improve operations consistent with the identified performance indicators and levels of performance;
 - increased participation in and conformance with the Green Marine Environmental Program by ports in the Saint Lawrence and Great Lakes maritime industry.
- b. To assist Green Marine port members with the development and/or implementation of an environmental management system
Expected Outcomes or Deliverables
 - the development of an environmental management system “model” for Green Marine ports, incorporating relevant EMS elements that pertain to the identified environmental issues and the corresponding performance indicators;
 - conduct of one or more workshops for Green Marine ports focused on the basics of an environmental management system, incorporating the specific issues and corresponding performance indicators;
 - assistance to individual ports interested in developing and/or implementing an environmental management system.*Impact as a Result of the Research*
 - adoption and implementation of an environmental management system by ports to assist their attainment of Level 3 and above performance in the Green Marine Environmental Program;

- measurable improvement in the elimination of negative impacts of port operations on the Saint Lawrence and Great Lakes environment.

The previous award from GLMRI (Grant # DTMAI-G-06-005) supported the development and publication of the “Manual of Best Management Practices for Port Operations and Model Environmental Management System.”¹ This resource greatly assisted the research and provided a readily available compendium for reference by Green marine stakeholders participating in this project.

Identification of the Additional Port Issues

The identification of additional port issues by the Principal Investigator derived from a review of the findings from the above-cited GLMRI-supported research.

- Stormwater runoff from bulk storage piles, bulk tank secondary containment structures, piers and dredge areas is being addressed at some locations by the installation of infrastructure modifications (e.g., detention ponds, stormwater drains, catch basins, low-profile berms at the edge of piers, sloping the edge of piers away from the water); however, protections appear to be inconsistent depending on the age of the facility, the jurisdiction (state/province) and the type of cargo-handling activity taking place;
- At U. S. ports, liquid bulk tank farms and fueling facilities have federally-required Spill Prevention and Control and Countermeasure (SPCC) Plans;
- Ports would benefit from efforts to develop a “master” environmental response plan addressing releases from the transfer, movement and storage of materials at or by tenant facilities, ship owners, rail lines, truck lines and adjacent property owners;
- Not all port authorities are on the “call list” or require “first call” status when a spill occurs on its property occupied by a tenant;
- Individual tenants or transporters may have a plan or procedures that exist independent of others;
- Emergency response organizations are either the local fire department or a contract spill response organization - - some of the latter are tenants of the port;
- With regard to spills in navigable waters, in some U. S. ports the Coast Guard is not considered a “first responder” organization;
- In general, spill response procedures seemed to differ by location, depending upon municipal and state/provincial requirements.
Spill response notification procedures were not always commonly understood;
- In the U. S., stormwater regulations applicable to municipal and other public facilities were promulgated in 1999 and some Great Lakes states are only, now, issuing permits, so regulatory compliance and enforcement is generally lacking. Also, stormwater runoff does not have the same visibility or receive the same

¹See American Great Lakes Ports Association website: www.greatlakesports.org.
October 30, 2008.

- public scrutiny as air emissions and hazardous waste generation because of the general perception that it's a natural consequence of precipitation - - in other words, "it's always been there." Canadian regulations do not require comparable permits for controlling stormwater runoff.
- The Spill Prevention, Control and Countermeasure Plan required by the U. S. Environmental Protection Agency incorporates requirements that apply not only to petroleum production and petroleum storage operations, but to port operations, such as the transfer of petroleum and chemical products from vessels to storage tanks, trucks and rail tankers. Canadian regulations are not as stringent and, generally, allow the transfer of spill response functions to contractors and regional spill response organizations.
- Some U. S. port operations and many tenant operations are subject to these rules and some of both groups have SPCC plans and conduct drills to "practice the plan," but more of both groups need to.

These two issues were identified as distinct in the "strawman" proposal, to which "cargo residues" (e.g., grain, cement, salt, fertilizer, ore, etc., spillage on the dock or in the water from loading/unloading) was subsequently added by Green Marine staff as another potential source of water pollution. Ultimately, the issue was re-defined as "Water and Land Pollution Prevention" with three sub-issues - - stormwater runoff, hazardous materials (oil and chemicals) spills and cargo residues - - included in the performance evaluation matrix.

Including the three sub-issues in the same matrix substantially aids the implementation of recommended BMPs because many are useful for controlling waterborne pollution (e.g., elevating storage pads, creating "capture" channels, constructing detention ponds, installing secondary containment structures) regardless of the potential source of pollution. Also, all three sub-issues can be addressed in the Management Plan required at Level 3 of the matrix.

Preparation of the "Strawman" Proposal

The Green Marine performance evaluation matrix is intended as a "self-evaluation guide" for use by ports to assess their environmental performance. An external evaluation process (i.e., audit) is intended beginning in 2009/2010, requiring Green marine participants to justify their performance by identifying written documents to verify that the performance criteria have been attained.

The Level 1 criteria pertain specifically to compliance with laws and regulations governing the issue.

The Level 2 criteria are recommended BMPs ~ usually readily and inexpensively implemented ~ and the port's performance evaluation is improved as the number of BMPs implemented increases.

The integration of BMPs in a port-wide management plan is the focus of the Level 3 evaluation.

At Level 4, ports are evaluated according to new technologies adopted and the more difficult or costly BMPs implemented. Technologies and BMPs affecting all port operations receive a better evaluation than those restricted to only a few operations.

Level 5 pertains to the Environmental Leadership Performance indicators, such as

- including environmental clauses in lease agreements;
- recruiting tenants and others to join Green Marine;
- conducting an environmental audit of tenant operations;
- initiating dialogue with local environmental groups;
- engaging tenants in port-wide environmental projects;
- implementing Green Awards.²

The Principal Investigator proposed a “strawman” self-evaluation guide for the stormwater and spills issues based on a review of the literature, the BMPs derived from the port assessments conducted under the previous GLMRI grant and the BMP manual, previously cited. The proposal was comprised of two parts: (1) the self-evaluation guide based on the five-level matrix with recommended BMPs at each level, and (2) an amended version that included for each of the two issues a “Basic Premise” explaining the distinction between Level 2 and Level 4 BMPs and an identification of the operational areas on port (or tenant) property that should be managed to control stormwater runoff or prevent spills.³ [Both the “strawman” proposal and the amended version are included here as Appendix A]

The operational areas identified for BMPs associated with stormwater runoff include:

- non-bulk container storage areas (drums, totes and other containers);
- dry bulk storage piles (salt, cement, fertilizer, etc.);
- cargo unloading areas at dockside;
- vehicle and equipment (including mobile equipment) fueling areas;
- building and grounds maintenance, including construction and landscaping areas;
- snow (pile) disposal areas.

² David Bolduc e-mail, “Draft proposal Water and Land Pollution Indicators,” June 16, 2009

³ Lynn A. Corson e-mail, “Strawman and Toronto Presentation,” April 17, 2009; revision of proposal of January 23, 2009 and March 31, 2009, also forwarded to David Bolduc, Green Marine Coordinator and Marilyn Baxter, Hamilton Port Authority.

The proposal was also reviewed by telephone conference calls June 12 and June 19, 2009, with David Bolduc, Green Marine Coordinator and Marilyn Baxter, Hamilton Port Authority and Chair of the Green Marine GLEC, and a meeting with these two and representatives of four Green Marine members and the Principal Investigator was held in Toronto June 22, 2009.

The operational areas identified for BMPs associated with prevention and response to spills include:

- liquid bulk storage areas (usually large “tank farm” locations);
- liquid bulk transfer areas (from/to vessels and bulk tanks and bulk tanks to truck and rail tankers).

Review of the “Strawman” Proposal with Green Marine Staff and Stakeholders

The proposal (combining the matrix and amended versions) was prepared as a PowerPoint presentation to be given at the Green Marine Green Tech Conference in Toronto May 20, 2009. An emergency caused by torrential rain and flooding of his property prevented the Principal Investigator from traveling to Toronto; however, the project Co-Principal Investigator, Marilyn Baxter, attended and gave the presentation. The presentation was well-received, according to Baxter, and she was able to solicit input to the proposal from those in attendance.

The meeting participants, other than Bolduc and Baxter, represented the U. S. Department of Transportation Saint Lawrence Seaway Development Corporation, Montreal Gateway Terminals Partnership, Federal Marine Terminals and the Port of Cleveland.

Bolduc forwarded a proposed Self-Evaluation Guide five-level matrix prior to the meeting. [See Appendix B] The matrix includes the major BMP recommendations of the Principal Investigator for the stormwater runoff and spills issues and others from the Green Marine staff for the cargo residues issue, all under the heading of “Water and Land Pollution Prevention.”

The meeting was productive and resulted in modifications to some of the recommended BMPs, the addition or deletion of others and the relocation of others from, for example, Level 2 to Level 3 or 5. The final Water and Land Pollution Prevention Self-Evaluation Matrix to be recommended for approval by the Green Marine Corporation is included here as Appendix C.

The discussion addressed other topics critical to the adoption and promulgation of the Self-Evaluation Guide for these issues:

- the Great Lakes Environmental Committee will recommend the final version of the matrix to the Green Marine Management Corporation (comprised of eight maritime organizations) for adoption;
- BMPs pertaining to ports will be identified “P”, those pertaining to terminals (port facility operators) will be labeled “T” and those relevant to both will be designated “P/T”.
- the cargo residue issue will be further studied by the Saint Lawrence Seaway Commission;
- snow disposal and snowmelt management will not be included in the stormwater runoff issue at this time; the Port of Montreal will initiate a study of the issue to be completed in 2010;

- the influence of a port lease agreement with tenants concerning environmental matters will be reviewed further, perhaps using the Port of Montreal agreement as a reference.

Findings and Analysis

Identification of Best Management Practices

The literature review from which many of the BMPs were recommended for the original BMP Manual were derived from 54 primary sources including state/provincial and federal (U. S. and Canadian) laws and regulations and guidance documents pertaining to these regulations, manuals published by various state departments of transportation concerning highway construction and related stormwater permit requirements, U. S. EPA and U. S. Coast Guard publications Canadian regulatory guidance manuals, and others. The Principal Investigator for this study served as Principal Investigator for seven U. S. Federal Highway Administration Joint Transportation Research Project studies over 20 years, four of them related, in some way, to the stormwater runoff and spills issues. A compendium exceeding 200 sources was compiled during these studies.

The range of BMP options pertaining to these specific issues is not limitless and many are “common sense,” at least to an outside observer who does not perform these functions regularly.

The BMP options adopted and implemented by ports depend primarily on management concern about environmental protection, frequent employee training focused on the best practices and a modicum of financial resources. Environmental protection (here, primarily land and water protection from pollution) is not dependent upon the form of port governance, the relative strength or weakness of state/provincial regulations, nor the influence of local environmental groups. Management and leadership are the primary characteristics needed to be exhibited by the port authority to ensure environmental protection. These are reflected in the Level 3 and Level 5 criteria included in the Self-Evaluation Guide matrix.

The Level 3 “management plan” criteria promote thinking about the activities performed by the port and its tenants and possible impacts on the port and tenant property environment, discussion with employees, tenants, neighbors and governing board members about possible programs to address impacts and the preparation of a plan that can be readily implemented.

The adoption of a policy by the port authority to include environmental protection measures in tenant lease agreements was a recommendation of the Principal Investigator as a Level 3 criteria and the participants in the Toronto meeting supported this recommendation. A “model” lease agreement may be proposed by Green Marine or, minimally, provisions that could be included in such an agreement may be promulgated. In the U. S., the land-owner, ultimately, assumes liability for damage to the environment regardless that a tenant may be responsible. Some ports have incurred severe financial penalties imposed by regulatory bodies after a tenant “walked away” from the property following an incident impacting the environment about which the port authority was unaware.

The Level 5 Environmental Leadership Performance criteria that may be included in this indicator were previously listed. The management and leadership exhibited by the port authority in developing the management plan and the inclusion of BMPs in that plan serve as the major link between environmental protection and environmental leadership in the Green Marine program and for those members who voluntarily perform a self-evaluation.

Level 1 Indicator: Compliance with Existing Regulatory Requirements

The previous GLMRI-supported assessment of 12 Great Lakes ports found that compliance of port authorities and their tenants with state/provincial and federal environmental regulations is not uniform, but neither is state/provincial or federal regulatory enforcement. As to environmental permits, especially the U. S. National Pollution Discharge Elimination System (NPDES) stormwater permit, larger tenants with regional or national (or international) operations appeared to be in full compliance with permit requirements while some other, primarily local, operators were not even permitted. Corporate oversight and local management knowledge of the commitment to compliance with permit requirements appeared to be the major influencing factors for this aspect of the ports' assessments.

The Level 1 indicator statement - - "compliance with existing regulations" - - implies a determination based on the port's or tenant's self-assessment as to whether it meets the requirements of local ordinances and state/provincial and federal regulations pertaining to environmental protection. Typically, "compliance" means that the facility or operation has obtained the necessary permits and meets the permit conditions; that it has been inspected by the regulatory body and has "passed" inspection; that it is aware of the regulatory requirements pertinent to its operation and the potential impacts on air, water (including groundwater) and land, and has devised and implemented plans and activities (including employee training) and periodically monitors its performance to determine compliance with the requirements.

The following guidance for compliance is given in response to a question posed in the Self-Evaluation Guide - Ports and Terminals (page 5): "How is it possible to know whether a company respects [complies with] the legislation and the regulations in effect?"

"For each of the issues applicable to your operations:

- ensure that your company is aware of the applicable regulatory requirements;
- identify the persons in charge of the application of these requirements at the operational level;
- ensure that these persons have the means (training, tools or equipment, availability) to effectively comply with the regulatory requirements;
- promptly rectify any accidental and temporary incidents of non-compliance. Keep a record of all inspections conducted/infractions noted for the subject issues in the subject region;
- keep a track record of these points for reporting and audit purposes."

The Principal Investigator, in formatting the proposed “strawman” matrix, thoroughly researched U. S. and Canadian laws and regulations and included those most germane to the stormwater runoff and spills prevention issues. The regulations, especially those of the U. S. Coast Guard (33 CFR Part 154, “Facilities Transferring Oil or Hazardous Materials in Bulk”), relevant to the spills prevention issue, are very prescriptive in terms of facility functional performance and preferred equipment (technology) related to - - in this case - - the transfer of oil or hazardous materials. The Level 2 and Level 4 BMPs included in the matrix (as explained in the amended “strawman”) are differentiated between those practices and technologies required by the regulations and those that are not. The Principal Investigator included the required practices and technologies as Level 2 BMPs - - Systematic Use of Best Practices - - and those that are not as Level 4 BMPs, because they “go beyond” what is required and should be credited as “Introduction of New Technologies [and Practices].”

At the Toronto meeting, the Green Marine Coordinator stated that BMPs stipulated in regulations should be listed as Level 1 - - compliance - - criteria because they are required.

The rationale for this approach is justifiable: regulatory “compliance” means meeting all of the requirements stipulated in a regulation, not merely conducting operations without receiving a violation or filing the appropriate reports with the regulatory agency. When viewed this way, “compliance” is not restricted to the domain of the port authority’s attorney or environmental manager, it is as much the responsibility of the operations managers and supervisors to make certain that practices (and technologies) prescribed by regulations are, in fact, continually being implemented and monitored.

For Green Marine members, this approach will require compiling a checklist of practices (and technologies) required by each regulation governing a specified issue, assigning management and supervisory responsibility, establishing monitoring and reporting policies and procedures, ensuring that work instructions for each required practice are prepared, providing employee training, and so forth; in the current parlance, an Environmental Management System or similar plan will need to be prepared. Such a plan will satisfy the Level 3 indicators.

When regulatory requirements are recommended by Green Marine as Level 1 BMPs (performance indicators), the Level 2 and Level 4 BMPs and technologies will be those that “go beyond” compliance. This approach provides a strong incentive for ports and terminals to be creative and to make additional investments in environmental protection practices and technologies; however, for some entities, the broad scope and prescriptive nature of most environmental regulations may present enough of a challenge that once having satisfied the Level 1 performance indicators, there may be fewer resources available to ports and terminals to implement Level 2 and Level 4 BMPs.

Relevance of Other Priority Environmental Issues to Ports and Terminals

Most of the primary environmental issues identified by Green Marine and its participants have greater relevance to the shipping sector; however, some performance indicators are suggested for ports and terminals:

1. Aquatic Invasive Species

- launch a registry of invasive species found on port territory, to be conducted in collaboration with the government organization carrying out sampling activities
- test sediments before every dredging operation to verify the absence of invasive species

2. Greenhouse Gases

- distribute an internal directive to ensure that each of the following practices is applied:
 - limit idling of vehicle engines
 - promote sustainable transportation practices by employees
 - implement measures to reduce congestion and idling during periods of heavy activity
 - inform or, when necessary, issue warnings to ships which emit excessive amounts of smoke
 - issue notices encouraging ships to use low sulphur fuel in auxiliary engines
 - complete of an annual report on GHG emissions
 - adopt of an energy performance plan that has quantifiable objectives and which formally incorporates the best practices required to achieve Level 2

3. Cargo Residues (now a sub-issue to the Water and Land Pollution Prevention issue)

- complete an inventory of equipment and practices linked to the production of cargo residues
- adopt a cargo residue management plan comprising the following elements:
 - designated procedures for receiving and handling complaints regarding the production and treatment of cargo residues
 - a collaborative procedure with shipowners and/or crews for reducing the amount of cargo residues left on board ships
 - a surveillance procedure to ensure proper functioning of equipment and actions to be undertaken in case of cargo leakages or spills
 - adapt loading and unloading operations in cases of abnormal dust emissions due to wind
 - acquire new loading and unloading equipment that serves to significantly reduce cargo residue quantities in all the terminals managed by the company

4. Conflicts of Use (reducing noise, dust, odor and light from port/terminal operations that affect people residing close to the port)

- distribute a telephone number to persons residing close to the port in order to permit them to report instances of noise, dust, odor or excessive light
- noise:
 - issue a warning that ships' sirens are to be used only to ensure safe movement
 - impose speed limits on vehicles in sensitive zones
 - inform employees of the importance of minimizing sound pollution
 - use quieter warning signals or equipment without compromising safety

- use equipment to reduce the noise emanating from rail operations at the port
- impose limits on night time operations, as needed
- dust:
 - adopt measures to hold back dust on roads
 - apply measures to improve the management of bulk cargo storage such as covering cargo that is stored in piles, reducing the height of such piles, moving piles to areas that are less exposed to wind, etc.
- light:
 - direct lights so they only illuminate the necessary zone
 - switch off bothersome lighting at a specific time if there are no operations underway
- odor:
 - implement a system for collecting vapors arising from tanker loading operations

The performance indicators pertaining to these issues are being applied by some ports/terminals in the self-evaluation performed in 2009. It is expected that some modifications will occur as more ports/terminals gain experience with the use of the indicators and as external audits serve to validate their relevance and feasibility.

Potential Economic Impacts of the Research Results

The Green Marine program was initiated in October 2007 and as of May 2009, 45 corporations, about half of the Saint Lawrence-Great Lakes maritime industry, were participating members. Fifteen of the members are port authorities, five of those are U. S. port authorities. In addition, there are 21 partner organizations (companies or associations with links to the maritime sector) and 24 supporters (government and environmental organizations).

The growth of the program is testimony to the commitment of the maritime sector, generally, to improving the environmental performance of shipping companies, port authorities and terminal operators. Those that join and actively strive to implement the BMPs stipulated by the performance indicators will derive considerable economic benefit in the future, as judged by recognition from their peers and government authorities and enhanced business opportunities with other Green Marine members.

This research, which provided the foundation for the performance indicators pertaining to preventing stormwater runoff and oil and chemical spills, will augment the promulgation of performance indicators by Green Marine and, undoubtedly, promote additional interest in the program by ports and terminals.

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Appendix A

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Green Marine Self-Evaluation Guide

Issue: Stormwater Run-off and Snow Melt Management

Objective: Reduce contamination of stormwater and snow melt and manage run-off

Level 1: Regulatory Compliance

- Does the port or company comply with existing regulatory requirements?

[See Annex 1]

Level 2: Systematic Use of Best Practices

- Implementation of practices to prevent contamination of stormwater and snow melt by dust, cargo residues, bulk storage piles, vehicle and equipment fueling, building and grounds maintenance chemicals and spillage from containers handled and stored on port property and manage run-off.

[See Annex 2]

Level 3: Integrated Management System

- Adoption of a management system formally incorporating best management practices selected from Annex 2 (and other sources) which have been implemented by the port authority;
- Relevant policies pertaining to the adoption of selected best management practices and the procedures for implementing each need to be included in the Integrated Management System.

Level 4: Introduction of New Technologies

- Adoption of new management tools or installation of new equipment to prevent contamination of stormwater and snow melt and manage run-off (from Annex 3 and other sources).

[See Annex 3]

Level 5: Excellence and Leadership

- Significance of investment in research and development projects to reduce contamination of stormwater and snow melt and manage run-off.

Annex 1

Issue: Stormwater Run-off and Snow Melt Management

Objective: Reduce contamination of stormwater and snow melt and manage run-off

Level 1: Regulatory Compliance

U.S.

- 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)

Canadian

- 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)
- Canadian Fisheries Act (R.S., 1985, c. F-14) (http://laws.justice.gc.ca/en/showdoc/cs/F-14/bo-ga:s_17::bo-ga:s_20/20070110?command=search&caller=SI&search_type=all&shorttitle=fisheries%20act&day=8&month=1&year=2007&search_domain=cs&showall=L&statuteyear=all&lengthannual=50&length=50&page=5)
- Ontario Technical Standards and Safety Act, 2000; Ontario Regulation 213/01, Fuel Oil and Fuels Safety Program “Advisories” issued by the Technical Standards and Safety Authority pursuant to that regulation. (www.tssa.org/regulated/fuels/fuelsSafety.asp)

Annex 2

Issue: Stormwater Run-off and Snow Melt Management

- Implementation of practices to prevent contamination of stormwater and snow melt by dust, cargo residues, bulk storage piles, vehicle and equipment fueling, building and grounds maintenance chemicals and spillage from containers handled and stored on port property and manage run-off.

Level 2: Systematic Use of Best Practices

- Control Stormwater Run-off from Non-bulk Container Storage Areas by –
 - locating areas on impervious surfaces with no storm drains and within berms low enough to permit equipment access but capable of containing spills/releases;
 - locating 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.
- Control Stormwater Run-off from Dry Bulk Storage Piles by –
 - 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;
 - installing screens in drainage channels to filter suspended solids and attached heavy metals. Periodically clean the screens and properly dispose of the sediment;-
 - covering the pile with an impervious tarpaulin as soon as possible after unloading and adjusting the cover as material is removed from the pile;
 - inspecting storage areas after rainfall or snowmelt to observe run-off or stormwater migration and implement preventive measures, if required.
- Control Stormwater Run-off of Dust and Cargo Residue Infiltration by-
 - 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;
 - 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;

- washing down or spraying the underside and tires of trucks transporting dry bulk materials from dirt roads on to public roads to reduce dust and “track out;”
 - prohibiting cargo residue washdowns in port; allow only manual or mechanized sweeping and containerize sweepings for disposal or acceptable alternative use.
- Control Stormwater Run-off of Vehicle and Equipment Fueling by -
 - using commercial (retail) fuel dispensing stations for port and fleet vehicles whenever possible;
 - restricting 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;
 - enforcing “No topping-off” policy with fuel dispensing attendants and vehicle operators;
 - posting clear written instructions for attendants and vehicle operators on correct dispensing procedures;
 - locating 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 small spills and that “washdowns” of spills are not permitted;
 - installing steel, concrete or other barriers around dispensing stations to prevent vehicle or mobile equipment damage;
 - locating drip pans and larger containment vessels for immediate access to be placed under vehicle fuel tanks if leaks occur;
 - inspecting, daily, pumps, dispensing hoses, fittings and all related equipment for leaks and situations that could result in leaks;
 - restricting 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.;
 - prohibiting any vehicle maintenance operation (e.g., fluid changes) in the fueling area.
- Control Stormwater Run-off of Building and Grounds Maintenance
 - 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 run-off;
- 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.

Construction and Landscaping Activity

- 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;
 - 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.
- Control Run-off of Snow Melt by –
 - avoiding direct disposal of snow in waterways or on ice-covered water bodies;
 - disposing of snow on a flat, impermeable surface 600’ or more from waterways, if settling ponds or other structures are not used to capture melt-water run-off, to prevent groundwater contamination and allow solids recovery;

- employing stormwater collection/treatment practices to control melt-water discharge.

Annex 3

Issue: Stormwater Run-off and Snow Melt Management

- Implementation of practices to prevent contamination of stormwater and snow melt by dust, cargo residues, bulk storage piles, vehicle and equipment fueling, building and grounds maintenance chemicals and spillage from containers handled and stored on port property and manage run-off.

Level 4: Introduction of New Technologies

- Control Stormwater Run-off from Non-bulk Container Storage Areas by –
 - constructing areas 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].
- Control Stormwater Run-off from Dry Bulk Storage Piles by –
 - constructing a run-off detention basin with a retention time sufficient to allow settling of pollutants (solids) so discharge will be below effluent limits;
 - locating storage piles at a distance from the shore of the waterway to avoid the potential of run-off contamination. [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.]
- Control Stormwater Run-off of Dust and Cargo Residue Infiltration by –
 - using enclosed conveyors or chutes and telescoping arm loaders to reduce spillage and dust; also, minimize the distance between the working face of a storage pile and trucks/trains being loaded to reduce the area that has to be swept/cleaned;

- using dust suppression, bag house, screw conveyors and vacuum collecting equipment wherever practical in the handling of fine, granular or powdery material.
- Control Stormwater Run-off of Vehicle and Equipment Fueling by –
 - installing 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;
 - installing vapor recovery systems to control emissions;
 - installing automatic shut-off devices on dispensing hoses to prevent fuel discharge if dropped or severed;
 - installing storage tanks and piping only with appropriate spill and overflow protection, release detection and corrosion protection systems; perform frequent monitoring of these systems and maintain required records.
- Control Stormwater Run-off of Building and Grounds Maintenance
 - Pesticide/Herbicide and Fertilizer Application*
 - replace or supplement use of chemical pesticides/herbicides and fertilizers with compost, bio-solids and other non-toxic substitutes;
 - Construction and Landscaping Activity*
 - install permanent, post-construction stormwater BMPs, if suitable, such as a detention or retention pond, swale or constructed wetland, infiltration basin, filter strips, permanent native grass seeding, etc.
- Control Run-off of Snow Melt by –
 - integrating settling chambers or other collection/treatment devices in or with mechanical melters to facilitate the collection of solids and to ensure the proper discharge of melt-water.

Issue: Prevention of and Response to Spills from Liquid Bulk Storage Tanks and Transfers to/from Tanks

Objective: Prevent spills of hazardous materials, including petroleum products, and respond to such spills when they occur, from liquid bulk storage tanks and during the transfer of products between vessels and tanks and tanks and truck and rail tankers on port property

Level 1: Regulatory Compliance

- Does the port or company comply with existing regulatory requirements?

[See Annex 1]

Level 2: Systematic Use of Best Practices

- Implementation of practices to prevent spills of hazardous materials, including petroleum products and to respond to such spills, when they occur, from liquid bulk storage tanks and during transfer of products between vessels and tanks and tanks and truck and rail tankers on port property.

[See Annex 2]

Level 3: Integrated Management System

- Adoption of a management system formally incorporating best management practices selected from Annex 2 (and other sources) which have been implemented by the port authority;
- Relevant policies pertaining to the adoption of selected best management practices and the procedures for implementing each need to be included in the Integrated Management System.

Level 4: Introduction of New Technologies

- Adoption of new management tools or installation of new equipment to prevent spills of hazardous materials, including petroleum products, and to respond to spills of products when such occur during transfers.

Level 5: Excellence and Leadership

- Significance of investment in research and development projects to reduce spills and improve response when spills occur.

Annex 1

Issue: Prevention of and Response to Spills from Liquid Bulk Storage Tanks and Transfers to/from Tanks

Objective: Prevent spills of hazardous materials, including petroleum products, and respond to such spills when they occur, from liquid bulk storage tanks and during the transfer of products between vessels and tanks and tanks and truck and rail tankers on port property

Level 1: Regulatory Compliance

U.S.

- 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)

Canadian

- “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>)
- “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)
- Canadian Environmental Protection Act, 1999, Part 5: Controlling Toxic Substances, Release of Toxic Substances. Report and Remedial Measures, Section 95. (www.canlii.org//ca/sta/c-15.31/sec95.html)
- Port Authorities Operations Regulations (SOR/2000-55), Part 1: Safety and Order in Ports, Removal - Property or waters, Section 13. (<http://canlii.ca/eliisa/highlight.do?text=spill+&language=en&searchTitle=Federal&path=/ca/regu/sor2000-55/sec13.html>)

Annex 2

Issue: Prevention of and Response to Spills from Liquid Bulk Storage Tanks and Transfers to/from Tanks

- Implementation of practices to prevent spills of hazardous materials, including petroleum products and to respond to such spills, when they occur, from liquid bulk storage tanks and during transfer of products between vessels and tanks and tanks and truck and rail tankers on port property.

Level 2: Systematic Use of Best Practices

Storage of Liquid Bulk Product

- 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;
- 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.

Transfer (Loading/Unloading) of Liquid Bulk Product

- 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;
- install and maintain vapor recovery systems for product transfer to bulk tanks.

Response to Spill of Liquid Bulk Product

- prepare to activate various components of the approved emergency response plan which address –
 - o weather, ice, tidal and current conditions;
 - o volume of liquid spilled, depth of water, distance from shore;
 - o communication system;
 - o emergency shutdown system;
 - o response resources including contracted response organizations, Coast Guard, fire-fighting units, shore clean-up organizations, other;
 - o equipment for containing, absorbing, skimming and pumping oil product and other oil recovery devices;
 - o temporary storage facilities for recovered oil products.

Issue: Stormwater Run-off and Snow Melt Management

Basic Premise: preventing the contamination of stormwater and melt water is simpler and less costly than containment and treatment.

Prevention: relies on the ability and willingness of employees to follow work practice instructions which derive from procedures established to implement port policies. These are classified primarily in Level 2: Systematic Use of Best Practices.

Containment and Treatment: requires identifying suitable sites for containment areas or treatment technologies and considerable investment in their construction or installation. These are classified primarily in Level 4: Introduction of New Technologies.

Port Property to Manage to Control Stormwater Run-off

- Non-bulk container (drum, tote) storage
- Dry bulk storage piles
- Dry bulk loading/unloading areas (to/from vessels) (to/from trucks and railcars)
- Vehicle and equipment fueling
- Building and grounds maintenance
- Liquid bulk loading/unloading (to/from vessels) (to/from tank trucks and rail tankers)
- General (breakbulk) cargo storage (for equipment and machinery containing or coated with petroleum/chemical-based products)

Level 2: Systematic Use of Best Practices

- Storage
 - site storage areas on impervious surfaces as distant from waterways as practical; keep stored materials covered; install secondary containment for storage of liquids; divert stormwater around the area
 - regularly inspect the storage area and handling equipment; schedule frequent maintenance and clean-up
- Dry Bulk Transfers
 - suspend transfers during unfavorable weather conditions; maintain pile size consistent with customer demand; regularly inspect handling equipment; schedule frequent maintenance and clean-up
 - prohibit cargo residue “washdowns” in port; containerize for disposal
- Vehicle and Equipment Fueling
 - restrict fueling to designated areas distant from waterways on impervious surfaces with containment berms and under cover, if practical; divert stormwater around the area
 - locate spill response equipment near the area; train employees to clean up small spills; prohibit spill washdowns
 - inspect fueling/transfer equipment daily

- Building and Grounds Activity
 - avoid pesticide/herbicide application, especially on surfaces sloping to waterways, above near-surface groundwater or where stormwater could be contaminated
 - design construction and landscape projects to expose only limited areas of soil; use simple erosion and sediment control devices during construction; employ “housekeeping” practices (e.g., sweeping, materials stockpile management, “track-out” clean-up, etc.) daily
- Snow Melt Management
 - restrict snow disposal to impermeable surface areas 600’ or more from waterways if containment structures are not used to capture run-off

Level 4: Introduction of New Technologies and/or Systems

- Storage
 - construct storage areas with a slightly sloping surface to a manually-operated dead-end sump to collect precipitation
 - construct a run-off detention basin with a retention time to allow for settling of solids
- Dry Bulk Transfers
 - use enclosed conveyors or chutes and telescoping arm loaders to reduce spillage and dust
 - use dust suppression, baghouse, screw conveyors and vacuum collecting equipment in the handling of fine, granular or powdery material
- Vehicle and Equipment Fueling*
 - install overflow protection devices on tanks and automatic shut-offs on dispensing hoses
 - install vapor recovery systems to control emissions
 - install release detection and corrosion protection on tank systems; frequently inspect all equipment and monitoring devices
- Building and Grounds
 - replace chemical pesticides, herbicides and fertilizers with compost, bio-solids and other non-toxic substitutes
 - install permanent post-construction control structures designed to reduce pollutant loading of stormwater discharge
- Snow Melt Management
 - use mechanical melters, preferably with settling chambers or other collection/treatment devices, to collect solids and treat discharged melt water

*Best Practices for liquid bulk storage tank transfers are described in “Issue: Prevention of and Response to Spills from Liquid Bulk Storage Tanks and Transfers to/from Tanks.”

Issue: Prevention of and Response to Spills from Liquid Bulk Storage Tanks and Transfers to/from Tanks and Vessels and Truck and Rail Tankers

Basic Premise: preventing and responding to spills of chemical and petroleum products from bulk storage tanks and transfers to/from those tanks is strictly regulated by Canadian and U.S. laws. As such, to be in compliance with these laws and regulations, ports, their tenants and operators must employ the Level 2 “best practices.” Any other technologies employed by ports, their tenants or operators would be considered Level 4: Introduction of New Technologies.

Port Property to Manage to Prevent and Respond to Spills

- Liquid bulk storage tank areas
- Land and dockside areas involved in transfers to/from vessels
- Areas involved in transfers from bulk tanks to truck and rail tankers

Level 2: Systematic Use of Best Practices

Storage of Liquid Bulk Product

- 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;
- 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.

Transfer (Loading/Unloading) of Liquid Bulk Product

- 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;
- install and maintain vapor recovery systems for product transfer to bulk tanks.

Response to Spill of Liquid Bulk Product

- prepare to activate various components of the approved emergency response plan which address –
 - weather, ice, tidal and current conditions;
 - volume of liquid spilled, depth of water, distance from shore;
 - communication system;
 - emergency shutdown system;
 - response resources including contracted response organizations, Coast Guard, fire-fighting units, shore clean-up organizations, other;
 - equipment for containing, absorbing, skimming and pumping oil product and other oil recovery devices;
 - temporary storage facilities for recovered oil products.

Appendix B

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WATER AND LAND POLLUTION PREVENTION

Stormwater run-off	Spills	Cargo Residues
LEVEL 1		
<p><u>U.S.</u></p> <ul style="list-style-type: none"> • 15 CFR Part 923, Coastal Zone Management Program • 40 CFR 122.6 EPA, National Pollutant Discharge Elimination System [NPDES], Program Requirements for Storm Water Discharges) <p><u>Canadian</u></p> <ul style="list-style-type: none"> • Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40 • Canadian Fisheries Act (R.S., 1985, c. F-14) 	<p><u>U.S.</u></p> <ul style="list-style-type: none"> • 40 CFR Part 112.7, EPA Oil Pollution Prevention (General requirements for Spill Prevention Control and Countermeasures Plan)) • 40 CFR Part 280 (Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks)) • 33 CFR Part 154, “Facilities Transferring Oil or Hazardous Materials in Bulk”) <p><u>Canadian</u></p> <ul style="list-style-type: none"> • “Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations” (SOR/2008-195), pursuant to Section 209 of the) • “Response Organizations and Oil Handling Facilities Regulations” (SOR/95-405), pursuant to the Canada Shipping Act (1995)) 	

WATER AND LAND POLLUTION PREVENTION

Stormwater run-off	Spills	Cargo Residues
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LEVEL 2		
<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Regularly inspect or test the storage area and handling equipment; schedule frequent maintenance and clean-up • Site storage areas on impervious surfaces as distant from waterways as practical; • Keep stored materials and the pile covered with an impervious tarpaulin as soon as possible after unloading and adjusting the cover as material is removed from the pile • Divert stormwater around the pile and distant from waterways 	<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Regularly inspect or test : the storage area and handling equipment, fixed and mobile tanks, transfer equipment and piping, starter controls for pumps, loading/unloading connections of pipelines, liquid level sensing devices and audible alarms • Schedule frequent maintenance and clean-up. • Prohibit spill washdowns • Locate spill response equipment near the area; • Organize annual training session for employees on the cleaning up of small spills and emergency response plan 	<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Regularly inspect handling equipment; schedule frequent maintenance and clean-up • Prohibit cargo residue “washdowns” in port. • Containerize for disposal • Use canvas between ships and docks when unloading. • If practical, spraying a light mist for dust control during handling operations (\$\$\$???) • Maintaining pile size/volume consistent with customer demand, transportation schedules and materials cost to reduce the amount of material exposed to weather conditions

WATER AND LAND POLLUTION PREVENTION

Stormwater run-off	Spills	Cargo Residues
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LEVEL 3		
<p>Adoption of a Stormwater management plan comprising the following elements :</p> <ul style="list-style-type: none"> • List potential source of runoff pollutants and pollutants of concern, and describe proposed source control measures and appropriate BMPs • Identification of areas sensitive to stormwater run-off (description and map) • inspecting storage areas after rainfall or snowmelt to observe run-off or stormwater migration and implement preventive measures) • Design construction and landscape projects to expose only limited areas of soil; use simple erosion and sediment control devices during construction • Identification of persons responsible for applying these procedures 	<p>Adoption of a Spill management plan comprising the following elements :</p> <ul style="list-style-type: none"> • Identification of pollutant types and pollutant source areas (description and map) • Identification for each pollutant source area, the source control measure(s) used to reduce pollutants to the maximum extent practicable • Procedure to report all spill cases • Identification of persons responsible for applying these procedures. 	<p>Adoption of a cargo residue management plan comprising the following elements :</p> <ul style="list-style-type: none"> • Completion of an inventory of equipment and practices linked to the production of cargo residues. • Designated procedures for receiving and handling complaints regarding the production and treatment of cargo residues. • A collaborative procedure with shipowners and / or crews for reducing the amount of cargo residues left on board ships. • Description of procedure for cargo residues disposal. • A surveillance procedure to ensure proper functioning of equipment and actions to be undertaken in case of cargo leakages or spills.

WATER AND LAND POLLUTION PREVENTION

Stormwater run-off	Spills	Cargo Residues
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LEVEL 4		
<p>Implement at least 2 of the following measures in one or more terminals managed by the company:</p>	<p>Implement the following measure in one or more terminals managed by the company:</p>	<p>Implement the following measure in one or more terminals managed by the company:</p>
<p>Infrastructure investment (examples):</p>	<ul style="list-style-type: none"> • Install overflow protection devices on tanks and automatic shutoffs on dispensing hoses. (\$\$\$???) • Install release detection and corrosion protection on tank systems. (\$\$\$???) • Ensure that the liquid bulk loading/unloading area drains to a catchment basin or other similar containment structure (\$\$\$???) 	<ul style="list-style-type: none"> • Adapt loading and unloading operations in cases of abnormal dust emissions due to wind. <ul style="list-style-type: none"> - Wind between 30 to 50 Km/h : decrease the operating speed - More than 50 Km/h : stop operating <p align="center">OR</p> <ul style="list-style-type: none"> • Use enclosed conveyors or chutes and telescoping arm loaders or other similar equipment to reduce spillage and dust.
<p>Equipments/technologies (examples):</p>		<p align="center">AND</p> <ul style="list-style-type: none"> • Use dust suppression, baghouse, screw conveyors, vacuum collecting equipment or other similar equipment in the handling of fine, granular or powdery material
<ul style="list-style-type: none"> • Have a storage areas with a slightly sloping surface to a manually-operated dead-end sump to collect precipitation • Have a run-off detention basin with a retention time to allow for settling of solids • Install permanent post-construction control structures designed to reduce pollutant loading of stormwater discharge. ?? <p>Equipments/technologies (examples):</p> <ul style="list-style-type: none"> • Install secondary containment for storage of liquids (\$\$\$???) • Installing screens in drainage channels to filter suspended solids and attached heavy metals. Periodically clean the screens and properly dispose of the sediment (stormceptor?) • Vegetalization and others (Appendix A: BMP Fact Sheets, San Francisco stormwater Design 		

Guidelines)		
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WATER AND LAND POLLUTION PREVENTION

Stormwater run-off	Spills	Cargo Residues
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LEVEL 5		
Implement at least 2 of level 4 measures in all terminals managed by the company.	Implement level 4 measures in all terminals managed by the company.	Implement level 4 measures in all terminals managed by the company.

Environmental Leadership Performance Indicator
(for port authorities only)

Purpose: Recognize port authorities' unique situation (little direct environmental impact / as landowner or landlord, can play significant role in influencing environmental practices of its tenants)

Example:

Level	Criteria
1	Port authority has taken formal steps to encourage its tenants to join Green Marine.
2	One or more of the port authority's tenants is a Green Marine participant. and... or...
3	At least 25% of the port authority's tenants are Green Marine participant. and... or...
4	At least 50% of the port authority's tenants are Green Marine participant. and... or...
5	All of the port authority's tenants are Green Marine participants. and... or...

Other criteria that could be included in this indicator:

- Environmental clauses in lease contracts or tenders
- Internal environmental audit, reporting or objectives for tenants
- Initiate dialog with local environmental groups
- Engage tenants in port-wide environmental projects
- Implement Green Awards
- Other...

Appendix C

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Stormwater run-off	Spills	Dry Bulk Cargo Storage and Handling (dry bulk terminals only)
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LEVEL 1		
<p>Compliance with existing regulations and adherence to Green Marine's guiding principles.</p> <p>(Identify applicable regulations.)</p>	<p>Compliance with existing regulations and adherence to Green Marine's guiding principles.</p> <p>(Identify applicable regulations.)</p>	<p>Compliance with existing regulations and adherence to Green Marine's guiding principles.</p> <p>(Identify applicable regulations.)</p>

Stormwater run-off	Spills	Dry Bulk Cargo Storage and Handling (dry bulk terminals only)
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LEVEL 2		
<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Where practical, build drainage channels with screens to filter suspended solids from the stormwater runoff. • Periodically clean the screens and properly dispose of the sediment. • Periodically inspect and maintain drainage infrastructure and equipment to ensure proper functioning. • For bulk material or cargo that could leach, place bulk storage areas on impervious surfaces as distant from waterways as practical; • Design construction and landscape projects to expose only limited areas of soil; use simple erosion and sediment control devices during construction and post-construction. 	<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Periodically inspect any piece of equipment that could leak • Schedule regular maintenance and clean-up of the above-mentioned equipment. • Ensure that spill washdowns are conducted in a controlled situation. • Locate spill response equipment near the areas of operations and/or have a mobile unit ready for response at all times. • Organize informal training sessions for employees on first response to small spills and environmental emergency response plan. 	<p>Implementation of the following best practices:</p> <ul style="list-style-type: none"> • Recover cargo residue on the ground by sweeping. • Ensure that cargo residue sweepings are disposed of in a proper way. • Prevent water contamination while loading and unloading operations (example: Use canvas between ships and docks when unloading). • Keep dry bulk piles covered as much as possible when they are likely to blow away by the wind or to leak out on the ground. • If practical, spraying a light mist for dust control during handling operations. • Maintain piles as low as practical to reduce the amount of material exposed to weather conditions.

Stormwater run-off	Spills	Dry Bulk Cargo Storage and Handling (dry bulk terminals only)
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LEVEL 3
Adoption of a Water and Land Pollution Prevention Plan.

Stormwater run-off	Spills	Dry Bulk Cargo Storage and Handling (dry bulk terminals only)
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LEVEL 4		
<p><u>Terminal operators:</u> Implement at least one of the following infrastructure / equipment investments in one or more terminals where there is a risk of water contamination by stormwater runoff: (terminal operator can claim level 4 even if the infrastructure is built and maintained by the port authority)</p> <ul style="list-style-type: none"> • A run-off detention basin with a retention time to allow for settling of solids • A permanent post-construction control structures designed to reduce pollutant loading of stormwater discharge (stormceptor). • On-site infiltration area <p><u>Port Authorities:</u> Implement the following infrastructure / equipment investments and monitoring measure:</p>	<p>Implement 2 of the following measures in one or more terminals managed by the company: (same criteria for port authorities)</p> <ul style="list-style-type: none"> • Implement a strategy to gradually replace conventional oil by biodegradable oil. • Organize annual and formal training session for employees on the cleaning up of small spills and environmental emergency response plan. • Implement a preventive maintenance program targeting equipment which might produce fuel or chemical spills. 	<p>Implement the following measures in one or more terminals managed by the company:</p> <ul style="list-style-type: none"> • Adapt loading and unloading operations in cases of abnormal dust emissions due to wind. (Each participant is to define acceptable wind conditions depending on the type of cargo.) • Systematically cover dry bulk piles when they are likely to blow away by the wind or to leak out on the ground. Piles are covered with an impervious tarpaulin as soon as possible after unloading and adjusting the cover as material is removed. <p>AND</p> <ul style="list-style-type: none"> • Use enclosed conveyors or chutes and telescoping arm loaders or other similar equipment to reduce spillage and dust. <p>OR</p> <ul style="list-style-type: none"> • Use dust suppression, baghouse, screw

<ul style="list-style-type: none">• One or more terminals on port property are equipped with stormceptor or detention basin.• Water runoff analysis is conducted regularly to ensure proper functioning of treating equipment and infrastructure.		conveyors, vacuum collecting equipment or other similar equipment in the handling of fine, granular or powdery material.
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Stormwater run-off	Spills	Dry Bulk Cargo Storage and Handling (dry bulk terminals only)
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LEVEL 5		
<p><u>Terminal operators:</u> Implement at least one of level 4 measures in all terminals where there is a risk of water contamination by stormwater runoff.</p> <p><u>Port Authorities:</u> No untreated runoff water reaches waterways. (All terminals are equipped with stormceptor or detention basin)</p>	<p>Implement at least 2 of level 4 measures in all terminals managed by the company INCLUDING the implementation of a preventive maintenance program targeting equipment which might produce fuel or chemical spills. (For port authorities and companies operating only one terminal, all level 4 measures must be implemented to reach level 5)</p>	<p>Virtually eliminate cargo residues by implementing level 4 measures in all terminals managed by the company.</p> <p>AND</p> <p>Implement a preventive maintenance program targeting dry cargo handling equipment.</p>