

Best Management Practices (BMPs) for Marinas and Small Boatyards in British Columbia

to

**Environment Canada
North Vancouver, British Columbia
August 30, 1995**

by

**PCA Consultants Ltd.
Richmond, B.C.**

ACKNOWLEDGMENTS

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PROJECT TEAM

The first draft of this document was prepared by DF Dickins Associates Ltd. in March 1994. The draft was edited, updated, expanded and produced in this final version by Ann Godon and Peter S. Wong of PCA Consultants Ltd.

The Scientific Authority on the project was Stanley Liu of Environment Canada. He was assisted by a steering committee consisting of Dr. John Jordan (Burrard Inlet Environmental Action Program and Vancouver Port Corporation), Chris Robins (formerly of Greater Vancouver Regional District), Wayne Knapp (Fisheries and Oceans Canada), Bob Ferguson (BC Environment), Lisa Walls (Environment Canada), and Sandra Lum (formerly of Environment Canada).

RELATED DOCUMENTS

The following documents are related to the best management practices for the ship and boat building and repair industry in British Columbia:

- **Best Management Practices (BMPs) for Ship and Boat Building and Repair Industry in British Columbia**
- **Best Management Practices (BMPs) for Marinas and Small Boatyards in British Columbia**
- **Best Management Practices (BMPs) for Ship and Boat Building and Repair Industry in British Columbia ----- Background Document**
- **Best Management Practices (BMPs) for Boat Building and Repair (pamphlet).**

FOREWORD

Following the development, in 1989, of an initial draft of a Recommended Environmental Management Practice document for major British Columbia shipbuilding and repair facilities, Environment Canada has conducted a survey of existing practices at all shipbuilding facilities in B.C. (Peter Hatfield, 1993). These survey results and subsequent consultation with industry representatives indicate that any future recommendations for improved practices need to be applied not only to the large shipyards, but also to government facilities, smaller commercial construction and repair yards, and any other facility offering repair facilities and services (including marinas, yacht clubs, and small craft harbours). Consequently, the Best Management Practices (BMPs) outlined are intended for implementation by all facilities in B.C. where ship or boat building and repair activities are conducted in close proximity to the aquatic environment. This includes building and repair of pleasure boats as well as commercial vessels. Since marinas and small boatyards do not provide all of the servicing activities normally available at the larger operations, a simplified version of the BMPs document for the industry is also produced to address those specific concerns found in the smaller facilities.

This BMP document was developed through the work of a Project Team including representatives from Environment Canada, B.C. Ministry of Environment, Lands and Parks, Greater Vancouver Regional District (GVRD), the Burrard Inlet Environmental Action Program (BIEAP), and Fisheries and Oceans Canada (DFO). This document is the final report in the development of the BMPs. (The first draft, prepared by DF Dickins Associates Ltd., was issued in March 1994.)

The BMPs outlined in this report include activities and remedial measures which are not completely specific to the shipbuilding and repair industry. Many of the recommended practices are equally applicable to many other industries as well. Waste minimization and the 3R's (recovery, recycle and reuse) are emphasized wherever possible in the individual BMPs.

Environment Canada will work cooperatively to find practical and cost effective solutions to the environmental issues addressed in this document. Facilities are encouraged to individualize the BMPs to their operations and site locations and to develop their own solutions for pollution control. It is expected that new facilities will adopt the BMPs in their construction and operation. Existing facilities could start by implementing the least-cost BMPs first. Site-specific circumstances will influence the applicability and timing of implementation of certain practices at both new and existing facilities.

The extent to which industry is able to follow the practices recommended in the final BMP document will be determined by audits. This BMP document does not preclude the government from introducing or taking regulatory steps in the future to ensure that the environment is adequately protected.

Enquiries and comments on the document are welcome and may be mailed or faxed to:

Environment Canada
Environmental Protection Branch
Commercial Chemicals Division
201 - 401 Burrard Street
Vancouver , B.C.
V6C 3S5

Phone: (604) 666-3198
Fax: (604) 666-6800
E-mail: boatyards.pyr@ec.gc.ca

For information regarding contaminant effects and the legislative background to the BMPs, as well as a review of current practices in Canada, the United States and overseas countries, the reader should

consult the Best Management Practices for the Ship and Boat Building and Repair Industry in British Columbia ---- Background Document and Best Management Practices (BMPs) for the Ship and Boat Building and Repair Industry in British Columbia. Both of these documents are available from Environment Canada at the address above.

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INTRODUCTION

Definition of Best Management Practices (BMPs)

Best Management Practices (BMPs) refer to industrial techniques and good housekeeping principles for reducing and preventing pollution. Best Management Practices are commonly referred to as BMPs. The overall philosophy behind BMPs is to conduct everyday activities in a more ecologically-sound manner: keeping pollutants out of surface waters and ground waters, recognizing that total containment and recovery is not always practical. BMPs fall into two general groups: source-control (e.g., vessel shrouding, sweeping, covering waste piles, and bermed storage for oils and paints) and treatment (e.g., hull washwater settling tanks and filters).

Objectives of Best Management Practices

Best Management Practices are needed to reduce and prevent contamination of the aquatic environment and to improve air quality. Boat building and repair can cause pollution in a number of ways:

- pressure washing of hulls produces water contaminated with anti-fouling paints; paints containing copper, tin, lead, zinc and other heavy metals that are toxic to aquatic organisms
- stormwater runoff carries various kinds of pollutants generated or resulted from painting, sanding and hull repair into fish habitat
- improper handling of chemicals and petroleum products used in ship and boat building and repair can cause spills which pollute fish-bearing waters
- drips and spills pollute public waters when vessels are painted afloat or over inter-tidal areas
- dust and grit from abrasive blasting fouls fish habitat, and stormwater leaches out heavy metals from improperly stored abrasive blasting grit

The Best Management Practices will help shipyards, boatyards and marinas comply with federal and provincial laws and municipal bylaws, including the Canadian Environmental Protection Act, Fisheries Act, Workers' Compensation Act, B.C. Waste Management Act, B.C. Contaminated Sites Legislation, and municipal air quality, noise, sewer and fire safety bylaws.

The BMPs were co-developed by Environment Canada; B.C. Ministry of Environment, Lands and Parks; Fisheries and Oceans Canada ; the Greater Vancouver Regional District and the Vancouver Port Corporation.

Implementation of BMPs

The Best Management Practices in this brochure apply to new construction or repair of commercial vessels or pleasure boats of any size at any location . Information presented in this brochure is a simplified version of the Best Management Practices for Ship and Boat Building and Repair Industry in British Columbia , because the smaller operating facilities do not provide all of the servicing activities normally available at the larger operations.

Shipyards, boatyards, marinas, yacht clubs and small craft harbours, (private, public or government) will be implementing the BMPs. The BMPs are voluntary at present but may become a regulatory requirement in the future, depending on industry cooperation. The extent to which industry follows the practices outlined here will be determined by facility audits.

Most of the BMPs proposed here are based on common sense and can be implemented quickly and at low cost, through simple changes to general housekeeping procedures or economical in-house fabrication. American experience has shown that the adoption of more stringent environmental standards has not imposed an intolerable financial burden on well-managed competitive operations.

There is no expectation that B.C. facilities will undertake any costly installations or improvements without weighing the alternatives which may be available to reduce contaminant discharges. Facilities should implement as many simple BMPs as possible in the short term while continuing to pursue other options or approaches to the more costly problems. All practices need to be implemented and judged on a case-by-case basis, taking into account the conditions, operations, and natural limitations at each facility. Environment Canada recognizes that financial and site limitations may delay implementation of the more costly BMPs until new construction or a major renovation occurs.

In implementing the BMPs, treatment and control systems of varying complexity will be needed to match the volumes of contaminants produced by individual facilities. Facilities are encouraged to individualize the BMPs to their operations and site conditions and to develop their own solutions for source control. Environment Canada will work cooperatively with facilities to find practical and cost effective solutions to the environmental issues addressed in the BMPs.

Scope of This Brochure

The Best Management Practices in this brochure focus on practices for small boatyards, marinas, yacht clubs and other facilities which primarily maintain and repair pleasure crafts. This brochure is excerpted from a larger document which covers BMPs for all sizes and types of shipyards and boatyards in B.C. The BMPs outlined here include those processes or operations necessary to clean, prepare, and coat boat hulls (including the storage and disposal of paints, solvents, oils, and cleaners). Some routine disposal activities are not covered specifically (e.g., grey water hookup to the municipal sewer system or disposal of general garbage).

The BMPs are divided into eight categories, each covering a specific operation or management task. In each case, the general intent behind the BMPs is stated and guidelines for achieving an improvement to existing practices are listed.

More detail on practices for hull washwater collection, abrasive blasting, and other operations typically carried out at larger boatyards and shipyards are available in the report Best Management Practices (BMPs) for the Ship and Boat Building and Repair Industry in British Columbia .

Normal dredging activities to maintain the proper draft available in marinas and small boatyards are beyond the scope of this study. To minimize the potential environmental impacts from activities involving dredging and the disposal of the dredged spoil, the owners and operators of the facilities must contact the local regulatory authorities (such as Environment Canada, Ocean Disposal Program) for assistance and approval.

For information regarding contaminant effects and the legislative background to the BMPs, as well as a review of current practices in Canada, the U.S. and overseas, the reader should consult the Best Management Practices for the Ship and Boat Building and Repair Industry in British Columbia - Background Document. Both documents are available from:

Environment Canada
Commercial Chemicals Division
201-401 Burrard St .
Vancouver , BC
V6C 3S5

1. Surface Preparation

(washing, abrasive blasting, stripping, scraping)

-includes storage of spent grit, cleaning/recovery, and disposal

INTENT: To reduce the level of contaminants entering the aquatic environment from spent grit, airborne dust, paint flakes, and hull washwater; and to reduce air emissions from airborne dust.

Note:

Practices regulated by federal or provincial legislation or municipal bylaws.

Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

Depending on the pressure used, washing activities can range from removal of loose paint, slime, and marine growth (using 1,500 psi to 5,000 psi or 10,000 kPa to 35,000 kPa) to a complete coating removal down to the original profiled metal (using ultra-high pressure systems operating up to 35,000 psi or 240,000 kPa).

BMPs

Collect hull washwater and remove all visible solids before discharging to a sewer or receiving waters. Inspect and clean all sumps, filters and/or screens regularly (see BMP 7-Record Keeping/yard checklist).



Sloped bermed area to direct hull wash water to sump for sludge catchment.

Avoid any high pressure washing of hull unless prior clean-up of the lift platform or yard surface is completed. Attempt to reduce or eliminate interaction between water runoff and other debris which may be transported to the aquatic environment (see also BMP 5).

Avoid high pressure washing on tide grids, docks, planked and grated surfaces, or other areas where the washwater cannot be contained.

Do not discharge to the sanitary sewer unless the wastewater meets the requirements of the local sewer authority. Monitor the quality of water discharged to sewers or local waters (this may already be required by your local sewer authority).

Attempt to contain and recover as much spent grit from abrasive blasting as possible. Prevent spent grit and fugitive dust from reaching the water. For more detailed practices consult the document Best Management Practices (BMPs) for the Ship and Boat Building and Repair Industry in British Columbia .

▲ Tarp under a vessel blocked on a gravel or dirt yard before sanding, scraping or stripping paint. Tarp or install rigid sheeting under a vessel blocked on a planked or grated surface. Dispose of collected paint chips and scrapings at an approved facility.

Avoid sanding, scraping and stripping of paint if vessels are blocked on tide grids. Only if other options are not available and unless the grids are well-removed from sensitive fish habitat, shellfish harvesting areas, fish farms, or shallow estuary areas, the above surface preparation activities should not be conducted on tide grids.

If surface preparation is unavoidable, tarp under vessels and collect paint chips, scrapings and other waste and then remove the tarps before the grid floods. Dispose of collected paint chips and scrapings at an approved facility.

Notes: Various treatment systems are available to remove the contaminants from hull washwater. Treatment systems are discussed in general Best Management Practice document. Another good source of information is Metro Seattle's Boatyard Wastewater Treatment Guidelines.

Sludge or debris from washwater may qualify as special waste and require disposal at an approved special waste facility. Consult B.C.'s Special Waste Regulation or have the material tested to determine if this is the case.

2. Coatings

(paint storage, application, disposal)

INTENT: To reduce the potential for paint products to enter the aquatic environment either through fire, spills in mixing, overspray, or improper disposal.

Note:

☐ Practices regulated by federal or provincial legislation or municipal bylaws.

▲ Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

BMPs

▲ Position vessels in a suitable location before applying antifouling coatings. This should be at an approved site, well-removed from sensitive fish habitat, shellfish harvesting areas, fish farms, shallow estuary areas, or surface storm drains. Avoid any spraying of antifouling paint or other coatings while the vessel is on a tide grid or beached at low tide. Use rollers or brushes only, with suitable drip trays for mixing. Apply antifouling paints in accordance with manufacturer's label instructions and in compliance with appropriate federal and provincial regulations.

To prevent paint drips from entering public waters, use tarps or drop sheets under vessels blocked on tide grids or planked or grated docks. Remove tarps before the grid floods.

▲ Use mixing shelters with containment pans and raincover to reduce general spillage. Avoid paint mixing on docks or floats (see photo below).



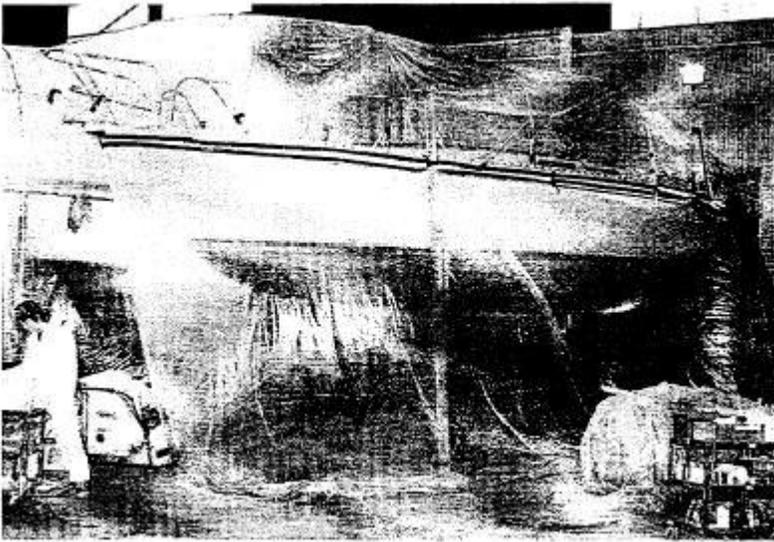
Portable shelter for paint mixing with rain cover and recessed metal floor for containment.

□ Store unopened paints, primers, epoxies, varnishes, etc., in a fire-resistant enclosure or fenced secure area with impervious floor and bermed area to contain at least 110% of the largest container or 10% of the total volume of the containers, whichever is greater (given the small size of most paint containers, the latter criterion is most relevant). If there is no roof over the bermed area, any accumulated storm water should be drained via a siphon to avoid any direct drainage route through the berm walls. Storage areas should comply with the local fire code and the National Building Code. Avoid any storage of coating materials directly at dockside or on the wharf.

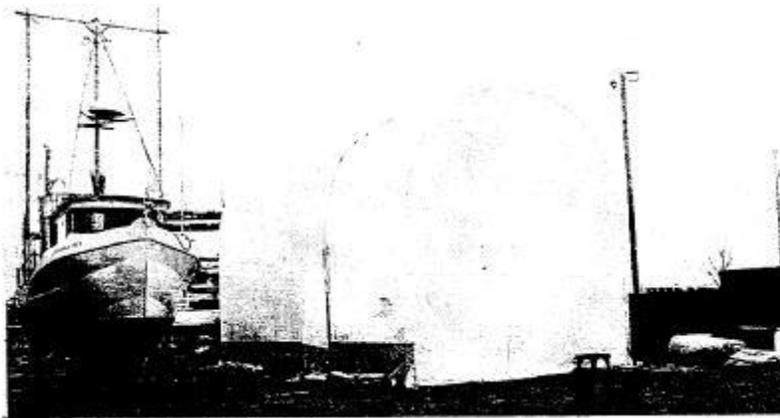
□ Use airless or high volume low pressure (HVLP) spray guns to reduce overspray. Monitor overspray at selected points around the yard perimeter. Establish and adhere to “safe” wind directions and speeds for particular facilities.

▲ Use rollers or brushes for all painting alongside, except where topsides are fully shrouded.

Shroud painting activities as much as possible to reduce overspray or runoff of paint from the yard into the aquatic environment. Refer to discussion of shrouding options under BMP #1 for blasting. Photo below shows a typical shrouding operation for painting in a small boatyard.

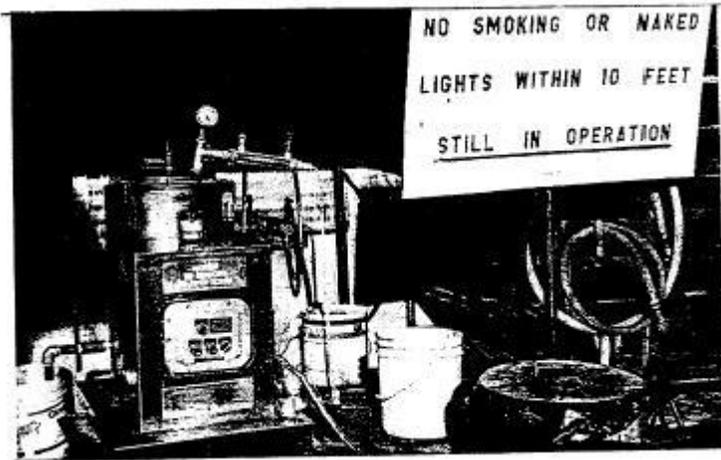


Fully shrouded boat prior to painting



Telescoping portable shelter used to enclose blasting and painting at a boatyard

Use a still to recover and recycle different solvent products. Stills are a cost-effective alternative to contract disposal of spent solvents. Obtain authorization from BC Environment for the operation of the still (as stills handle Special Waste). Maintain used solvents in a secure and covered area with adequate containment prior to processing.



Solvent still

- ▲ Allow empty paint cans to air dry before disposal.
- ▲ Attempt to send partial cans of paints away with the vessel as much as possible or combine leftover paints and use them as needed around the yard in order to reduce the volume of waste entering landfills and ensure the maximum utilization of the paint at a later date.

3. Waste Fluids

(tank cleaning, hydraulic systems, bilge cleaning)
- includes storage, separation, off-site disposal, on-site processing

INTENT: To facilitate the safe disposal of waste fluids and reduce the chance of accidental spillage.

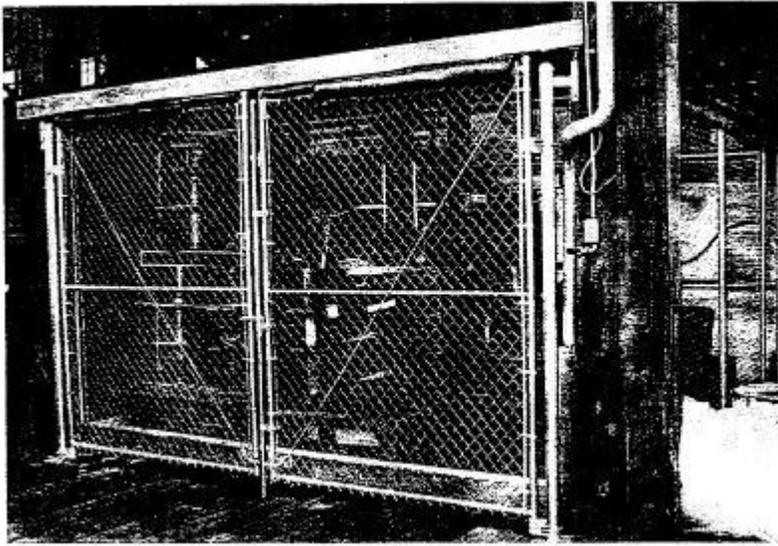
Note:

- Practices regulated by federal or provincial legislation or municipal bylaws.
- ▲ Practices which can be implemented with a short lead time and minimal financial outlay and for modification to existing facilities.

BMPs

- ▲ Segregate different waste fluids in colour coded containers or by tank design to reduce the chances for cross-contamination. Clearly mark tank contents.
- Maintain waste tanks, drums or receptacles in a secure, covered area with containment equivalent to 10% of the total volume or 110% of the largest container, whichever is greater. Refer to photos at the end of the report.

▲ Empty and clean drip pans and open containers promptly.



Secure storage for non-hazardous chemicals

- ▲ Recycle used oil filters at an approved facility. Drain all oil filters before recycling.
- ▲ Do not pour any liquid waste products down floor, sink, or outdoor storm drains. To ensure that drains are not misused, install signage with symbols such as fish on all drains.
- ▲ Discharge sanitary wastes and grey water to the municipal sewer or haul away in tank trucks for disposal.

Steam clean oily parts over a grate and sump to enable collection of oily water.

Waste oil is a special waste as defined in the B.C. Special Waste Regulation. Oil handling practices need to be in compliance with this legislation (refer to section 16 and 48(3) of the Regulation for containment and handling practices).

4. Chemical and Petroleum Products Storage

INTENT: To reduce the potential for an uncontained spill.

Note:

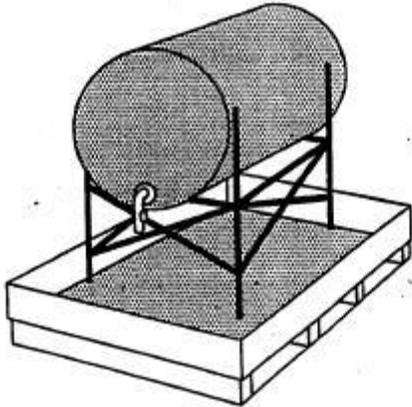
- Practices regulated by federal or provincial legislation or municipal bylaws.
- ▲ Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

This BMP applies to chemical and petroleum products used in repair or new construction and is not intended for fueling operations (for fueling, see B.C. Coastal Marina Facility and Operating Standards or other applicable guidelines).

BMPs

▲ Use a drip tray for drums in use (see diagram below). A cover is preferred to prevent rainwater accumulation.

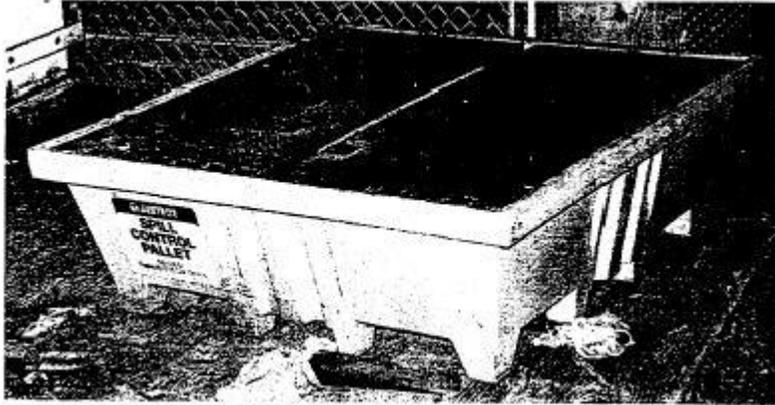
□ Provide above-ground storage tanks with suitable containment and overfill protection systems.



□ Provide a secure, fenced and covered area for oil, gasoline, and chemical drum or pail storage. The area should have an impervious floor and be surrounded by a berm capable of holding 10% of the total volume of fluids stored or 110% of the largest single container, whichever is larger. In cases where bermed area is not covered, arrange for drainage of storm water through siphons rather than any drainpipes penetrating the berm wall. Individual drums can be stored on portable spill pallets. See photos below.



Sprinklered, fire resistant inside storage for paint and other flammable products



Spill control pallet

5. General Yard Maintenance and Housekeeping

INTENT: To minimize opportunities for cross-contamination between different activities, to minimize storm water runoff of contaminants directly to receiving waters, and to foster a sense of general cleanliness which will lead to more organized and consistent handling of waste products.

Note:

- Practices regulated by federal or provincial legislation or municipal bylaws.
- ▲ Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

BMPs

- ▲ Recover all solid wastes prior to lift, tide grid, or railway submergence.

Pave or concrete as much of the active part of the workyard as possible to encourage good maintenance and recovery of contaminants.

- ▲ Maintain hose connections and valves to avoid unintentionally running water over yard debris.

▲ Sweep and/or clean the active working area of the yard on a regular basis (daily when blasting - see proposed WCB Regulations, May, 1994).

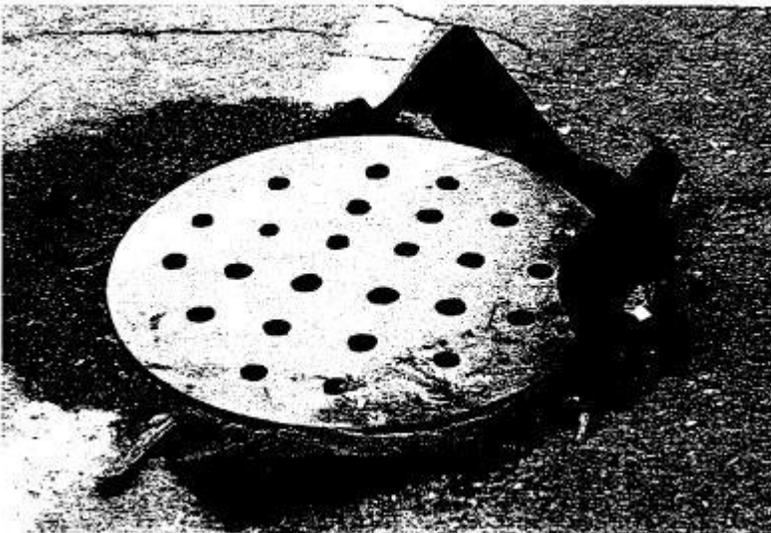


Yard sweeper (“Bobcat” attachment is a good alternative for smaller yards)

▲ Provide appropriate garbage collection facilities to collect wastes for recycling or disposal to prevent littering.

▲ Pump out waste oil recycling tanks on a regular basis to ensure that vessel owners and employees are not forced to leave oil containers in a vulnerable or exposed location. Waste oil tanks should conform with ULC/ORD-C-142-23 “Above-Ground Waste Oil Tanks”.

▲ Filter or provide collectors around yard drains to prevent flushing of spent grit into the stormwater runoff or sewer system (see photo below).



Poly-filter under yard drain manhole covers to catch sludge, grit, oils and grease runoff from yard.

6. Spill Prevention, Control and Countermeasures

INTENT: Provide for an organized, prompt and effective response to fuel and chemical spills in the yard, docks, floats and surrounding waters.

Note:

Practices regulated by federal or provincial legislation or municipal bylaws.

Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

BMPs

Establish a site-specific spill contingency plan which takes into account the particular layout of the facility and maximum spill volumes likely to be encountered for both oil and chemicals.

Report spill incidents directly to the Provincial Emergency Program, Environment Canada and Canadian Coast Guard. Refer to emergency numbers in Appendix A of this document.

Register hazardous materials with local fire department.

Maintain a countermeasures equipment inventory (e.g., sorbent pads, containment booms, etc.) that is chemically compatible and sized in accordance with the volume of hazardous materials stored on-site. Marked spill kits should be situated around the yard in covered containers. Replace used spill response materials immediately.

Train employees in the use of the contingency plan, spill containment and recovery equipment, and correct spill reporting procedures.

Dispose all contaminated clean-up materials (rags, sorbents, etc.) in accordance with the B.C. Special Waste Regulation.

For more information on contingency plans consult the Best Management Practices (BMPs) for the Ship and Boat Building and Repair Industry in B.C. Other sources of information are: the Canadian Standards Association (CSA) Emergency Planning for Industry - A National Standard of Canada (CAN/CSA-Z711-M91), May, 1991; the BC Ministry of Environment, Lands and Parks Guidelines for Industry Emergency Response Contingency Plans, March, 1992, available at no charge from their Environmental Emergency Coordination Office. Additional information is also available through Environment Canada.

7. Record Keeping, Checklists, Written Company Standards

INTENT: To provide a self-regulating check on BMP performance; to maintain a record of deficiencies and improvements needed; and to ensure client compliance with established environmental procedures as a condition of use.

Note:

Practices regulated by federal or provincial legislation or municipal bylaws.

Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

BMPs

▲ Establish a daily checklist of key yard areas to confirm cleanliness and appropriate storage and security procedures. Assign different inspection responsibilities to specific employees.

▲ Post hazardous waste disposal charts in conspicuous locations detailing for each waste the HAZARD (poison, flammable, corrosive), PROHIBITED DISPOSAL (dumpster, drain, sewer), RECOMMENDED DISPOSAL (recycle, solvent still, contractor disposal, etc.).

▲ Prepare a summary of the BMPs that apply to your operation and issue to all employees and yard users. Post BMP lists in conspicuous locations around the yard.

▲ Ensure receipt of a signed checklist from each user detailing consumption and disposal of any hazardous products while in the yard. Make completion and compliance a condition of launching the vessel.

Establish an overall corporate environmental philosophy which reflects management's commitment to protecting the environment. Carry this philosophy through visual signs, written forms and verbal messages.

Consider funding a site audit to establish soil and marine sediment contamination levels as a "before BMP" baseline. The results will demonstrate the effectiveness of BMPs on improving the quality of the local environment.

Keep a record of the water quality tests for washwater discharged to sewers and surface waters.

▲ Consider some form of employee suggestion box on BMPs with an award incentive. An example would be finding less labour intensive, safer and/or more cost-effective means of achieving a given BMP action item.

8. Training

INTENT: To instill a sense of personal responsibility among all employees and yard users, and provide the necessary background to ensure that the BMPs are implemented properly and in a cost-effective manner.

Note:

Practices regulated by federal or provincial legislation or municipal bylaws.

▲ Practices which can be implemented with a short lead time and minimal financial outlay and/or modification to existing facilities.

BMPs

▲ Task one person with organizing training sessions on BMPs, and make him or her accountable to management. Ensure that all employees are trained in BMPs.

Initiate a regular routine of workshops and employee briefings on different environmental issues. Involve different agencies (federal, provincial and municipal) in the training program to share perspectives on different environmental issues and force an ongoing dialogue of priorities.

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Relevant Legislation and Related Reports

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Appendix A

Contact List: Applicable Government Agencies

GOVERNMENT CONTACT LIST

Legislation	Agency	Telephone Number
Fisheries Act (s. 36 (3))	Environment Canada, Commercial Chemicals Division	(604) 666-3197
GVRD Air Quality Management Bylaw 725	Greater Vancouver Regional District (GVRD), Burnaby	(604) 432-6200
Greater Vancouver Sewerage & Drainage District Sewer Use	Greater Vancouver Sewerage & Drainage District, Burnaby (part	(604) 432-6200

Bylaw 164	of GVRD)	
Federal Pest Control Products Act	Pest Management Regulatory Agency	(800) 267-6315
Provincial Pesticide Act	BC Ministry of Water, Lands and Parks, Surrey	(604) 582-5200
Ocean Disposal Regulations	Environment Canada	(604) 664-9100
Hazardous Waste Regulation (formerly Special Waste Regulation)	BC Ministry of Water, Lands and Parks	(604) 582-5200
Worker's Compensation Act	Worker's Compensation Board	(604) 276-3100 (888) 621-7233
Environmental Review	Burrard Inlet Environmental Action Program/Fraser River Estuary Management Program, Burnaby	(604) 775-5756

Emergency Numbers

Spill Reporting Regulation	Provincial Emergencies Program	(800) 663-3456
	Environment Canada	
	Canadian Coast Guard	(604) 666-6100
		(604) 666-6011 (800) 889-8852