



**CLEAN-UP STANDARD FOR
OCEAN DISPOSAL OF VESSELS**

July 2001

**ENVIRONMENT CANADA
Ocean Disposal Control Program**

PACIFIC AND YUKON REGION

Canada



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Revision 1

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Environment Canada
Environmental Protection Branch

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CLEAN-UP STANDARD FOR OCEAN DISPOSAL OF VESSELS

1. BACKGROUND

1.1 Background: Development of this Standard

This Standard was developed from the clean-up criteria applied to the vessels sunk after 1995 on the Pacific coast. This revision of the Standard has several modifications based on experience from recent vessel clean-up and disposal projects, as well as site monitoring data from vessel disposal sites.

Each clean-up criterion in the Standard is approached from the viewpoint of reasonableness, with the proviso that preventing environmental effects or potential environmental effects are the priority. Research has indicated that there may be several potential concerns that are not reflected in the existing guidelines. Until more research has been completed, a stricter criterion than that indicated solely by the site monitoring data has been employed in these instances.

As further quantitative data are generated there will be adjustments to this Standard. It is the intention of Environment Canada to amend and further develop this Standard as scientific evidence concerning environmental impacts is made available. Revision 1 of this Standard has superceded the initial publication (February 1998).

Prospective permit applicants should also consult the publications entitled *Disposal of Vessels Guidelines for Applying for an Ocean Disposal Permit Under the Canadian Environmental Protection Act* and *Clean-up Guideline for Ocean Disposal of Vessels* (available from Environment Canada).

1.2 Interpretation and Definitions

In this Standard and the above noted publications, the following interpretation and definitions will apply:

- “clean-up debris” means any material that was not a part of the vessel. If vessel debris and clean-up debris are mixed, then the mixture is considered to be clean-up debris;
- “Designated Inspector” means the qualified person who inspects the vessel in accordance with this Standard. The Designated Inspector may be an Environment Canada employee or other person engaged by an Environment Canada official;
- “emulsified oil” means a mixture of oil that is finely dispersed in water, and does not

readily separate due to gravity;

- “fitted equipment” means machinery or components that were bolted, welded, or otherwise fastened in a manner to indicate that removal while in service would not be a casual act, and that they were part of the outfit of the ship during its last period of service;
- “grease” means a lubricant or corrosion protective substance which was applied as a solid, and does not apply to any compounds that were not designed to be a lubricating or protective compound, nor does it apply to sludge or to heavy oils that may have thickened or solidified;
- “halocarbon” has the meaning under the Federal Halocarbon Regulations (Schedule 1) of the *Canadian Environmental Protection Act*.
- “machinery spaces” has the meaning under the Marine Machinery Regulations of the *Canada Shipping Act*;
- “PCBs” Polychlorinated biphenyls (PCBs) means any products that contain chlorobiphenyl congeners or any chlorinated organic compounds in concentrations that would be regulated under the Chlorobiphenyls Regulations, i.e., greater than 50 parts per million (ppm);
- “oil absorbent material” means any substance which is sold or marketed primarily as a material to absorb oils or fuels for spill cleanup;
- “Regulations” mean the Disposal at Sea Regulations under the *Canadian Environmental Protection Act (1999)*;
- “responsible Environment Canada official” means the Environment Canada official who has been assigned primary responsibility for verifying that the condition of the vessel is satisfactory for issuing a permit under the Regulations;
- “structure” means components that are an integral part of the strength members of the ship (decks, bulkheads, webs, etc.), which were not designed for removal except in the most unusual circumstances. In most cases, structure components are welded in position;
- “vessel” has the meaning described in the *Canada Environmental Protection Act* Section 122 for “aircraft” and “ship”;
- “vessel debris” means material that was once part of the vessel that has been removed or disconnected from its original location in the vessel.

2. SCOPE

This Standard was developed for ships. However, it may also be used for aircraft or other machinery that is scheduled for ocean disposal under the Regulations. In these cases, Environment Canada should be contacted to determine the applicability of the Standard.

The preparation activity for a vessel sinking consists of several related activities. The two primary activities are vessel clean-up, and salvage or recycling efforts. If the vessel will be sunk in an area accessible to divers then diving safety preparations should be part of the preparation activities.

This Standard is primarily intended to address environmental clean-up requirements mandated by federal authorities. Applicants are cautioned that provinces and municipalities may have further requirements that must be addressed, especially with respect to work-site safety and disposition of materials that are removed from the vessel. It is not within the scope of this Standard to discuss provincial or municipal regulations, although the responsible Environment Canada official may require that those requirements directly applicable to the vessel be met prior to permit approval.

Experience has shown that job-site safety during clean-up and salvage operations is frequently a problem. Falls, fire, and air quality issues are especially important in vessels. This Standard does not address job-site safety requirements for permit applicants, except as they relate to the formal inspection process. Permit applicants must refer to Worker's Compensation Board (WCB) regulations and the Canada Labour Code for requirements related to maintenance of a safe and legally compliant work-site.

Proponents are strongly cautioned that vessels at the end of their life are inherently dangerous work sites; failure to implement and enforce an adequate safety program could lead to injury or fatality.

Under the *Canadian Environmental Assessment Act*, federal departments and agencies are required to conduct or participate in federal environmental assessments if a federal authority exercises or performs certain powers, duties or functions in relation to a project.

With respect to the ocean disposal of vessels, Environment Canada is the lead responsible authority but other federal departments or agencies involved in this activity will be required to conduct their own environmental assessments or input into the environmental assessment conducted by Environment Canada. Proponents may be required to supply information.

Although diver safety is a significant issue in the case of vessels sunk as diving attractions it is not among the environmental concerns required by the Canadian Environmental Protection Act (CEPA) to be taken into account by the Minister of the Environment in granting an Ocean Disposal Permit. Consequently, a permit applicant planning to sink a vessel as a diver attraction should seek legal advice regarding such

issues as diver safety, the preparation of the vessel from a diver safety perspective and liability before applying for an Ocean Disposal Permit under CEPA.

3. OIL AND GREASE

The aim of the hydrocarbon clean-up is to remove liquid hydrocarbons (fuels, oils) that could escape into the environment. It is acknowledged that it is impossible to remove all hydrocarbon contaminants, however experience has indicated that a very thorough clean-up is achievable. In general terms all liquid hydrocarbons are to be removed and semi-solids (greases) either removed where practical or contained. Permit applicants are advised that the Designated Inspector will require access to every space, tank, compartment, pipe and component in the vessel.

3.1 Structural Tanks

All structural tanks are assumed to be contaminated by hydrocarbons until proven otherwise by inspection. Structural tanks encompass, *inter alia*: fuel storage/settling/service/day tanks, cargo tanks, oil tanks, structural hydraulic tanks, fresh water tanks, ballast tanks, stabilizer tanks, black and gray water tanks, voids, and cofferdams.

Tank covers are to be removed, or tanks are to be opened for human access by some other method. Tank interiors including deckheads are to be cleaned of all hydrocarbons.

For inspection purposes, structural tanks are divided into two categories:

- **Double bottom tanks.** Each bay in a double bottom tanks must be inspected. Safe access for Designated Inspectors is an absolute requirement. Proponents are strongly cautioned that double bottom tanks typically have difficult access, and that safety of workers and inspection staff must be actively addressed.
- **"Tall" tanks.** For inspection purposes the tank may either be opened and certified gas free for Designated Inspector access, or tanks may be flooded to a height approximately 20 cm below the bottom of the deepest structural member on the tank top, and a manhole size inspection cover provided on the tank top. Note that any piping in the tank must be inspected in accordance with section 3.4.

No visible hydrocarbons are allowed on the tank surfaces (this includes all interior fittings, piping, structural members, etc.). If flooding is used for tall structural tanks, then no visual evidence of oil on the water surface is allowed. If tall structural tanks are flooded, oil absorbent pads and excess loose oil absorbent material must be removed.

3.2 Non-structural Tanks

All non-structural tanks are assumed to be contaminated by hydrocarbons until proven otherwise by inspection. For inspection purposes non-structural tanks that are left in the vessel must be opened for visual inspection. Note that non-structural tanks are frequently relatively small and access openings for on-going maintenance are typically not as large as for structural tanks. In most instances, larger openings will need to be cut to allow for complete inspection.

No visible hydrocarbons are allowed. Debris and excess loose oil absorbent material must be removed.

3.3 Fuel and Oil Filling Points

All filling stations or deck fittings that were used for receiving fuels, oils or other hydrocarbons are to be opened and cleaned. The Designated Inspector will require access to ensure that the filling points and any associated fittings are completely drained and free of hydrocarbons. This will typically require access from the bottom and the top.

3.4 Fuel and Oil Piping Including Manifolds

Fuel and oil piping is to be drained of all product. The requirement for cleaning and opening of pipes varies according to the type of product that was in the lines. In general, the more viscous the product the more opening and active cleaning activity will be required. For very viscous products (e.g. Bunker "C" fuel), the Designated Inspector will require that all piping and fittings be fully opened for visual inspection.

Small-bore hydrocarbon-carrying lines ($\frac{1}{2}$ inch nominal or smaller) must be removed from the vessel, except as follows: vertical runs may remain.

Vertical piping runs are to have all valves completely opened and any blanking flanges or spectacle plates removed.

Horizontal piping runs larger than $\frac{1}{2}$ inch nominal require one full opening that allows visual inspection of the internal pipe bore on each major horizontal run. This opening will be used to assess sludge formation, and may lead to further cleaning requirements depending on findings. Note that this includes piping in tanks; some coordination will be required if the "flooding" method of inspection is used (see section 3.1). **In addition:**

- For light products, piping shall be opened at low spots and a minimum of every three metres. Opening means flanges separated, couplings unbolted and piping separated, or the pipe is to be cut completely through at the bottom.
- For heavy products, piping shall be opened at low spots and a minimum of every three metres. Opening means that the pipe is completely open for visual

examination. Opening locations are to be clearly marked for the Designated Inspector by means of tagging, spray paint, etc

By the time of the inspection all draining of piping systems is to be completed; no visual evidence of hydrocarbon weeping may exist at openings.

3.5 Fuel and Oil Piping Fittings

Fittings consist of valves, site glasses, coolers, siphon breakers, filters, etc. All fittings are to be opened and cleaned, or removed from the vessel. The Designated Inspector will require a visual examination of internals. Fittings in light oil systems may have a cut through the lowest point of the fitting in lieu of complete opening. By the time of the inspection all draining of fittings is to be completed; no visual evidence of hydrocarbon weeping may exist at openings.

Where fittings are of complex construction or have more than one oil-tight compartment (as in coolers), then the Designated Inspector will require access to all sub-compartments or components.

3.6 Bilge Piping

All piping that runs through the bilge areas of machinery spaces is assumed to be contaminated by hydrocarbons until proven otherwise. Piping in bilge spaces is to be treated as for fuel and oil piping.

3.7 Gauges and Gauge Lines

Pressure gauges and gauge lines are assumed to be contaminated with the product that they were intended to measure. Pressure gauges and gauge lines for hazardous material systems (including hydrocarbon systems), and other systems that may have been contaminated with hazardous materials, are to be removed from the vessel.

All fluid filled gauges are to be removed from the vessel. Temperature gauges may be left in position provided that they do not contain any hazardous material. Other measuring instruments are to be removed from the vessel or opened for cleaning and examination.

3.8 Combustion Engines

Combustion engines include any reciprocating engine in which fuel is consumed (diesel, gasoline, gases), Stirling cycle engines and gas turbines.

- **Structure.** All access panels, explosion doors, handhold doors, maintenance panels, gear covers, bearing covers/ retaining plates, etc. are to be removed. Visible oil is to

be removed from all internal components. The surrounding and support structure is to be made accessible for inspection, especially the area under the engine. At least one main bearing is to be opened to determine if their design allows oil to be trapped and all are to be opened and cleaned if required. Heads on reciprocating engines are to be removed for inspection.

- **Fuel System.** All fuel system components are to be stripped from the engine. These include injectors, carburetors, supply, distribution and return lines, filters, pumps, relief valves, pressure regulating mechanisms, governors and heat exchangers. If the permit applicant wishes to sink these items with the vessel they are to be opened, cleaned, and readied for inspection.
- **Lubricating Oil System.** Lubricating oil sumps are to be drained and opened for cleaning and visual inspection. This will typically require that additional access openings be made. All lubricating oil piping, both internal to the engine and external to the engine, is to be removed or opened and drained. Lubricating oil system components are to be opened and cleaned, or removed from the vessel. Internal oil gallery plugs are to be removed. Bearing covers on external pedestal and thrust bearings are to be removed, and drains opened. Proponents are advised that engine structure may need to be removed to allow access for oil galleries and internal supply lines. Engine driven oil pumps are to be pulled and cleaned. Engine oil filling and dirty oil drainage arrangements are to be removed or opened and proven clean.
- **Other Systems.** Other components and systems susceptible to contamination with hydrocarbons (superchargers, turbochargers, air filters, etc.) are to be opened for inspection.

3.9 Boilers

Boiler fireboxes are to be opened for inspection. A section of the bottom firebrick is to be removed through to the underlying structure. The removed section must be of adequate size to allow visual inspection (approximately 200 mm x 200 mm), and must be located at the lowest accessible part of the firebox, or if the floor is at an even keel, below the oil sprayers.

Any bricking or firewall material showing evidence of hydrocarbon contamination is to be removed from the vessel. All boiler mounted fuel components (burners, valves, fuel control components, etc.) are to be removed from the vessel, or opened for inspection.

Blind bilges (if fitted) associated with boilers are to be opened for inspection.

3.10 Non-combustion Engines, Shafting, Gearing and Stern Glands

Main gearboxes and associated clutches are to be drained of all lubricating oils. All access panels, explosion doors, handhold doors, maintenance panels, bearing cover retaining plates, etc. are to be removed. Further access openings are to be made as required for cleaning and inspection access. Internal gear sprayers, lubricating lines and other components are to be removed, or opened and drained. Bearing covers on external pedestal and thrust bearings are to be removed and drains opened. Any bearings with sumps (typically plummer bearings) are to have sumps fully opened for inspection.

Stern tubes and seals, if of the oil bath type, are to be drained of oil. Note that this may require extraordinary measures to preserve the watertight integrity of the vessel during the clean up and salvage operation. The Designated Inspector will require that evidence be presented to confirm the absence of oil in the stern tubes.

Vessels that are equipped with thrusters, Z-drives, or other methods of unconventional drive will be addressed on a case-by-case basis. The criterion is that no hydrocarbons remain in the drive system. Permit applicants must recognize that this may require that the vessel be dry-docked. In these instances the responsible Environment Canada official may allow special inspections to confirm part-progress on those particular items associated with the dry-docking activity.

3.11 Steering Gear

Hydraulic pumps and associated piping and fittings are to be removed, or opened and drained. Hydraulic telemotor systems are to be treated similarly. Main steering rams are to have the ram cylinders opened to allow visual inspection. Grease lines and reservoirs for rudder heads are to be removed from the ship, or opened and cleaned. Grease in rudder stocks may remain *in situ* if required to preserve watertight integrity of the vessel during cleanup, otherwise it must be removed.

Vessels with combined drive and steering systems are to be addressed as per section 3.10.

3.12 Auxiliary Machinery

Auxiliary machinery refers to machinery and components that are not an integral part of the main propulsion system of the vessel. The term can include, *inter alia*: pumps, motors, compressors, galley equipment, capstans, elevators, cargo handling machinery, etc. Many pieces of auxiliary machinery have a lubricating oil system or are in direct contact with liquid hydrocarbons.

All lubricating oil system components are to be stripped from auxiliary machinery, or opened and drained. Lubricating oil sumps are to be opened, drained and wiped clean. Bearings, except as allowed in section 3.14, are to be opened and cleaned. An adequate

opening to allow a complete visual inspection of the sump is required. Auxiliary machinery that had a liquid hydrocarbon as its working fluid is to be completely opened and drained.

3.13 Hydraulics

Unless there is acceptable proof to the contrary, all hydraulic systems will be assumed to have employed a hydrocarbon based fluid. Hydraulic lines are to be removed from the vessel, or opened at every fitting and blown through with air until clear. Small bore lines (less than ½ inch nominal) are to be removed from the vessel (except that vertical runs may remain). Hydraulic fittings (valves and valve blocks of all types, cylinders, pumps, accumulators, filters, coolers, etc.) are to be removed from the ship or stripped to component level and cleaned. Hydraulic sumps are to be drained, and opened for cleaning and visual inspection. This will typically require that additional access openings be made.

3.14 Grease

All grease reservoirs are to be removed from the ship, or opened and cleaned. Grease lines are to be removed. All visible grease accumulations must be removed. Machinery that employs grease-packed gearboxes (common on deck machinery) must be opened and cleaned of grease. Grease on chains and sprockets is to be removed. Greased cables are to be removed from the vessel.

Site monitoring has not shown adverse effects from small amounts of grease contained within housings and bearings. Sealed rolling element bearings that contain grease may be left *in-situ*. Grease in other fittings such as stuffing boxes, glands, etc. may be left *in situ* if the seals are intact and the quantities are small. Small is a relative term but will be interpreted to mean less than 100 milliliters evenly distributed throughout the component.

3.15 Bilge Areas

Bilge areas include the interior skin in machinery compartments, cargo holds, storerooms, etc. The bilge area includes all areas that would be subject to contact with oily water, or may be a catch area for spills from cargo or stores, and interior skin areas which may have been subject to hydrocarbon contamination through sprays, spills, disposal, etc. Bilge areas include the plating and all surfaces of attached stiffeners (including undersides) and fittings. Machinery and other components are to be moved/ removed as necessary to allow access for inspection. Bilge areas are to be free of visible oils, greases and sludge. Oil or grease films evident to the touch must be removed. Any debris contaminated with hydrocarbons is to be removed.

Any cleaning fluids used to clean the bilge are to be removed from the vessel.

Accumulations of loose oil absorbent material are to be limited to those amounts which cannot reasonably be picked up with brooms and vacuums. See section 5.2.

3.16 Decks and Floor Coverings

Decks and floor coverings include ceramic tile, linoleum and linoleum tile, carpet, and continuous floor coverings.

Oil and grease films on deck coverings are to be removed. In compartments subject to hydrocarbon spills during the vessel's life (e.g. workshops, compartments with fuel or oil tank overflows or tank covers), a section of the floor covering (if fitted) is to be removed through to the underlying structure. The removed section must be of adequate size to allow visual inspection (approximately 200 mm x 200 mm), and must be located at the lowest accessible part of the compartment, or where there is no low spot, adjacent to the likely contamination source.

Sections of wood planking on upper decks are to be removed through to the underlying structure in areas of visual staining. The removed section must be smoothly sawn to allow examination of the end grain cross section, and be of adequate size to allow visual inspection of both the planking and the underlying deck (approximately 200 mm x 200 mm). Planking that has oil penetration deeper than 2 mm from the surface is considered saturated.

Deck coverings or underlay that have been saturated with hydrocarbons are to be removed from the vessel.

3.17 Bulkheads and Deckheads

Bulkheads and deckheads are to be free of oil and grease films. Where it is evident that a spill or accumulation has occurred, coverings are to be removed to reveal the full extent of the spill or accumulation.

Access for visual inspection is required behind fitted bulkheads and deckheads.

3.18 Other Components and Structure

Other components that may contain oils or grease are to be removed from the vessel, or fully opened for inspection.

Concrete fill or ballast poured into bilges and equipment foundations may remain in situ subject to the following conditions:

- The low edges of any containment system are opened to allow trapped oil to drain; and

- The surface of the concrete is cleaned of visible hydrocarbons; and
- The concrete fill is tight against the structure.

4. HAZARDOUS MATERIALS

4.1 Removal of Hazardous Material

All hazardous materials are to be removed from the vessel, except as allowed by the Regulations or by this Standard. Permit applicants are advised that removal from the vessel must be undertaken in a careful and measured manner. Hazardous material handling, storage and disposal are the subject of provincial and municipal regulations.

4.2 Residues in Cargo Areas

Residues in cargo areas will be considered to be hazardous material until proven otherwise by the permit applicant.

4.3 Unknown Wastes

Any waste product which is of unknown origin or content will be assumed by the Designated Inspector to be hazardous material until proven otherwise by the permit applicant.

4.4 Antifreeze and Coolants

Antifreeze and coolant mediums, other than untreated water, are to be drained and removed from the vessel.

4.5 Batteries

All batteries are to be removed from the vessel. This includes batteries that are part of fitted equipment.

4.6 Fire Extinguishing Systems

Fire extinguishing systems are to be fully decommissioned. Except for fire fighting systems that employ untreated sea water or fresh water, all fire fighting compounds are to be removed from the ship. Storage containers, if left *in situ*, are to be opened for inspection. Any lines that have been charged with any fire fighting product other than untreated sea water or fresh water are to be treated as for fuel and oil piping (see section 3). See also Section 4.7 Halocarbon systems.

4.7 Halocarbons

All halocarbons in refrigerating, air conditioning, fire-fighting and other systems shall be removed from the vessel. The permit applicant is reminded of the requirements contained in the Federal Halocarbon Regulations ("Recovery" section) under the *Canadian Environmental Protection Act*. Notices concerning dismantling, disposing and decommissioning should be preserved for review by the Designated Inspector.

Permit applicants are advised that provinces may have additional requirements.

4.8 Mercury

Equipment or components using mercury (see listings below) are to be removed intact from the vessel. Any other visible mercury is to be removed from the vessel. **Permit applicants are reminded of the health hazard associated with airborne mercury.**

The following items typically contain mercury and shall be removed intact from the vessel: mercury thermometers, vacuum measuring devices, fluorescent tubes, "silent" light switches, float switches, "tip" switches on portable equipment, domestic style thermostats and cathode ray tubes.

The following items may contain mercury and shall be removed from the vessel or **carefully** opened to show that mercury is not present: gyroscopes, vacuum measurement gauges, some laboratory equipment, profile draft indicators, remote tank level measuring systems, and roll indicators.

Thermometer pockets and other receptacles for mercury instruments shall be fully accessible for inspection.

4.9 Zinc

Zinc anodes are to be removed from the exterior hull, sea bays, piping systems, coolers, etc.

4.10 Copper and Electrical Cabling

It is expected that the permit applicant will make a significant effort to salvage copper from cabling, motors, generators and fittings.

Uncoated elemental copper in bus-bars and other applications must be removed. Enclosed or coated copper need not be removed except as follows:

- Visible copper cabling must be removed.
- Open ends of electrical cables that show any evidence of fluid weeping (except

- for water) must be removed in their entirety.
- Enclosed or coated copper that is damaged or severely degraded relative to its in-service condition must be removed.

4.11 Lead

Lead ballast bars, shielding and fittings are to be removed.

4.12 Cadmium

Cadmium plated items and elemental cadmium must be removed.

4.13 Other Metals

There are no restrictions at this time.

4.14 Polychlorinated Biphenyls (PCBs)

Liquid polychlorinated biphenyls are to be removed from the vessel. The following suspect components are to be removed:

- Fluid filled transformers. All transformers shall be made visible for inspection.
- Fluorescent light ballasts.
- Electronic components that may be fluid filled, based on their external appearance.

PCBs held in solid matrix may be difficult to detect from visual appearance. For vessels constructed before 1980, the following items must be removed:

- Oil impregnated felt or cloth gasket material.
- Other materials as specified by the Responsible Departmental Official. Permit applicants should check with Environment Canada for the list of required removals for their permit.

Where there is reason to suspect that other equipment or components may contain PCBs, then the responsible Environment Canada official will require that the permit applicant either remove the equipment or component from the vessel, or provide proof from a competent authority acceptable to the responsible Environment Canada official that the equipment or component does not contain PCBs.

4.15 Black and Gray Water

Black water (sewerage) and gray water (drains from sinks, showers, dishwashers, etc.) are to be removed from the vessel. Black water lines are to be flushed to the satisfaction of the Designated Inspector.

Gray water lines are to be treated as per fuel and oil piping (section 3.4). Drain lines and traps from sinks and deck scuppers in workshops, laboratories and other compartments where oil or hazardous chemicals may have been employed are to be fully opened for inspection.

4.16 Radioactive Materials

A certificate of radiation compliance is required for ex-warships, research vessels, or other vessels (as specifically required by the Environment Canada official) that may have carried radioactive material or equipment. The certificate of compliance is to state that material remaining on the vessel meets the abandonment requirements of the *Nuclear Safety and Control Act*.

4.17 Plastics, Other Synthetic Materials and Soft Furnishings

Plastic, other synthetic materials and soft furnishings may be left *in-situ* if they are part of the structure of the vessel and are securely attached to the structure of the vessel, subject to any tests that the responsible Environment Canada official may specify. Material that is not securely attached is vessel debris (see part 5).

Plastic foam insulation is addressed at Section 6.2.

4.18 Fitted Hazardous Materials and Products

Hazardous materials and products are to be removed in accordance with section 4, except as specifically exempted by this section. Materials that are not specifically addressed in this section, and that are an integral component of the structure of the vessel, may be left *in situ*. Examples may serve to illustrate the distinction:

- liquid paint must be removed, but paint on the hull may be left;
- structural glue may be left in place, although adhesives in tubes, cans, bottles, etc. must be removed from the vessel.

If there is doubt as to what is acceptable the responsible Environment Canada official will provide a ruling on the specific issue in question.

5. DEBRIS

5.1 Introduced Material

No material may be introduced into the vessel, unless:

- It is of a permanent and commemorative nature (plaques, markers, etc.) and it does not otherwise contravene this Standard, or
- It is structural in nature, and is a requirement to allow the vessel to be safely moved or handled, and it does not otherwise contravene this Standard, or
- It is required to make the vessel safe for work, and is of small quantity and it does not otherwise contravene this Standard.

5.2 Debris

Clean-up debris must be removed from the vessel. The standard of cleanliness required is broom clean. Vessel debris may remain in the vessel subject to the conditions below:

- no vessel debris contaminated with hydrocarbons or hazardous material may remain in the vessel; and
- vessel debris that is heavy and/ or bulky fitted equipment, and was disconnected or removed from the structure of the vessel for cleaning or inspection purposes, may remain in its original compartment. Otherwise, vessel debris must be contained in a sealed compartment or structural tank that is below the waterline of the ship and underneath the largest section of the superstructure; and
- no vessel debris may be placed in a compartment or structural tank that is to be sealed until both the compartment and the debris have been inspected; and
- vessel debris must be negatively buoyant.

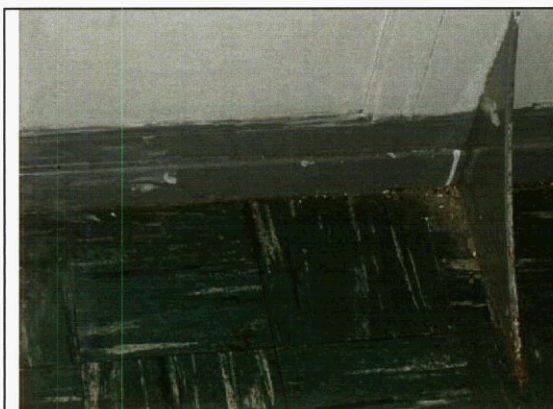


Figure 5.2A. Broom clean on a tile deck. Tiles are approximately 30 cm square



Figure 5.2B Broom clean on a painted deck. Note that rust need not be removed.

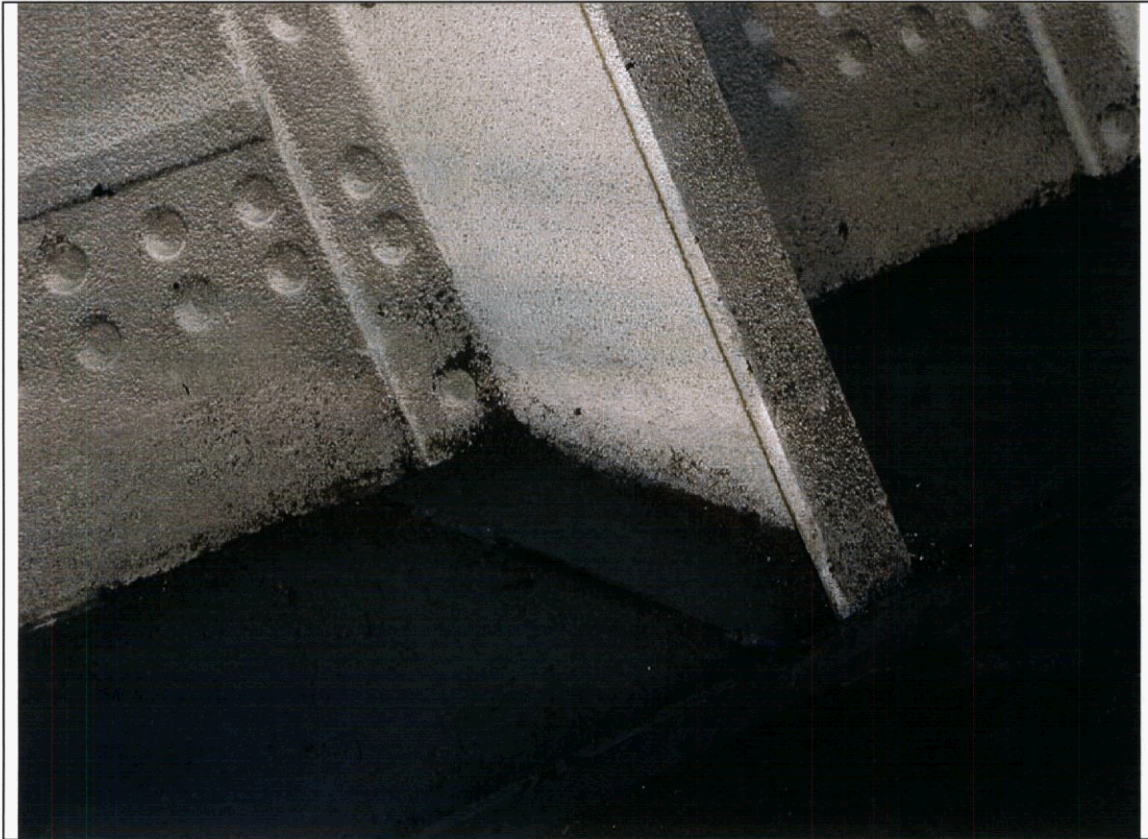


Figure 5.2C Broom clean in way of stiffeners. Remaining material is loose oil absorbent material.

5.3 Recyclable Metals

Recyclable metals (especially copper, lead, brass, bronze and aluminum) left as vessel debris are not acceptable, except as small cuttings and minor amounts in clean-up debris. Commercially viable recyclable materials are to be removed from the vessel.

6. INSULATION

6.1 Asbestos Containing Material

Asbestos-containing material (ACM) is the subject of workplace safety regulation. Permit applicants are required to adhere to local regulations concerning ACM during the vessel preparation process. Permit applicants are cautioned that air-borne asbestos is a known health hazard, and that failure to follow applicable workplace safety regulations could result in serious long-term health effects.

Intact and undisturbed asbestos insulation need not be removed.

Loose or friable asbestos evident in compartments under inspection may cause the inspection to be terminated by the Designated Inspector, at the permit applicant's expense. Loose or friable ACM must be addressed. It may be removed from the vessel and disposed of in accordance with local regulations. Alternatively, loose or friable ACM may be treated as "vessel debris", subject to the following:

- It may not be mixed with other vessel debris or introduced material;
- It must be sealed in a compartment located low in the vessel (below the normal waterline of the ship) and under the major portion of the superstructure. This compartment must be inspected and deemed clean by a Designated Inspector prior to placing any ACM in the compartment.

6.2 Plastic Foam Insulation

Plastic foam insulation is to be removed from the vessel unless it meets the all of the following requirements:

- The foam is securely fastened in place to the ship structure by waterproof glue, studs or other secure and permanent method; and,
- The foam is intact; and,
- The foam is covered with a structurally sound and solid surface; and,
- The composition of the foam is known, and is deemed acceptable for ocean disposal by the responsible Environment Canada official.

6.3 Other Types of Insulation

There are no specific requirements for insulation that is not asbestos or plastic foam. If disturbed, other types of insulation may be considered as vessel debris.

7. PAINT

7.1 Anti-fouling Coatings

Anti-fouling coatings must be at least five years old before a permit under the Regulations can be issued. The permit applicant is required to produce documentation from the previous owners showing the dates when the vessel was last removed from the water and the underwater hull maintenance that was carried out. If the permit applicant cannot provide the responsible Environment Canada official with satisfactory evidence relating to underwater hull coating types and dates applied, then the responsible Environment Canada official will require that tests be carried out to ascertain the current anti-fouling properties of the coating. These tests will require at least six samples from various portions of the underwater hull and will be subject to leachate tests as specified by the responsible Environment Canada official. Information on the interpretation of the test results can be obtained from Environment Canada.

Underwater hulls that are more than 80% covered with marine growth will be assumed to be free of active anti-fouling products.

7.2 Above Waterline Exterior and Interior Paints

Loose and flaking paint must be removed from painted surface. “Loose and flaking” is defined as paint that may be removed with application of reasonable force using a wire brush. See figures for guidance on requirements.

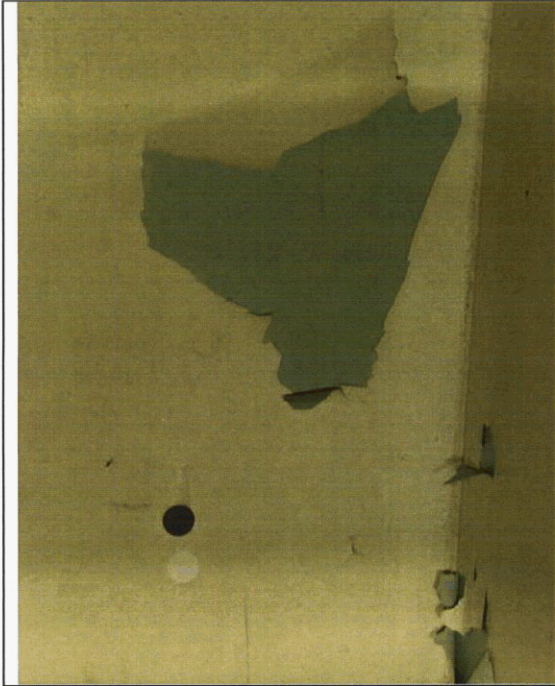


Figure 7.2A. Large chips of loose and flaking paint. Black/ white dots are 4cm diameter.

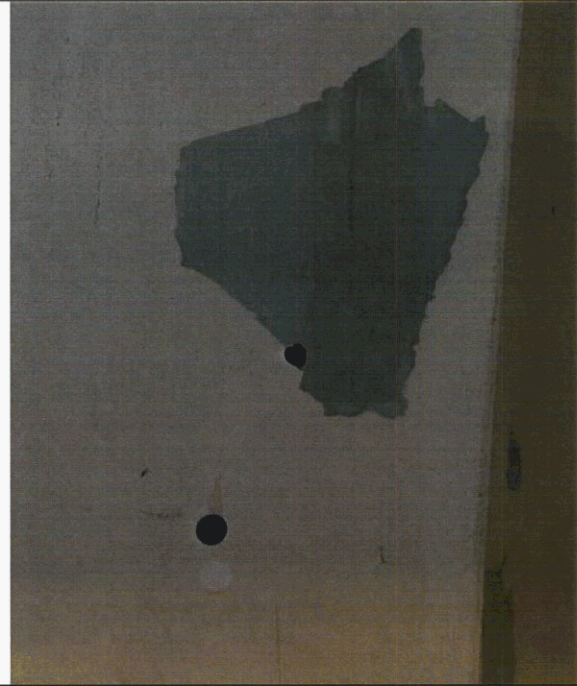
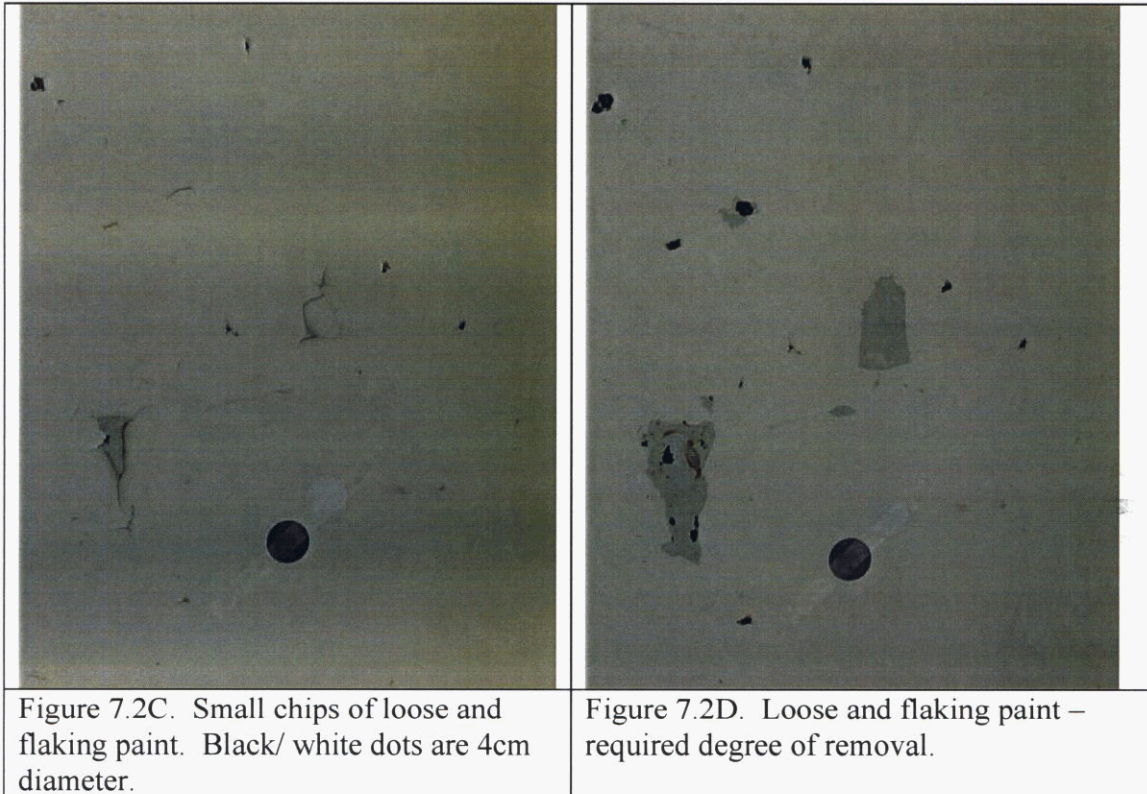


Figure 7.2B. Loose and flaking paint – required degree of removal.



Subject to any contamination issues, paint chips may be treated as vessel debris.

8. ADMINISTRATIVE REQUIREMENTS

8.1 Designated Inspector Qualifications

Despite the detailed content of this Standard it is recognized that there is a degree of subjectivity in the inspection process. For this process to be successful and achievable, Designated Inspectors must be trained and experienced in ship construction and operation, and be completely familiar with the environmental issues. Designated Inspectors are to be retained by the responsible Environment Canada official. Designated Inspectors must meet all of the following minimum requirements:

- Designated Inspectors must have an operating license issued under the *Canada Shipping Act* or the *National Defence Act*. The licenses are to be the highest level licenses granted under the applicable legislation; and
- Designated Inspectors must have served at sea as the chief engineer of a ship that has a tonnage of at least 2000 tonnes or the tonnage of the vessel inspected, whichever is less; and
- Designated Inspectors must have satisfactory work experience related to environmental issues; and

- Designated Inspectors must be provincially licensed as:
 - Professional Engineers, actively practicing in the disciplines of marine engineering and naval architecture, or
 - Members of the Bar, actively practicing in Admiralty or environmental law.

Designated Inspectors must not have any financial or other interest in the project.

8.2 Requesting Inspections

Inspections are to be requested by the Applicant in accordance with the publication entitled "Disposal of Vessels Guidelines for Applying for an Ocean Disposal Permit under the *Canadian Environmental Protection Act*" (available from Environment Canada). A sketch or drawing of the compartment layout in the vessel must accompany the request for inspection, unless this has been previously delivered to Environment Canada.

Unless otherwise agreed with the responsible Environment Canada official, Environment Canada will engage the Designated Inspector. Inspection costs may be passed to the permit applicant if more than one inspection is required.

8.3 Inspection Requirements

The Designated Inspector will not enter any space that is not, in the Designated Inspector's opinion, safe to enter. Reasons for refusing to enter a compartment or space include inadequate access openings, flooding above the level of the deck-plates, unsafe ladders, noxious fumes, airborne dusts or particles that may contain asbestos, or concerns over adequate oxygen in tanks or closed compartments. Applicants should have suitable ventilation and test equipment or valid test reports available to address potential safety concerns. Failure to address safety concerns will cause the inspection to be terminated by the Designated Inspector.

It is expected that the permit applicant and a representative from the applicant will accompany the Designated Inspector during the inspection. The Designated Inspector will verbally debrief the permit applicant and the applicant's representative on completion of the inspection.

8.4 Reports

Written reports are required, and shall contain the following information:

- A summary of the status of the vessel as measured against the requirements of this Standard.
- A detailed listing of every structural compartment (room, space, tank, void, deck area, etc) in the vessel. The listing shall identify each compartment specifically.
- A general description of the compartment including equipment, fittings and fixtures remaining in the compartment.
- Findings for issues described in parts 3 through 7 of this Standard.
- A description of corrective action required to meet Standard requirements.

The Designated Inspector shall render the written report within 10 working days of the inspection.