The following guidance document is provided in its original format as approved by the LC/LP governing bodies in 2016 (LC 38/16). The final published guidance is available from the IMO Publications section, in English, French and Spanish as publications reference I547(E/F/S).

Guidelines on Low Cost, Low Technology Compliance Monitoring

Assessment of Permit Compliance for Disposal of Wastes and Other Matter at Sea

Draft

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for the Scientific Groups of the
London Convention and Protocol

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Preface

The objective of this guidance document is to provide practical information about using low-cost and low-technology approaches that are useful for monitoring compliance with permit conditions associated with ocean disposal of waste materials or other matter. The primary audiences for this guidance are countries that are in the early stages of developing waste assessment and monitoring actions in concert with permit programmes for disposal of wastes and other matter into ocean waters.

Step-by-step waste assessment guidance to determine the acceptability for marine disposal and impacts of wastes and other matter proposed to be disposed of in ocean waters is available from IMO's London Protocol and London Convention (LP/LC), the primary international treaties for protection of the world's oceans from pollution caused by dumping at sea of wastes or other matter. That guidance addresses both (1) field monitoring of potential environmental impacts and (2) permit issuance for ocean disposal, and generally includes state-of-the-practice approaches to manage wastes proposed for ocean dumping. It is now recognized that some countries are in the early stages of building environmental management programmes and have limited scientific, technical, and economic capabilities. For these countries, low cost, low technology approaches to field monitoring and determining compliance with permits would be beneficial.

This low cost, low technology compliance monitoring guidance is intended to complement the existing London Protocol and Convention Waste Assessment Guidelines which are available at http://www.imo.org/en/OurWork/Environment/LCLP/Publications/wag/Pages/default.aspx. Specific Waste Assessment Guidelines exist for eight waste categories listed in Annex 1 of the London Protocol (i.e. dredged materials, sewage sludge, fish wastes, vessels and platforms, inert inorganic geological material, organic material of natural origin, and bulky items). The complete description of the waste materials covered by this guidance is available at the London Protocol and London Convention website: http://londonprotocol.imo.org.

This guidance focuses solely on monitoring compliance with specific permit conditions related to loading, transport, and dumping of waste materials, and should be used to ensure that permit conditions are met.

This guidance is applicable to all eight categories of waste outlined above. In addition, there is a companion to this guidance that describes low cost, low technology field monitoring for dredged and inert, inorganic geological materials, focusing on all aspects of collection and analysis of environmental samples, entitled *Low cost, low technology field monitoring assessment of the effects of disposal in marine waters of dredged material or inert, inorganic, geological material,* and is available as an IMO Publishing (IMO sales reference I542).

It is worth noting that some permitting authorities may require permittees to conduct certain field monitoring as part of the requirements in their permit. If so, there can be an overlap where a permittee may be conducting field monitoring, which the permitting authority can use to monitor compliance monitoring.

This guidance is the culmination of efforts by the Scientific Groups of the London Protocol and London Convention. Co-chaired by Canada and the United Kingdom, members of the working group that produced this draft guidance included Chile, China, Ireland, Italy, Japan, Mexico, the Netherlands, Nigeria, Republic of Korea, the United States, and the World Organization of Dredging Associations.

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1. Introduction

The objective of this document is to provide guidance on compliance monitoring for countries that are developing capabilities to manage potential environmental impacts of the disposal of wastes or other matter into marine waters. At this point in time, these targeted countries may be limited in their scientific, technical, and/or economic abilities to carry out comprehensive and state-of-the-practice compliance monitoring programmes.

Guidance is provided for use of low cost, low technology compliance monitoring approaches using the working definition in the text box.

The working definition of low cost, low technology compliance monitoring for this document:
Monitoring using simplified methods that enable the collection of the minimum information needed to begin validating permit assumptions. The "low technology" basket includes techniques that are:

- low cost in development and implementation;
- easy to develop and deploy;
- simple to use automated devices; and
- practical, and equipment (if needed) is readily available (through purchase or borrowing).

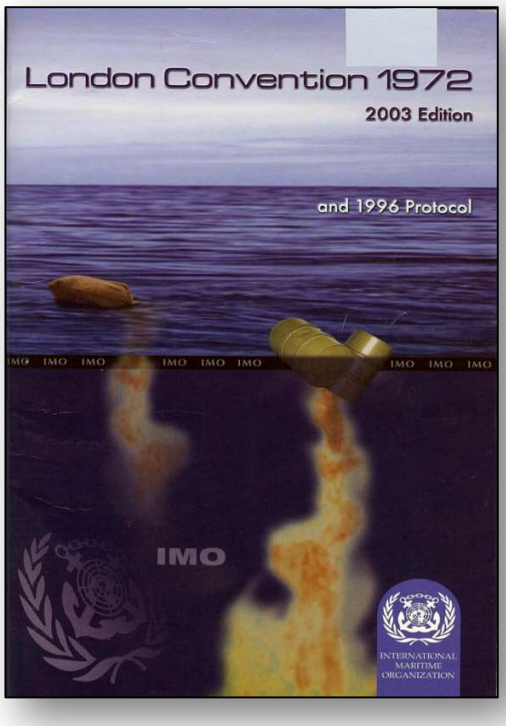
This compliance monitoring guidance is based on Annex 2 to the London Protocol and complements the existing London Protocol and London Convention Waste Assessment Guidelines. Managed under the International Maritime Organization, a specialized agency of the United Nations, the London Protocol and the London Convention are the two primary international treaties protecting the world's oceans from pollution. Waste Assessment Guidelines, available from the London Protocol and London Convention, provide robust procedures for assessment of wastes proposed to be dumped in the ocean and include a section on permitting. However, the Waste Assessment Guidelines include very little information regarding compliance monitoring for permits issued for disposal of wastes into ocean waters (see the London Protocol and Convention website references section).

The key elements of the Waste Assessment Guidelines include:

- General – Is there a way that the necessity for ocean dumping can be reduced?
- Waste prevention audit – What could be done to reduce or prevent generation of the waste?
- Consideration of waste management options – What are the alternatives to dumping at sea?
- Chemical, physical and biological properties – What are the characteristics of the waste?
- Action list – Will the waste cause unacceptable adverse impacts at the dump site?
- Dump site selection – Where is an acceptable dump site in marine waters?
- Assessment of potential impacts (impact hypotheses) – What are the potential impacts at the dump site? Are management measures needed to alleviate the adverse impacts at the dump site?

- Permits and permit conditions – What special conditions should be included in the permit?

- Monitoring – What compliance monitoring and field monitoring activities are needed?



Specific Waste Assessment Guidelines have been developed for the eight categories of waste or other matter that are allowed to be dumped into marine waters under the London Protocol, provided they meet the conditions specified in the guidelines (e.g. not causing unacceptable adverse impacts).

The Waste Assessment Guidelines are to be used by national authorities responsible for regulating the dumping of wastes or other matter into the sea. They are intended to assist individuals or organizations who may be regulators, port authorities, or other interested entities to provide the tools from a simple starting point to incrementally building an assessment, management, and permitting system for waste materials or other matter to be considered for dumping at sea. The guidelines contain procedures to guide these authorities in evaluating applications for dumping of wastes or other matter. However, it is recognized that some of the approaches detailed in the Waste Assessment Guidelines require technical equipment and knowledge that may not be available or affordable by those countries in the early stages of issuing permits for waste management and dumping at sea.

This compliance monitoring guidance is intended to address the last bullet in the list above describing the Waste Assessment Guidelines, specifically, compliance monitoring. Compliance monitoring means checking to ensure that permit conditions are being met (e.g. ensure that wastes are disposed of within the dump-site specified in the permit).

This guidance first describes what a permit is, what the objectives for having specific conditions within the permit are, and to what specific conditions can pertain. This is followed by a presentation of the specific types of approaches that can be used for compliance monitoring. This is then followed by a brief discussion of the types of management actions that may be appropriate if permit conditions are being violated.

Field monitoring versus compliance monitoring

Field monitoring is the assessment of the effects of waste disposal into marine waters. It is designed to see if predictions of potential environmental impacts (or the absence of effects) made during the assessment of the proposed project are correct.

Compliance monitoring verifies that permit conditions are being met. Permits generally specify the material to be dumped, the handling procedures, the volumes, the dumping location, and other conditions.

Some permits may contain requirements that the permittee conduct field monitoring at the dump-site to ensure that the material is dumped in the correct location or that any environmental impacts are as predicted in preparation of the permit.

2. Permits and permit conditions

2.1 What's in a permit?

The first and most critical step in compliance monitoring is preparing a permit with conditions that are clear, measurable and enforceable.

2.2 Permit issuance

A permit for ocean dumping should only be issued after the procedures in the Waste Assessment Guidelines are used, once it is determined that alternatives have been thoroughly evaluated, and the waste or other matter proposed to be dumped is suitable for disposal at the proposed ocean dump-site. The bottom line in compliance monitoring is that appropriate conditions should be included in the permit that allow the permitting authority to ensure that the disposal actions take place as agreed upon with the permittee prior to disposal actions taking place.

2.3 What are the objectives of specifying permit conditions?

Permits and the specific conditions included in the permit are the mechanism by which the waste disposal project is controlled, such that the project is carried out as planned in the permit application and in the corresponding environmental impact assessment. In general, the objectives are to minimize environmental impacts of the disposal of the waste materials, achieving local and national environmental standards.

It is likely that many ocean dumping related permits will include requirements for collection and transport of wastes that are not strictly covered by the London Convention/London Protocol. For something like dredged material, this could include aspects of dredging and transport to a dump-site. While these activities may not be specifically covered by the LP/LC, they are included in this guidance in many instances because they are often pertinent to the ocean dumping aspects of the permit, and to give the reader a more complete overall picture of permit compliance monitoring.

Permitting and managing the use of ocean dump-sites involve regulating the times, the quantity, and the physical/chemical characteristics of materials that are dumped at the site; establishing disposal controls, conditions, and requirements to avoid and minimize potential impacts to the marine environment; and monitoring the dump-site environs to verify that unanticipated or significant adverse effects are not occurring from past or continued use of the disposal site (USEPA 2013).

Annex 2 of the London Protocol requires that any permit issued shall contain data and information specifying the following:

1. The types and sources of materials to be dumped (e.g. specifying the location of the waste material or the load-site);
2. The location of the dump-site(s);
3. The method of dumping; and
4. Reporting requirements (e.g. reporting of disposal actions).

Permit conditions may also address:

5. Monitoring requirements (e.g. monitoring the dump-site environs to verify that unanticipated or significant adverse effects are not occurring from the disposal actions);
6. The quantities and physical/chemical characteristics of the materials to be disposed, and operational parameters, such as for dredging projects, the type of dredging equipment or time restrictions when dredging can occur; and
7. Establishing disposal controls, conditions, and requirements at the disposal site or en route to the disposal site to avoid and minimize potential impacts to the marine environment.

Permit conditions specify the basic elements and requirements of the permit.

- *Who* is authorized to undertake the disposal?
- *What* can be disposed of, the type and source of material?
- *When* is the disposal allowed to take place?
- *Where* the material is to be disposed of, i.e. the name and location of the dump-site?
- *How* much material can be dumped?
- *What* limits must be met during disposal, and what field monitoring will the permittee be required to conduct?

2.4 Aspects of disposal that may be covered by specific permit conditions

As stated above, permits for the disposal of wastes at sea may include specific conditions to minimize the environmental impacts of disposal activities. Examples of information that may be included in specific permit conditions are provided below.

For disposal at sea projects, there can be specific conditions related to the types and sources of materials to be dumped, and how it should be loaded. These may cover:

- The what and where:
  - Location of the project (latitude and longitude coordinates);
  - Quantity of materials to be dumped;
- The type of material to be dumped, including its physical and chemical characteristics;
- The type of equipment used to produce and load the waste, for example for dredging projects this can include:
  - Type of dredging equipment;
  - Overflow allowed from barge;
  - Closed bucket;
  - Turbidity controls;
- Date and time of loading operations:
  - Seasonal restrictions (e.g. environmental windows);

    - Tidal or weather conditions during loading operations;
- Identification of sensitive species and protection measures;
- Clean-up requirements (for vessels or other similar materials).

For dumping activities, there are specific conditions related to the location and use of the dump-site. These may cover:

- Where to dump at the dump-site:
    - Location of the dump-site, latitude and longitude coordinates;
    - Where to dump within the site;
    - Route to dump-site and restrictions during transit (no spills, route around sensitive areas);
- Operational restrictions:
    - Time of day and date;
    - Number of and size of loads;
    - Type of equipment;
    - Rate of dumping;
    - How to dump (e.g. from a moving vessel);
    - Weather and tidal conditions;
    - Presence of an observer on board;
    - No sensitive species present;
- Water quality requirements:
    - Water quality standards;
    - Turbidity plume restrictions.

For disposal at sea projects, there are specific conditions related to monitoring for potential impacts from dumping. These may cover:

- The development of a site management and monitoring plan by the permittee or permitting authority;
- Pre- and post- bathymetric surveys to ensure that the dumped material is where it should be;
- A baseline assessment of conditions at the dump-site;
- Monitoring programmes to ensure any relevant environmental quality criteria are not exceeded during dumping and to assess whether predicted impacts in the permit application and environmental impact analysis were correct.

For disposal at sea projects, there are specific conditions related to reporting on dumping activities. These may cover:

- Reporting on waste quantities, amounts, times, and locations;
- Reporting on disposal locations, amounts and times, and compliance with permit conditions;
- Reporting on environmental effects during disposal and compliance with permit conditions;
- Reporting on monitoring of the dump-site;
- Submission of reports by specific dates (e.g. weekly, monthly, 90 days after completion).

2.5 Examples of specific conditions that permits may include

Provided below are several examples from actual permits for dredging and disposal of dredged material, and from permits for disposal of vessels and fish wastes. These are provided to illustrate the potential construction of permit conditions that regulators can develop for permits issued under their domestic legal frameworks. Not all areas noted above are included, and the example conditions provided below (which were taken from NY Department of Environmental Conservation, 2004) are intended to serve as samples to build upon. Some of the examples below deal with important issues associated with permits, but some go beyond the minimum list of permit conditions required under the LP (see section 2.2).

Note of caution to permit writers:

These are examples of permit conditions that have been used in various locations. They are not intended to be directly used as your permit conditions, as local circumstances should be assessed and appropriate permit conditions for the specific disposal action specified.

2.6 Permits for dredging and dredged material disposal

1. Type of dredge

a. When using a clamshell dredge, the amount of suspended solids dispersed during the dredging operation should be minimized by maximizing the size of the bucket used for dredging. This minimizes the number of "bites" needed to dredge a particular site.

b. Bucket retrieval rates should be controlled to minimize turbidity. When off-loading dredged material using a clamshell or backhoe, the bucket should not swing over open water.

c. A closed clamshell bucket (i.e. environmental bucket) is sometimes needed because the sediments to be dredged contain contaminants at levels of concern. While sediments with elevated levels of contamination may not be suitable for ocean dumping, it may still be necessary to remove them to get at cleaner sediments below or nearby. The closed clamshell bucket reduces the amount of suspended solids in the upper water column at the site of dredging.

d. The closed clamshell bucket should have a sealing system to minimize the loss of material during transport through the water column. Excessive loss of water from the bucket should be investigated and repaired. An experienced bucket dredge operator with sufficient control over bucket depth, bucket closure and bucket hoist speed should be used.

2. No barge overflow is allowed during transport of dredged material outside the dredged area as it is transported to the dumping location within the disposal site.

Note: It is a good idea to provide a few words of explanation along with the permit conditions, so that the permittee understands the intention of the action or requirement. The explanation of the reason for the closed clamshell bucket in the above example is a good brief statement of the need for the permit condition.

3. Restrictions on when to dredge

a. Tidal periods: dredging may only be conducted during the incoming tide (note: this is mainly for semi-enclosed water bodies and is intended to minimize the dispersal of dredged material by allowing time for settling of suspended sediments).

b. Seasonal periods: dredging is only allowed during January-March (for protection of sensitive species as they migrate through the area during other parts of the year).

4. Dump-site location

a. All disposals are to occur at least 100 metres inside the dump-site boundaries.

b. Disposal shall be initiated within the applicable release zone boundary defined by the coordinates XX, YY, ZZ, WW) and completed (i.e. doors closed) prior to leaving this zone.

c. Disposal methods, which prevent mounding of dumped material from becoming an unacceptable navigation hazard, will be used.

d. The material shall be disposed so that at no point will depths less than -8 metres below Mean Low Water (MLW) occur (i.e. a clearance of 8 metres above the seabed will be maintained).

5. No barge overflow or leakage is allowed during transport of the waste material as it is transported to the dumping location within the dump-site.

6. Dumping shall only occur at the dump-site for the period of outgoing tide between 30 minutes of the start of outgoing tide, to 30 minutes before the end of the outgoing tide. This is to ensure that the plume from dumping does not enter the nearby entrance to the XXX Bay.

Permit conditions should be clear and drafted in plain unambiguous language. They must clearly state who needs to do what, when, where, and for how long (LP/LC; *Waste Assessment Guidelines Training Set Extension*).

7. Water Quality

a. There shall be no exceedance of water quality criteria outside the dump-site at any time.

b. There shall be no exceedance of water quality criteria within the dump-site or anywhere in the environment four hours after dumping.

c. There shall be no visible plume four hours after dumping.

d. Turbidity: No increase that will cause a substantial visible contrast to natural conditions.

8. Pre-disposal monitoring

The Permittee will conduct a bathymetric survey of the entire dump-site within three (3) months prior to project disposal. Bathymetric surveys are used to monitor the disposal location to ensure a navigation hazard is not produced, to assist in verification of material placement, to monitor bathymetry changes and trends and to ensure that the site capacity is not exceeded, i.e. the mound does not exceed the site boundaries.

9. Post-disposal bathymetric monitoring

The permittee will conduct a bathymetric survey of the entire dump-site consistent with the pre-disposal survey requirements within 30 days after disposal project completion. Bathymetric surveys are used to monitor the disposal location to ensure a navigation hazard is not produced, to assist in verification of material placement, to monitor bathymetry changes and trends and to ensure that the site capacity is not exceeded, i.e. the mound does not extend beyond the site boundaries.

10. Dump-management and monitoring plan

A long-term site monitoring and management plan is to be developed by the permittee, approved by the permitting authority, and implemented. The plan will include:

- A baseline assessment of conditions at the dump-site;
- A programme for monitoring the dump-site;
- Special management conditions or practices to be implemented at each dump-site that are necessary for protection of the environment;
- Consideration of the quantity of the material to be disposed of at the dump-site, and the presence, nature, and bioavailability of the contaminants in the material;
- Consideration of the anticipated use of the dump-site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after the closure of the dump-site; and
- A schedule for review and revision of the plan (which shall not be reviewed and revised less frequently than 10 years after adoption of the plan, and every 10 years thereafter).

Note: A good reference for development of a site monitoring and management plan is Australia's *Checklist for Completing Long Term Monitoring and Management Plans for Dredging* (Australia 2012).

11. Disposal monitoring and recording of disposal locations

a. For all disposal activities, an electronic tracking system must be utilized (author's note: electronic tracking systems can be used where the technology is available and feasible). The electronic tracking system will provide surveillance of the transportation and disposal of dredged material. The electronic tracking system will be maintained and operated to continuously track the horizontal location and draft condition (accuracy ± 0.1 metres) of the disposal vessel (i.e. hopper dredge or disposal scow) from the point of dredging to the disposal dump-site and return to the point of dredging.

b. Data shall be collected at least every 0.25 kilometres or every 4 minutes during travel to and from the dump-site and 12 seconds or every 10 metres of travel, while the hull status is open within the dump-site.

c. In addition to the continuous tracking data, the following trip information shall be electronically recorded for each disposal cycle:

- Load number;

- Disposal vessel name and type (e.g. scow);
- Estimated volume of load;
- Description of material disposed;
- Source of dredged material; and
- Date, time, and location at initiation and completion of disposal event.

12. Alternative to electronic tracking system

The permit holder must ensure that all dumping activities carried out under this permit are witnessed and recorded by an on-board observer who has been appointed by the permitting authority. An observer, selected by the permitting authority and paid by the permittee, shall be present on all vessels used to dump waste material or tow such vessels to the dump-site. The observer shall receive the full cooperation of the crew and complete access to on-board amenities and navigation equipment. No material shall be transported to the dump-site or dumped without an observer present. The presence of an impartial observer will help ensure that the material is dumped at the correct location, and if not, where it was dumped.

13. Notice to fishermen

Fifteen days prior to dredging, the permittee shall notify fishermen by notice in local media (e.g. newspapers) in the area that dredging and disposal operations will commence.

14. Project initiation and violation reporting

a. The permittee shall notify the permitting authority in writing (i.e. email is acceptable) 15 days prior to the beginning of a dredging cycle and 15 days prior to project disposal.

b. The permittee shall notify the Permit Manager (name) at (phone number, email address) within 30 minutes of any known permit violation or casualty.

15. Post-disposal summary reports

A Post-disposal summary report shall be provided to the permitting authority by email within 90 days after project completion. These reports should include:

- Dredging project title;
- Permit number and expiration date (if applicable);
- Contract number;
- Name of contractor(s) conducting the work;
- Name and type of vessel(s) disposing of material at the dump-site;
- Disposal timeframes for each vessel;
- Location (coordinates) of disposals;
- Volume deposited at the dump-site (total paid and unpaid in situ volume, and gross volume reported by dredging contractor in the disposal logs);
- Number of loads to dump-site;
- Type of material deposited at the dump-site;
- Identification by load number of any misplaced material;
- Dates of pre- and post-disposal bathymetric surveys of the dump-site and results; and
- A narrative discussing any violation(s) of the permit (if applicable). The narrative should include a description of the violation, indicate the time it occurred, and when it was reported to the permitting authority, discuss the circumstances

surrounding the violation, and identify specific measures taken to prevent recurrence.

Example outline of a disposal at sea permit

1. Introduction
2. Permittee and contact information
3. Permit manager and contact information
4. Nature of waste to be disposed
5. Duration of permit
6. Loading site(s) coordinates
7. Dump-site coordinates
8. Disposal locations within the dump-site
9. Method of loading
10. Route to dump-site and method of transport
11. Method of disposal
12. On-board observer requirements
13. Total quantity to be disposed
14. Approvals
15. Permit application fees and permit monitoring fees
16. Inspection
17. Development of a site management and monitoring plan
18. Monitoring bathymetry
19. Monitoring water quality during dumping
20. Monitoring impacts after dumping
21. Water quality parameters that must be met during dumping
22. Contractors
23. Reporting and notification
24. Special precautions

2.7 Other permit types

While the above permit conditions are specifically targeted at dredged material disposal, many of the conditions, such as pre-disposal monitoring, water quality, and post-disposal summary reports apply to other types of waste. In addition, examples of permit conditions for other types of wastes are provided below. These are provided to illustrate the potential construction of permit conditions that regulators can develop for permits issued under their domestic legal frameworks.

2.7.1 Permits for vessel disposal: Clean-up[2]

1. All liquid PCBs and all solids with PCBs greater than 50 ppb shall be removed.
2. All materials which may float or remain in suspension shall be removed.
3. All fuel and oil will be removed.
4. All hazardous materials will be removed (e.g. batteries, fire extinguishers, lead ballast bars or sheet fitting, cooling fluids, active anti-fouling paint).

[2] In Canada, a vessel is not eligible as a "reverse list" waste until it has been cleaned; the permit says the vessel must be cleaned to a certain standard, and correct any deficiencies noted by an inspector.

5. On-site contingency measures to clean up any floating debris and surface oil residues from the vessel after its disposal shall be in place.
6. There shall be an inspection by the permitting authority or their representative to verify clean-up prior to disposal.
7. Disposal shall be timed to prevent disturbance of spawning fish by noise.
8. Transport to dump-site shall only occur under conditions minimizing the risk of unintentional sinking or loss.
9. The permittee must establish and maintain a 500 metre marine mammal exclusion zone surrounding the explosive charges.
10. Underwater blasting shall occur during daylight hours only.
11. The permittee must establish and maintain a vessel exclusion zone during disposal (e.g. using a patrol boat and/or temporary marker buoys).
12. A baseline survey of the intended dump-site conducted by the permittee as described in the permit is to be undertaken and the results of this survey shall be provided to the permitting authority at least one week before the disposal of the vessel.
13. The permittee shall ensure that any alterations made to the vessel before its disposal are agreed to in writing by the permitting authority in advance.
14. The permittee shall ensure that any debris or unpermitted deposits resulting from the disposal operation are removed from the sea on completion of that operation.
15. The permittee must ensure that there is a minimum depth of water above the vessel clear of obstruction, which shall be no less than three metres at all states of the tide.

Figure 1 – *Sinking of the HCMS Annapolis*

in Halkett Bay, Canada
Photo Credit: Environment and Climate Change Canada.

2.7.2 Permits for the disposal of fish wastes and organic wastes

1. The permittee shall provide the permitting authority with a description of the waste permitted for disposal (e.g. fish waste or material resulting from industrial operations processing wild fisheries stocks and consisting of flesh, skin, bones, entrails, shells and associated organic wastes and demonstration that the waste material is free from disease).
2. The permittee shall specify the origin of waste to be disposed of (e.g. name and address of fish processing plant or plants) to the permitting authority.

3. The permittee shall take measures to ensure that waste cannot be accessed by sea-birds (e.g. use of netting or sealed containers except during direct loading or disposal of the waste).
4. The permittee shall take measures to ensure maximum dispersion of waste within the disposal site (e.g. speed and route of vessel during disposal).
5. The permittee shall not hold wastes for longer than 96 hours to prevent fouling and potential health hazards.
6. The permittee shall take measures to prevent spillage and is required to recover any waste spilled.

Figure 2 – *Fish wastes on a barge. Note that spillage is possible so weather and wave conditions should be acceptable on the way to the dump-site to prevent loss of materials*
Photo credit: Environment and Climate Change Canada.

3. Compliance monitoring of permit conditions

Compliance monitoring means checking to be sure that all permit conditions are achieved.

The first, and perhaps most important, element in compliance monitoring is to ensure that the written permit conditions are clear, unambiguous, and can be measured. The less the amount of interpretation of the intent and meaning of a permit condition, the better.

This document is targeted at "low cost, low technology" compliance monitoring techniques, i.e. low cost in development and implementation; easy to develop and deploy; simple to use automated devices; and practical feasible use of readily available equipment (through purchase or borrowing). The fundamental element in low technology, low cost compliance monitoring is to ensure that permit conditions are written such that they can be assessed by permitting authority staff and management with commensurate skills and with techniques or technology that are readily available.

The four basic approaches for compliance monitoring include checking reports, visual observations, electronic surveillance, and field monitoring. In a nutshell, compliance monitoring has as its objective the verification that permit conditions were met, or in some instances where real-time monitoring is needed and specified in the permit, are being met.

3.1 Checking reports from permittees

Review of submitted reports from the permittee that contain such information as the coordinates of loading and disposal and the number of individual disposals and volumes disposed. Two key items: The conditions in permits should specify (1) the precise information that should be reported and (2) when the reports are due (e.g. daily, weekly). If it is a permit for a dredging project, photos of the dredging and disposal operations are also helpful for review of the project, and can be required as permit conditions. If resources are available, cameras (i.e. still or video) can be installed on individual dredges and scows to allow real-time access to various dredging activities and conditions.

3.2 Visual observations from observers on shore, on board the disposal vessel itself, or on board other vessels.

The permitting authority may appoint a person to be carried on the disposal vessel as a permit condition. On site, the observer can watch the overall process. With access to the ship's navigation equipment, the observer can note from where the material was taken, about how much was loaded, how it was dumped, and the exact location where it was disposed. The route to the dump-site and the location of the disposal can be tracked by smartphones used by an on-board observer. See figure 3.

From the shoreline, observers can note the loading and disposal actions including start and finish times and locations, the direction of travel of the disposal vessel, and the disposal location if relatively close to shore when the material is deposited. In addition, observations from other vessels can provide this information and can be used if the dump-site is farther off shore.

Observations of any plume resulting from disposal can confirm predictions made about the direction of the plume, and where it is expected to travel. This may be especially relevant if there are sensitive areas near the dump-site; for example, the disposal activity may have been restricted to a certain state of the tide to avoid suspended sediments impacting sensitive areas.

Figure 3– *An observer recording a waste disposal operation under a Disposal at Sea Permit from Environment and Climate Change Canada*
Photo Credit: Barry Smith

Citizens can be encouraged to assist the permitting authority in making observations from the shoreline or from other vessels.

If the permittee is required to conduct field monitoring in their permit, the permit should contain a provision for an observer, appointed by the permitting authority, to be present during the monitoring efforts to ensure compliance.

3.3 Electronic surveillance to verify load and disposal locations and number of trips

Electronic tracking can be relatively unsophisticated using smartphones, or can be much more involved, reporting an extensive amount of information using a system such as the U.S. Army Corps of Engineers' Data quality management system (formerly termed the "Silent inspector") (see Army Corps of Engineers' website on Data quality management system). The Corps of Engineers' electronic tracking system includes on-board sensors on the dredge, which continually monitor dredge activities, operations, location, and quantities dredged. On-board sensors on the disposal vessel report such information as location, depth of the water (to ensure no short dumping is occurring), disposal locations, and rates of disposal. Information from these sensors is routed to the National Data Quality Management Support Center for data processing, storage and publishing.

Other electronic systems are available, such as the Automated Disposal Surveillance System by a company named Leidos, http://www.adiss-afiss.com (Leidos' website). (Note: this is not an endorsement just an observation that other electronic systems are available).

3.4 Field monitoring during and after disposal operations when required in a permit

Field monitoring associated with a particular site or permit should be well thought out and described in a site management and monitoring plan or other planning document.

Field monitoring may be conducted by the permitting authority or the permittee. Some permits may contain requirements for the permittee to conduct various types of field monitoring activities. In a sense, this is requiring the permittee to collect field monitoring data for the permitting authority to use as part of their compliance monitoring. Field monitoring at the disposal site during disposal operations is generally conducted to ensure that water quality conditions specified in the permit are being met, such as turbidity requirements. Monitoring at the dump-site and in the surrounding areas shortly after disposal (such as bathymetry) is conducted to ensure that the materials were placed within the site and in the correct locations, did not result in a navigation hazard from creating a mound of materials, and did not move offsite to sensitive aquatic habitats.

In general, field monitoring during and shortly after the disposal operations is conducted to see if the predictions made during the preparation of the permit regarding water quality impacts during dumping and the fate of the dumped material (where the material would be deposited) were correct. Longer-term field monitoring may also be required in the permit which could involve numerous types of sampling efforts and would be focused on determining if there were any environmental impacts (via null hypotheses) from the dumping. These types of monitoring should be described in a site management and monitoring plan. The results of all monitoring activities conducted by the permittee should be reported to the permitting authority for determination of whether the permit conditions have been met as well as determination of whether future permits need to be written differently to other sites used.

If field monitoring is required in the permit, the permitting authority needs to ensure that the proper monitoring was completed as part of its determination of compliance with the permit.

The companion document to this guidance*, Low cost, low technology field monitoring assessment of the effects of disposal in marine waters of dredged material or inert, inorganic, geological material* (IMO, 2016), provides comprehensive advice on practical and low cost, low technology techniques for assessing physical characteristics of material on the seabed and in the water column. Advice is also provided regarding measurement of chemical and biological characteristics.

When required in the permit, concise reports of monitoring activities and results should be prepared by the permittee. Reports should detail the measurements made, results obtained, and how these data relate to the monitoring objectives, specifically, the impact hypotheses included in the monitoring plan. The frequency of reporting required in the permit will depend upon the scale of disposal activity and the intensity of monitoring.

Important note:

The above text talks about the field monitoring programme, as if it will just happen. The details of the field monitoring programme and the reporting requirements should be specified in the permit. If there are unknowns when the permit is written, the permit should state that the field monitoring plan must be submitted and approved by the permit authority.

3.5 Overall compliance review

Although compliance can and should be assessed at any point in the life of a permit, at some point all the compliance related information gathered should be compiled and evaluated by the permitting authority to determine if all the permit requirements were met. This entails comparing the permit requirements to what actually occurred during the dumping as documented in the visual observations, electronic surveillance, field monitoring, and reports from the permittee or others.

Depending on the permit requirements, this comparison might include evaluations such as:

- Was the correct material dumped and only the correct material (e.g. figure 3)?
- Was the material cleaned appropriately (i.e. a vessel)?
- Was the route to the dump-site correct?
- Did any material escape during transport?
- Was the material dumped at the correct location within the dump-site?
- Was any material dumped outside the dump-site?
- Was the material dumped during the correct part of the tidal cycle?
- Was the required field monitoring conducted by the permittee?
- Were all the appropriate reports received from the permittee?
- Were there any short term exceedances of allowable water quality parameters during dumping?
- Does the dumped material exceed any permitted requirements regarding its location on the seabed (is it too close to the surface where it might impede normal ship traffic?

Figure 4 – *Organic waste (musk ox offal)*
Photo credit: Environment and Climate Change Canada.

4. Compliance determination: permit violations and management actions[3]

Information gained from compliance reports, including field monitoring, should be used to evaluate if the permit conditions are being met, whether disposal actions are causing unacceptable adverse impacts, whether follow-up monitoring is needed, whether management actions can minimize those impacts, and whether permits should be modified. This section addresses compliance evaluation and possible management actions.

Any violations of the permit should be noted and dealt with appropriately. There are numerous possible approaches to dealing with violations based on how serious the violation is. Violators can be fined or banned from future consideration. Material dumped in the wrong location could need to be removed by the permittee and relocated. If the wrong material was dumped, the permittee could be required to remove it, test it, or monitor it as appropriate.

The permitting authority could use compliance data in conjunction with other data, such as the field monitoring data, to conclude that the dump-site was not appropriate for dumping of a particular material, that other dumping permit restrictions are needed to protect the environment, or that a particular method of dumping is not appropriate for a particular type of waste. The permitting authority could also add restrictions/modifications to future permits.

Results and information generated from the compliance assessment and field monitoring may show that follow-up actions may be needed. For example, decisions may include the need to conduct additional confirmatory monitoring, or initiate more intense monitoring at the next level.

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[3] An expanded discussion of management alternatives is included in the companion document to this guidance, *Low Cost Low Technology Field Monitoring assessment of the effects of disposal in marine waters of dredged material or inert, inorganic, geological material* (IMO, 2016).

Another possibility, if significant loss of material at the dump-site is found, is that the boundaries of the survey may need to be expanded. In addition, if the results show that the environmental effects are unacceptable, management alternatives may be considered to address the identified unacceptable conditions.

Effects versus adverse effects versus unacceptable adverse effects

The disposal of materials into the sea at dump-sites will have effects. Whether these effects are adverse and whether these effects are considered to be unacceptable adverse effects is sometimes a difficult determination given limitations in scientific, technical, and economic capabilities. The assessment of unacceptability should integrate information on the characteristics of the materials disposed at the dump-site, the characteristics of the dump-site and surrounding areas, the potential effects on human health and living resources, amenities, and other uses of the sea, and the alternatives to disposal in ocean waters.

Management actions can be an effective control for both sediment and water-column impacts resulting from disposal. The following are possible management actions for dealing with disposal issues:

- The most obvious control measure for open-water disposal is a modification in the techniques or equipment used for loading and dumping. For example, when dredged material is dumped at sea using a hopper dredge, the materials may be deposited outside the site, which can be seen in sediment samples or result in turbidity or water-column concentrations of contaminants exceeding water-quality criteria. Changing to mechanical (e.g. bucket) dredging with mechanical disposal would reduce the release of dredged materials into the water column. This would then result in less spread of dredged material compared with disposal from hopper dredges (mechanically dredged material is usually like a hunk of material whereas hopper dredged material is more like a slurry).Figure 4.

- Other disposal management actions include taking such actions as developing constraints on rates of disposal from barges, changing the track lines when disposing at the site, and timing the disposal to occur during slack tides.

Figure 5 – *On the left, a mechanical bucket dredging showing consolidated material, and on the right, the hopper of a dredge showing a slurry of dredged material*
Sources: Norfolk Dredging Inc., and Seaturtle.org.

- Other possible management actions for continuing or future disposal activities include:

  - Disposing of future waste materials into a confined disposal facility on- shore or other appropriate upland location; or

  - Disposing of the waste into a confined aquatic disposal cell and capping it. Dredged material can be disposed of in existing depressions in the seabed or in holes excavated to receive the material in cases where there is a need for the material to be isolated from the marine environment by capping. This option would only be appropriate in low energy environments where currents or wave action would not erode the cap. Most experience with placing dredged material in confined aquatic disposal facilities has been in estuarine harbours, not open ocean waters. They are highly engineered facilities.

- If field monitoring results show that unacceptable adverse impacts have occurred at the dump-site, and possibly in the surroundings areas, the dumping should be stopped, and management actions should be considered. These can include sediment removal or capping the dump-site or affected areas within it with clean materials. The intention is to isolate the materials from the surrounding environment, lessening the potential pathways to aquatic life and humans.

Possible management actions for dealing with fish waste and organic waste disposal issues include:

- If field monitoring shows an accumulation of fish waste on the seabed, a new disposal site should be identified or the rate and pattern of disposal should be modified to ensure dispersion.

Possible management actions dealing with vessel disposal issues include:

- Vessels found to be dumped in an inappropriate location where they might become a concern for some reason could be removed and dumped elsewhere; and

- If field monitoring shows elevated levels of contaminants in fish located at a sunken vessel dumped under a permit, a fish consumption advisory notice could be issued and/or the vessel could be removed. Clean-up procedures should be re-evaluated if this happens.

Finally, no guidance is provided in this document regarding fines or other punitive actions when violations of permits are found. Enforcement actions, monetary fines, and other appropriate actions are best left to local authorities.

5. A final word on the key to successful compliance monitoring

The following sentence is repeated from earlier in this document because it is the basis of compliance monitoring. *The first and most critical step in compliance monitoring is preparing a permit with conditions that are clear, measurable, and enforceable.*

Permits and the specific conditions included in the permit are the mechanism by which the waste disposal project is controlled, such that the project is carried out as planned in the permit application and in the corresponding environmental impact assessment.

The most basic permit conditions to be verified are those that specify (1) the type and source of material that can be dumped, (2) the equipment, timing, and locations used for loading and disposal, (3) how much can be dumped, and (4) the location on the seafloor and the possible environmental effects of the deposited material.

The four basic approaches for compliance monitoring include checking reports, visual observations, electronic surveillance, and field monitoring. In a nutshell, compliance monitoring has as its objective the verification that permit conditions were met.

Although compliance can and should be assessed at any point in the life of a permit, at some point all the compliance related information gathered should be compiled and evaluated by the permitting authority to determine if all the permit requirements were met.

Any violations of the permit should be noted and dealt with appropriately.

6. References

Australia Department of Sustainability, Environment, Water, Population and Communities; *Checklist for Completing Long Term Monitoring and Management Plans for Dredging*; July 2012. http://www.environment.gov.au/system/files/resources/c307da1c-237b-43a8-a178-583a60e388d1/files/ltmmp-checklist.pdf

International Maritime Organization, Secretariat of the London Protocol and Convention, *Low Cost, Low Technology Field Monitoring Assessment of the Effects of Disposal in Marine Waters of Dredged Material or Inert, Inorganic, Geological Material*, October 2016.

Leidos, Inc. Automated Disposal Surveillance System, http://www.adiss-afiss.com.

London Protocol and Convention website, Waste Assessment Guidelines. http://www.imo.org/OurWork/Environment/LCLP/Publications/wag/Pages/default.aspx.

London Protocol and Convention; *Waste Assessment Guidelines Training Set Extension for the Application of Low-technology Techniques for Assessing Dredged Material;* http://www.imo.org/OurWork/Environment/LCLP/Publications/wag/Pages/default.aspx.

New York State Department of Environmental Conservation, Division of Water*, In-Water and Riparian Management of Sediment and Dredged Material,* November, 2004. www.dec.state.ny/dow/bwam.html.

U.S. Army Corps of Engineers Website on Data Quality Management System,

http://dqm.usace.army.mil.

US EPA and US Army Corps of Engineers. *Guidance Document For Development of Site Management Plans For Ocean Dredged Material Disposal Sites,* February 1996.

US EPA, *Mobile Ocean Dredged Material Disposal Site, Draft Site Management and Monitoring Plan*, March 2015.

USEPA, *Southeastern United States Inactive Ocean Dredged Material Disposal. Site Management and Monitoring Plan*, November 2013.
http://www.epa.gov/region4//water/oceans/documents/inactive_odmds_smmp_2013_final.pdf
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Appendix: Sample permits

This appendix presents three examples of complete permits that were issued for specific disposal activities within particular countries. The examples cover permits for the disposal of fish waste, a vessel, and dredged material.

The examples illustrate how permits can be constructed and the types of conditions they can include. All of the examples shown here deal with important issues associated with permits for specific wastes, but it should be noted that they all go beyond the minimum list of permit conditions required under the LP (see section 2.2). Please note that these examples are not intended to be copied directly nor used as your permit conditions. Local circumstances should be assessed and appropriate permit conditions should be specified for specific disposal actions being authorized under your country's legislative framework.

Many countries publish their permits online for public notification and review. You may wish to consult these sites for additional examples of permits and conditions specific to other types of wastes.

This appendix contains the following:

1. Sample Permit for fish waste disposal at sea – *example from the UK for the disposal of clean crushed whelk shells.*

2. Sample Permit for disposal of a vessel at sea – *example from Canada for the former HCMS Annapolis.*

3. Sample Disposal at sea permit for dredged material – *example from Canada.*

1. Sample permit for fish waste disposal at sea

Marine Consents Unit, Welsh Government
MARINE AND COASTAL ACCESS ACT 2009: PART 4 – MARINE LICENSING

Marine Licence: 11/77/ML

The Welsh Ministers (hereinafter referred to as "the Licensing Authority") hereby authorize:

Quay Fresh & Frozen Foods Ltd **Rock Street** **New Quay** **Ceredigion** **SA45 9PL**	
Company Registration No: 2738303	

(Hereinafter referred to as "the Licence Holder") to deposit in the sea the substances or articles the particulars of which are set out at paragraph 1 of the attached Schedule of conditions. The Licence is subject to the conditions of use set out, or referred to, in the said Schedule.

This Licence shall be valid from the beginning of the day of **5 March 2012**, (hereinafter referred to as the start date of this Licence) to the end of the day of **4 March 2013**, (hereinafter referred to as the end or expiry date of this Licence).

For the purposes of this Licence and attached schedule and unless indicated otherwise:

(i) all times shall be taken to be Greenwich Mean Time (GMT); and,

(ii) all coordinates shall be taken to be latitude and longitude degrees and minutes to two decimal places.

Signed:

Marine Consents Unit
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

For and on behalf of the Licensing Authority
Date of issue: 5 March 2012

SCHEDULE OF CONDITIONS

1. Particulars of the deposit operation

1.1. Place of production of the substances or articles:

	Quay Fresh & Frozen Foods Ltd, New Quay, IS015.

1.2. Description of the substances or articles for deposit:

	FISH WASTE (Clean crushed whelk shells), including clean water (not from production) that may be used to assist in the deposit of material through the chute, as described in the application received on 29 December 2011.

1.3. The Licence Holder or any Agent or Contractor acting on their behalf under this Licence is permitted to deposit a quantity not exceeding **2,000 tonnes per annum** of the substances or articles specified at sub-paragraph 1.2 of this Schedule, at the Deposit area(s) detailed at paragraph 1.4 and up to the maximum quantity specified for each Deposit area specified at paragraph 1.5.

1.4 The Deposit areas authorized under this licence are:

1.4.1 Deposit area name and/or code:
at:

	NEW QUAY, IS015 **Within the area bounded by joining the points 52 13.110 N 04 21.650 W.**
	Up to a maximum quantity of **2,000 tonnes per annum** may be deposited as set out in paragraph 1.5 of this schedule.

1.5 Within the overall quantities authorized for deposit set out in paragraph 1.3, and the authorized deposit area set out in paragraph 1.4 the following limits also apply:

Clean crushed whelk shells may be deposited between **5 March 2012** and **4 March 2013** at the authorized deposit area:

	Area code	Area name	Maximum qty (tonnes)	Type
	IS015	**NEW QUAY**	**2,000 per annum**	**Clean crushed whelk shells**
Maximum 48 tonnes per week with a yearly average of 40 tonnes per week				

2. Agents or contractors responsible for the loading, transportation, storage or deposit of the substances or articles

2.1 Any person in charge of the loading of a vessel or any intermediate storage of the substances or articles prior to their deposit in the sea shall maintain a written record on the premises relating to individual cargoes or loads (received or dispatched). This written record shall include the following details, where applicable:

2.1.1 date and time each load was received or dispatched and the quantity;

2.1.2 general description of the substances or articles and the name of the producer(s) or holder(s);

2.1.3 registration numbers of vehicles delivering loads;

2.1.4 consignment note numbers (if any);

2.1.5 the reference number of the Licence issued under Part 4 of the Marine and Coastal Access Act 2009, which permits the substances or articles being loaded or stored to be deposited in the sea;

2.1.6 name(s) of vessel or identification code and type of container into which substances or articles are loaded;

2.1.7 signature(s) and status of the person or persons authorizing loading of substances or articles to the vessel or container;

2.1.8 the results of any checks carried out on the substances or articles prior to authorization of loading.

2.2 The Licence Holder must ensure that only authorized personnel have access to the substances or articles for deposit.

3. Distribution of copies of this licence

3.1 The Licence Holder is required to ensure that a copy of this Licence and attached Schedule, any special conditions and any subsequent revisions or amendments thereto, is available at the address of the Licence Holder.

4. Inspection of the operation

4.1 The written record referred to in paragraph 2.1 shall be available for inspection by authorized Marine Enforcement Officers at all reasonable times at the premises where the substances or articles are stored prior to loading for deposit at sea.

4.2 The documents referred to in paragraph 3 shall be available for inspection at all reasonable times by authorized Marine Enforcement Officers at the locations stated in that paragraph.

4.3 The Licence Holder must advise the Licensing Authority and Marine Enforcement Officers **10 days** before the licensed operation, or an individual phase of the operation, is expected to commence.

5. Returns to be made to the Licensing Authority

5.1 The Licence Holder is required to acknowledge receipt of this Licence and confirm that he or she has understood its terms by signing and returning the attached acknowledgement form MCUAck1 within **28 days** of the date of issue of this Licence. No operations permitted under the terms of this Licence shall commence until the MCUAck1 form has been signed and returned to the Licensing Authority.

5.2 Certified returns of quantities of substances or articles deposited under this Licence are required to be submitted to the Marine Consents Unit (mcu@wales.gsi.gov.uk) on the attached disposal return form by 31 January and 31 July each year. The returns must specify the full licence number and amount deposited each calendar month in the authorized deposit area. Where no deposit is made in a given period a NIL return is required.

5.3 If this Licence expires during the course of the calendar year and is not renewed or superseded by a further Licence relating to the works specified in paragraph 1, a certified return of quantities of substances or articles deposited under this Licence shall be submitted not later than 28 working days after the expiry date of this Licence.

6. Force Majeure

6.1 If, by reason of "force majeure" the substances or articles as specified at sub-paragraph 1.2 of this Schedule are deposited otherwise than at the authorized deposit area specified at paragraph 1.4 of this schedule, full details of the circumstances shall be notified within 48 hours to the Licensing Authority.

"Force majeure" may be deemed to apply when, due to stress of weather or any other cause, the master of a vessel determines that it is necessary to deposit the substances or articles because the safety of human life and/or of the vessel is threatened.

7. Changes to this Licence

7.1 In the event of the Licence Holder becoming aware that any of the information on which the granting of this Licence was based has changed or is likely to change, he/she shall immediately notify the Licensing Authority of the details.

7.2 Should the Licence Holder wish any of the particulars set down in paragraph 1 of the Schedule to be altered he/she shall immediately inform the Licensing Authority and receive written consent to the change before taking any further action.

8. Contacts

8.1 Except where otherwise indicated, the primary point of contact with the Licensing Authority and the address for returns and correspondence shall be:-

Marine Consents Unit
Welsh Government
Cathays Park
Cardiff
CF10 3NQ
Email: mcu@wales.gsi.gov.uk

8.2 For the purposes of this Licence any references to Marine Enforcement Officers shall

mean the relevant officers located at:-

Welsh Government
Fisheries Office
Suite 3, Cedar Court
Haven's Head Business Park
Milford Haven
Pembrokeshire
SA73 3LS
Tel: 01646 693412
Email: milfordhavenfisheryoffice@wales.gsi.gov.uk

Project Specific Conditions

9.1 The Licence Holder must ensure only clean, crushed whelk shells are deposited. Under no circumstances may undersized, or unprocessed, or other shells be discarded into the sea. The deposited whelk shells must be clean of all organic matter and must be crushed into fragments to a size of approximately 10 mm and not larger than 15 mm.

9.2 The Licence Holder must ensure that no organic shellfish material is disposed of to sea. Unprocessed shells which are not free of flesh must be disposed of as category 3 animal by-products.

9.3 The Licence Holder must prevent the disposal of man-made debris at sea. Such debris must be disposed of to land.

9.4 The Licence Holder must ensure that discharge is directly into the sea and not onto the cliffs below the disposal chute.

9.5 The Licence Holder must continue to seek alternative options for disposal or beneficial use of the shells other than to sea.

9.6 The Licence Holder must keep a log book on a daily basis recording accurate details of the quantities of clean, crushed whelk shells deposited, and the disposal returns made to the Licensing Authority in accordance with condition 5.2.

9.7 The Licence Holder must ensure that all records and documents are available for inspection by Welsh Government Marine Enforcement Officers at any time.

9.8 The Licence Holder must allow Welsh Government Marine Enforcement Officers or any other person authorized by the Marine Consents Unit to inspect the works at any reasonable time.

EXPLANATORY NOTES

*This page does not form part of this Licence **11/77/ML** or its associated schedule but the Licence Holder is recommended to read the following guidance notes.*

1. The granting of this licence does not absolve the Licence Holder from obtaining such other authorizations, consents and approvals which may be required under any other legislation, controls or regulations.

2. Under Section 72 of the Marine and Coastal Access Act 2009, the Licensing Authority may vary or revoke this Licence if it appears to the Authority that the Licence Holder

is in breach of any conditions in it or for any other reason that appears to the Authority to be relevant.

3. A person who contravenes Section 65 (1) of the Marine and Coastal Access Act 2009, or fails to comply with any condition of a Marine Licence, commits an offence under Part 4, Chapter 3, section 85 of the Marine and Coastal Access Act 2009.

4. It is a defence, under Part 4, Chapter 3, section 86 of the Marine and Coastal Access Act 2009, for a person charged with an offence under section 85 (1) to prove that:

   a) the activity was carried out for the purpose of securing the safety of a vessel, aircraft or marine structure or for the purpose of securing life; and,

   b) that he/she took steps within reasonable time following the incident to inform the Licensing Authority of:

      (i) the fact that the activity was carried out;
      (ii) the locality and circumstances in which it was carried out; and
      (iii) any substance or objects concerned.

5. If the works authorized by this Licence are unlikely to be completed by the expiry date of this licence, the Licence Holder should apply for a replacement licence at least **12 weeks** prior to the expiry date of this Licence.

2. Sample Permit for Disposal of a Vessel at Sea

Department of the Environment
Canadian Environmental Protection Act, 1999

Notice is hereby given that, pursuant to section 127 of the *Canadian Environmental Protection Act, 1999*, Disposal at Sea Permit No. 4543-2-03607 authorizing the loading for disposal and the disposal of waste or other matter at sea is approved. The permit is published on the CEPA Registry on October 7, 2014.

1. *Permittee*: Artificial Reef Society of British Columbia, Vancouver, British Columbia.

2. *Waste or other matter to be disposed of*: Ships, aircraft, platforms or other structures from which all material that can create floating debris or other marine pollution has been removed to the maximum extent possible if, in the case of disposal, those substances would not pose a serious obstacle to fishing or navigation after being disposed of.

2.1. *Nature of waste or other matter*: Ship.

2.2. *Description of ship:*

Name of ship: former *HMCS Annapolis*.
Gross Tonnage: 2880.
Length: 113.1 metres.
Beam: 12.8 metres.
Draught: 4.2 metres.
Construction: Aluminium, Steel.

3. *Duration of permit*: Permit is valid from October 14, 2014, to October 13, 2015.

3.1 The Permittee must not conduct the transport and disposal during the period of February 1, 2015, to August 14, 2015.

4. *Loading site(s)*: Long Bay, Gambier Island, British Columbia at approximately 49.47061° N, 123.36147° W (NAD83), as submitted in support of the permit application.

5. *Disposal site(s)*: The disposal must occur at Halkett Bay Marine Park, British Columbia between 49.44861° N, 123.33086° W (NAD83) and 49.44950° N, 123.32986 W (NAD83).

6. *Route to disposal site(s) and method of transport*: The Permittee must take the safest navigational route from the loading site to the disposal site via tow vessel(s), under conditions minimizing the risk of unintentional sinking or loss.

7. *Method of disposal*: Ship will be scuttled by explosive cutting allowing water to enter hull.

8. *Requirements and Restrictions*:

8.1. The Permittee must remove all floatables and all petroleum-based products (fuel oil, hydraulic fluids, lubricants, etc.) from the ship prior to its disposal.

8.2 The disposal of the ship must be done during weather conditions that will enable effective positioning and/or anchoring of the ship on the sea floor.

8.3 The Permittee must provide on-site contingency measures and equipment and must clean up any floatables and surface oil residues from the ship after its disposal, and

must carry out clean up measures as determined by the Minister, within two (2) days after the disposal.

9. *Inspection*:

9.1. By accepting this permit, the Permittee and its contractors are subject to inspection pursuant to Part 10 of the *Canadian Environmental Protection Act, 1999*.

9.2. The Permittee must keep records of transport and disposal activity for the duration of the permit and make them available for inspection by any Enforcement Officer or Analyst designated pursuant to subsection 217(1) of the *Canadian Environmental Protection Act, 1999*, for two (2) years following the expiry of the permit.

9.3. Tow vessel(s) operating under the authority of this permit must carry and display a radar-reflecting device at all times mounted on the highest practical location.

9.4 The Permittee must allow an Enforcement Officer designated pursuant to subsection 217(1) of the *Canadian Environmental Protection Act, 1999* and/or a departmental representative to board and inspect the ship identified in this permit prior to its disposal.

9.5 The Permittee must provide appropriate and timely transport to and from the ship for all Enforcement Officer(s) and departmental representatives mentioned pursuant to Paragraph 9.4 of this permit.

9.6 The Permittee must address any clean-up deficiencies identified by the Enforcement Officer and/or departmental representative prior to disposal of the ship.

9.7 Prior to disposal, the ship must meet the criteria stipulated in Environment Canada's *Clean-Up Standard for Disposal at Sea of Vessels, Aircraft, Platforms & Other Structures (Revision 3, December 2007).*

9.8 The Permittee must not introduce new material to the ship after an Enforcement Officer and/or departmental representative has inspected the ship and confirmed that the criteria identified in Paragraph 9.7 of this permit have been met.

10. Contractors:

10.1. The transport or disposal at sea referred to in this permit shall not be carried out by any person without written authorization from the Permittee.

10.2. All persons involved in the transport and/or disposal activities authorized by this permit must conduct these activities in accordance with the permit conditions.

11. Reporting and notification:

11.1. The Permittee must provide the following information at least 48 hours before loading and disposal activities commence: name or number of ship, platform or structure used to carry out the transport and/or disposal, name of the contractor including corporate and on-site contact information, and expected period of transport and disposal activities. The above-noted information shall be submitted to the Environmental Enforcement Division of the Department of the Environment, Pacific and Yukon Region, 604-666-9059 (fax) or das.pyr@ec.gc.ca (email).

11.2. The Permittee must submit a written report to the Minister, as represented by the Regional Director of the Environmental Protection Operations Directorate, Pacific and

Yukon Region, 201–401 Burrard Street, Vancouver, BC, V6C 3S5, 604-666-5928 (fax) or das.pyr@ec.gc.ca (email) no later than 30 days after the expiry of the permit. This report must include the following transport and disposal information: the location of the final disposal site (bow and stern coordinates); the date on which disposal activity occurred; copies of documentation regarding all required notifications pursuant to this permit; confirmation that the terms identified in this permit were adhered to and/or satisfied.

11.3. At all times, a copy of this permit must be available on all powered ships directly engaged in the transport and disposal operations.

11.4 Upon completion of the disposal, a notice must be submitted to the Canadian Hydrographic Service with regard to the new aids to navigation so that chart corrections may be made.

12. *Special precautions*:

12.1 The Permittee must establish a 500 metre marine mammal exclusion zone surrounding the explosive charges and the exclusion zone must be maintained by a qualified and experienced marine mammal observer. The marine mammal exclusion zone must be monitored for 30 minutes prior to the initiation of explosive charges to ensure that no marine mammals are within the exclusion zone. If there is a marine mammal observed within 500 metres of the explosive charges, explosive use is not to occur until the marine mammal moves out of the 500 metre marine mammal exclusion zone.

12.2 The Permittee must conduct underwater blasting for the purpose of carrying out the disposal authorized by this permit during daylight hours.

12.3 Works, undertakings and activities must adhere to the document "Wright, D.G., and G.E. Hopky. *1998 Guidelines for the use of explosives in or near Canadian fisheries waters*. Can Tech. Rep. Fish Aquat. Sci 2107: iv + 34p." except that the "guideline criteria of 100kPa" must be revised and reduced to 30kPa.

12.4 The Permittee must maintain a vessel exclusion zone of at least 100 metres during disposal. This zone must be maintained either through the use of a patrol boat and/or marker buoys. Any temporary buoys must be removed within two (2) days of disposal.

12.5 Tow vessel(s) operators must be qualified and must be familiar with the route from the loading site to the disposal site.

12.6 All equipment used during transport and disposal must be in working order and must be maintained to prevent leaks and spills of petroleum-based products.

Steven Wright
Regional Director
Environmental Protection Operations Directorate
Pacific and Yukon Region
On behalf of the Minister of the Environment
Signed on: October 2, 2014

3. Sample Disposal at Sea Permit for Dredged Material

Department of the Environment
Canadian Environmental Protection Act, 1999

Notice is hereby given that, pursuant to section 127 of the *Canadian Environmental Protection Act, 1999*, Disposal at Sea Permit No. 4543-2-04423 authorizing the loading for disposal and the disposal of waste or other matter at sea is approved. The permit is published on the CEPA Registry on Tuesday, February 17th, 2015.

1. *Permittee*: Department of Fisheries and Oceans, Québec, Quebec.

2. *Waste or other matter to be disposed of*: Dredged material.

2.1. *Nature of waste or other matter:* Dredged material consisting of gravel, sand, silt, clay and colloids.

3. *Duration of permit*: Permit is valid from March 2, 2015, to March 1, 2016.

3.1. The loading activities are restricted to the following periods: from March 2 to May 4, 2015; and from June 11, 2015, to March 1, 2016. The Permittee may modify the duration of the restriction periods with the written approval of the Department of the Environment.

3.2. The disposal at sea activities are restricted to the following periods: from March 2 to May 4, 2015; from June 11 to June 30, 2015; and from September 1, 2015, to March 1, 2016. The Permittee may modify the duration of the restriction periods with the written approval of the Department of the Environment.

4. *Loading site(s)*: Pointe-Basse Harbour, Quebec, 47.38933° N, 61.79083° W (NAD83), with the exception of the zone of exclusion described in Annex 1 of the 2015 addendum of the environmental effects screening report titled "Dragage d'entretien et immersion en mer, Havre de pêche de Pointe-Basse, Îles-de-la-Madeleine" (February 2014), by the Department of Fisheries and Oceans and approved by the Department of the Environment, submitted in support of the permit application.

5. *Disposal site(s)*:

a) PBCM-1, 47.36650° N, 61.79967° W (NAD83). The disposal site is located approximately 2.6 km south of the loading site.

b) Pointe-Basse Channel, 47.38933° N, 61.79083° W (NAD83).

6. *Method of loading*: Dredging will be carried out using a clamshell dredge, a hydraulic shovel or a hydraulic dredge.

7. *Route to disposal site(s) and method of transport*: Most direct navigational route from the loading site to the disposal site via towed scow.

8. *Method of disposal*: Disposal will be carried out by bottom dumping, and levelling of the seabed in the channel by a steel beam, a scraper blade, or a hydraulic shovel.

9. *Total quantity to be disposed of*: Not to exceed 14 000 cubic metres, place measure.

10. *Fees*: The fee prescribed by the *Disposal at Sea Permit Fee Regulations* shall be paid by the Permittee in accordance with those regulations.

11. *Inspection*:

11.1. By accepting this permit, the Permittee and its contractors accept that they are subject to inspection pursuant to Part 10 of the *Canadian Environmental Protection Act, 1999*.

11.2. The Permittee shall ensure that records of all loading and disposal activities are kept on site for the duration of the permit and are available for inspection by any enforcement officer or analyst, for two years following the expiry of the permit.

12. *Contractors*:

12.1. The loading or disposal at sea referred to under this permit shall not be carried out by any person without written authorization from the Permittee.

12.2. The Permittee shall ensure that all persons involved in the loading, transport or disposal activities authorized by this permit conduct these activities in accordance with the relevant permit conditions.

13. *Reporting and notification*:

13.1. The Permittee shall provide the following information at least 48 hours before loading and disposal activities commence: name or number of ship, platform or structure used to carry out the loading and/or disposal, name of the contractor including corporate and on-site contact information, and expected period of loading and disposal activities. The above-noted information shall be submitted to the Regional Director of the Environmental Protection Operations Directorate, Department of the Environment, Quebec Region, 105 McGill Street, 4th floor, Montréal QC H2Y 2E7, 514-496-6982 (fax), immersion.dpe@ec.gc.ca (email).

13.2. The Permittee must complete the Register of Disposal at Sea Operations as provided by the Department of the Environment. This register must, at all times, be kept aboard any vessel involved with the disposal operations and be accessible to enforcement officers designated under the *Canadian Environmental Protection Act, 1999*.

13.3. The Permittee must keep a written register of the time of departure of the vessel to the disposal site and advise the Canadian Coast Guard station once per day of the departure times entered in the register. The Permittee must record these communications in the register mentioned in the previous paragraph.

13.4. The Permittee shall submit a written report to the Minister, as represented by the Regional Director of the Environmental Protection Operations Directorate, Quebec Region, identified in paragraph 13.1, within 30 days after the expiry of the permit. This report shall contain the following information: a list of all work completed pursuant to the permit, including the names of the loading and disposal site(s) used, the quantity of matter disposed of at the disposal site(s), the dates on which disposal activities occurred and the *Register of Disposal at Sea Operations*.

13.5. At all times, a copy of this permit and of documents and drawings referenced in this permit shall be available at the loading site and on all powered ships directly engaged in the loading and disposal operations.

Marc Provencher
A/Regional Director
Environmental Protection Operations Directorate
Quebec Region
On behalf of the Minister of the Environment
Signed on: February

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