ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΚΩΝ ΣΠΟΥΔΩΝ
ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ ΣΤΗ ΝΑΥΤΙΛΙΑ

ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ:

«ΜΕΛΕΤΗ ΔΙΑΧΕΙΡΙΣΗΣ ΘΑΛΑΣΣΙΟΥ ΕΡΜΑΤΟΣ ΣΕ ΠΕΤΡΕΛΑΙΟΦΟΡΟ ΠΛΟΙΟ – BALLAST WATER MANAGEMENT PLAN FOR OIL TANKER»

Μουλατζίκος Λάμπρος

ΜΝ/06015

6ος κύκλος (2006-2008)

ΠΕΙΡΑΙΑΣ ΟΚΤΩΒΡΙΟΣ 2009

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Μουλατζίκος Λάμπρος

Τελειόφοιτος Προγράμματος Μεταπτυχιακών Σπουδών στη Ναυτιλία

Τριμελής Εξεταστική Επιτροπή

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Τα μέλη της Επιτροπής:

- Τσελέντης Βασίλειος-Στυλιανός (Επιβλέπων)
- Μηλιαράκη Μαρία
- Σαμιώτης Γεώργιος

Η έγκριση της Διπλωματικής Εργασίας από το Τμήμα Ναυτιλιακών Σπουδών του Πανεπιστημίου Πειραιώς δεν υποδηλώνει αποδοχή των απόψεων του συγγραφέα.

Ευχαριστίες και Αναγνωρίσεις

Η πραγματοποίηση αυτής της εργασίας και η τελική διαμόρφωση αυτής δε θα ήταν εφικτή χωρίς την ιδιαίτερη και πολύτιμη βοήθεια του επιβλέποντα Καθηγητή μου κ.κ. Τσελέντη, ο οποίος συνέβαλε τα μέγιστα με τη συμπαράσταση και την καθοδήγησή του καθόλη τη διάρκεια της προετοιμασίας του κειμένου αλλά και την συνολική υποστήριξή του όλα τα χρόνια των σπουδών μου στο Ναυτιλιακό Τμήμα.

Σε αυτό το σημείο θα ήθελα να ευχαριστήσω όλους τους Καθηγητές μου, κάποιοι εκ των οποίων συμμετέχουν στην Εξεταστική Επιτροπή, για την συμβολή τους κατά τη διάρκεια της φοίτησής μου στο Μεταπτυχιακό Πρόγραμμα, οι οποίοι μου προσέφεραν τα απαραίτητα εφόδια και γνώσεις για να ασχοληθώ επαγγελματικά στην αγορά της Ναυτιλίας. Θα ήθελα να αναφερθώ στην αμέριστη συμπαράσταση και την παροχή υλικού από τη ναυτιλιακή εταιρεία A.K.Shipping & Trading Inc. στην οποία εργάζομαι ανελλιπώς από τον Μάιο του 2007. Τέλος, ιδιαίτερη μνεία αξίζει στον εκλεκτό συνάδερφο και αρχιμηχανικό κ. Ιωάννη Βασιλική, ο οποίος με τις απεριόριστες γνώσεις του με βοήθησε τόσο στην σύνταξη όσο και στην κατανόηση πολλών τεχνικών ζητημάτων που αναπτύσσονται στη συγκεκριμένη μελέτη.

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SUMMARY

This thesis has been prepared in order to become an approved Ballast Water Management Plan for a specific double hull oil tanker according to relevant regulations of IMO.

First of all, we analyzed the essential role that ballast water plays to ship's safety, to human health, to environment and to property of resources.

By including various ship's plans, such as General Arrangement, Capacity Plan and Location of Sampling Points, as well as useful tables with ballast water pump capacities, time tables for the methods that we describe, we intend to assist anyone to understand and follow all the steps of the procedure properly.

In our case study, the ballast water system is based on ballast exchange by using centrifugal permanent ballast water pumps. Three "pump through" methods can be used: sequential, flow through and dillution with the second one to be the most suitable for the specific tanker. Type of sampling point is manhole and location of sampling points is shown in relevant plan.

Assessment criteria shall be followed for each method in order to ensure that basic aspects of safety will not be affected, such as longitudinal strength, stability, minimum draught forward, propeller immersion, bridge visibility and sloshing.

Decision to proceed with ballast operation shall be taken when ship is in open water, traffic density is low, enhanced navigational watch is maintained, maneuverability of ship is not unduly impaired and general weather / sea state conditions are suitable.

Frequency and timing of removal of sediments depend on factors such as sediment build up, ship's trading schedule, availability of reception facilities and work load of ship's crew. Disposal shall take place in areas outside 200 nautical miles from land and in water depths of over 200 meters.

Crew shall be familiarized with pumping arrangements, locations of air & sounding pipes of all ballast tanks, position of suctions and pipelines, location and access of sampling points, overboard discharge arrangements (especially for flow through method), times required to undertake various exchange operations, method of record keeping, safe handling and storage of sediments.

Recording requirements related to ballast is the ballast water record book, the ballast water reporting form, the ballast water handling log, the sediment removal and tank flushing log, the ballast exchange notification form and the ballast exchange plan.

Then, we followed some steps as per ship's Loading Manual in order to confirm that ship's trim, stresses, draught, stability and list are not affected by the methods that we described. For each step, we can take results such as maximum shear force (faced to specific frame for each step) and maximum bending moment.

Last chapter refers to items for consideration when choosing and installing ballast water treatment systems (in our case study we described methods of exchange).

ΠΕΡΙΛΗΨΗ

Η εργασία ετοιμάστηκε έτσι ώστε να αποτελεί μια εγκεκριμένη και πλήρης μελέτη διαχείρισης θαλάσσιου έρματος για ένα δεξαμενόπλοιο διπλού τοιχώματος σύμφωνα με τους σχετικούς κανονισμούς του IMO.

Το θαλάσσιο έρμα παίζει σημαντικό ρόλο στην ασφάλεια του πλοίου, στην ανθρώπινη υγεία, στο περιβάλλον και ειδικότερα στις θάλασσες.

Παραθέτουμε διάφορα σχέδια του συγκεκριμένου πλοίου, όπως τη Γενική Διάταξη, το Πλάνο Χωρητικότητας και το Σχέδιο με τα σημεία δειγματοληψίας του έρματος, καθώς και χρήσιμους πίνακες με τις χωρητικότητες των αντλιών που χρησιμοποιούμε και τους απαιτούμενους χρόνους για τις διαδικασίες ανταλλαγής έρματος.

Στο συγκεκριμένο πλοίο, το σύστημά μας βασίζεται σε φυγοκεντρικές μόνιμα εγκατεστημένες αντλίες θαλάσσιου έρματος. Τρεις είναι οι εγκεκριμένες μέθοδοι που μπορεί να χρησιμοποιηθούν: sequential, flow through και dillution, με την δεύτερη να είναι η πιο κατάλληλη για την περίπτωση που εξετάζουμε. Για τα σημεία δειγματοληψίας έχουμε επιλέξει τις ανθρωποθυρίδες οι οποίες φαίνονται αναλυτικά στο σχετικό σχέδιο.

Πριν χρησιμοποιήσουμε κάποια μέθοδο, θα πρέπει να εξετάζουμε αν πληρούνται διάφορα κριτήρια που σχετίζονται με την ασφάλεια, όπως η διαμήκης αντοχή, η ευστάθεια, το ελάχιστο εμπρόσθιο βύθισμα, η ικανότητα μανουβραρίσματος κ.ά.

Η απόφαση για να γεμίσουμε ή να αδειάσουμε θαλάσσιο έρμα πρέπει να λαμβάνεται όταν το πλοίο είναι σε ανοιχτή θάλασσα, δεν υπάρχει μεγάλος αριθμός πλοίων στην περιοχή και οι καιρικές συνθήκες το επιτρέπουν.

Η συχνότητα και ο χρόνος αφαίρεσης των ιζημάτων εξαρτάται από παράγοντες όπως ο ρυθμός ανάπτυξής τους, το εμπορικό πρόγραμμα του πλοίου, τη δυνατότητα υποδοχής τέτοιων ιζημάτων στην στεριά και το φόρτο εργασίας του πληρώματος.

Το πλήρωμα πρέπει να είναι εξοικειωμένο με τις διατάξεις των αντλιών, τα σημεία των εξαεριστικών και των αναρροφήσεων, τα σημεία δειγματοληψίας, τους απαιτούμενους χρόνους για κάθε μέθοδο καθώς και τη σωστή καταγραφή δεδομένων.

Είναι αναγκαίο να καταγράφονται διάφορα δεδομένα και μετρήσεις σχετικά με το θαλάσσιο έρμα, όπως βιβλίο προέλευσης έρματος, έντυπο ειδοποίησης λιμενικών αρχών, βιβλίο για τον καθαρισμό δεξαμενών κ.ά.

Στην συνέχεια, ακολουθώντας διάφορα βήματα στο Εγχειρίδιο Φόρτωσης του πλοίου μπορέσαμε να επιβεβαιώσουμε ότι παράγοντες όπως ευστάθεια, δυνάμεις στα εγκάρσια τμήματα, βύθισμα, βαθμός κλίσης προς πλάγια, δεν επηρεάζονται αρνητικά από τις μεθόδους που περιγράψαμε.

Το τελευταίο κεφάλαιο αναφέρεται στα σημεία που πρέπει να σταθούμε αν επιλέξουμε να εγκαταστήσουμε συστήματα treatment και με τα οποία καταπολεμούμε τους επιβλαβείς οργανισμούς που φέρει το θαλάσσιο έρμα μέσα στις δεξαμενές.

RECORD OF AMENDMENTS

When any change / amendment is made to a chapter, a new Record of Amendments page shall also be sent together with the relevant amended chapter. The holder of the controlled copy shall replace existing pages with amended ones and destroy all old copies.

No	Date	Revised Part	Revision details / description	Signature

SHIP PARTICULARS

Ship's Name	M/T TAXIARCHIS[1]
Ship Type	Oil Tanker
Port of Registry	Monrovia
Owner	LAKEMOUNT ENTERPRISES LTD
International Call Sign	A8FQ6
Flag	Liberia
Gross Tonnage	45140
IMO Number	8322715
Classification	Det Norske Veritas
Length (overall)	228.00 m
Length Between Perpendiculars	223.00 m
Breadth Moulded	32.24 m
Depth Moulded	19.50 m
Total Water Ballast Capacity	30670 m3
Total number of Segregated Ballast Tanks onboard	13 Tanks
Ballast Water Management Method(s)	Combined method
Identification (Rank) of Ballast Water Management Officer	Chief Officer

[1] Ex names of ship: Bro Selma, Osco Bellona.

INTRODUCTION

1. This Manual is written in accordance with the requirements of regulation B-1 of the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004 (the convention) and the associated Guidelines.

2. The purpose of the Manual is to meet the requirements for the control and management of ship's ballast water and sediments in accordance with the Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans resolution MPEC 127 (53) (The Guidelines). It provides standard operational guidance for the planning and management of ship's ballast water and sediments and describes safe procedures to be followed.

3. This Manual has been examined by the vessel's classification society and no alteration or revision shall be made to any part of it without the prior approval of the classification society.

4. This plan may be inspected on request by an authorized authority.

5. Changes to non mandatory information in Appendices will not be required to be approved.

6. It is the owners / operators or master's responsibility to regularly review the plan and ensure that the information contained therein is accurate and updated.

Note: The Plan is to be written in the working language of the crew, if the text is not in English, French or Spanish, the plan is to include a translation into one of these languages.

The status of the Ballast Water Management Convention as of today[2] is that 18 States representing 15.36% of the gross tonnage of the world's merchant fleet have ratified the Convention. These States are:

- Antigua & Barbuda
- Albania
- Barbados
- Egypt
- France
- Kenya
- Kiribati
- Liberia
- Maldives
- Mexico

[2] Det Norske Veritas, Maritime Consulting, Ballast Water Management, 2009.

- Nigeria
- Norway
- St. Kitts & Nevis
- Sierra Leone
- South Africa
- Spain
- Syria
- Tuvalu

The Convention will enter into force 12 months after the date on which not less than 30 States representing not less than 35% of the gross tonnage of the world's merchant fleet have ratified the Convention.

When the Convention enters into force, ballast management becomes an international requirement and the entire world fleet (with some exemptions) will have to comply with the standards in the Convention.

Until the Convention enters into force, a number of States have introduced, or plan to introduce, restrictions on ballast water for ships entering their territorial waters. These States as of today are:

- Argentina
- Australia
- Bahrain
- Brazil
- Canada
- Chile
- Egypt
- Georgia
- Iran
- Iraq
- Israel
- Kuwait
- Lithuania
- New Zealand
- Norway
- Oman
- Panama Channel
- Peru
- Qatar
- Russia
- Saudi Arabia
- Turkey
- Ukraine
- United Arab Emirates
- USA
- UK (Orkney Island)

The Convention specifies two standards to satisfy its requirements, Ballast Water Exchange (Standard D-1) and Ballast Water Treatment (Standard D-2).

Guidelines on how a Ballast Water Management Plan must be set up have been developed within IMO. The Guidelines are given in Resolution MEPC.127 (53). Ship's classification society (DNV) approves Ballast Water Management Plans found to be in compliance with the aforementioned guidelines.

We prepared relevant Plan for ship using exchange methods, which is different than a Plan for ships using treatment methods. However, the Guidelines given in Resolution MEPC.127 (53) are valid for both methods.

Treatment means a process or mechanical, physical, chemical or biological method to kill, remove or render infertile, harmful or potentially harmful organisms within ballast water.

All of the various potential ballast water treatment technologies are currently at a very early stage of development and significant further research is required.

It is likely to be some years before a new ballast water treatment system is developed, proven effective, approved and accepted for operational use. Ballast water exchange will therefore remain a primary method for some time yet, despite its limitations.

It appears that any new ballast water treatment system will involve a combination of technologies, for example primary filtration or physical separation followed by a secondary biocide treatment.

The current global budget for ballast water treatment R&D (about US$10 million) is insignificant compared to the global costs of marine introductions (likely to be at least in the tens of billions of US$).

There is a desperate need to develop and implement international standards and procedures for the evaluation and approval of new ballast water treatment systems[3].

[3] 1st International Ballast Water Treatment R&D Symposium.

CHAPTER 1: PURPOSE

Ballast water is essential to control trim, list, draught, stability, or stresses of the ship. However, ballast water may contain aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

The essential methods of ballast water management take into account the need to ensure that Ballast Water Management practices used to comply with this Convention do not cause greater harm than they prevent to the environment, human health, property or resources of any States and the safety of the ship.

It is estimated that at least 7,000 different species are being carried in ships' ballast tanks around the world. Studies carried out in several countries indicated that many species of bacteria, plants and animals can survive in a viable form in the ballast water and sediment carried in ships, even after journeys of several months' duration.

The water in many international ports is highly contaminated with sewage and agricultural run-off. High concentrations of pathogens can be taken up in the millions of gallons of ballast water needed to stabilize a ship and subsequently can be transported throughout the world.

In addition to bacteria and viruses, ballast water can also transfer a range of species of micro-algae, including toxic species that may form harmful algae blooms or 'red tides'. The public health impacts of such outbreaks are well documented and include paralytic shellfish poisoning, which can cause severe illness and death in humans.

Subsequent discharge of ballast water or sediment into the waters of port States may result in the establishment of harmful aquatic organisms and pathogens which may pose threats to indigenous human, animal, plant life and the marine environment. When all factors are favorable, an introduced species by survive to establish a reproductive population in the host environment, it may even become invasive, out-competing native species and multiplying into pest proportions. Although other media have been identified as being responsible for transferring organisms between geographically separated water bodies, ballast water discharge from ships appears to have been among the most prominent.

As a result IMO has developed guidelines for the development and implementation of a Ballast Water Management on board ships aiming to assist Governments, appropriate authorities, ships masters, operators, owners and port authorities, as well as other interested parties, in preventing, minimizing and ultimately eliminating the risk of introducing harmful aquatic organisms and pathogens form ships' ballast water and associated sediments while protecting ships' safety.

Good record keeping is critical to the success of a sound ballast water management program.

The appointed ballast water management officer is responsible for ensuring the maintenance of appropriate records and that ballast water management and/or treatment procedures are followed and recorded.

The function of the Ballast Water Management Plan is to assist in complying with IMO guidelines and quarantine measures intended to minimize the risk of transplanting harmful aquatic organisms and pathogens from ships' ballast water and associated sediments, while maintaining ship safety.

As part of this function the plan provides information to port state control and other authorized officers about a ship's ballast handling system, sampling points and ballast water management system.

1.1. PLANS

The following plans and tables, which are provided in section 8.6 below, illustrate the ballast water system arrangements and ship's capabilities and are to be used to assist the crew in understanding and following the Ballast Water Management Plan Ballast Tank arrangement.

1. General Arrangement,
2. Capacity Plan,
3. Plans and table listing indicating the location of sampling and access points in ballast water tanks,
4. Ballast water pump capacities.

1.2. DESCRIPTION OF THE BALLAST WATER SYSTEM

The following table lists the typical Loading Ballast Conditions as per vessel's approved Loading Manual as well as the tanks used for water ballast operations in each condition.

Typical Ballast Loading Conditions

Normal Ballast Condition
W.B.T. No. 1 (P & S)
W.B.T. No. 2 (P & S)
W.B.T. No. 3 (P & S)
W.B.T. No. 4 (P & S)
W.B.T. No. 5 (P & S)
W.B.T. No. 6 (P & S)
Aft Peak Tank

The vessel operates in SBT mode and all its wing tanks can be used for ballast. The Permanent Water Ballast Pumps (P.W.B.P.) number 1 and number 2 located at Aft Pump Room as well as the Permanent Water Ballast Pump number 3 located at Fwd

Pump Room are used for ballasting the vessel. The following tables list the pumps and tanks available for Ballast Water operations.

Pump	Rated Capacity (m3/hr)	Type	Location
No. 1 P.W.B.P.	1100	Centrifugal	Aft Pump Room
No. 2 P.W.B.P.	1100	Centrifugal	Aft Pump Room
No. 3 P.W.B.P.	200	Centrifugal	Fwd Pump Room

Tank	Location (Frame No.)	Capacity (m3)	Pumps available
Fore peak Tank	234-251	2572.6	PWBP Nos 1,2,3
W.B.T. No. 1 (P)	199-229	3140.3	PWBP Nos 1,2,3
W.B.T. No. 1 (S)	199-229	3361.6	PWBP Nos 1,2,3
W.B.T. No. 2 (P)	169-199	2012.5	PWBP Nos 1,2,3
W.B.T. No. 2 (S)	169-199	2233.8	PWBP Nos 1,2,3
W.B.T. No. 3 (P)	139-169	2017.8	PWBP Nos 1,2,3
W.B.T. No. 3 (S)	139-169	2239.1	PWBP Nos 1,2,3
W.B.T. No. 4 (P)	109-139	2017.8	PWBP Nos 1,2,3
W.B.T. No. 4 (S)	109-139	2276.9	PWBP Nos 1,2,3
W.B.T. No. 5 (P)	79-109	2015.3	PWBP Nos 1,2,3
W.B.T. No. 5 (S)	79-109	2236.6	PWBP Nos 1,2,3
W.B.T. No. 6 (P)	49-79	2066.5	PWBP Nos 1,2,3
W.B.T. No. 6 (S)	49-79	2186.3	PWBP Nos 1,2,3
Aft peak Tank	5-15	293.14	PWBP Nos 1,2,3

1.3. BALLAST WATER SAMPLING POINTS

Plans and table listing regarding the location of the ballast water sampling points is contained in section 8.6.

Compliance monitoring may be undertaken by authorized officers (e.g. Port State Control), by taking and analyzing ballast water and sediment samples from ships. There is unlikely to be any need for crew members to take samples except at the express request, and under the supervision of an authorized officer. Authorized officers must be advised of all safety procedures to be observed when entering enclosed spaces.

Where ballast water or sediment sampling for compliance or effectiveness monitoring is being undertaken, the time required to analyze the samples shall not be used as a basis for unduly delaying the operation movement or departure of the ship.

When sampling for research or compliance monitoring, authorized officers (e.g. Port State Control) should give as much notice to the Master as possible that sampling will occur, to assist him in planning staffing and operational resources accordingly.

The Master has a general obligation to provide reasonable assistance for the above monitoring and information pertaining to ballast arrangements and sampling points. Port State Authorities should indicate to the Master or responsible officer the purpose for which the sample is taken (i.e. monitoring, research or enforcement).

Port State Authorities may sample or require samples to analyze ballast water and sediment, before permitting a ship to discharge its ballast water.

CHAPTER 2: OPERATION OF THE BALLAST WATER MANAGEMENT SYSTEM

Pre-planning is necessary in order to ensure that the ballast exchange, ballast water treatment or other control options are in compliance with all safety considerations as addressed in Chapter 3 .

2.1. Ballast Water Exchange

Ballast water exchange in open water and the need for exchange should be carefully examined and prepared in advance, in a similar manner to the preparation of a cargo plan for a loaded voyage, and with the same degree of thoroughness**.**

The Convention requires that vessels should contact ballast water exchange:

- At least 200 nm from the nearest land and in water at least 200 m in depth; if this is not possible;
- As far from the nearest land as possible, and in all cases at least 50 nm from the nearest land and in water at least 200 m in depth;
- In sea areas designated by the Port State.

All local and/or national regulations should be taken in consideration as they may specify other depths and distances from land.

A ship will not be required to deviate from its intended voyage or delay the voyage in order to comply with any particular requirement at stated above. In addition if the master decides reasonably that an exchange would threaten the safety or stability of the ship, its crew or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition he is not required to comply with above paragraphs.

There are three methods of Ballast Water exchange which have been evaluated and accepted by the Organization. The three methods are the sequential method, the flow through method and the dilution method are considered as “pump through” methods.

2.2. Sequential Method

The ‘Sequential Method’ is a process by which a ballast tank intended for the carriage of ballast water is first emptied and then refilled with replacement ballast water to achieve at least a 95 per cent volumetric exchange.

In each tank, all of the ballast water should be discharged until section of the pumps is lost, and stripping pumps or eductors should be used if possible. This is to avoid a possible situation, where organisms are left in the bottom part of the tank, the tank is refilled with new water which may allow re-emergence of organisms.

The sequential method requires careful planning and monitoring by the ship's staff to mitigate risks to the ship in respect of:

- Longitudinal strength;
- Dynamic loads;
- Excessive trim;
- Bottom forward slamming;
- Propeller emergence;
- Intact stability;
- Bridge visibility.

A detailed step by step operational description of the ballast exchange sequence used is given in Section 7 which should be consulted prior, during and after the exchange in addition to the safety considerations in Section 6. At the same time ships staff should be taking account ship's position in relation to the land, navigational hazards, shipping density, current and forecast weather, machinery performance and degree of crew fatigue, before proceeding to the next pair of steps. If any factors are considered unfavourable the ballast exchange should be suspended or halted.

2.3. Flow through Method

Flow-through method is a process by which replacement ballast water is pumped into a ballast tank intended for the carriage of ballast water, allowing water to flow through overflow or other arrangements to achieve at least 95 per cent volumetric exchange of ballast water. Pumping through three times the volume of each ballast water tank usually shall be considered to meet the standard described above. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 per cent volumetric exchange is met.

The flow-through method has the advantage that it can be used in weather conditions which would be marginal for use of the sequential method, since there is little change to the condition of the ship and is relatively easy to follow by ships staff. However, the flow-through method introduces certain other risks and problems which must be considered before using this procedure. Refer also to Section 6, "Safety procedures for the ship and the crew".

The disadvantages are not that all tanks are designed with a head to the top of the overflow. Moreover, some tank configurations can be difficult to flush through effectively, in particular cellular double bottom spaces and peak tanks. There is a danger of over pressurization of tanks and there can be an accumulation of water on deck, which in sub zero temperature conditions make the method impractical and dangerous for crew. In addition pumps and piping will experience an increase in work load.

The above in addition to the safety aspects addressed in Section 6 should be carefully consulted and followed where applicable.

Where peak tanks are partially filled, the flow through method should be avoided unless any inadvertent exceeding of the design partial filling levels will not result in hull girder bending moments and shear forces exceeding the permissible values.

2.4. Dilution Method

Dilution method is a process by which replacement ballast water is filled through the top of the ballast tank intended for the carriage of the ballast water with simultaneous discharge from the bottom at the same flow rate and maintaining a constant level in the tank through out the ballast exchange operation to achieve at least 95 per cent volumetric exchange of ballast water.

Pumping through three times the volume of each ballast water tank usually shall be considered to meet the standard described above. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 per cent volumetric exchange is met.

Safety considerations addressed in Chapter 3 should be carefully consulted and followed as applicable.

2.5. Precautionary Practices

Minimizing uptake of harmful aquatic organisms, pathogens and sediments

When loading ballast, every effort should be made to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms. The uptake of ballast water should be minimized or, where practicable, avoided in areas and situations such as:

Areas identified by the port State in connection with advice relating to :

- areas with outbreaks, infestations or known populations of harmful organisms and pathogens;
- areas with current phytoplankton blooms (algal blooms, such as red tides);
- nearby sewage outfalls;
- nearby dredging operations;
- when a tidal stream is known to be more turbid;
- areas where tidal flushing is known to be poor;

- in darkness when bottom-dwelling organisms may rise up in the water column;
- in very shallow water;
- where propellers may stir up sediment.

If it is necessary to take on and discharged ballast water in the same port to facilitate safe cargo operations, care should be taken to avoid unnecessary discharge of ballast water that has been taken up in another port.

Minimize departure and arrival ballast quantities but always within the constraints of safe navigation.

Non-release or minimal release of ballast water

In cases where ballast exchange or other treatment options are not possible, ballast water may be retained in tanks or holds. Should this not be possible, the ship should only discharge the minimum essential amount of ballast water in accordance with port States' contingency strategies.

Discharge to reception facilities

If reception facilities for ballast water and/or sediments are provided by a Port State, they should, where appropriate, be utilized.

CHAPTER 3: SAFETY PROCEDURES FOR THE SHIP AND THE CREW

3.1. Exchange at Sea

The exchange of ballast water in open sea has to be distinguished from ballast operations carried out in ports or in sheltered waters. Ballast water operation at sea has the potential to be more hazardous than ballast water operations carried out in port.

A decision should be made at the completion of each sequence, taking account factors such as the ship's position, weather forecast, machinery performance, stability, strength, degree of crew fatigue, before proceeding to the next sequence. If any factors are considered unfavourable the ballast exchange a decision should be made if exchange operations should be suspended until conditions become more favourable or halted.

Contingency procedures for situations which may affect ballast water exchange at sea, including deteriorating weather conditions, pump failure and loss of power; time to complete the ballast water exchange for each tank or an appropriate sequence thereof; continual monitoring of the ballast water operation; monitoring should include pumps, levels in tanks, line and pump pressures, stability and stresses;

3.2. Safety considerations

Ballast water exchange has a number of safety considerations which include but are not limited to:

- avoidance of over and under-pressurization of ballast tanks;
- sloshing loads in tanks that may be slack at any one time
- maintain adequate intact stability in accordance with an approved trim and stability booklet taking into account the free surface effects on stability;
- permissible seagoing strength limits of shear forces and bending moments in accordance with an approved loading manual;
- torsional forces;
- forward and aft draughts and trim, with particular reference to bridge visibility;
- propeller immersion;
- minimum forward draft;
- wave-induced hull vibrations when performing ballast water exchange;
- watertight closures (e.g. manholes) which may have to be opened during ballast exchange must be re-secured; crew safety is paramount during this operation. Provision of discharging pipe head on the manhole cover is suggested;

- maximum pumping/flow rates – to ensure the tank is not subjected to a pressure grater than that for which it has been designed
- internal transfers of ballast;
- admissible weather conditions;
- weather routing in areas seasonably affected by cyclones, typhoons, hurricanes, or heavy icing conditions;
- System failure which in open sea may have larger consequences than in harbor. Increased use of the ballast system may result in earlier wear-out of components than normal (vents, valves, pumps, etc.) therefore extra attention to the maintenance of the various components is suggested.

3.2.1. Sequential Method

- Hull girder damage due to insufficient longitudinal strength;
- Adverse effects on ship's stability due to free surface effects resulting in a reduction of ship's GM while emptying ballast water tanks or holds originally in a filled or partially filled condition in order to achieve exchange;
- Structural damage to ship bottom forward caused by insufficient forward draught;
- Impairment of maneuverability and/or ability to make headway; caused by insufficient after draught, as a result of emptying after ballast water tanks or holds originally in a filled condition or filling partially filled forward water ballast tanks in order to achieve exchange;
- Reduction of bridge visibility forward caused by insufficient forward draught, as a result of emptying forward ballast water tanks or holds originally in a filled condition or filling partially filled aft water ballast tanks in order to achieve exchange;
- Structural damage to topside and hopper side tanks caused by inertia loading, as a result of a full ballast hold with empty adjacent wing tanks;
- Structural damage to partially filled ballast water tanks or holds caused by sloshing as a result of resonance with ship motion.

3.2.2. Flow through Method

- Accumulation of water on decks which can cause a safety hazards to crew working on deck. (Effects on the stability may be negligible.)

3.2.3. Dilution Method

- Under pressurization or over pressurization damage of ballast water tanks caused by blockages in air pipes or using excessive pumping rates relative to the design of the ballast system.

3.3. Conditions under which ballast water exchange at sea should not be undertaken

These circumstances may result from critical situations of an exceptional nature or *force majeure* due to stress of weather, known equipment failures or defects, or any other circumstances in which human life or safety of the ship is threatened.

Ballast water exchange at sea should be avoided in freezing weather conditions.

However, when it is deemed absolutely necessary, particular attention should be paid to the hazards associated with the freezing of overboard discharge arrangements, air pipes, ballast system valves together with their means of control, and the build up of ice on deck.

Consideration must always be given to personnel safety, including precautions which may be required when personnel are required to work on deck at night, in heavy weather, when ballast water overflows the deck, and in freezing conditions. These concerns may be related to the risks to the personnel of falling and injury, due to the slippery wet surface of the deck plate, when water is overflowing on the deck, and to the direct contact with the ballast water, in terms of occupational health and safety. The vessels ISM system requirements and specifically health and safety requirements to be observed at all times.

3.4. Precautionary Advice to Masters When Undertaking Ballast Water Exchange Operations

Masters should take all necessary precautions when undertaking Ballast Water Exchange sequences that involve periods when the criteria for propeller immersion, minimum forward draft and bridge visibility cannot be met:

1. During ballast water exchange sequences there may be times when, for a transitory period, one or more of the following criteria cannot be fully met or are found to be difficult to maintain :

    - bridge visibility standards (SOLAS V/22);
    - propeller immersion;
    - minimum draft forward;
    - emergency fire pump suction.

2. In planning a Ballast Water Exchange operation that includes sequences which involve periods when the criteria for propeller immersion, minimum draft and or trim are not met, the following should be taken into consideration :

    - the duration(s) and time(s) during the operation that any of the criteria will not be met;

- the effect(s) on the navigational and maneuvering capabilities of the ship;
- the time to complete the operation.

3. A decision to proceed with the operation should only be taken when it is anticipated that :

    - the ship will be in open water;
    - the traffic density will be low;
    - an enhanced navigational watch will be maintained including if necessary an additional look out forward with adequate communications with the navigation bridge;
    - the maneuverability of the vessel will not be unduly impaired by the draft and trim and or propeller immersion during the transitory period;
    - the general weather and sea state conditions will be suitable and unlikely to deteriorate.

CHAPTER 4: DESCRIPTION OF THE METHOD(S) USED ON BOARD FOR BALLAST WATER MANAGEMENT AND SEDIMENT CONTROL

A ballast plan for a ballast voyage should be prepared in advance, in a similar manner to the preparation of a cargo plan for a loaded voyage, and with the same degree of thoroughness. This pre-planning is necessary in order to maintain safety in case compliance with ballast exchange or other ballast water treatment or control options is required.

The safety information in Section 6 should be taken into account when preparing the voyage plan.

Additionally, operational limits defined for specific ballast exchange conditions must be adhered to during operation. Therefore, it is considered imperative to plan for and find the appropriate weather window to conduct safe ballast exchange operations.

Ballast exchange operations are complex procedures and may last from several hours to days. All personnel engaged in ballast exchange should be trained to respond to routine and emergency procedures.

It should always be considered that while performing a ballast exchange at sea, failure of power system or any part of ballast pumping and piping system can take place. Such incidents should be brought immediately to the attention of the Company's Safety Officer and emergency procedures should be activated to bring the ship back to her ballast seagoing condition as soon as possible. Such emergency procedures could be ballasting by gravity and even utilization of the general service pump.

4.1. Sequential method

The following describe a safe sequence for the exchange of ballast water using the empty-then-refill procedure, known as the sequential method. The process requires the removal of very large weights from the ship in a dynamic situation, and then their replacement. This is a new procedure, and a sense of familiarity with the mechanics of ballasting in port should not be allowed to induce complacency.

The sample table below indicates the status of the ballast water in every tank used at the start of each step, and indicates the weight of fuel and domestic drinking water aft of the engine room bulkhead, estimated draughts, bending moments and shear forces at the time of the exchange. The action to be taken and tanks involved in each step are then specified.

It will be noted that the original condition is restored after each pair of steps. A positive decision should be made at that time, taking account of the ship's position, weather forecast, machinery performance and degree of crew fatigue, before proceeding to the next pair of steps. If any factors are considered unfavourable the ballast exchange should be suspended or halted.

Heeling effects due to asymmetrical emptying or filling be taken into account so that all steps represent upright conditions. Actual operations must be managed so that listing does not develop during pumping. The steps in the table meet trim and draught requirements of propeller and rudder immersion, to avoid any possibility of slamming while changing ballast, and to maintain the bridge visibility within tolerable limits. If not, a suitable warning should be issued in order to enable the Master to exercise suitable caution.

It is as important to avoid under-pressure in a tank due to emptying, as it is to avoid overpressure when filling. The consequences of bulkhead damage, or even tank collapse, at sea will be even more significant than in port. Each step is checked for conformity with strength and stress limitations. Checks are made that the minimum intact stability requirements of the ship are met at every stage, and that the allowable limits of bending moments are not exceeded. Each step shall therefore be safe for the ship at sea in fair weather. The Ballast Exchange Plans developed in this manual are presented in Chapter 8 .

4.2. Flow through method

The flow-through method, whereby tanks are overfilled by pumping in additional water, has the advantage that it can be used in weather conditions which would be marginal for use of the sequential method, since there is little change to the condition of the ship. It is also used in cases where the sequential method presents structural dangers to the vessel as regard to the shear forces and bending moments developed during the operation. However, the flow-through method introduces certain other risks and problems which must be considered before using this procedure. Refer also to Section 6.

Half of the additional costs of a ballast system designed for flow-through exchange arises from the distribution pipe work in the tank. Currently studies are in progress to examine in greater detail the flow regime in the tank, in order to optimize the amount and layout of the internal pipe work[4].

If the flow through method is used, caution should be exercised, as:

- Air pipes are not designed for continuous water flow;
- Current research indicates that pumping of at least three volumes of the tank capacity could be needed to be effective, when filling with clean water from the bottom and overflowing from the top;
- Certain watertight and weather tight closures (e.g. manholes) which may be opened during ballast exchange should be re-secured.

[4] Holdo, A.E. Rose, A. Armstrong, 1999. An analysis of Flow-Through Ballast Water Exchange, *Transimare* Vol. 111 Pt 2.

4.2.1. Additional Safety issues related to the Flow-Through Method

The parameters used when the ship is designed always take account of storm conditions and the water on deck which results. Therefore, even at maximum pumping rates, any accumulation of water on deck will be insufficient to affect stability.

Research has established that it is necessary to pump in three times the volume of the tank to achieve a 95% change of water. For the record, pumping in only once the volume of the tank produces a 63% exchange; twice the volume produces 86% exchange, while four times the volume produces a 98% water exchange.

A step by step procedure should be followed, listing the order in which tanks are to be processed. After each step, a positive decision should be made, taking into account the ship's position, weather forecast, machinery performance and degree of crew fatigue, before proceeding to the next step. If any factors are considered unfavourable the ballast exchange should be suspended or halted. Ballast exchange by the floe through method is not permitted in freezing conditions. (See also paragraph 6.3. above).

The size of the tank exit must permit a flow rate in excess of the pump capacity, in order to avoid over-pressurization of a tank, which can lead to structural damage. The recommended tank outflow should be 200% of the pumping capacity. Further more and although classification society rules generally specify that air pipes from tank are sized to allow an outflow equal to 125% of pumping capacity, on existing ships they are not intended to be used for continuous water flow.

Tank covers or other openings to be used should be specified. Opening of tank covers or manholes, though it is a normal practice for seamen in fine weather may nevertheless, compromise the integrity of the main deck. The authority as well as the responsibility for this, rests with the Master, and prudent seamanship will ensure a procedure for conforming they are closed after work is completed.

Only centrifugal ballast pumps should be used to avoid pulsing pressure. Large quantities of water cascading onto weather deck will impose serious safety risks and habitability degradation on crew members going about their other business. There will be increase in corrosion of deck plating and fittings, aggravated by interruption of routine maintenance. As a general rule, it will be unsuitable for double bottom tanks to be overflowed, onto the upper deck because the head of water will cause excess internal pressure, and the air pipes fitted are not intended to be used for continuous water flow. Ballast in double bottom tanks should be exchanged by sequential method.

CHAPTER 5: PROCEDURE FOR THE DISPOSAL OF SEDIMENTS

Where practicable, routine cleaning of the ballast tank to remove the sediments should be carried out in mid-ocean or under controlled arrangements in port or dry dock.

When sediment has accumulated consideration should be given to flushing tank bottoms and other surfaces when suitable areas, i.e. outside 200 nautical miles from land and in water depths of over 200 meters. The volume of sediment in a ballast tank should be monitored on a regular basis.

Sediment in ballast tanks should be removed in a timely basis and as found necessary always taking into account safety and operational considerations addressed in this manual. The frequency and timing of removal will also depend on factors such as sediment build up, ship's trading pattern, availability of reception facilities, work load of the ship's personnel and safety considerations.

Removal of sediment from ballast tank should preferably be undertaken under controlled conditions in port, at a repair facility or in dry dock. The removed sediment should preferably be disposed of in a sediment reception facility if available.

Flushing by using water movement within a tank to bring sediment into suspension, will only remove a part of the mud, depending on the configuration of an individual tank and its piping arrangement. Removal may be more appropriate on a routine basis during scheduled dry dockings. This is often needed for other reasons anyway. However, flushing at sea may be a useful tool on some occasions such as when a ship changes its trading area.

When sediment is removed from the ship's ballast tanks and is to be disposed of by that ship at sea, such disposal should only take place in areas outside 200 nautical miles from land and in water depths of over 200 meters.

A significant impediment in achieving adequate exchange and removal of sediment is of course the structural stiffening in the ballast tank itself. It would therefore be very beneficial if the structure could be simplified to provide an interrupted surface. Fortunately this possibility now exists due to the development of a sandwich plate construction by the Canadian Company Intelligent Engineering, in which a stiffened plate is formed by a metal-elastomer-metal sandwich. The use of this construction method in shipbuilding is approved by major Classification Societies and its application to ballast tanks looks very promising[5].

[5] Lloyd's Register 2000. *A New Concept For A New Age – The Sandwich Plate System for Shipbuilding.* Marine Bulletin Special Report.

CHAPTER 6: METHODS OF COMMUNICATION

This section contains information to assist the Master in the procedures for coordinating the discharge of ballast water of a Coastal State, Local Government or other involved parties.

The quick and effective communication between the ship and the Coastal State or other involved parties becomes vital in mitigating the effects of an unnecessary delay for ships seeking entry to Port States.

The requirements and roles of the various national and local authorities involved vary widely from state to state and even from port to port. Approaches to the responsibility for ballast water exchange also vary. In majority of coastal states responsibility for compliance with port state requirements is placed on the ship owner and the ship.

THE COASTAL STATE SHOULD BE CONTACTED FOR SPECIFIC BALLAST WATER DISCHARGE REQUIREMENT AND REPORTING PRIOR TO VESSEL'S ARRIVAL IN PORT STATES TERRITORIAL WATERS.

Therefore the Master with the responsible officer should timely obtain all necessary information and prepare the vessel accordingly, taking into consideration the safety and operational restrictions as described in this plan. Information on specific port state procedures can be obtained either by referring to Appendix 6 of this plan, consulting the company and/or local agent for latest information/requirements.

6.1. Action to be taken by the vessel where coastal state has specific procedures for discharge of ballast water:

- Contact ship's agent to ascertain the latest information/requirements on ballast discharge in the water of respective state; (refer to Appendix 6 for information also – update as necessary if information received is newer than the one contained in Appendix 6)
- Advise/communicate with the company and request any other information they might hold on ballast water discharge;
- Follow agreed reporting procedures;
- Use local port forms (if any) in replacement to forms contained in Appendix 5 and follow instructions as per Section 12 for additional forms required by this Plan;
- Ensure that you timely plan for all above actions and that safety and operational restrictions are consulted;
- Keep proper records and have them readily available for possible inspection.

6.2. Action to be taken by the vessel where coastal state has no specific procedures for discharge of ballast water:

- Contact ship's agent and/or company to obtain latest information on the discharge requirements at port state territory; (update in Appendix 6 if new requirements have been placed in force.)
- Advise/communicate with the company and request any other information they might hold on ballast water discharge;
- If no specific forms are required use forms as per instructions in Chapter 7 and Appendix 5;
- Carry out discharge of ballast water as per water ballast exchange plan calculated sequence;
- Ensure that you timely plan for all above actions and that safety and operational restrictions are consulted;
- Keep proper records and have them readily available for possible inspection.

6.3. CREW TRAINING AND FAMILIARIZATION

It is imperative priority to ensure that all Master, ship's officers and crew have an understanding of the need for ballast water management through proper training. If crew members understand the reasons for the exchange or treatment of ballast water and associated sediments, they are more likely to ensure that it is carried out effectively and efficiently.

Owners, managers, operators and other personnel involved in officer and crew training for ballast water management should consider the recommendations mentioned below.

Training for ship's masters and crews as appropriate should include instructions on the requirements of the convention, the ballast water and sediment management procedures and the ballast water records, having due regard to matters of ship safety, maintenance of records and reporting requirements, in accordance with the information contained in the IMO convention.

The Master and Ballast Water Management Officer should ensure that the personnel assigned key responsibilities in any ballast exchange procedures are suitable and well trained. Special attention should be given to the safety aspects related with the relevant procedures.

Ship's officers and ratings engaged in ballast water exchange at sea must be aware of what is expected of them and why they should be trained in and familiarized with the following :

- Ship's pumping arrangements including ballast arrangements;
- Locations of air and sounding pipes of all ballast tanks;
- Position of all ballast tank suctions and pipelines;
- Location and suitable access points for sampling points;
- Overboard discharge arrangements and openings for release of water on deck;
- Inspection and maintenance for ensuring that sounding pipes are clear and non-return devices and air pipes are in good order;
- Requirements of Ballast Water Management;

- Times and circumstances required to undertake the various ballast water exchange operations;
- Methods used for ballast water exchange at sea used, the related safety precautions and associated hazards;
- General safety considerations and safety aspects associated with the particular systems and procedures used onboard the ship which affect the safety or human health of crew and the safety of the ship;
- Method of on-board ballast water record keeping, reporting and recording of routine soundings;
- Precautions for entering tanks for sediment removal, safe handling and packaging and storage of sediment;

A Training Record form is provided for this purpose in Appendix 5. This form may be substituted by the vessel's ISM System training forms as applicable.

6.4. DUTIES OF APPOINTED BALLAST WATER MANAGEMENT OFFICER

The Appointed Ballast Water management Officer is the Chief Officer.

Duties of the appointed officer in charge of ballast water management include the following:

- Ensure that the ballast water management and/or treatment procedures are followed and recorded;
- Where ballast exchange is required, follow the applicable Ballast Exchange Sequence, or develop a new sequence on the basis of ship's assessment criteria, condition of hull, equipment and weather forecast;
- Ensure adequate and enough personnel and equipment are available for the execution of the Ballast Exchange Sequence and/or treatment;
- Ensure that the steps/sequences are followed in the prepared order;
- Inform the shore management on commencement/interruption/completion of ballast water exchange, using the Notification Form;
- Maintain the Ballast Water Record Book and all other relevant/applicable documentation;
- Prepare the appropriate national or port Ballast Water Declaration Form prior to arrival at destination;
- Assist the port state control or quarantine officers for any sampling that may need to be undertaken;
- Undertake familiarization and training of crew in ballast water management requirements and applicable shipboard systems and procedures;
- Other duties specified by the Company.

The Master must ensure that the Ballast Water Management Plan is clearly understood by the appointed Officer and by any other ships staff that may be involved.

Delay in ports may be avoided, if a proper ballast water management routine can be documented to the port authorities[6]

The duty Officer must keep the Master advised on the progress of the plan from time to time. Should there be any doubt, or if the management plan does not keep to the schedule, the Master shall be advised accordingly.

Additionally, the appointed Duty Officer shall inform the Chief Officer (if different) when commencing/stopping Ballast Operation at each stage.

[6] Det Norske Veritas, 2009. *Marine Consulting – Ballast Water Management and risks generated.*

CHAPTER 7: RECORDING REQUIREMENTS

The ballast water management officer is to ensure that the ballast water record book and any other necessary documentation/forms are completed and kept up-to-date.

Ballast Water Record Book

The Ballast Water Record Book may be an electronic record system or it may be integrated into another record book or system and which shall at least contain the information as specified in Appendix 5 and as per the convention requirement.

The Ballast Water Record Book and relevant documentation is to be maintained on board for a minimum of two years in order to provide port state control or other authorized officers with information they may require concerning the ballast water on board the ship. Thereafter the manual should be maintained in the company's control for a minimum period of 3 years.

All appropriate forms are provided in Appendix 5 and are described below.

7.1. Ballast Water Reporting Form

The Ballast Water Reporting Form, is to be used when reporting ballast water management to national or local authorities that request such information in advance. Guidance for completing the form is also included in the pages following the form. Before this general form is completed, the appointed ballast water management officer should ensure that the appropriate form required by the country or port of call (if any) is used.

7.2. Ballast Water Handling Log

The Ballast Water Handling Log is to be maintained in order to provide quarantine officers with historical information they may require concerning the source of the ballast water on board the ship.

7.3. Sediment Removal and Tank Flushing Log

The Sediment Removal and Tank Flushing Log is to be maintained in order to provide quarantine officers with historical information they may require concerning sediment removal and tank flushing.

7.4. Ballast Exchange Notification Form

The Ballast Exchange Notification Form is to be used to notify shore management of ballast exchange prior to arrival at destination.

7.5. Ballast Exchange Plan

The Ballast Exchange Plan is to be prepared taking into account the relevant assessment criteria, condition of hull and equipment. The shore management is to be advised accordingly.

We will give following simple way of ballast water management summary[7] reported to Authorities enabling the reader to understand all the required details (see also Appendix 6):

COLUMN A – Ballast Water tanks / cargo holds
Tank: List all ballast tanks (including cargo holds used for ballast water) on board.
Full Capacity: Record the maximum capacity of every tank in cubic meters.

COLUMN B – Ballast Water source
BW uptake: Record the port where ballast water was taken up for the voyage. If ballast water was taken up at sea, please record the location using latitude and longitude coordinates.
Uptake Date: Record the dates of ballast water uptakes (please use DD/MM/YY).
Volume of BW taken up: Record the relevant volume, in cubic meters, of ballast water taken up at the place / date / time in question.

COLUMN C – Exchange
Pump Identification: Identify pumps for ballasting and state CURRENT, measured delivery rate – the amount of water per hour that the pumps currently deliver (from experience / measurement). This is not the same as the rated capacity of the new pumps.
Exchange Location: Record start and end locations of deep sea ballast water exchange for each tank in Lat / Long coordinates.
Exchange Date / Time: Record start and end date and time for each tank.
List the Pumps Used: Record which pump(s) was used to exchange each tank.
Empty / Refill Only: Residual volume when empty (m3) – When using the empty refill method (sequential) – record what volume was left in the tank at the end of the emptying cycle before refilling the tank – resultant mix of ballast water in each tank must contain no more than 5% of high risk water.
Flow-Through / Dilution: Volume pumped (m3) - When using the flow-through or dilution method, record the volume of water pumped (Measured Capacity of pumps used for exchange x Hours of pumping).
Percentage Exchanged: Record the percentage of the tank's FULL capacity that was exchanged at sea. The percentage must be at least 95% in the case of Empty / Refill (sequential) method exchanges and at least 300% in the case of Flow-Through or Dilution method exchanges.

[7] Australian Quarantine and Inspection Service. *Guide to completing the Ballast Water Management Summary.*

CHAPTER 8: ASSESSMENT CRITERIA FOR SEQUENTIAL METHOD AND DEFINITION OF SEA STATE ACCORDING TO W.M.O.

8.1. Assessment criteria for Sequential Method

- Longitudinal Strength
- Stability
- Minimum Draught Forward
- Propeller Immersion
- Bridge Visibility Forward
- Sloshing (where applicable)

8.1.1. Longitudinal Strength

The longitudinal strength criteria and results are shown in each Ballast Exchange Plan as applicable from Ship's approved Loading Manual / Loadicator. Extracts from the approved loading manual are included at the end of this Appendix.

8.1.2. Stability

The Trim and Stability results and criteria are shown in each Ballast Exchange Plan as applicable from Ship's approved Trim and Stability Manual Loadicator. Extracts from the Trim and Stability manual are included at the end of this Appendix.

8.1.3. Minimum Draught Forward

Minimum Draught Forward **Tfb: 7.81 (m)**

For steps / sequences where this criterion is not satisfied, it is recommended that the operation is carried out in calm seas, unless an acceptable sea state has been defined (see also paragraph 6.4).

8.1.4. Propeller Immersion

Propeller shaft above baseline **H: 4.500 (mm)**
Propeller diameter **Dp: 7.600 (mm)**

Propeller immersion is defined as the I/D where
I = distance from propeller centerline to the waterline
D = Propeller diameter

For steps / sequences where the propeller immersion is not satisfied, i.e. less than 50%, the Master is advised that the propeller will not be fully immersed (see also paragraph 6.4).

8.1.5. Bridge Visibility Forward

As an indication of bridge visibility, the view of the sea surface forward of the bow from the conning position is to be not more than two ship lengths or 500m whichever is less. It is recognized that not all ships in service comply with SOLAS 1974, Chapter V Safety of Navigation, Regulation 22, Navigation Bridge Visibility. In such cases, ships in service are expected to comply in respect of forward view and blind sectors, in so far as is practicable without structural alteration being required.

Length between perpendiculars Lpp = 223.00 (m)
Height of conning position Dc = 35.20 (m)
Height of position 'S' Ds = 23.80 (m)
Horizontal distance from conning position to position 'S' KcKs = 192.85 (m)
Horizontal distance from Fp to position 'S' KfKs = 1.80 (m)

Note: Where there are containers or other cargo on deck, the position 'S' should be considered in respect of worst visibility. If the position 'S' is aft of the fore perpendicular, then KfKs is to be taken as a negative value.

The Bridge forward visibility criterion for the various steps of a ballast exchange is as follows:

$$\frac{\sin(90-\varphi-\theta)}{\sin\varphi}(D_s - T_f + K_f K_s)\frac{T_a - T_f}{L_{pp}} \leq 2L_{oa}$$

For steps / sequences where bridge visibility forward criterion is not satisfied, the Master is advised that bridge visibility forward will be reduced. These steps / sequences are to be carried out in daylight hours only and lookouts are to be posted forward, in radio communication with the bridge.

8.1.6. Sloshing (where applicable)

The use of the sequential method will result in partial fillings of ballast tanks or holds which, when contemplated for sea-going conditions, could pose a risk of significant loads due to sloshing induced by the ship motions. Sloshing studies carried out indicated that the following cases should not pose a sloshing risk:

- Fore peak tank filled with a centerline wash bulkhead or a centerline ring structure or horizontal ring structures
- Wing ballast tanks of single skin oil tankers fitted with transverse ring web structures

According to a three-star rating system issued by PWSRCAC[8], sequential method has following ratings for major criteria:

[8] Prince William Sound Regional Citizens' Advisory Council.

- § Safety, one star rating: catastrophic risk potential for vessel failure or loss of human life
- § Environmental, three stars rating: technology removes invasive species and has no negative impact on the environment
- § Efficacy, three stars rating: very effective in treating a wide variety of invasive species and is readily available
- § Cost, three stars rating: technology well established and proven cost effective
- § Practicality, three stars rating: little or no impact on current operations

8.2.Sea States according to W.M.O.

Sea State Code	Description	Range of significant wave height (meters)
0	Calm (glassy)	0
1	Calm (rippled)	0 – 0.1
2	Smooth (wavelets)	0.1 – 0.5
3	Slight	0.5 – 1.25
4	Moderate	1.25 – 2.5
5	Rough	2.5 – 4.0
6	Very Rough	4.0 – 6.0
7	High	6.0 – 9.0
8	Very High	9.0 – 14.0
9	Phenomenal	Over 14.0

8.3. List of Ballast Exchange Plans

No.	Description of Conditions	Condition number from approved manual, upon which the plan is based	Methods of Ballast exchange examined
1	Ballast Condition	Condition no. 3	Combined method

The results of the calculations against relevant criteria described in Appendix 1 are included herein for each step of the Ballast Exchange Plans listed above.

8.3.List of possible Ballast Exchange methods for each Ballast Tank

Ballast Tank	Frame No.	Capacity (m3)	Applicable Methods for Ballast Exchange	Remarks
Forepeak Tank	234-251	2572.6	Sequential	

W.B.T. 1 (P)	199-229	3140.3	Sequential or Flow Through	See note 1
W.B.T. 1 (S)	199-229	3361.6	Sequential or Flow Through	See note 1
W.B.T. 2 (P)	169-199	2012.5	Sequential or Flow Through	See note 1
W.B.T. 2 (S)	169-199	2233.8	Sequential or Flow Through	See note 1
W.B.T. 3 (P)	139-169	2017.8	Sequential or Flow Through	See note 1
W.B.T. 3 (S)	139-169	2239.1	Sequential or Flow Through	See note 1
W.B.T. 4 (P)	109-139	2017.8	Sequential or Flow Through	See note 1
W.B.T. 4 (S)	109-139	2276.9	Sequential or Flow Through	See note 1
W.B.T. 5 (P)	79-109	2015.3	Sequential or Flow Through	See note 1
W.B.T. 5 (S)	79-109	2236.6	Sequential or Flow Through	See note 1
W.B.T. 6 (P)	49-79	2066.5	Sequential or Flow Through	See note 1
W.B.T. 6 (S)	49-79	2186.3	Sequential or Flow Through	See note 1
Aft peak Tank	-5 - 15	293.14	Sequential	

Note 1: The method to be used shall be decided depending on the results of the particular loading condition.

8.5. Time Table for Flow Through Method

Ballast Tank	**Frame No.**	**Capacity (m3)**	**Pumps**	**Time for 3 exchanges (hrs)**
W.B.T. 1 (P)	199-229	3140.3	Ballast pump no. 1 or 2	8.56
W.B.T. 1 (S)	199-229	3361.6	Ballast pump no. 1 or 2	9.17
W.B.T. 2 (P)	169-199	2012.5	Ballast pump no. 1 or 2	5.49
W.B.T. 2 (S)	169-199	2233.8	Ballast pump no. 1 or 2	6.09
W.B.T. 3 (P)	139-169	2017.8	Ballast pump no. 1 or 2	5.50
W.B.T. 3 (S)	139-169	2239.1	Ballast pump no. 1 or 2	6.11
W.B.T. 4 (P)	109-139	2017.8	Ballast pump no. 1 or 2	5.50

W.B.T. 4 (S)	109-139	2276.9	Ballast pump no. 1 or 2	6.21
W.B.T. 5 (P)	79-109	2015.3	Ballast pump no. 1 or 2	5.50
W.B.T. 5 (S)	79-109	2236.6	Ballast pump no. 1 or 2	6.10
W.B.T. 6 (P)	49-79	2066.5	Ballast pump no. 1 or 2	5.64
W.B.T. 6 (S)	49-79	2186.3	Ballast pump no. 1 or 2	5.96

8.6. SHIP'S PLANS

1. **General Arrangement**
2. **Capacity Plan**
3. **Ballast Water Sampling Points Plans and Table Listing**

List of Ballast Water Sampling Points

Ballast Tank	Frame No.	Location of sampling point	Type of sampling point
No 1 W.B.T. (P&S)	199-229	Between Frame No. 226-227 (P&S)	Manhole
No 1 W.B.T. (P&S)	199-229	Between Frame No. 209-210 (P&S)	Manhole
No 2 W.B.T. (P&S)	169-199	Between Frame No. 194-195 (P&S)	Manhole
No 2 W.B.T. (P&S)	169-199	Between Frame No. 171-172 (P&S)	Manhole
No 3 W.B.T. (P&S)	139-169	Between Frame No. 164-165 (P&S)	Manhole
No 3 W.B.T. (P&S)	139-169	Between Frame No. 142-143 (P&S)	Manhole
No 4 W.B.T. (P&S)	109-139	Between Frame No. 135-136 (P&S)	Manhole
No 4 W.B.T. (P&S)	109-139	Between Frame No. 112-113 (P&S)	Manhole
No 5 W.B.T. (P&S)	79-109	Between Frame No. 104-105 (P&S)	Manhole
No 5 W.B.T. (P&S)	79-109	Between Frame No. 82-83 (P&S)	Manhole
No 6 W.B.T. (P&S)	49-79	Between Frame No. 74-75 (P&S)	Manhole
No 6 W.B.T. (P&S)	49-79	Between Frame No. 52-53 (P&S)	Manhole

CHAPTER 9: RESULTS FROM LOADING MANUAL

The most basic step of our Plan is to confirm that ship's trim, stresses, draught, stability, list will not be affected by the ballast exchange methods that we described above.

In order to confirm that ship will not be affected, we have to make some calculation reports by using ship's Loading Manual.

Our results that are shown in the following pages can be categorized into following:

- Initial Condition
- Step 1
- Step 2
- Step 3
- Step 4
- Steps 5-16

In each step, firstly we enter the weights of solids, cargo, ballast, fuel & miscellaneous. Obviously, weight of solids and cargo is considered to be zero because our calculations are based on ballast exchange procedure. Weight of fuel is 1588.369 tons and weight of miscellaneous items is 405.594. Therefore, the only weight that is changed step by step is the weight of ballast water.

Based on the results of the Loading Manual, we can check with the safety limits given if Trim, List & Draught calculated are sufficient to ensure ship's safe navigation.

Another basic calculation is the maximum bending moment (specified for each step between which groups of frames will be faced) and the maximum shear force (specified for each step in which frame will be faced).

Regarding the stability of the ship, we can note the changes of the Vertical Center Gravity (VCG), the Transverse Center Gravity (TCG) and the Longitudinal Center Gravity (LCG) for each tank (Ballast Tanks, Fuel Tanks & Miscellaneous Tanks).

For all the steps that we follow, we confirm that ship's trim, stresses, draught, stability, list will not be affected by the ballast exchange methods that we follow.

After following all the steps, we take results as listed in the following pages and we can note that maximum shear force for all steps is reported at frame no. 199 (exactly between Water Ballast Tanks no. 1 & 2). Maximum bending moment for all steps will be faced between frames no. 124 & 109, except step 1 where maximum bending moment will be faced between frames no. 169 & 154.
For all steps, ship's GM (liquid) is calculated above minimum limits, i.e. 0.200 m.

One of the series of trials conducted was to examine the process of ballast water exchange. Methylene blue dye can be added directly to the tank through three sampling tubes and a period of approximately 20 hrs shall be allowed for dispersion[9].

[9] Rigby G. & Hallegraeff G. 1994. *The Transfer and Control of Harmful Marine Organisms in Shipping Ballast Water.*

INITIAL CONDITION

LOAD CALCULATOR REPORT

N/T TAXIARCHIS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights		Result (Ton (Air))	
Solids	:	0.000	
Cargo	:	0.000	
Ballast	:	28882.459	
Combined	:	0.000	
Fuel	:	1588.369	
Misc.	:	405.594	
DeadWeight	:	30876.422	
LightWeight	:	17539.000	
Displacement	:	48415.422	
Gravity Centres		**Result (m)**	**Limit (Min.)**
KG Solid	:	10.065	
KG Adjustment	:	0.055	
KG Total	:	10.119	
KG Maximum	:	14.196	
KG Margin	:	4.076	
KM	:	14.259	
GM Solid	:	4.195	
GM Liquid	:	4.140	0.150
Calculated TRIM/LIST/DRAFT		**Result**	**Limit**
Trim Aft (-0.5 deg)	:	-1.933 m	5.000 m
Longitudinal Moment	:	184337.7 Ton m	
List Port (-0.3 deg)	:	-0.173 m	2.000 m
Transverse Moment	:	-982.9 Ton m	
Draft Fore	:	7.148 m	
Draft Mid Port	:	8.201 m	
Draft Mid	:	8.115 m	15.730 m
Draft Mid Starboard	:	8.028 m	
Draft Aft	:	9.081 m	
Seawater Density	:	1.0250 T/m^3(Air)	

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

GZ			Result	Limit (Min.)
Area	0-30	:	37.17 mDeg	3.15 mDeg
Area	30-40	:	32.07 mDeg	1.72 mDeg
Area	0-40	:	69.24 mDeg	5.16 mDeg
Maximum GZ = 4.015 m		:	52.6 deg	25.0 deg
GZ at 30.0 deg		:	2.760 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	287.330	642.4	4.0	0.6	5.6	0.6
214	2062.179	19088.9	11.2	12.4	12.6	15.3
199	2802.710	55819.2	15.3	28.8	17.2	37.4
184	2323.177	92658.1	12.7	39.7	14.2	53.3
169	1994.753	123619.0	10.9	47.7	12.2	65.2
154	1393.136	147814.0	7.6	57.1	8.5	78.0
139	915.962	164160.7	5.0	63.4	5.6	86.6
124	236.374	172092.0	1.3	66.5	1.4	90.8
109	-403.898	170421.3	-2.2	65.8	-2.5	89.9
94	-1221.471	158144.7	-6.7	61.1	-7.5	83.4
79	-1952.555	134601.7	-10.6	53.9	-12.0	73.1
64	-2361.506	102232.3	-12.9	48.6	-14.5	64.1
49	-2759.700	63370.5	-23.3	37.2	-28.5	47.0

Maximum Bending Moment between frame 124 and 109 = 172602.2 Ton m

Maximum Shear Force at frame 199 = 2802.710 Ton

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length=m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	2.760	GZ[60.0] =	3.874
GZ[1.0] =	0.067	GZ[31.0] =	2.861	GZ[61.0] =	3.834
GZ[2.0] =	0.135	GZ[32.0] =	2.958	GZ[62.0] =	3.788
GZ[3.0] =	0.204	GZ[33.0] =	3.050	GZ[63.0] =	3.738
GZ[4.0] =	0.275	GZ[34.0] =	3.139	GZ[64.0] =	3.682
GZ[5.0] =	0.347	GZ[35.0] =	3.223	GZ[65.0] =	3.622
GZ[6.0] =	0.421	GZ[36.0] =	3.304	GZ[66.0] =	3.557
GZ[7.0] =	0.497	GZ[37.0] =	3.381	GZ[67.0] =	3.487
GZ[8.0] =	0.573	GZ[38.0] =	3.454	GZ[68.0] =	3.412
GZ[9.0] =	0.652	GZ[39.0] =	3.523	GZ[69.0] =	3.333
GZ[10.0] =	0.731	GZ[40.0] =	3.589	GZ[70.0] =	3.248
GZ[11.0] =	0.812	GZ[41.0] =	3.655	GZ[71.0] =	3.159
GZ[12.0] =	0.894	GZ[42.0] =	3.715	GZ[72.0] =	3.065
GZ[13.0] =	0.978	GZ[43.0] =	3.769	GZ[73.0] =	2.966
GZ[14.0] =	1.065	GZ[44.0] =	3.818	GZ[74.0] =	2.862
GZ[15.0] =	1.154	GZ[45.0] =	3.862	GZ[75.0] =	2.754
GZ[16.0] =	1.244	GZ[46.0] =	3.900	GZ[76.0] =	2.641
GZ[17.0] =	1.336	GZ[47.0] =	3.933	GZ[77.0] =	2.524
GZ[18.0] =	1.432	GZ[48.0] =	3.960	GZ[78.0] =	2.401
GZ[19.0] =	1.532	GZ[49.0] =	3.981	GZ[79.0] =	2.274
GZ[20.0] =	1.634	GZ[50.0] =	3.998		
GZ[21.0] =	1.747	GZ[51.0] =	4.009		
GZ[22.0] =	1.859	GZ[52.0] =	4.015		
GZ[23.0] =	1.972	GZ[53.0] =	4.015		
GZ[24.0] =	2.084	GZ[54.0] =	4.010		
GZ[25.0] =	2.197	GZ[55.0] =	4.000		
GZ[26.0] =	2.318	GZ[56.0] =	3.985		
GZ[27.0] =	2.435	GZ[57.0] =	3.965		
GZ[28.0] =	2.547	GZ[58.0] =	3.940		
GZ[29.0] =	2.656	GZ[59.0] =	3.909		

L O A D C A L C U L A T O R R E P O R T

N/T ΤΑΧΙΑΡΧΗΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP2	100.0	2012.500	2062.813	1.0250	8.91	-10.46	53.91	0
BS2	100.0	2233.000	2288.825	1.0250	8.57	9.43	53.91	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
BP6	100.0	2066.500	2118.162	1.0250	8.77	-10.10	-61.72	0
BS6	100.0	2186.300	2240.958	1.0250	8.62	9.25	-61.78	0
AP	100.0	293.100	383.668	1.3090	12.58	0.07	-106.42	0
Ballast	91.6	28096.803	28882.45	1.0468	9.29	0.01	14.81	0

Fuel	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

Ν/Γ ΤΑΧΙΑΡΧΙΕΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

STEP 1

L O A D C A L C U L A T O R R E P O R T

N/T 7AX1ARCHLS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights	Result (Ton (Air))
Solids	0.000
Cargo	0.000
Ballast	20171.703
Combined	0.000
Fuel	1588.369
Misc.	405.594
DeadWeight	22165.664
LightWeight	17539.000
Displacement	39704.664

Gravity Centres	Result (m)	Limit (Min.)
KG Solid	10.362	
KG Adjustment	0.067	
KG Total	10.428	
KG Maximum	15.264	
KG Margin	4.836	
KM	15.641	
GM Solid	5.279	
GM Liquid	5.212	0.150

Calculated TRIM/LIST/DRAFT	Result	Limit
Trim Aft (-0.2 deg)	-0.875 m	5.000 m
Longitudinal Moment	218920.1 Ton m	
List Port (-0.1 deg)	-0.056 m	2.000 m
Transverse Moment	-324.9 Ton m	
Draft Fore	6.250 m	
Draft Mid Port	6.715 m	
Draft Mid	6.687 m	15.730 m
Draft Mid Starboard	6.659 m	
Draft Aft	7.125 m	

Seawater Density : 1.0250 T/m^3(Air)

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ			Result	Limit (Min.)
Area	0-30	:	44.41 mDeg	3.15 mDeg
Area	30 40	:	32.98 mDeg	1.72 mDeg
Area	0-40	:	77.38 mDeg	5.16 mDeg
Maximum GZ = 3.776 m		:	52.7 deg	25.0 deg
GZ at 30.0 deg		:	3.022 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

ΝΙΤ ΤΑΧΙΑΡΧΗΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	480.313	2027.2	6.7	1.8	9.4	2.0
214	2646.772	26127.0	14.4	17.0	16.2	21.0
199	3890.921	75114.7	21.2	38.8	23.9	50.4
184	1791.760	116152.4	9.8	49.8	11.0	66.8
169	-143.727	127838.1	-0.8	49.4	-0.9	67.4
154	-133.985	125513.9	-0.7	48.5	-0.8	66.2
139	33.425	124478.6	0.2	48.1	0.2	65.7
124	31.676	124648.4	0.2	48.1	0.2	65.7
109	102.495	125320.7	0.6	48.4	0.6	66.1
94	29.266	125975.5	0.2	48.7	0.2	66.4
79	76.198	126438.9	0.4	50.6	0.5	68.7
64	-1940.797	111589.7	-10.6	53.1	-11.9	70.0
49	-3501.150	70212.6	-29.6	41.2	-36.2	52.1

Maximum Bending Moment between frame 169 and 154 = 128620.0 Ton m

Maximum Shear Force at frame 199 = 3890.921 Ton

L O A D C A L C U L A T O R R E P O R T

Ν/Τ ΤΑΧΙΑΡΧΟΥΣ

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length=m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	3.022	GZ[60.0] =	3.700
GZ[1.0] =	0.084	GZ[31.0] =	3.085	GZ[61.0] =	3.678
GZ[2.0] =	0.169	GZ[32.0] =	3.145	GZ[62.0] =	3.653
GZ[3.0] =	0.256	GZ[33.0] =	3.202	GZ[63.0] =	3.626
GZ[4.0] =	0.344	GZ[34.0] =	3.257	GZ[64.0] =	3.596
GZ[5.0] =	0.435	GZ[35.0] =	3.309	GZ[65.0] =	3.563
GZ[6.0] =	0.529	GZ[36.0] =	3.358	GZ[66.0] =	3.528
GZ[7.0] =	0.624	GZ[37.0] =	3.404	GZ[67.0] =	3.491
GZ[8.0] =	0.720	GZ[38.0] =	3.448	GZ[68.0] =	3.451
GZ[9.0] =	0.817	GZ[39.0] =	3.489	GZ[69.0] =	3.408
GZ[10.0] =	0.916	GZ[40.0] =	3.528	GZ[70.0] =	3.363
GZ[11.0] =	1.014	GZ[41.0] =	3.567	GZ[71.0] =	3.315
GZ[12.0] =	1.114	GZ[42.0] =	3.602	GZ[72.0] =	3.265
GZ[13.0] =	1.216	GZ[43.0] =	3.633	GZ[73.0] =	3.213
GZ[14.0] =	1.320	GZ[44.0] =	3.662	GZ[74.0] =	3.158
GZ[15.0] =	1.427	GZ[45.0] =	3.687	GZ[75.0] =	3.101
GZ[16.0] =	1.538	GZ[46.0] =	3.709	GZ[76.0] =	3.041
GZ[17.0] =	1.650	GZ[47.0] =	3.728	GZ[77.0] =	2.979
GZ[18.0] =	1.763	GZ[48.0] =	3.743	GZ[78.0] =	2.915
GZ[19.0] =	1.877	GZ[49.0] =	3.756	GZ[79.0] =	2.848
GZ[20.0] =	1.993	GZ[50.0] =	3.765		
GZ[21.0] =	2.125	GZ[51.0] =	3.772		
GZ[22.0] =	2.251	GZ[52.0] =	3.775		
GZ[23.0] =	2.370	GZ[53.0] =	3.776		
GZ[24.0] =	2.482	GZ[54.0] =	3.773		
GZ[25.0] =	2.588	GZ[55.0] =	3.768		
GZ[26.0] =	2.685	GZ[56.0] =	3.760		
GZ[27.0] =	2.777	GZ[57.0] =	3.749		
GZ[28.0] =	2.864	GZ[58.0] =	3.735		
GZ[29.0] =	2.946	GZ[59.0] =	3.719		

CARGOMASTER(R) V4 : Program Release = 1.0G Approved Release = 1.0D

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
AP	100.0	293.100	383.668	1.3090	12.58	0.07	-106.42	0
Ballast	63.9	19598.500	20171.70	1.0566	9.53	0.05	22.92	0

Fuel	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

STEP 2

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHIS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights		Result (Ton (Air))
Solids		
Cargo	:	0.000
Ballast	:	0.000
Combined	:	28882.459
Fuel	:	0.000
Misc.	:	1588.369
DeadWeight	:	405.594
LightWeight	:	30876.422
Displacement	:	17539.000
	:	48415.422

Gravity Centres		Result (m)	Limit (Min.)
KG Solid	:	10.065	
KG Adjustment	:	0.055	
KG Total	:	10.119	
KG Maximum	:	14.196	
KG Margin	:	4.076	
KM			
GM Solid	:	14.259	
GM Liquid	:	4.195	
	:	4.140	0.150

Calculated TRIM/LIST/DRAFT		Result	Limit
Trim Aft (-0.5 deg)	:	-1.933 m	5.000 m
Longitudinal Moment	:	184337.7 Ton m	
List Port (-0.3 deg)	:	-0.173 m	2.000 m
Transverse Moment	:	-982.9 Ton m	
Draft Fore	:	7.148 m	
Draft Mid Port	:	8.201 m	
Draft Mid	:	8.115 m	15.730 m
Draft Mid Starboard	:	8.028 m	
Draft Aft	:	9.081 m	
Seawater Density	:	1.0250 T/m^3(Air)	

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ

		Result	Limit (Min.)
Area	0-30	: 37.17 mDeg	3.15 mDeg
Area	30-40	: 32.07 mDeg	1.72 mDeg
Area	0-40	: 69.24 mDeg	5.16 mDeg
Maximum GZ = 4.015 m		: 52.6 deg	25.0 deg
GZ at 30.0 deg		: 2.760 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	287.330	642.4	4.0	0.6	5.6	0.6
214	2062.179	19088.9	11.2	12.4	12.6	15.3
199	2802.710	55819.2	15.3	28.8	17.2	37.4
184	2323.177	92658.1	12.7	39.7	14.2	53.3
169	1994.753	123619.0	10.9	47.7	12.2	65.2
154	1393.136	147814.0	7.6	57.1	8.5	78.0
139	915.962	164160.7	5.0	63.4	5.6	86.6
124	236.374	172092.0	1.3	66.5	1.4	90.8
109	-403.898	170421.3	-2.2	65.8	-2.5	89.9
94	-1221.471	158144.7	-6.7	61.1	-7.5	83.4
79	-1952.555	134601.7	-10.6	53.9	-12.0	73.1
64	-2361.506	102232.3	-12.9	48.6	-14.5	64.1
49	-2759.700	63370.5	-23.3	37.2	-28.5	47.0

Maximum Bending Moment between frame 124 and 109 = 172602.2 Ton m

Maximum Shear Force at frame 199 = 2802.710 Ton

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length=m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	2.760	GZ[60.0] =	3.874
GZ[1.0] =	0.067	GZ[31.0] =	2.861	GZ[61.0] =	3.834
GZ[2.0] =	0.135	GZ[32.0] =	2.958	GZ[62.0] =	3.788
GZ[3.0] =	0.204	GZ[33.0] =	3.050	GZ[63.0] =	3.738
GZ[4.0] =	0.275	GZ[34.0] =	3.139	GZ[64.0] =	3.682
GZ[5.0] =	0.347	GZ[35.0] =	3.223	GZ[65.0] =	3.622
GZ[6.0] =	0.421	GZ[36.0] =	3.304	GZ[66.0] =	3.557
GZ[7.0] =	0.497	GZ[37.0] =	3.381	GZ[67.0] =	3.487
GZ[8.0] =	0.573	GZ[38.0] =	3.454	GZ[68.0] =	3.412
GZ[9.0] =	0.652	GZ[39.0] =	3.523	GZ[69.0] =	3.333
GZ[10.0] =	0.731	GZ[40.0] =	3.589	GZ[70.0] =	3.248
GZ[11.0] =	0.812	GZ[41.0] =	3.655	GZ[71.0] =	3.159
GZ[12.0] =	0.894	GZ[42.0] =	3.715	GZ[72.0] =	3.065
GZ[13.0] =	0.978	GZ[43.0] =	3.769	GZ[73.0] =	2.966
GZ[14.0] =	1.065	GZ[44.0] =	3.818	GZ[74.0] =	2.862
GZ[15.0] =	1.154	GZ[45.0] =	3.862	GZ[75.0] =	2.754
GZ[16.0] =	1.244	GZ[46.0] =	3.900	GZ[76.0] =	2.641
GZ[17.0] =	1.336	GZ[47.0] =	3.933	GZ[77.0] =	2.524
GZ[18.0] =	1.432	GZ[48.0] =	3.960	GZ[78.0] =	2.401
GZ[19.0] =	1.532	GZ[49.0] =	3.981	GZ[79.0] =	2.274
GZ[20.0] =	1.634	GZ[50.0] =	3.998		
GZ[21.0] =	1.747	GZ[51.0] =	4.009		
GZ[22.0] =	1.859	GZ[52.0] =	4.015		
GZ[23.0] =	1.972	GZ[53.0] =	4.015		
GZ[24.0] =	2.084	GZ[54.0] =	4.010		
GZ[25.0] =	2.197	GZ[55.0] =	4.000		
GZ[26.0] =	2.318	GZ[56.0] =	3.985		
GZ[27.0] =	2.435	GZ[57.0] =	3.965		
GZ[28.0] =	2.547	GZ[58.0] =	3.940		
GZ[29.0] =	2.656	GZ[59.0] =	3.909		

L O A D C A L C U L A T O R R E P O R T

Ν/Τ ΤΑΧΙΑΡΧΗΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL %	VOLUME m^3	Ton (Air)	WEIGHT DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL %	VOLUME m^3	Ton (Air)	WEIGHT DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP2	100.0	2012.500	2062.813	1.0250	8.91	-10.46	53.91	0
BS2	100.0	2233.000	2288.825	1.0250	8.57	9.43	53.91	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
BP6	100.0	2066.500	2118.162	1.0250	8.77	-10.10	-61.72	0
BS6	100.0	2186.300	2240.958	1.0250	8.62	9.25	-61.78	0
AP	100.0	293.100	383.668	1.3090	12.58	0.07	-106.42	0
Ballast	91.6	28096.803	28882.45	1.0468	9.29	0.01	14.81	0

Fuel	VOL %	VOLUME m^3	Ton (Air)	WEIGHT DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

STEP 3

LOAD CALCULATOR REPORT

N/T TAXIARCHIS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights		Result (Ton (Air))
Solids	:	0.000
Cargo	:	0.000
Ballast	:	28498.791
Combined	:	0.000
Fuel	:	1588.369
Misc.	:	405.594
DeadWeight	:	30492.754
LightWeight	:	17539.000
Displacement	:	48031.754

Gravity Centres		Result (m)	Limit (Min.)
KG Solid	:	10.045	
KG Adjustment	:	0.055	
KG Total	:	10.100	
KG Maximum	:	14.246	
KG Margin	:	4.146	
KM	:	14.298	
GM Solid	:	4.253	
GM Liquid	:	4.198	0.150

Calculated TRIM/LIST/DRAFT		Result	Limit
Trim Aft (-0.4 deg)	:	-1.434 m	5.000 m
Longitudinal Moment	:	225167.6 Ton m	
List Port (-0.3 deg)	:	-0.177 m	2.000 m
Transverse Moment	:	-1009.7 Ton m	
Draft Fore	:	7.323 m	
Draft Mid Port	:	8.128 m	
Draft Mid	:	8.039 m	15.730 m
Draft Mid Starboard	:	7.951 m	
Draft Aft	:	8.756 m	
Seawater Density	:	1.0250 T/m^3(Air)	

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

GZ

		Result	Limit (Min.)
Area	0-30	: 37.66 mDeg	3.15 mDeg
Area	30-40	: 32.29 mDeg	1.72 mDeg
Area	0-40	: 69.95 mDeg	5.16 mDeg
Maximum GZ = 4.034 m		: 52.7 deg	25.0 deg
GZ at 30.0 deg		: 2.787 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	254.711	446.1	3.6	0.4	5.0	0.4
214	1979.698	18076.8	10.8	11.7	12.1	14.5
199	2675.346	53285.9	14.6	27.5	16.4	35.7
184	2165.681	88069.0	11.8	37.7	13.3	50.7
169	1822.881	116650.4	9.9	45.1	11.2	61.5
154	1222.530	138370.4	6.7	53.4	7.5	73.0
139	762.301	152374.7	4.2	58.9	4.7	80.4
124	115.336	158324.2	0.6	61.1	0.7	83.5
109	-476.637	155260.3	-2.6	60.0	-2.9	81.9
94	-1230.233	142407.5	-6.7	55.0	-7.5	75.1
79	-1881.829	119331.9	-10.3	47.7	-11.5	64.8
64	-2195.991	88684.5	-12.0	42.2	-13.5	55.6
49	-2490.707	53002.4	-21.1	31.1	-25.7	39.3

Maximum Bending Moment between frame 124 and 109 = 158439.7 Ton m

Maximum Shear Force at frame 199 = 2675.346 Ton

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length-m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	2.787	GZ[60.0] =	3.898
GZ[1.0] =	0.068	GZ[31.0] =	2.886	GZ[61.0] =	3.858
GZ[2.0] =	0.137	GZ[32.0] =	2.982	GZ[62.0] =	3.814
GZ[3.0] =	0.207	GZ[33.0] =	3.073	GZ[63.0] =	3.765
GZ[4.0] =	0.279	GZ[34.0] =	3.161	GZ[64.0] =	3.711
GZ[5.0] =	0.352	GZ[35.0] =	3.245	GZ[65.0] =	3.652
GZ[6.0] =	0.428	GZ[36.0] =	3.325	GZ[66.0] =	3.588
GZ[7.0] =	0.505	GZ[37.0] =	3.401	GZ[67.0] =	3.520
GZ[8.0] =	0.583	GZ[38.0] =	3.473	GZ[68.0] =	3.446
GZ[9.0] =	0.662	GZ[39.0] =	3.542	GZ[69.0] =	3.368
GZ[10.0] =	0.743	GZ[40.0] =	3.607	GZ[70.0] =	3.286
GZ[11.0] =	0.824	GZ[41.0] =	3.672	GZ[71.0] =	3.198
GZ[12.0] =	0.907	GZ[42.0] =	3.732	GZ[72.0] =	3.106
GZ[13.0] =	0.993	GZ[43.0] =	3.787	GZ[73.0] =	3.009
GZ[14.0] =	1.080	GZ[44.0] =	3.836	GZ[74.0] =	2.908
GZ[15.0] =	1.170	GZ[45.0] =	3.879	GZ[75.0] =	2.802
GZ[16.0] =	1.261	GZ[46.0] =	3.917	GZ[76.0] =	2.691
GZ[17.0] =	1.355	GZ[47.0] =	3.949	GZ[77.0] =	2.575
GZ[18.0] =	1.452	GZ[48.0] =	3.977	GZ[78.0] =	2.455
GZ[19.0] =	1.552	GZ[49.0] =	3.999	GZ[79.0] =	2.331
GZ[20.0] =	1.656	GZ[50.0] =	4.015		
GZ[21.0] =	1.770	GZ[51.0] =	4.026		
GZ[22.0] =	1.884	GZ[52.0] =	4.033		
GZ[23.0] =	1.998	GZ[53.0] =	4.034		
GZ[24.0] =	2.111	GZ[54.0] =	4.029		
GZ[25.0] =	2.224	GZ[55.0] =	4.020		
GZ[26.0] =	2.345	GZ[56.0] =	4.006		
GZ[27.0] =	2.462	GZ[57.0] =	3.986		
GZ[28.0] =	2.575	GZ[58.0] =	3.962		
GZ[29.0] =	2.683	GZ[59.0] =	3.932		

CARGOMASTER(R) V4 : Program Release = 1.0G Approved Release = 1.0D

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP2	100.0	2012.500	2062.813	1.0250	8.91	-10.46	53.91	0
BS2	100.0	2233.000	2288.825	1.0250	8.57	9.43	53.91	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
BP6	100.0	2066.500	2118.162	1.0250	8.77	-10.10	-61.72	0
BS6	100.0	2186.300	2240.958	1.0250	8.62	9.25	-61.78	0
Ballast	90.7	27803.703	28498.79	1.0250	9.24	0.01	16.45	0

Fuel	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

STEP 4

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights		Result (Ton (Air))
Solids	:	0.000
Cargo	:	0.000
Ballast	:	28882.459
Combined	:	0.000
Fuel	:	1588.369
Misc.	:	405.594
DeadWeight	:	30876.422
LightWeight	:	17539.000
Displacement	:	48415.422

Gravity Centres		Result (m)	Limit (Min.)
KG Solid	:	10.065	
KG Adjustment	:	0.055	
KG Total	:	10.119	
KG Maximum	:	14.196	
KG Margin	:	4.076	
KM	:	14.259	
GM Solid	:	4.195	
GM Liquid	:	4.140	0.150

Calculated TRIM/LIST/DRAFT		Result	Limit
Trim Aft (-0.5 deg)	:	-1.933 m	5.000 m
Longitudinal Moment	:	184337.7 Ton m	
List Port (-0.3 deg)	:	-0.173 m	2.000 m
Transverse Moment	:	-982.9 Ton m	
Draft Fore	:	7.148 m	
Draft Mid Port	:	8.201 m	
Draft Mid	:	8.115 m	15.730 m
Draft Mid Starboard	:	8.028 m	
Draft Aft	:	9.081 m	
Seawater Density	:	1.0250 T/m^3(Air)	

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ			Result	Limit (Min.)
Area	0-30	:	37.17 mDeg	3.15 mDeg
Area	30-40	:	32.07 mDeg	1.72 mDeg
Area	0-40	:	69.24 mDeg	5.16 mDeg
Maximum GZ = 4.015 m		:	52.6 deg	25.0 deg
GZ at 30.0 deg		:	2.760 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	287.330	642.4	4.0	0.6	5.6	0.6
214	2062.179	19088.9	11.2	12.4	12.6	15.3
199	2802.710	55819.2	15.3	28.8	17.2	37.4
184	2323.177	92658.1	12.7	39.7	14.2	53.3
169	1994.753	123619.0	10.9	47.7	12.2	65.2
154	1393.136	147814.0	7.6	57.1	8.5	78.0
139	915.962	164160.7	5.0	63.4	5.6	86.6
124	236.374	172092.0	1.3	66.5	1.4	90.8
109	-403.898	170421.3	-2.2	65.8	-2.5	89.9
94	-1221.471	158144.7	-6.7	61.1	-7.5	83.4
79	-1952.555	134601.7	-10.6	53.9	-12.0	73.1
64	-2361.506	102232.3	-12.9	48.6	-14.5	64.1
49	-2759.700	63370.5	-23.3	37.2	-28.5	47.0

Maximum Bending Moment between frame 124 and 109 = 172602.2 Ton m

Maximum Shear Force at frame 199 = 2802.710 Ton

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length=m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	2.760	GZ[60.0] =	3.874
GZ[1.0] =	0.067	GZ[31.0] =	2.861	GZ[61.0] =	3.834
GZ[2.0] =	0.135	GZ[32.0] =	2.958	GZ[62.0] =	3.788
GZ[3.0] =	0.204	GZ[33.0] =	3.050	GZ[63.0] =	3.738
GZ[4.0] =	0.275	GZ[34.0] =	3.139	GZ[64.0] =	3.682
GZ[5.0] =	0.347	GZ[35.0] =	3.223	GZ[65.0] =	3.622
GZ[6.0] =	0.421	GZ[36.0] =	3.304	GZ[66.0] =	3.557
GZ[7.0] =	0.497	GZ[37.0] =	3.381	GZ[67.0] =	3.487
GZ[8.0] =	0.573	GZ[38.0] =	3.454	GZ[68.0] =	3.412
GZ[9.0] =	0.652	GZ[39.0] =	3.523	GZ[69.0] =	3.333
GZ[10.0] =	0.731	GZ[40.0] =	3.589	GZ[70.0] =	3.248
GZ[11.0] =	0.812	GZ[41.0] =	3.655	GZ[71.0] =	3.159
GZ[12.0] =	0.894	GZ[42.0] =	3.715	GZ[72.0] =	3.065
GZ[13.0] =	0.978	GZ[43.0] =	3.769	GZ[73.0] =	2.966
GZ[14.0] =	1.065	GZ[44.0] =	3.818	GZ[74.0] =	2.862
GZ[15.0] =	1.154	GZ[45.0] =	3.862	GZ[75.0] =	2.754
GZ[16.0] =	1.244	GZ[46.0] =	3.900	GZ[76.0] =	2.641
GZ[17.0] =	1.336	GZ[47.0] =	3.933	GZ[77.0] =	2.524
GZ[18.0] =	1.432	GZ[48.0] =	3.960	GZ[78.0] =	2.401
GZ[19.0] =	1.532	GZ[49.0] =	3.981	GZ[79.0] =	2.274
GZ[20.0] =	1.634	GZ[50.0] =	3.998		
GZ[21.0] =	1.747	GZ[51.0] =	4.009		
GZ[22.0] =	1.859	GZ[52.0] =	4.015		
GZ[23.0] =	1.972	GZ[53.0] =	4.015		
GZ[24.0] =	2.084	GZ[54.0] =	4.010		
GZ[25.0] =	2.197	GZ[55.0] =	4.000		
GZ[26.0] =	2.318	GZ[56.0] =	3.985		
GZ[27.0] =	2.435	GZ[57.0] =	3.965		
GZ[28.0] =	2.547	GZ[58.0] =	3.940		
GZ[29.0] =	2.656	GZ[59.0] =	3.909		

L O A D C A L C U L A T O R R E P O R T

Μ/Τ ΤΑΞΙΑΡΧΗΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP2	100.0	2012.500	2062.813	1.0250	8.91	-10.46	53.91	0
BS2	100.0	2233.000	2288.825	1.0250	8.57	9.43	53.91	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
BP6	100.0	2066.500	2118.162	1.0250	8.77	-10.10	-61.72	0
BS6	100.0	2186.300	2240.958	1.0250	8.62	9.25	-61.78	0
AP	100.0	293.100	383.668	1.3090	12.58	0.07	-106.42	0
Ballast	91.6	28096.803	28882.45	1.0468	9.29	0.01	14.81	0

Fuel	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

Ν|7 ΤΑΧΙΑΡΧΙΚΕΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

STEP 5-16 FLOW THROUGH METHOD

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 1 (Approved:25 APR 06)

Intact Stability : Sufficient

This loading computer does NOT check the damage stability. When loaded with oil cargo, it is to be checked that the loading condition does not deviate significantly from the loading conditions in the approved stability manual or that the loading condition is in compliance with limiting curves of KG approved with respect to damage stability.

Weights		Result (Ton (Air))	
Solids	:	0.000	
Cargo	:	0.000	
Ballast	:	28882.459	
Combined	:	0.000	
Fuel	:	1588.369	
Misc.	:	405.594	
DeadWeight	:	30876.422	
LightWeight	:	17539.000	
Displacement	:	48415.422	

Gravity Centres		Result (m)	Limit (Min.)
KG Solid	:	10.065	
KG Adjustment	:	0.055	
KG Total	:	10.119	
KG Maximum	:	14.196	
KG Margin	:	4.076	
KM	:	14.259	
GM Solid	:	4.195	
GM Liquid	:	4.140	0.150

Calculated TRIM/LIST/DRAFT		Result	Limit
Trim Aft (-0.5 deg)	:	-1.933 m	5.000 m
Longitudinal Moment	:	184337.7 Ton m	
List Port (-0.3 deg)	:	-0.173 m	2.000 m
Transverse Moment	:	-982.9 Ton m	
Draft Fore	:	7.148 m	
Draft Mid Port	:	8.201 m	
Draft Mid	:	8.115 m	15.730 m
Draft Mid Starboard	:	8.028 m	
Draft Aft	:	9.081 m	
Seawater Density	:	1.0250 T/m^3(Air)	

L O A D C A L C U L A T O R R E P O R T

M/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ		Result	Limit (Min.)
Area	0 30	: 37.17 mDeg	3.15 mDeg
Area	30-40	: 32.07 mDeg	1.72 mDeg
Area	0-40	: 69.24 mDeg	5.16 mDeg
Maximum GZ = 4.015 m		: 52.6 deg	25.0 deg
GZ at 30.0 deg		: 2.760 m	0.200 m

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Hull Stress : Sufficient

Frame	Shear Force Ton	Bending Moment Ton m	Harbour (%) Shear Force	Harbour (%) Bending Moment	Sea (%) Shear Force	Sea (%) Bending Moment
229	287.330	642.4	4.0	0.6	5.6	0.6
214	2062.179	19088.9	11.2	12.4	12.6	15.3
199	2802.710	55819.2	15.3	28.8	17.2	37.4
184	2323.177	92658.1	12.7	39.7	14.2	53.3
169	1994.753	123619.0	10.9	47.7	12.2	65.2
154	1393.136	147814.0	7.6	57.1	8.5	78.0
139	915.962	164160.7	5.0	63.4	5.6	86.6
124	236.374	172092.0	1.3	66.5	1.4	90.8
109	-403.898	170421.3	-2.2	65.8	-2.5	89.9
94	-1221.471	158144.7	-6.7	61.1	-7.5	83.4
79	-1952.555	134601.7	-10.6	53.9	-12.0	73.1
64	-2361.506	102232.3	-12.9	48.6	-14.5	64.1
49	-2759.700	63370.5	-23.3	37.2	-28.5	47.0

Maximum Bending Moment between frame 124 and 109 = 172602.2 Ton m

Maximum Shear Force at frame 199 = 2802.710 Ton

L O A D C A L C U L A T O R R E P O R T

N/T TAXIARCHIS

Planning condition : Cond 11 (Approved:25 APR 06)

GZ Values :

Degree=deg : Length=m

DEGREE :	LEVEL	DEGREE :	LEVEL	DEGREE :	LEVEL
GZ[0.0] =	0.000	GZ[30.0] =	2.760	GZ[60.0] =	3.874
GZ[1.0] =	0.067	GZ[31.0] =	2.861	GZ[61.0] =	3.834
GZ[2.0] =	0.135	GZ[32.0] =	2.958	GZ[62.0] =	3.788
GZ[3.0] =	0.204	GZ[33.0] =	3.050	GZ[63.0] =	3.738
GZ[4.0] =	0.275	GZ[34.0] =	3.139	GZ[64.0] =	3.682
GZ[5.0] =	0.347	GZ[35.0] =	3.223	GZ[65.0] =	3.622
GZ[6.0] =	0.421	GZ[36.0] =	3.304	GZ[66.0] =	3.557
GZ[7.0] =	0.497	GZ[37.0] =	3.381	GZ[67.0] =	3.487
GZ[8.0] =	0.573	GZ[38.0] =	3.454	GZ[68.0] =	3.412
GZ[9.0] =	0.652	GZ[39.0] =	3.523	GZ[69.0] =	3.333
GZ[10.0] =	0.731	GZ[40.0] =	3.589	GZ[70.0] =	3.248
GZ[11.0] =	0.812	GZ[41.0] =	3.655	GZ[71.0] =	3.159
GZ[12.0] =	0.894	GZ[42.0] =	3.715	GZ[72.0] =	3.065
GZ[13.0] =	0.978	GZ[43.0] =	3.769	GZ[73.0] =	2.966
GZ[14.0] =	1.065	GZ[44.0] =	3.818	GZ[74.0] =	2.862
GZ[15.0] =	1.154	GZ[45.0] =	3.862	GZ[75.0] =	2.754
GZ[16.0] =	1.244	GZ[46.0] =	3.900	GZ[76.0] =	2.641
GZ[17.0] =	1.336	GZ[47.0] =	3.933	GZ[77.0] =	2.524
GZ[18.0] =	1.432	GZ[48.0] =	3.960	GZ[78.0] =	2.401
GZ[19.0] =	1.532	GZ[49.0] =	3.981	GZ[79.0] =	2.274
GZ[20.0] =	1.634	GZ[50.0] =	3.998		
GZ[21.0] =	1.747	GZ[51.0] =	4.009		
GZ[22.0] =	1.859	GZ[52.0] =	4.015		
GZ[23.0] =	1.972	GZ[53.0] =	4.015		
GZ[24.0] =	2.084	GZ[54.0] =	4.010		
GZ[25.0] =	2.197	GZ[55.0] =	4.000		
GZ[26.0] =	2.318	GZ[56.0] =	3.985		
GZ[27.0] =	2.435	GZ[57.0] =	3.965		
GZ[28.0] =	2.547	GZ[58.0] =	3.940		
GZ[29.0] =	2.656	GZ[59.0] =	3.909		

L O A D C A L C U L A T O R R E P O R T

Ν/Τ ΤΑΞΙΑΡΧΟΣ

Planning condition : Cond 11 (Approved:25 APR 06)

Tank data :

Cargo	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

Ballast	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
BP1	100.0	3140.300	3218.807	1.0250	11.16	-9.62	83.87	0
BS1	100.0	3361.600	3445.640	1.0250	10.79	8.99	83.82	0
BP2	100.0	2012.500	2062.813	1.0250	8.91	-10.46	53.91	0
BS2	100.0	2233.000	2288.825	1.0250	8.57	9.43	53.91	0
BP3	100.0	2017.800	2068.245	1.0250	8.90	-10.47	24.85	0
BS3	100.0	2239.100	2295.078	1.0250	8.57	9.44	24.85	0
BP4	100.0	2017.800	2068.245	1.0250	8.90	-10.47	-4.25	0
BS4	100.0	2276.900	2333.822	1.0250	8.49	9.70	-4.25	0
BP5	100.0	2015.300	2065.683	1.0250	8.91	-10.47	-33.33	0
BS5	100.0	2236.600	2292.515	1.0250	8.58	9.43	-33.33	0
BP6	100.0	2066.500	2118.162	1.0250	8.77	-10.10	-61.72	0
BS6	100.0	2186.300	2240.958	1.0250	8.62	9.25	-61.78	0
AP	100.0	293.100	383.668	1.3090	12.58	0.07	-106.42	0
Ballast	91.6	28096.803	28882.45	1.0468	9.29	0.01	14.81	0

Fuel	VOL % %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
FFP	50.0	252.850	240.207	0.9500	10.98	-5.60	99.41	167
FFS	50.0	278.200	264.290	0.9500	10.95	5.16	99.42	226
FAP	50.0	367.500	349.125	0.9500	8.48	-7.72	-78.84	826
FAS	50.0	388.400	368.980	0.9500	8.55	7.39	-78.84	992
F_SETT	98.0	46.942	44.595	0.9500	15.18	-7.69	-84.12	8
F_SERV	98.0	46.942	44.595	0.9500	15.18	-7.69	-81.87	8
DOP	98.0	67.522	58.069	0.8600	1.69	-4.50	-86.80	44
DOS	98.0	87.220	75.009	0.8600	1.61	4.41	-85.75	70
DO_SETT	98.0	56.154	48.292	0.8600	15.31	-13.81	-81.87	16
DO_SERV	98.0	53.018	45.595	0.8600	15.42	-13.73	-84.12	16
BOIL_DO	100.0	1.500	1.290	0.8600	17.03	-12.35	-101.36	0
LO_SYST	50.0	15.700	14.287	0.9100	1.30	0.02	-88.82	24
ME_LO	50.0	23.550	21.431	0.9100	14.25	10.58	-83.75	4
AE_LO	50.0	13.300	12.103	0.9100	14.25	12.34	-83.75	1
STTB_LO	50.0	0.550	0.501	0.9100	2.96	1.69	-100.20	0
Fuel	55.8	1699.348	1588.369	0.9093	9.56	-0.94	-23.54	2401

L O A D C A L C U L A T O R R E P O R T

N17 TAXIARCHES

Planning condition : Cond 11 (Approved:25 APR 06)

Misc	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
LO_SEP	100.0	2.600	2.366	0.9100	9.98	-7.13	-93.11	0
LO_DRAIN	50.0	5.250	4.778	0.9100	0.69	1.36	-81.50	2
LO_SLUDG	50.0	17.550	17.550	1.0000	0.26	0.00	-89.00	25
SLUDGE	50.0	8.700	8.700	1.0000	3.69	-6.90	-85.37	4
HYDR_O	50.0	6.150	6.150	1.0000	14.26	8.57	-85.25	1
HYDR_DRN	50.0	7.850	7.850	1.0000	13.82	14.41	-81.64	5
HYDR_CCP	50.0	1.650	1.650	1.0000	2.44	0.17	-95.48	1
CPP	50.0	3.050	3.050	1.0000	14.25	8.57	-84.12	0
FO_OVERF	50.0	7.800	7.800	1.0000	0.80	-4.70	-81.49	9
FO_DRN	50.0	5.250	5.250	1.0000	0.70	-1.36	-81.50	2
CYLINDER	50.0	9.200	9.200	1.0000	14.25	8.57	-82.62	1
FRESHW_P	50.0	88.900	88.900	1.0000	15.87	-5.62	-111.17	141
FRESHW_S	50.0	88.900	88.900	1.0000	15.87	5.62	-111.17	141
TECHW_P	100.0	45.600	45.600	1.0000	18.02	-11.00	-105.13	0
TECHW_S	100.0	45.600	45.600	1.0000	18.02	11.00	-105.13	0
BILGEW	50.0	25.150	25.150	1.0000	1.09	0.00	-98.71	42
FEEDW	100.0	20.900	20.900	1.0000	13.00	-0.38	-104.00	0
COOLW	100.0	16.200	16.200	1.0000	5.30	0.00	-103.20	0
Misc	59.6	406.300	405.593	0.9900	13.06	0.37	-103.55	374

Solids	VOL %	VOLUME m^3	WEIGHT Ton (Air)	DENSITY T/m^3(Air)	VCG m	TCG m	LCG m	TRANS.FSR. m^4
No weight in this group.								

CHAPTER 10: ITEMS FOR CONSIDERATION WHEN CHOOSING / INSTALLING BALLAST WATER TREATMENT SYSTEMS

a. Ballast water pump capacity vs. ballast water treatment system capacity
The ballast water pumping capacity (1 pump) of a ship cannot exceed the capacity (Treatment Rated Capacity, TRG) of the treatment system, as given in the Type Approval Certificate of the treatment system.

In case two pumps (where capacity of both pumps exceed the TRG of the installed treatment system) are connected to the treatment system, instructions in the Ballast Water Management Plan stating that only one pump can be run at a time must be included.

A possible solution when the ballast pumping capacity exceeds the TRG of the treatment system is to install an orifice in the inlet pipe to the treatment system to limit the flow.

b. Ballast pump pressure head
Some ballast water treatment systems will need new or additional ballast water pumps. Ballast water pumps with increased head may cause some challenges to be considered:

- Suitability of existing flanges to tackle the higher pressure in the system
- New pressure drop calculations for the air pipes of the ballast tanks in case the flow rate increases.

c. Bypass operations of the treatment system
The guidelines for Type Approval of ballast water treatment systems require, in the event of an emergency, that suitable bypasses or overrides of the treatment system to protect the safety of the ship and personnel should be arranged. Such bypasses should activate an alarm, and the bypass event should be recorded by the Control Equipment of the treatment system. The alarms are audible and visual signals in all stations from which ballast water operations are controlled.

Any additional bypass possibility of the treatment unit in a ballast system must in general be avoided or logged automatically in the treatment system's control unit. This in general is applicable in cases of heeling operations or other internal movement of ballast water in the ship. These operations must be identified by the control unit of the treatment system to avoid triggering the bypass alarm.

Accidental filling and discharging by gravity of the ballast water must be avoided by installing non-return valves on the ballast piping between the overboard discharge outlet and the ballast tanks.

d. Safety issues related to gas generation during treatment of the ballast water
Some ballast water treatment systems use or generate different toxic and flammable gases in order to achieve the required treatment level by the Convention.
A guideline for the storage of chemicals onboard ships has been developed at IMO, given in BWM.2 / Circ. 20 dated 21st July 2009.

Toxicity, explosion and flammability of the gases generated while treating the ballast water must be considered and proposals for dealing with those gases (ventilation, fire fighting, alarms etc.) will be considered and approved by ship's classification society. Typical gases are: Hydrogen (H2), Ozone (O3), Methane (CH4) and Sodium Hypochlorite (NaClO).

e. Inerting of ballast tanks

Some ballast water treatment systems combine their technology with inerting of the ballast tanks. Inerting of the ballast tanks as part of normal operation represents an increased risk for personnel in connection with tank entry.

The governing rule with respect to piping system of the ballast tanks is that it must be possible to over-pump the ballast tanks within the pressure limits of the structure. Pressure drop calculations must be submitted for approval.

The following alternatives are accepted to classification societies as means to maintain the Inert Gas pressure in the ballast tank:

- Pressure relief loop with discharge directly overboard.
- Pressure-Vacuum valves with means to release water.

Discharging of ballast normally ensures that there is adequate oxygen levels in ballast tanks, although one is frequently struggling with achieving adequate levels in the double bottom area (portable fans with plastic hoses leading to the double bottoms are normally required arranged prior to tank entry).

The following assessments must be considered when inerting ballast tanks:

- Assessment of capacity of the P/V valve during discharging (vacuum) and ballasting (pressure relief with water).
- Arrangements for ventilating double bottom part of ballast tanks must be provided.
- Inerted ballast tanks to have direct access to open deck.
- Air and Sounding pipes to be led to open deck.
- Warning signs posted at the manholes of the ballast tanks.
- Safety procedures for tank entry for the ballast tanks to be included in the ship's safety manual.
- Leakage hazards from an inerted tank to a non-inerted tank must be considered and identified with relevant procedures in the ship's safety manuals.

f. Installation of treatment equipment in gas dangerous zones

For oil tankers and chemical carriers with liquid products having a flash point not exceeding 60 degrees Celsius, all electrical equipment must be based in a non-hazardous area, or must be certified as safe for use in a hazardous area.

Ballast water from ballast tanks adjacent to cargo tanks in which liquids with flash point not exceed 60 degrees Celsius is present, is not allowed to be led to the engine room because of risk of leakage of flammable gases. Following the same reasoning, it is not allowed to take ballast water from such ballast tanks into gas safe rooms on deck.

CONCLUSIONS

The Convention, as per which we prepared relevant plan, specifies two standards to satisfy its requirements, Ballast Water Exchange (Standard D-1) and Ballast Water Treatment (Standard D-2).

Guidelines on how a Ballast Water Management Plan must be set up have been developed within IMO. The Guidelines are given in Resolution MEPC.127 (53) (see also Appendix 4).
Ship's classification society (DNV) approves Ballast Water Management Plans found to be in compliance with the aforementioned guidelines.

We prepared relevant Plan for ship using exchange methods, which is different than a Plan for ships using treatment methods. However, the Guidelines given in Resolution MEPC.127 (53) are valid for both methods.

The methods that are suitable for our case study is the sequential method (empty / refill) and the flow-through method (see also relevant table in Chapter 8).

Sequential method is very friendly to the environment, its practicality and efficacy are in a high level, however as described in Chapter 8, there are many assessment criteria related to safety that have to be carefully examined before using this method.

Therefore, we conclude that the best exchange method for specific oil tanker (which is more than twenty years old and its trading area is Middle East – Far East) is the flow trough method. According to relevant time table shown in Chapter 8, time required to perform three exchanges varies between 5.5 and 9.17 hours for each ballast tank.

The tool that we used to confirm suitability of the flow-through method is the ship's Loading Manual (see Chapter 9), from where we can take some useful results, such as maximum bending moment, maximum shear force etc. It is very important to ensure that trim, list, stability, draught and stresses will not be affected in a negative way by the method that we use for the ballast exchange.

All of the various potential ballast water treatment technologies are currently at a very early stage of development and significant further research is required.

It is likely to be some years before a new ballast water treatment system is developed, proven effective, approved and accepted for operational use. Ballast water exchange will therefore remain a primary method for some time yet, despite its limitations.

It appears that any new ballast water treatment system will involve a combination of technologies, for example primary filtration or physical separation followed by a secondary biocide treatment.

Treatment systems are much more expensive than exchange methods and usually can be installed on new buildings or on ships of low age. It is not economically efficient to install such treatment systems on a ship that is more than twenty years old, like M/T TAXIARCHIS.

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INTERNATIONAL MARITIME ORGANIZATION

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RESOLUTION A.868(20)
adopted on 27 November 1997

GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER TO MINIMIZE THE TRANSFER OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning prevention and control of marine pollution from ships,

RECALLING ALSO resolution A.774(18) by which it recognized that the uncontrolled discharge of ballast water and sediment from ships has led to the transfer of harmful aquatic organisms and pathogens, causing injury to public health and damage to property and the environment, and accordingly adopted Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges, and further that the Marine Environment Protection Committee (MEPC) and the Maritime Safety Committee (MSC) shall keep the ballast water issue and the application of the Guidelines under review with a view to further developing the Guidelines as a basis for a new Annex to MARPOL 73/78,

RECALLING FURTHER that the 1992 United Nations Conference on Environment and Development (UNCED), in its Agenda 21 requests IMO to consider the adoption of appropriate rules on ballast water discharge to prevent the spread of non-indigenous organisms, and further proclaims in its Declaration on Environment and Development that States shall widely apply the precautionary approach according to their capabilities,

BEARING IN MIND that MEPC/Circ.288 recognized that the existing Guidelines do not provide a complete solution towards the total prevention of the introduction of harmful aquatic organisms and pathogens, but urged that focus should be directed on measures aimed at minimizing the risks, emphasizing further that in applying the existing Guidelines, the ship's safety was of paramount importance,

NOTING the objectives of the Convention on Biological Diversity, 1992, and that the transfer and introduction of alien aquatic species with ballast water threatens the conservation and sustainable use of biological diversity,

NOTING FURTHER the status of work carried out by MEPC as requested by resolution A.774(18) concerning the development of legally binding provisions on ballast water management together with guidelines for their effective implementation, as well as the Guidance on Safety Aspects of Ballast Water Exchange at Sea prepared by the Sub-Committee on Ship Design and Equipment, and distributed as MEPC/Circ.329 and MSC/Circ.806, both of 30 June 1997,

RECOGNIZING that several States have taken unilateral action by adopting legally binding provisions for local, regional or national application with a view to minimizing the risks of introducing harmful aquatic organisms and pathogens through ships entering their ports, and also that this issue, being of worldwide concern, demands action based on globally applicable regulation together with guidelines for their effective implementation and uniform interpretation,

HAVING CONSIDERED the recommendation of the MEPC at its fortieth session on this issue,

1. ADOPTS the Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens set out in the Annex to the present resolution;

2. REQUESTS Governments to take urgent action in applying these Guidelines, including the dissemination thereof to the shipping industry, to use them as a basis for any measures they adopt with a view to minimizing the risks of introducing harmful aquatic organisms and pathogens, and to report to the MEPC on any experience gained in their implementation;

3. REQUESTS ALSO the MEPC to work towards completion of legally binding provisions on ballast water management in the form of a new Annex to MARPOL 73/78, together with guidelines for their uniform and effective implementation with a view to their consideration and adoption in the year 2000;

4. REQUESTS FURTHER the MSC to include in its workplan the evaluation of information received from interested parties, particularly that relevant to 12.2 of the Guidelines adopted herewith, with a view to determining the hazards and potential consequences for various existing ship types and operations. The MSC is also requested to consider any other relevant issues concerning ballast water management as well as design objectives for new ships, with a view to minimizing to the extent possible risks of introducing harmful aquatic organisms and pathogens with ships' ballast water and sediments;

5. REVOKES resolution A.774(18).

ANNEX

GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER TO MINIMIZE THE TRANSFER OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

Contents

1 Introduction

1.1 Studies carried out in several countries have shown that many species of bacteria, plants, and animals can survive in a viable form in the ballast water and sediment carried in ships, even after journeys of several months' duration. Subsequent discharge of ballast water or sediment into the waters of port States may result in the establishment of harmful aquatic organisms and pathogens which may pose threats to indigenous human, animal and plant life, and the marine environment. Although other media have been identified as being responsible for transferring organisms between geographically separated water bodies, ballast water discharge from ships appears to have been among the most prominent.

1.2 The potential for ballast water discharge to cause harm has been recognised not only by the International Maritime Organization but also by the World Health Organization, which is concerned about the role of ballast water as a medium for the spreading of epidemic disease bacteria.

1.3 These Guidelines are not to be regarded as a certain solution to the problem. Rather, each part of them should be viewed as a tool which, if correctly applied, will help to minimize the risks associated with ballast water discharge. As scientific and technological advances are made, the Guidelines will be refined to enable the risk to be more adequately addressed. In the interim, port States, flag States and other parties that can assist in mitigating this problem should exercise due care and diligence in an effort to conform to the maximum extent possible with the Guidelines.

1.4 The selection of appropriate methods of risk minimization will depend upon several factors, including the type or types of organisms being targeted, the level of risk involved, its environmental acceptability, the economic and ecological costs involved and the safety of ships.

2 Definitions

For the purposes of these Guidelines, the following definitions apply:

Administration means the Government of the State under whose authority the ship is operating.

Convention means MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships, 1973, and the Protocol of 1978 related thereto).

Member States means States that are Members of the International Maritime Organization.

Organization means the International Maritime Organization (IMO).

Port State authority means any official or organisation authorized by the Government of a port State to administer guidelines or enforce standards and regulations relevant to the implementation of national and international shipping control measures.

Treatment means a process or mechanical, physical, chemical or biological method to kill, remove or render infertile, harmful or potentially harmful organisms within ballast water.

3 Application

The Guidelines are directed to Member States and can apply to all ships; however, a port State authority shall determine the extent to which they do apply.

4 Guideline objectives and background

4.1 The objectives of these Guidelines, developed under technical and scientific guidance, are intended to assist Governments and appropriate authorities, ship masters, operators and owners, and port authorities, as well as other interested parties, in minimizing the risk of introducing harmful aquatic organisms and pathogens from ships' ballast water and associated sediments while protecting ships' safety.

4.2 The Guidelines allow port States to exempt ships within the area under their jurisdiction from part or all of the relevant provisions. Notwithstanding, any administration wishing to apply restrictions to ballast water operations should still follow these Guidelines, when developing legislation or procedures.

4.3 In order that the Guidelines may be implemented in a standard and uniform manner, all Member State Governments, ship operators, other appropriate authorities and interested parties are requested to apply these Guidelines.

5 Dissemination of information

5.1 Administrations are encouraged to maintain and exchange information relevant to these Guidelines through the Organization. Accordingly, administrations are encouraged to provide the Organization with the following:

.1 Information on severe outbreaks or infestations of harmful aquatic organisms which may pose a risk;

.2 Copies of current domestic laws and regulations;

.3 Technical and research information;

.4 Education materials (such as audio and video tapes) and printed materials; and

.5 Location and terms of use of alternative exchange zones, contingency strategies, availability of shore reception facilities, fees, etc.

5.2 Member States, applying ballast water and sediment discharge procedures, should notify the Organization of specific requirements and provide to the Organization, for the information of other Member States and non-governmental organizations, copies of any regulations, standards, exemptions or guidelines being applied. Verification and detailed information concerning port State requirements should be obtained by the ship prior to arrival.

5.3 Port State authorities should provide the widest possible distribution of information on ballast water and sediment management and treatment requirements that are being applied to shipping. Failure to do so may lead to unnecessary delays for ships seeking entry to port States.

5.4 Shipping organizations and ships' managers should be familiar with the requirements of port State authorities with respect to ballast water and sediment management and treatment procedures, including information that will be needed to obtain entry clearance.

5.5 Member States are invited to provide the Organization with details of any research and development studies that they carry out with respect to the impact and control of harmful aquatic organisms and pathogens in ships' ballast water and sediment.

5.6 Member States should provide to the Organization details of records describing reasons why existing requirements could not be complied with, e.g. force majeure, heavy weather, failure of equipment, or lack of information concerning port State requirements.

6 Training and education

6.1 Training for ships' masters and crews as appropriate should include instructions on the application of ballast water and sediment management and treatment procedures, based upon the information contained in these Guidelines. Instruction should also be provided on the maintenance of appropriate records and logs. Governments should ensure that their marine training organizations include this in the contents of their syllabus.

6.2 The application of processes and procedures concerning ballast water management are currently at the core of the solution to minimize the introduction of harmful aquatic organisms and pathogens.

6.3 Governments are encouraged to include knowledge of duties regarding the control of pollution of the sea by harmful aquatic organisms and pathogens in their training requirements for certificates.

7 Procedures for ships and port States

7.1 Procedures for ships

7.1.1 Every ship that carries ballast water should be provided with a ballast water management plan to assist in the minimization of transfer of harmful aquatic organisms and pathogens. The intent of the plan should be to provide safe and effective procedures for ballast water management.

7.1.2 The ballast water management plan should be specific to each ship.

7.1.3 The ballast water management plan should be included in the ship's operational documentation. Such a plan should address, *inter alia*:

- relevant parts of these Guidelines;
- approval documentation relevant to treatment equipment;
- an indication of records required; and
- the location of possible sampling points.

7.2 Procedures for port States

7.2.1 Reception and treatment facilities should be made available for the environmentally safe disposal of ballast tank sediments.

7.2.2 Discharge of ship's ballast water into port reception and/or treatment facilities may provide an acceptable means of control. Port State authorities wishing to utilize this strategy should ensure that the facilities are adequate.

8 Recording and reporting procedures

8.1 Procedures for ships

8.1.1 Where a port State authority requires that specific ballast water procedures and/or treatment option(s) be undertaken, and due to weather, sea conditions or operational impracticability such action cannot be taken, the master should report this fact to the port State authority as soon as possible and, where appropriate, prior to entering seas under its jurisdiction.

8.1.2 To facilitate the administration of ballast water management and treatment procedures on board each ship, a responsible officer should be appointed to maintain appropriate records and to ensure that ballast water management and/or treatment procedures are followed and recorded.

8.1.3 When taking on or discharging ballast water, as a minimum, the dates, geographical locations, ship's tank(s) and cargo holds, ballast water temperature and salinity as well as the amount of ballast water loaded or discharged should be recorded. A suitable format is shown in appendix 1. The record should be made available to the port State authority.

8.1.4 The location and suitable access points for sampling ballast or sediment should be described in the ship's ballast water management plan. This will allow crew members to provide maximum assistance when officers of the port State authority require a sample of the ballast water or sediment.

8.2 Procedures for port States

8.2.1 Consistent with 5.2 above, port States should provide ships with the following information:

- details of their requirements concerning ballast water management;
- location and terms of use of alternative exchange zones;
- any other port contingency arrangements; and
- the availability, location, capacities of and applicable fees relevant to reception facilities that are being provided for the environmentally safe disposal of ballast water and associated sediment.

8.2.2 To assist ships in applying the precautionary practices described in 9.1.1 below, port States should inform local agents and/or the ship of areas and situations where the uptake of ballast water should be minimized, such as:

- areas with outbreaks, infestations or known populations of harmful organisms and pathogens;
- areas with current phytoplankton blooms (algal blooms, such as red tides);
- nearby sewage outfalls;
- nearby dredging operations;
- when a tidal stream is known to be the more turbid; and
- areas where tidal flushing is known to be poor.

9 Ships' operational procedures

9.1 Precautionary practices

9.1.1 Minimizing uptake of harmful aquatic organisms, pathogens and sediments

When loading ballast, every effort should be made to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms. The uptake of ballast water should be minimized or, where practicable, avoided in areas and situations such as:

- areas identified by the port State in connection with advice relating to 8.2.2 above;
- in darkness when bottom-dwelling organisms may rise up in the water column;
- in very shallow water; or
- where propellers may stir up sediment.

9.1.2 Removing ballast sediment on a timely basis

Where practicable, routine cleaning of the ballast tank to remove sediments should be carried out in mid-ocean or under controlled arrangements in port or dry dock, in accordance with the provisions of the ship's ballast water management plan.

9.1.3 Avoiding unnecessary discharge of ballast water

If it is necessary to take on and discharge ballast water in the same port to facilitate safe cargo operations, care should be taken to avoid unnecessary discharge of ballast water that has been taken up in another port.

9.2 Ballast water management options

9.2.1 Ballast water exchange

Near-coastal (including port and estuarine) organisms released in mid-ocean, and oceanic organisms released in coastal waters, do not generally survive.

When exchanging ballast at sea, guidance on safety aspects of ballast water exchange as set out in appendix 2 should be taken into account. Furthermore, the following practices are recommended:

- where practicable, ships should conduct ballast exchange in deep water, in open ocean and as far as possible from shore. Where this is not possible, requirements developed within regional agreements may be in operation, particularly in areas within 200 nautical miles from shore. Consistent with 9.1.2 above, all of the ballast water should be discharged until suction is lost, and stripping pumps or eductors should be used if possible;
- where the flow-through method is employed in open ocean by pumping ballast water into the tank or hold and allowing the water to overflow, at least three times the tank volume should be pumped through the tank;

- where neither form of open ocean exchange is practicable, ballast exchange may be accepted by the port State in designated areas; and

- other ballast exchange options approved by the port State.

9.2.2 Non-release or minimal release of ballast water

In cases where ballast exchange or other treatment options are not possible, ballast water may be retained in tanks or holds. Should this not be possible, the ship should only discharge the minimum essential amount of ballast water in accordance with port States' contingency strategies.

9.2.3 Discharge to reception facilities

If reception facilities for ballast water and/or sediments are provided by a port State, they should, where appropriate, be utilized.

9.2.4 Emergent and new technologies and treatments

9.2.4.1 If suitable new and emergent treatments and technologies prove viable, these may substitute for, or be used in conjunction with, current options. Such treatments could include thermal methods, filtration, disinfection including ultraviolet light, and other such means acceptable to the port State.

9.2.4.2 Results concerning the application and effectiveness of new ballast water management technologies and associated control equipment should be notified to the Organization with a view to evaluation and incorporation, as appropriate, into these Guidelines.

10 Port State considerations

The following is provided for the guidance of port State authorities in the implementation of their ballast water management programme, and to assess risks in relation to the ballast water containing harmful aquatic organisms and pathogens.

10.1 Highly disparate conditions between uptake and discharge ports

Significantly different conditions may exist between port(s) of origin and the port in which ballast water is discharged. Examples include freshwater ballast being released into highly saline ports. There may be organisms capable of surviving such extreme transfers; however, there is a lower probability of species establishment under such transport events.

10.2 Ballast water age

The length of time during which ballast water is within an enclosed ballast tank may also be a factor in determining the number of surviving organisms, because of the absence of light, decreasing nutrients and oxygen, changes of salinity and other factors. However, the maximum length of survival of organisms in ballast water varies, and in many cases is not known. Water of an age of 100 days should be considered the minimum for applying this consideration. Ballast water and sediments may contain dinoflagellate cysts and other organisms capable of surviving for a much longer length of time.

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10.3 Presence of target organisms

10.3.1 Under certain circumstances it may be possible to determine if one or more target species are present in the water of a specific port and have been ballasted in a ship. In these circumstances, the receiving port State authority may invoke management measures accordingly. Even if such target species are not present, however, it should be noted that the ship may still be carrying many untargetted species which, if released in new waters, could be potentially harmful.

10.3.2 Port States are encouraged to carry out biological baseline surveys in their ports and to disseminate the results of their investigations.

11 Enforcement and monitoring by port states

11.1 Consistent with the precautionary approach to environmental protection, these Guidelines can apply to all ships unless specifically exempted by a port State authority within its jurisdiction. In accordance with 5.2 above, port State authorities should inform the Organization on how the Guidelines are being applied.

11.2 Member States have the right to manage ballast water by national legislation. However, any ballast discharge restrictions should be notified to the Organization.

11.3 In all cases, a port State authority should consider the overall effect of ballast water and sediment discharge procedures on the safety of ships and those on board. Guidelines will be ineffective if compliance is dependent upon the acceptance of operational measures that put a ship or its crew at risk. Port States should not require any action of the master which imperils the lives of seafarers or the safety of the ship.

11.4 It is essential that ballast water and sediment management procedures be effective as well as environmentally safe, practicable, designed to minimize costs and delays to the ship, and based upon these Guidelines whenever possible.

11.5 Any instructions or requirements of a ship should be provided in a timely manner and be clear and concise.

11.6 Port States should on request provide a visiting ship with any requested information relative to ballast water management and its potential effects with respect to harmful aquatic organisms and pathogens.

11.7 Any enforcement or monitoring activities should be undertaken in a fair, uniform and nationally consistent manner at all ports within the port State. Where there are compelling reasons whereby nationally consistent procedures cannot be followed, then deviations should be reported to the Organization.

11.8 Compliance monitoring should be undertaken by port State authorities by, for example, taking and analysing ballast water and sediment samples to test for the continued survival of harmful aquatic organisms and pathogens.

11.9 Where ballast water or sediment sampling for compliance or effectiveness monitoring is being undertaken, port State authorities should minimize delays to ships when taking such samples.

11.10 When sampling for research or compliance monitoring, the port State authority should give as much notice as possible to the ship that sampling will occur, to assist in planning staffing and operational resources.

11.11 The master has a general obligation to provide reasonable assistance for the above monitoring which may include provision of officers or crew, provision of the ship's plans, records pertaining to ballast arrangements and details concerning the location of sampling points.

11.12 Sampling methods for research and monitoring is the responsibility of the individual port State. The Organization welcomes information on new or innovative methods of sampling and/or analysis, and any relevant information should be provided to it.

11.13 Port State authorities should indicate to the master or responsible officer the purpose for which a sample is taken (i.e., monitoring, research or enforcement). Results of analyses of samples should be made available to ship's operators on request.

11.14 Port State authorities may sample or require samples to analyse ballast water and sediment, before permitting a ship to proceed to discharge its ballast water in environmentally sensitive locations. In the event that harmful aquatic organisms or pathogens are found to be present in the samples, a port State's contingency strategy may be applied.

12 Future considerations in relation to ballast water exchange

12.1 Research needs

Operational measures such as ballast water exchange may be appropriate in the short term; however, there is a clear need for further research. These Guidelines should be revised and adjusted in the light of results concerning new ballast water management options.

12.2 Long-term evaluation of safety aspects in relation to ballast water exchange

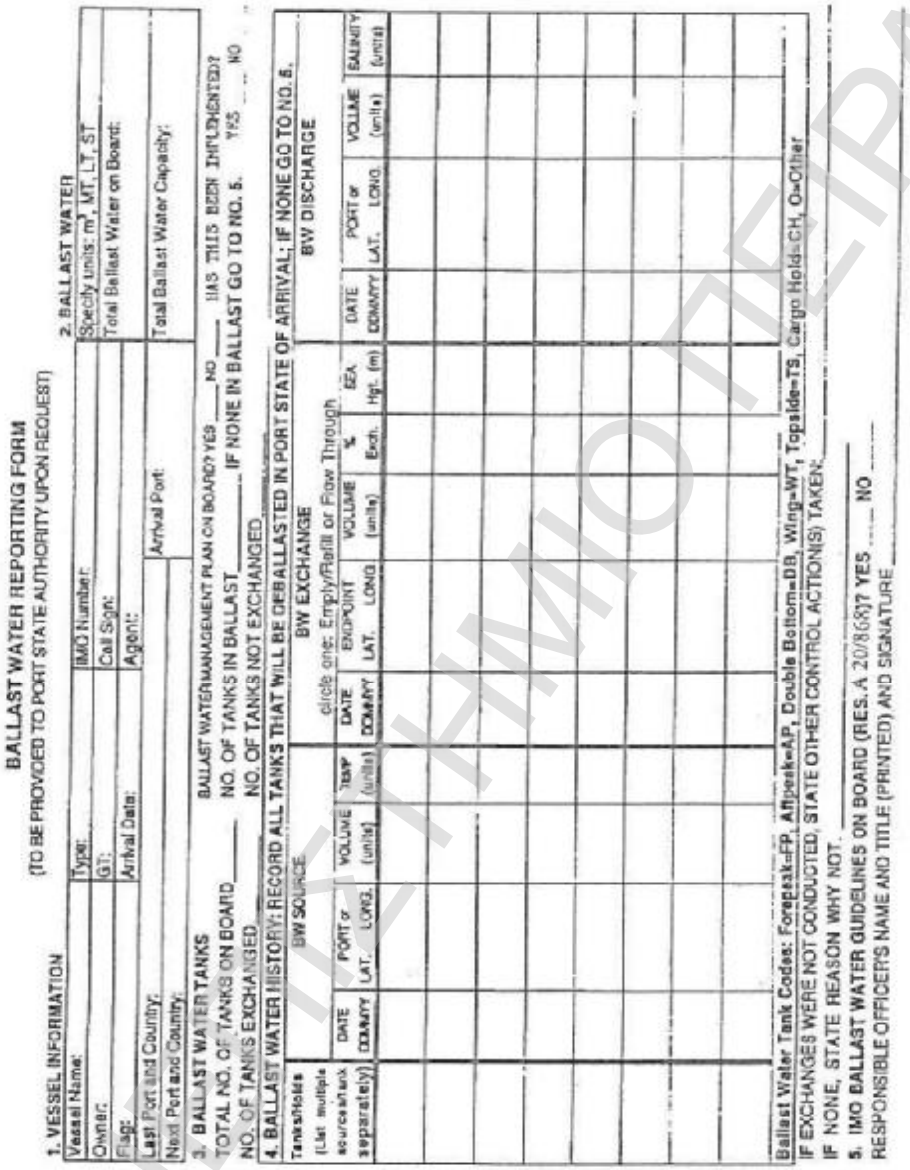
Recognizing the need to evaluate the hazards and potential consequences for various types of ships and operations, interested parties should carry out detailed studies and provide information relevant to:

- experience gained from carrying out ballast water exchange at sea, including any samples/model procedures;
- operational precautions and procedures implemented to avoid potential hazards and consequences that may arise during the ballast water exchange at sea;
- an evaluation of the safety margins between the actual metacentric height and stresses versus the allowable seagoing limits specified in the approved trim and stability booklet and loading manual, relevant to different types of ships and loading conditions;
- any hazards which may arise due to human element issues relative to the responsible execution of ballast water exchange at sea in a manner which may not be fully prudent;
- operational procedures carried out prior to initiating the ballast water exchange at sea and check points during the exchange;
- the extent of training and management necessary to ensure that the process of ballast water exchange at sea is effectively monitored and controlled on board;
- plan of action to incorporate any unique procedures should an emergency occur which may affect the exchange of ballast water at sea; and
- the decision-making process, taking into account relevant safety matters, including ship's position, weather conditions, machinery performance, ballast system inspection and maintenance, crew safety and availability.

13 Ballast system design

Builders, owners and classification societies should take these Guidelines into consideration when designing new ships or modifying existing ships.

APPENDIX 1



BALLAST WATER REPORTING FORM
(TO BE PROVIDED TO PORT STATE AUTHORITY UPON REQUEST)

1. VESSEL INFORMATION

Vessel Name:	Type:	IMO Number:	
Owner:	GT:	Call Sign:	
Flag:	Arrival Date:	Agent:	
Last Port and Country:		Arrival Port:	
Next Port and Country:			

2. BALLAST WATER
Specify units: m³, MT, LT, ST
Total Ballast Water on Board:
Total Ballast Water Capacity:

3. BALLAST WATER TANKS
BALLAST WATER MANAGEMENT PLAN ON BOARD? YES ___ NO ___ HAS THIS BEEN IMPLEMENTED?
TOTAL NO. OF TANKS ON BOARD ___ NO. OF TANKS IN BALLAST ___ IF NONE IN BALLAST GO TO NO. 5. YES ___ NO ___
NO. OF TANKS EXCHANGED ___ NO. OF TANKS NOT EXCHANGED ___

4. BALLAST WATER HISTORY: RECORD ALL TANKS THAT WILL BE DEBALLASTED IN PORT STATE OF ARRIVAL; IF NONE GO TO NO. 5.

Tanks/holds (List multiple sources/tank separately)	BW SOURCE				BW EXCHANGE (circle one: Empty/Refill or Flow Through)						BW DISCHARGE				
	DATE DD/MM/YY	PORT or LAT. LONG.	VOLUME (units)	TEMP (units)	DATE DD/MM/YY	PORT or ENDPOINT LAT. LONG.	VOLUME (units)	% Exch.	SEA Hgt. (m)	DATE DD/MM/YY	PORT or LAT. LONG.	VOLUME (units)	SALINITY (units)

Ballast Water Tank Codes: Forepeak=FP, Aftpeak=AP, Double Bottom=DB, Wing=WT, Topside=TS, Cargo Hold=CH, O=Other
IF EXCHANGES WERE NOT CONDUCTED, STATE OTHER CONTROL ACTION(S) TAKEN: ___
IF NONE, STATE REASON WHY NOT: ___

5. IMO BALLAST WATER GUIDELINES ON BOARD (RES. A 20/868)? YES ___ NO ___
RESPONSIBLE OFFICER'S NAME AND TITLE (PRINTED) AND SIGNATURE ___

APPENDIX 2

GUIDANCE ON SAFETY ASPECTS OF BALLAST WATER EXCHANGE AT SEA

1 Introduction

1.1 This document is intended to provide guidance on the safety aspects of ballast water exchange at sea. The different types of ships which may be required to undertake ballast water exchange at sea make it presently impractical to provide specific guidelines for each ship type. Shipowners are cautioned that they should consider the many variables that apply to their ships. Some of these variables include type and size of ship, ballast tank configurations and associated pumping systems, trading routes and associated weather conditions, port State requirements and manning.

1.2 Ballast water exchange at sea procedures contained in relevant management plans should be individually assessed for their effectiveness from the environmental protection point of view as well as from the point of view of their acceptability in terms of structural strength and stability.

1.3 In the absence of a more scientifically based means of control, exchange of ballast water in deep ocean areas or open seas currently offers a means of limiting the probability that fresh water or coastal aquatic species will be transferred in ballast water. Two methods of carrying out ballast water exchange at sea have been identified:

.1 the sequential method, in which ballast tanks are pumped out and refilled with clean water; and/or

.2 the flow-through method, in which ballast tanks are simultaneously filled and discharged by pumping in clean water.

2 Safety precautions

2.1 Ships engaged in ballast water exchange at sea should be provided with procedures which account for the following, as applicable:

.1 avoidance of over and under-pressurization of ballast tanks;

.2 free surface effects on stability and sloshing loads in tanks that may be slack at any one time;

.3 admissible weather conditions;

.4 weather routeing in areas seasonably affected by cyclones, typhoons, hurricanes, or heavy icing conditions;

.5 maintenance of adequate intact stability in accordance with an approved trim and stability booklet;

.6 permissible seagoing strength limits of shear forces and bending moments in accordance with an approved loading manual;

.7 torsional forces, where relevant;

.8 minimum/maximum forward and aft draughts;

.9 wave-induced hull vibration;

.10 documented records of ballasting and/or de-ballasting;

.11 contingency procedures for situations which may affect the ballast water exchange at sea, including deteriorating weather conditions, pump failure, loss of power, etc.;

.12 time to complete the ballast water exchange or an appropriate sequence thereof, taking into account that the ballast water may represent 50 % of the total cargo capacity for some ships; and

.13 monitoring and controlling the amount of ballast water.

2.2 If the flow through method is used, caution should be exercised, since:

.1 air pipes are not designed for continuous ballast water overflow;

.2 current research indicates that pumping of at least three full volumes of the tank capacity could be needed to be effective when filling clean water from the bottom and overflowing from the top; and

.3 certain watertight and weathertight closures (e.g. manholes) which may be opened during ballast exchange, should be re-secured.

2.3 Ballast water exchange at sea should be avoided in freezing weather conditions. However, when it is deemed absolutely necessary, particular attention should be paid to the hazards associated with the freezing of overboard discharge arrangements, air pipes, ballast system valves together with their means of control, and the accretion of ice on deck.

2.4 Some ships may need the fitting of a loading instrument to perform calculations of shear forces and bending moments induced by ballast water exchange at sea and to compare with the permissible strength limits.

2.5 An evaluation should be made of the safety margins for stability and strength contained in allowable seagoing conditions specified in the approved trim and stability booklet and the loading manual, relevant to individual types of ships and loading conditions. In this regard particular account should be taken of the following requirements:

.1 stability to be maintained at all times to values not less than those recommended by the Organization (or required by the Administration);

.2 longitudinal stress values not to exceed those permitted by the ship's classification society with regard to prevailing sea conditions; and

.3 exchange of ballast in tanks or holds where significant structural loads may be generated by sloshing action in the partially filled tank or hold to be carried out in favourable sea and swell conditions so that the risk of structural damage is minimized.

2.6 The ballast water management plan should include a list of circumstances in which ballast water exchange should not be undertaken. These circumstances may result from critical situations of an exceptional

nature, *force majeure* due to stress of weather, or any other circumstances in which human life or safety of the ship is threatened.

3 **Crew training and familiarization**

3.1 The ballast water management plan should include the nomination of key shipboard control personnel undertaking ballast water exchange at sea.

3.2 Ships' officers and ratings engaged in ballast water exchange at sea should be trained in and familiarized with the following:

.1 the ship's pumping plan, which should show ballast pumping arrangements, with positions of associated air and sounding pipes, positions of all compartment and tank suctions and pipelines connecting them to ship's ballast pumps and, in the case of use of the flow through method of ballast water exchange, the openings used for release of water from the top of the tank together with overboard discharge arrangements;

.2 the method of ensuring that sounding pipes are clear, and that air pipes and their non-return devices are in good order;

.3 the different times required to undertake the various ballast water exchange operations;

.4 the methods in use for ballast water exchange at sea if applicable with particular reference to required safety precautions; and

.5 the method of on-board ballast water record keeping, reporting and recording of routine soundings.

APPENDIX 5: BLANK FORMS:

1. **Ballast Water Handling Log**
2. **Sediment Removal And Tank Flushing Log**
3. **Ballast Water Reporting Form**
4. **Ballast Exchange Notification Form**
5. **Ballast Exchange Plan**
6. **Training Record Form**

Ballast Water Handling Log

BALLAST WATER HANDLING LOG

Record of ballast water management on board

Ship ..... Port of Registry ..... IMO number .....

TANK LOCATION	DATE	INITIAL CONTENT (tonnes)	FINAL CONTENT (tonnes)	GEOGRAPHIC LOCATION OF SHIP (Port or Lat. & Long.)	PUMPS USED, or GRAVITATE	DURATION OF OPERATION	SALINITY	SIGNATURE OF OFFICER IN CHARGE	RANK

BALLAST WATER HANDLING LOG

Narrative record of events related to ballast water management on board

Ship ..... Port of Registry .... IMO number .....

Record here events which are relevant to ballast management, and which will be of interest to quarantine officers, such as sediment removal during drydock, or tank flushing at sea. Each entry should be completed with the signature and rank of the officer making the entry.

Date	Activity	Comments

Sediment Removal And Tank Flushing Log

Ship	*SPARTAN WARRIOR*	Port of Registry	*MONROVIA*	IMO number	*9030993*

TANK(S)	DATE	ACTIVITY	GEOGRAPHIC LOCATION (Port or Lat. & Long.)	SIGNATURE OF OFFICER IN CHARGE	RANK

Ballast Water Reporting Form (To be provided to the Port State Authority upon request)

1. SHIP INFORMATION

Ship's Name:	*SPARTAN WARRIOR*	Type:	*OIL TANKER*	IMO Number:	*9030993*	Specify Units: M^3, MT, LT, ST
Operator:		Gross Tonnage:	*159.766*	Call Sign:	*ELLB2*	Total Ballast Water on Board:
Flag:	*LIBERIA*	Arrival Date:		Agent:		
Last Port and Country:				Arrival Port:		Total Ballast Water Capacity:
Next Port and Country:						

2. BALLAST WATER

3. BALLAST WATER TANKS

Ballast Water Management Plan on board? YES ☐ NO ☐
Management Plan Implemented? YES ☐ NO ☐
Total number of ballast tanks on board: _____ No. of tanks in ballast:_____ IF NONE IN BALLAST GO TO No. 5.
No. of tanks exchanged: _____ No. of tanks not exchanged_____

4. BALLAST WATER HISTORY: RECORD ALL TANKS THAT WILL BE DE-BALLASTED IN PORT STATE OF ARRIVAL; IF NONE GO TO No. 5.

Tanks / Holds (List multiple sources per tank separately)	**BALLAST WATER SOURCE**				**BALLAST WATER EXCHANGE Circle one: Empty/Refill or Flow Through**					**BALLAST WATER DISCHARGE**			
	DATE DDMMYY	Port or Lat/Long	Volume (M^3)	Temp (M^3)	DATE DDMMYY	Endpoint Lat/Long	Volume (M^3)	% Exch.	Sea Hgt. (m)	DATE DDMMYY	Port or Lat/Long	Volume (M^3)	Salinity (units)

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP; Bottom Side = BS; Top Side = TS; Cargo Hold = CH; Other = O

IF EXCHANGES WERE NOT CONDUCTED, STATE OTHER CONTROL ACTION(S) TAKEN: _____

IF NONE STATE REASON WHY NOT: _____

5. IMO BALLAST WATER GUIDELINES ON BOARD (RES. A.868(20))? YES ☐ NO ☐

RESPONSIBLE OFFICER'S NAME, TITLE (PRINTED) AND SIGNATURE: _____

Guidelines For Completing The Ballast Water Reporting Form

Ship Information

Ship's Name: Print the name of the ship.
Owner: The registered owners or operators of the ship.
Flag: Country of the port of registry.
Last Port and Country: Last port and country at which the ship called before arrival in the current port - no abbreviations, please.
Next Port and Country: Next port and country at which the ship will call, upon departure from the current port - no abbreviations, please.
Type: List specific ship type, write out or use the following abbreviations:
bulk(bc); roro (rr); container (cs); tanker(ts); passenger (pa); oil/bulk ore (ob); general cargo (gc). Write out any additional ship types.
GT: Gross tonnage.
Arrival Date: Arrival date at current port. Please use the European date format (DDMMYY)
IMO Number: Identification Number of the ship used by the International Maritime Organization.
Call Sign: Official call sign.
Agent: Agent used for this voyage.
Arrival Port: This is the current port. No abbreviations, please.

Ballast Water

(Note: Segregated ballast water = clean, non-oily ballast)
Total ballast water on board: Total segregated ballast water upon arrival at current port - with units.
Total ballast water capacity: Total volume of all ballastable tanks or holds - with units.
Ballast Water Tanks: Count all tanks and holds separately (e.g. port and starboard tanks should be counted separately).
Total No. of Tanks on board: Count all tanks and holds that can carry segregated ballast water.
Ballast Water Management Plan on board?: Do you have a ballast water management plan, specific to your ship, onboard? Circle Yes or No.
Management Plan Implemented?: Do you follow the above plan? Circle Yes or No.
No. of Tanks in Ballast: Number of segregated ballast water tanks and holds with ballast at the start of the voyage to the current port. If you have no ballast water on board, go to Section 5.
No. of Tanks Exchanged: This refers only to tanks and holds with ballast at the start of the voyage to the current port.
No. of Tanks Not Exchanged: This refers only to tanks and holds with ballast at the start of the voyage to the current port.

Ballast Water History

BW Source: Please list all tanks and holds that you have discharged or plan to discharge in this port. Carefully write out, or use codes listed below the table. Follow each tank across the page, listing all source(s), exchange events, and/or discharge events separately. If the ballast water history is identical (i.e. the same source, exchange and discharge dates and locations), sets of tanks can be combined (example: wing tank 1 with wing tank 2, both water from Belgium, exchanged 02.11.97, mid ocean). Please use an additional page if you need, being careful to include the arrival date, ship's name and IMO number at the top.
Date: Date of ballast water uptake. Use European format (DDMMYY).
Port or Latitude/Longitude: Location of ballast water uptake.
Volume: Volume of ballast water uptake, with units.
Temperature: Water temperature at time of ballast water uptake, in degrees centigrade (Celsius).
BW Exchange: Indicate Exchange Method: Circle empty/ refill or flow through.
Date: Date of ballast water exchange. Use European format (DDMMYY).
Endpoint or Latitude/Longitude: Location of ballast water exchange. If it occurred over an extended distance, list the end point latitude and longitude.
Volume: Volume of ballast water exchanged, with units.

Guidelines For Completing The Ballast Water Reporting Form

Percentage exchanged: Percentage of ballast water exchanged. Calculate this by dividing the number of units of water exchanged by the original volume of ballast water in the tank. If necessary, estimate this based on pump rate. (Note: For effective flow-through exchange this value should be at least 300%).
Sea Height (m): Record the sea height in meters at the time of the ballast exchange (Note: This is the combined height of the wind seas and swell, measured from crest to trough. It does not refer to the depth.)

BW Discharge:

Date: Date of ballast water discharge. Use European format (DDMMYY).
Port or Latitude/Longitude: Location of ballast water discharge, no abbreviations for ports.
Volume: Volume of ballast water discharged, with units.
Salinity: Record salinity of ballast water at the time of discharge, with units, (i.e. specific gravity (sg) or parts per thousand (ppt)).
If exchanges were not conducted, state other control action(s) taken: If exchanges were not made on all tanks and holds to be discharged, what other actions were taken? E.g. transfer of water to a land based holding facility, or other approved treatment.
If none, state reasons why not: List specific reasons why ballast exchange was not done. This applies to all tanks and holds being discharged.
IMO Ballast Water Guidelines On Board?: Do you have IMO Resolution A.868(20) on board your ship? Circle Yes or No.
Responsible Officer's name and title (Printed) and signature: e.g. the First Mate, Captain, or Chief Engineer must print his name and title and sign the form.

Ballast Exchange Notification Form

SHIP: *SPARTAN WARRIOR* **VOYAGE:** _____ **DATE:** _____

TO: _____

ATTN: _____

FROM: **Ballast Water Management Officer** _____

NOTIFICATION OF BALLAST WATER EXCHANGE PRIOR ARRIVAL AT DESTINATION

LOCATION FOR BALLAST WATER EXCHANGE: **Latitude:** _____ **Longitude:** _____

BALLAST WATER EXCHANGE METHOD: **SEQUENTIAL** **COMBINED** **FLOW-THROUGH**
(Select one or both boxes, as appropriate) ☐ ☐ ☐

BALLAST WATER EXCHANGE DURATION: **COMMENTS WITH RESPECT TO SHIP SAFETY, IF ANY:**

COMMENCED AT: _____ _____

INTERRUPTED AT (if applicable): _____ _____

COMPLETED AT: _____ _____

Ballast Exchange Plan

W.B.T.	W.B.T.	W.B.T.	W.B.T.	W.B.T.	W.B.T.	W.B.T.	FO/DO/ LO/FW	Draft Aft	Trim	Draft Fwd	Stability Criteria	S.W.B.M.	S.W.S.F.	Prop. Imm.	Invisible Length	Estimated Time	Remarks
A.P.T.	AFT B.W.T (P)	AFT B.W.T (S)	No.2 P / S	No.4 P / S	C.O.T.No. 3 (C)	F.P.T.	MT	m	m	>9.03 m		%	%	%	<500 m	hours	
Initial Condition																	
STEP 1:																	
STEP 2:																	
STEP 3:																	
STEP 4:																	
STEP 5:																	
STEP 6:																	
STEP 7:																	
STEP 8:																	
BALLAST PUMPS IN USE							**Ballast/ Center Co Pump**			**5000m^3/hr**	**Fire Pump**		**290m^3/hr**	**Educt. Str.**	**400m^3/hr**		
INDEX																	

E		Empty	**F**	Full	Note: When two tanks are shown in one collumn status is seperated by"/".(eg F/F)
S		Slack	**C**	Changed	

Note 1: The Master is advised that bridge visibility forward will be reduced during this step/sequence. This step/sequence is to be carried out during daylight hours, up to moderate sea and weather and lookouts to be posted forward, in radio communication with the bridge.See appendix 6.

Note 2: Where two ballast pumps are used for filling purposes, when the fill level reaches 80% - 90%, then one of the pumps is to be deployed.

Note 3: Minimum forward draft criteria is not satisfied. This step / sequence is to be carried out up to moderate sea. (see also paragraph 6.4 of the manual).See appendix 6.

Note 4: The Master is advised to verify the tanks shown as "e" or "E" are totally empty and tanks shown as "f" or "F" are totally full, at the start and end of the step / sequence.

Note 5: Manholes to be opened during the operation. Opening of manholes in fair weather and sea conditions could nevertheless compromise the watertight integrity of the deck. The responsibility for this action rests with the Master and proper seamanship is to be used in order to ensure that a procedure is followed for confirming that the manholes are closed after the work is completed.

Note 6: Propeller immersion is not fullfilled.The Master is to be advised that all necessary precautions will have to be taken during these sequences.See appendix 6.

Note 7: In case that Flow Trough method is being used, it is necessary prior to this operation to open the water tight manhole cover(s)/access openings of the correspoding tank in order to mitigate risk of over pressurisation. On completion of each tank's ballast exchange manhole(s) must be re-secured.

Note 8: For safety reasons it is strongly recommended that access openings/manhole cover(s) on upper deck should not be used as overflow discharge, unless a blank flange with a seat are fitted to the access cover so that a portable overflow pipe with 90 degrees elbow can be connected during the flow through operation.

Training Record for Ballast Water Management Manual					
Date	**Name**	**Rank**	**Signature**	**Remarks**	**Verified By**
MASTER SIGNATURE		**DATE:**		**SHIPS STAMP**	

APPENDIX 1: NATIONAL OR LOCAL QUARANTINE REQUIREMENTS FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS (Including MSC Circ 1145)

General

This Appendix includes national and local requirements from different countries in alphabetical order. Most of the information is based on ICS / INTERTANKO's model ballast water plan from November 1997, however some updated information is included.

It is proposed that the vessel's personnel include relevant information from their own experience with different port states in this appendix. New information from other sources may be included here.

Some of the port states have made information regarding their requirements available on the internet. Their home page addresses may be found in the table below and on print outs included for that particular country. Printout from their internet pages is also included in this appendix.

Please note that some of the requirements may have changed without our knowledge. There may also be countries not included in this appendix that have recently introduced new requirements. If approaching a port, in which the ship has no previous experience on ballast water practice, it is wise to contact the local authorities in advance.

This section must be regularly reviewed and updated by the ship and the management company, as information becomes available.

Summary on existing national, regional or local quarantine requirements for ballast water

Country	Authority	Ports/ ships affected	Implementation	Methods	Sampling	Reference/ Further
Argentina	*Direccion Nationalde Sanidad de Fronteras, del Ministerio de Salud Publica*	*Buenos Aires/ Ships arriving from areas where cholera is epidemic*	*Mandatory (1990)*	*In tank treatment by adding chlorine to ballast water through air pipes*	*Random by authorities*	*New regulations are imposed under Ordinance No. 13. 12-97 dated 5th. january 1998 (Rules for the Protection of the Environment)*
Australia	*AQIS (Australian Quarantine and Inspection Service)*	*All/All*	*Mandatory (2001)*	*Exchange, deep ocean areas*	*Target/ random/ mandatory supervised by AQIS*	*AQIS Australian Ballast Water Management Requirements* *http://www.affa.gov.au/docs/quarantine/shipping.html*
Canada	*Transort Canada, Marine Safety Directorate.*	*All vessels bound for Canadian ports.*	*Mandatory (2000)*	*Exchange deep ocean areas (greater than 2000 m.) (some exceptions)*	*None required by ship*	"TP 13617 Guidelines for the Control of Ballast Water Discharge from Ships under Canadian Jurisdiction" *http://www.tc.gc.ca/MarineSafety/Directorate/tp/toc_e.htm*
Chile	*Chilean Navy*	*All/ All ships coming from abroad, ballasted with sea water.*	*Mandatory application (1995)*	*Exchange, deep ocean areas.*	*Not defined*	*Chilean declaration DGTM. And MM.ORD.NO. 12600/228 VRS. Order for Preventive Measures to Avoid Transmission of Harmful Organisms and Epidemics by Ballast Water. 10th. August 1995.*
Israel	*Ministry of transport*	*All/ All*	*Mandatory application (1994)*	*Exchange, deep ocean areas. Ships bound for Eilat must exchange outside of the Red Sea when practical.*	*Not defined*	*Israel notice to Mariners No. 4/96 dated 19th. April 1996.*
New Zealand	*New Zealand Ministry of Fisheries*	*All/ All ships entering New Zealand territorial waters loaded with territorial water of another country*	*Compliance with guidelines. Import health standard for ballast water come into force on April 30, 1998.*	*Exchange, deep ocean areas/ use of fresh water/ use of approved on-shore treatment facility/ Use of approved in-tank treatment/ discharge into approved non-exchange zone.*	*Not defined*	*A Guide to New Zealand Ballast Water Control* *Http://www.fish.govt.nz/sustainability/ballast/ballastwater.htm#Discharge*
United Kingdom	*Orkney Island Council*	*All ships visiting Flotta Terminal in ballast. Exemption, Liquefied gas carriers.*	*Mandatory application (1998)*	*Discharge to shore reception facility*	*None*	*Flotta Terminal Port information Book (EEP. UK plc.)*

Country	Authority	Ports/ ships affected	Implementation	Methods	Sampling	Reference/ Further
USA*	USCG (US Coast Guard).	All / All	Mandatory in Great Lakes and Hudson River (North of George Washington bridge). Voluntary elsewise (for 3 years from 1998.) Reporting is mandatory	Complete exchange outside US EEZ on depth of 2000 m or deeper/ Retain ballast water on board/ Complete exchange in alternative designated areas/ Alternative ballast water management practises approved in advance by USCG.	USCG might sample ballast water and sediments.	US Code of Federal Regulations (33 CFR Part 151, Subpart C./ US NoOndigenous Aquatic Nuisance Prevention and Control Act (16 US Code 4701, et seq. US Invasive Species Act 1996 Commandant, Office of Response (G-MOR); United States Coast Guard 2100 2nd. Street, Southwest, Room 3100. Washington DC 20593-0001 http://www.uscg.mil/hq/g-m/mso/mso4/bwbrochure.html Interim Rule, July 1st. 1999

* *California: California state bill (1999) ban discharge of ballast water into state waters unless the vessel concerned has a ballast water discharge permit. From 1 st. April 2000, Master must submit a ballast water report when entering state waters. From December 2002, no ballast water that contain "live exotic ballast water organisms" may be discharged into state waters (exemption rel to safety). After January 2003 terminals are required to start building treatment facilities. (further reading; California Water Resources Control Board)*

Information shown:

1. Country or locality
2. Monitoring Authority
3. Ports Affected
4. Ships Affected
5. Implementation
6. Date of Start
7. Methods Acceptable
8. Are unwanted aquatic organisms or pathogens defined ?
9. Are uptake control measures specified ?
10. What sampling is required ?
11. What records are required
12. What procedure must be undertaken if *en route* treatment or exchange is not possible ?
13. What procedures should be undertaken if ballast is found to be unacceptable after testing?
14. Further information.

Argentina - Buenos Aires:

Monitoring Authority:
Direccion Nacional de Sanidad de Fronteras, del Ministerio de Salud Publica (quarantine authorities from the ministry of public health).

Ports affected: Buenos Aires.

Ships affected: Ships arriving from areas where cholera is endemic.

Implementation Mandatory.

Date of start: About 1990

Methods acceptable:
In-tank treatment by adding chlorine to ballast water through air pipes.

Unwanted aquatic organisms or pathogens: Not known.

Uptake control measures: Not known whether any specified.

Sampling required: Random, by Argentine authorities.

Records required: Not known

Procedures if en route management is not possible: Not applicable.

Procedure if ballast water found to be unacceptable after sampling:
Not applicable

For further information refer to: Not known.

General

Ships should note that new regulations will be introduced in the near future, under Ordinance No. 12-97, dated 7th January 1998, entitled “Rules for the Protection of the Environment”. The regulations will designate coastal areas in which discharge of ballast water will be prohibited. The areas in question are generally small and mostly comprise enclosed bays.

Ships should seek the latest information from their agents prior to arrival.

In exceptional circumstances, condition of discharge may be specified by the appropriate regional authority as noted in Annexes II to IV of the enclosed Guidelines.

Procedure if ballast water found to be unacceptable after sampling:

Not applicable.

For further information refer to:

"Canadian Guidelines for the control of Ballast Water Discharges from Ships in Waters under Canadian Jurisdiction" (enclosed).

Australian Government
Australian Quarantine and Inspection Service

Australian Ballast Water Management Requirements

Edmund Barton Building Barton ACT GPO Box 858 Canberra ACT 2601 ph +61 2 6272 3933 **www.aqis.gov.au** ABN 24 113 085 695

DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY

Contents

Introduction

On July 1 2001, Australia introduced mandatory ballast water management requirements (the requirements) to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ship's ballast water.

Background

The Australian Quarantine and Inspection Service (AQIS) is the lead agency for the management of ballast water taken up overseas. Part of AQIS' charter is to ensure that foreign ballast water has been managed in accordance with the requirements before permitting its discharge inside Australia's territorial sea (12 nautical limit generally applies).

The requirements incorporate a 'Ballast Water Decision Support System' (BWDSS) - a computer application that can provide vessels with a risk assessment of their ballast water and deem it to be acceptable for discharge or otherwise. Use of the BWDSS is not mandatory.

Any ballast water that has been exchanged at sea by an approved method is deemed to be acceptable for discharge in Australian ports / waters.

Revised ballast water reporting and verification systems also form an integral part of Australian requirements.

Australian ballast water management requirements are consistent with International Maritime Organisation (IMO) Guidelines for minimising the translocation of harmful aquatic species in ships' ballast water.

Safety of vessels and crews are of paramount importance. Vessels undertaking ballast water management to comply with Australian requirements should do so in accordance with the IMO Guidelines.

Australia's new ballast water management requirements have legislative backing and will be enforced under the *Quarantine Act 1908*.

What the new arrangements mean for the shipping industry

Mandatory ballast water management requirements

All internationally trading vessels are required to manage their ballast water in accordance with AQIS requirements. **The discharge of high-risk ballast water in Australian ports or waters is prohibited.**

High Risk Ballast Water

AQIS deems all salt water from ports (or coastal waters) outside Australia's territorial sea to present a "high-risk" of introducing exotic marine pests into Australia. The discharge of high-risk ballast water from ships is prohibited anywhere inside Australia's territorial seas (12 nautical mile limit generally applies).

Ballast water of the following types is deemed by AQIS to be "low-risk":

- Fresh Water from any source
- Ballast Water that has been assessed as "low-risk" for discharge (at specified ports / locations on specified dates) by the BWDSS
- Ballast Water that has been exchanged at an approved location (mid-ocean) by an approved method
- Ballast Water taken up in mid-ocean
- Ballast Water taken up inside Australia's territorial seas*.

**AQIS is a Federal Government agency. AQIS ballast water management requirements do not regulate ballast water taken up inside Australia's territorial sea. Victoria, one of six Australian States, has additional requirements for the management of ballast water. These additional requirements are enforced by the Victorian State Government and involve management and reporting of ballast water taken up in Australian waters. At the time of printing, Victorian State requirements regulate the discharge of Australian domestic ballast water only in the port of Hastings (Western Port). The Victorian State Government plans to roll out the Hastings requirements to each of its other three commercial ports (viz: Melbourne, Geelong and Portland) later in 2004. Australia's other State / Territory Governments may enact similar laws in the future to regulate the movement of Australian domestic ballast water.*

Mariners should ascertain if any State / Territory Government ballast water management requirements (over and above AQIS' requirements) need to be met for calls at any Australian port on their vessel's itinerary.

Ballast water management options

Mariners may elect to use any of the following ballast water management options – which have all been approved by AQIS:

1. Ballast Water Decision Support System (BWDSS)

Receive a tank-by-tank risk assessment from the BWDSS that deems the ballast water on board to be low-risk. Instructions for the use of the BWDSS may be found in the BWDSS Instruction Guide included in this information package.

2. Non-discharge of 'high-risk' ballast water in Australian ports or waters

Vessels that do not need to discharge any ballast water in Australian waters do not need to carry out any management of foreign ballast water. Mariners are cautioned that permission to discharge high-risk ballast will not be given under any circumstances. It is therefore considered prudent to manage all ballast water on board a vessel as if it may need to be discharged in Australian waters. In the event of unforeseen circumstances, whereby it becomes necessary to discharge some ballast water, permission to do so may be sought and granted provided the ballast water in question has been managed to make it low-risk prior to arrival in Australian waters.

Vessels carrying high-risk ballast water through Australian ports may be required, at their own expense, to employ independent marine surveyors on arrival and departure from Australia to formally certify that no high-risk ballast water has been discharged during the vessel's visit to Australia.

3. Tank-to-tank transfer

It is permissible to move high-risk ballast water around from tank-to-tank within a ship. Masters of vessels that use this procedure must be vigilant to ensure that the risk of unauthorised ballast discharge, during ballast transfer operations, is assessed and managed appropriately.

4. Full ballast water exchange at sea

- Sequential exchange (empty/refill) method
- Flow through method
- Dilution method.

Each of these methods has been tested and has demonstrated results of achieving the necessary 95% (or better) volumetric exchange of high-risk ballast water. Ballast exchanges ***must*** be conducted outside the Australian 12 nautical mile limit. It is also ***recommended*** that ballast exchanges be conducted as far as possible away from shore and in water at least 200m deep.

• **Sequential Exchange (empty / refill):** This method involves emptying tanks (a few at a time) of high-risk ballast water at sea before refilling them with clean water from the deep ocean. It is important to ensure that the ballast mix achieved by this method contains no more than 5% of high-risk ballast water.

Soundings of tanks should be recorded at the end of the 'emptying phase' so that the make up of the ballast mixture may be verified by AQIS on arrival in an Australian port.

Not all ships are able to empty ballast tanks at sea for safety reasons. Masters should ensure their ships' safety at every stage of a sequential exchange operation.

• Flow-Through Method:

300% of a tank's full capacity of clean water from the deep ocean must be pumped into each tank to achieve an acceptable 95% volumetric exchange.

Even when, at the start of a flow through operation, a tank is only partially filled with high-risk ballast water, **300% of full capacity** must still be pumped into the tank to comply with Australian requirements. The 300% capacity is measured from when water begins to flow into a tank. In the case of a tank that is not completely full at the commencement of a flow through operation, 300% of the tank's full capacity still starts to be measured from when the pumps are started – not from when the tank starts to overflow.

AQIS will seek to verify that ballast exchanges have been properly carried out in accordance with the law. The verification process is an examination of records about ballast exchange operations that are kept by the ship.

Masters should pay attention to the following when conducting flow-through ballast exchanges:

Tanks may be flushed one at a time or in similar pairs. For example: Double Bottom Tanks 1 Port and Starboard may be pumped simultaneously using the same pump. It is not acceptable to flush dissimilar pairs of tanks (e.g. DBT1 P and DBT 2S) together. The reason for this is that dissimilar tanks being flushed together using a single pump would receive unequal quantities of water from the pump.

Estimating the quantity of water flushed through each tank involves estimating the delivery rate of ballast pumps and timing the hours of running of those pumps. It should be noted that pumps might not deliver their rated capacity – due to wear and tear on pumps / pipes etc. Masters should ensure that the pump delivery rate used in exchange calculations is the rate that has been experienced during recent ballast operations.

Actual pump delivery rates may be determined by observing the time it takes to pump a known quantity of water (eg. timing how long it takes from starting to fill an empty tank until it overflows).

Masters should ensure that ballast tanks are not pressurised beyond design specifications when using the flow-through method.

• Dilution Method:

Some vessels (mainly tankers) are fitted with extra piping / pumping arrangements. On some of these vessels, ballast may be pumped in through one side of a tank and out through the other simultaneously (pumping in / pumping out - as opposed to pumping in / simply overflowing out).

Flushing using two pumps is acceptable. As for "flow-through", 300% of each tank's full capacity must be flushed through for an acceptable exchange.

Safety Considerations

Where full ballast water exchange has not been undertaken due to safety reasons (weather, sea conditions or operational impracticability), the Master should report this to AQIS as soon as possible and certainly prior to entering Australia's territorial sea (12 nautical mile limit generally applies). Under no circumstances should this information be sent to AQIS any later than

transmission of the *Quarantine Pre-Arrival Report (QPAR)*. The QPAR must be forwarded to AQIS between 12 and 48 hours prior to arrival at an Australian port (see addresses at the end of this document).

Alternative Ballast Water Management Methods

Vessels wishing to use alternative methods not specified above should apply in writing to AQIS before the event. Vessels arriving in Australian ports without having managed their ballast by an approved method (see above) are likely to be refused permission to discharge their ballast water in Australian waters.

Ballast Water Reporting

All vessels arriving in Australia from international waters are required to submit a *Quarantine Pre-Arrival Report (QPAR)* to AQIS. The QPAR requires details about the vessel including:

- Vessel particulars
- Human health
- Pet animals / birds on board
- Recent visits by the vessel to places where organisms of concern to Quarantine are known to exist.

The QPAR also requires reporting of ballast water management procedures undertaken.

Masters are required to send the QPAR to AQIS between 12 – 48 hours prior to arrival in Australia – usually via ships' local agents. This timing allows for efficient processing of the QPAR to assist in avoiding any disruption to a vessel's schedule.

Masters / agents that do not submit the QPAR to AQIS will not be given formal quarantine clearance to enter port. This will cause delays to the vessel and additional AQIS charges to the vessel will be incurred.

No ballast water may be discharged from internationally trading vessels in Australian waters without express **written** permission from AQIS. Such permission may be given following lodgement of the QPAR with AQIS – provided acceptable ballast water management is reported on the QPAR. If details / intentions about discharge of international ballast water (as originally submitted to AQIS) change for any reason, a revised QPAR must be sent to AQIS prior to discharging any ballast water that has not already been specifically authorised.

Masters must also complete the *AQIS Ballast Water Log* with details about ballast water uptake ports, BWDSS usage, ocean exchanges and intended Australian discharge locations.

This form needs not be sent to AQIS under normal circumstances – AQIS Officers will examine it during their physical attendance on board each vessel. Completed forms must be retained on the vessel for a period of two years and produced to AQIS on request.

Verification Inspections

AQIS Officers will conduct ballast water verification inspections on-board vessels to ensure compliance with Australia's ballast water management requirements.

AQIS Officers will use the QPAR, BWDSS results (if available), AQIS ballast-water logs and the vessel's deck and engineering logs to verify that the information supplied to AQIS is correct.

The verification inspection will take around 30 minutes to complete and in most cases will be conducted at the same time as a routine vessel inspection.

Co-regulation

It is envisaged that, in the future, Co-regulatory Agreements covering all aspects of Australian Quarantine requirements will be available to vessels that regularly visit Australian ports and have demonstrated a good quarantine compliance history.

Co-regulatory Agreements will set out the details of Quarantine concerns, how they will be managed and who will bear responsibility for ensuring that subject vessels comply with AQIS requirements.

Co-regulatory Agreements will be subject to formal audit by AQIS on a regular basis.

Co-regulatory Agreements are not available at the moment. Due to the recent outbreaks of Foot and Mouth disease around the world, AQIS will inspect every vessel arriving in Australian ports from overseas, until further notice.

Tank stripping

Sediments from ballast tanks must not be discharged in Australian waters.

Ballast tank stripping using pumps that are permanent fixtures on a vessel is acceptable. The use of portable pumps to strip out ballast tanks or manual removal and dumping of sediment in Australian ports / waters is not permitted.

Access to sampling points

Masters must provide access to safe ballast water sampling points on board their vessels.

Ballast water samples may be required to ensure compliance with Australia's ballast water management requirements or for further ballast water research.

Where a ballast water sample is required, AQIS Officers will avoid delays to vessels wherever possible. AQIS will endeavour to give prior warning to vessels – via their Australian agents – in the event that the necessity to obtain a ballast water sample is anticipated.

Ballast Water Exchange Calculations

Acceptable ballast water exchanges must achieve at least a 95% dilution of high-risk ballast water with clean seawater from the deep ocean.

Sequential Exchange (Empty / Refill) Operations:

At least 95% of the water in a given tank must have been drawn from the deep ocean on arrival in Australia. Residual high-risk ballast that remains in a tank at the end of the "Emptying" phase of an exchange operation must be less than 5% of the total volume contained in the tank on arrival in Australian waters.

Masters are requested to record a sounding and corresponding volume of residual water at the end of the emptying phase of sequential exchange operations. Masters are also requested to record

times, dates, locations and methods used (gravity / pumps / combination of gravity and pumps) to empty and refill all tanks managed by this method.

Sequential Exchange Calculation Example 1:

A vessel has a Fore Peak ballast tank with full capacity 2000m^3. The vessel's Master wishes to arrive in an Australian port with the Fore Peak only half full (1000m^3). Regardless of how much "high-risk" water is in the tank before the exchange, the water in the tank must be exchanged so that after refilling, not more than 5% of the resulting mixture in the tank is "high-risk" water. After pumping out (when suction on the pump is lost), a sounding of the tank is taken and this shows that only 5 m^3 remains.

In this situation, provided at least 95 m^3 of deep ocean water is added to the FPT, the resultant mixture will be acceptable for discharge in Australian waters. The Master may fill the tank only to his desired volume of 1000 m^3 and the ballast water in the tank requires no further management.

Sequential Exchange Calculation Example 2:

A vessel has a centre line, double bottom tank beneath No.1 Cargo Hold (DB1C) with full capacity 6000 m^3. The vessel's Master wishes to arrive in an Australian port with DB1C only filled to one third of its capacity (2000 m^3).

After pumping out (when suction on the pump is lost), a sounding of the tank is taken and this shows that 250 m^3 remains in the tank.

To achieve a 95% volumetric exchange in this tank, the Master has two options:

i) Fill the tank up to 5000 m^3 and then pump out water until his desired level of 2000 m^3 is reached.
ii) Strip the tank until only 100 m^3 remains before refilling the tank to 2000 m^3

Flow-Through and Dilution Operations:

300% of the full capacity of every tank exchanged by either of these methods must be pumped into the relevant tank - using clean seawater from the deep ocean.

Critical to the efficiency of this method are the following:

- Only similar pairs of tanks may be flushed through simultaneously
- Pumping hours to achieve the required 300% exchange should be calculated using the experiential pumping rate of ballast pumps rather than the "pumping capacity" of the new pumps as stated in manufacturers specifications. A pumps' efficiency usually decreases with age.

If a tank initially contains more than 5% of its full capacity of high-risk ballast water, 300% of the tanks **full** capacity must be pumped in to achieve the required 95% volumetric exchange.

Flow Through / Dilution Calculations:

A cape sized vessel (150,000 DWT) with nine cargo holds, has the following ballast tanks:

Tank / Hold	Capacity	Contents
Fore Peak	2000 m^3	1000 m^3
WBT 1P	3000 m^3	Full
WBT 1S	3000 m^3	Full
WBT 2P	4200 m^3	Full
WBT 2S	4200 m^3	Full
WBT 3P	3000 m^3	1200 m^3
WBT 3S	3000 m^3	Full
WBT 4P	4200 m^3	Full
WBT 4S	4200 m^3	Full
After Peak	1200 m^3	800 m^3
CH #5	21750 m^3	20150 m^3

The ten-year-old vessel is fitted with two main ballast pumps each with a rated capacity of 2500 m^3/hr when the vessel was new. From experience, the Chief Officer believes that each of these pumps now delivers about 2000 m^3/hr. The Chief Officer has timed (and recorded details of) a number of ballast filling / emptying operations to determine this pumping rate.

Example 1:

Fore peak tank initially contains 1000 m^3 of high-risk ballast water. Master wishes to exchange the tank's contents in mid-ocean using the flow through method.

300% of the tanks full capacity (i.e. 3 x 2000 m^3) = 6000 m^3.

Using only one pump, the Master must pump clean seawater into the tank for 3 hours. Using two pumps together, the required pumping time would be halved (90 minutes).

1 Pump delivers 2000 m^3/hr = 6000 m^3 in 3 hours = 300% of tank's FULL capacity.
2 Pumps deliver 4000 m^3/hr = 6000 m^3 in 1.5 hours = 300% of tank's FULL capacity.

Example 2:

Master wishes to use flow through method on WBT 1P, WBT 1S, WBT 2P and WBT 2S.

a) Acceptable:

Using both ballast pumps together the master simultaneously flushes WBT 1P and 1S simultaneously for 4.5 hours (combined capacity of 1P&S = 6000 m^3, 4.5 hours pumping @ 2 x 2000 m^3/hr = 18000 m^3 = 300% of each tank's full capacity).

After the ballast exchange in WBT 1P and S, those tanks are closed off and a new exchange begins on WBT 2P and S simultaneously.

b) Unacceptable:

Master uses both pumps to flush WBT 1P&S and WBT 2P&S simultaneously for 21.6 hours: The pumps deliver the same quantity of water but it is impossible to say how much water each tank received if this procedure is used.

Further Advice & Information

Further information can be obtained by contacting AQIS.

Log on to our web site

Home page address:	**www.aqis.gov.au/shipping**
AQIS Seaports Program address:	**seaports@aqis.gov.au** **dssadmin@aqis.gov.au**

Contact us by phone or fax

Calling within Australia	Phone:	(02) 6272 4363
	Fax:	(02) 6272 3276
Overseas enquires:	Phone:	+61 2 6272 4363
	Fax:	+61 2 6272 3276

(Addresses – re: page 5 'Safety Considerations')

Australian Government
Australian Quarantine and Inspection Service

Guide to AQIS forms for vessel clearance

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Contents

GUIDE TO COMPLETING THE QUARANTINE PRE-ARRIVAL REPORT FORM (QPAR)

The Quarantine Pre-Arrival Report form (QPAR) is divided into four sections:

1. ship's particulars for vessels' first port of call in Australia
2. quarantine Pre-arrival information
3. ballast water management
4. declaration.

Ships' Agents or Masters are required to fill out each section according to the instructions in this guide.

Section: 1 – Ship's particulars for vessels' first port of call in Australia

In Section: 1, you must enter your vessel's details in order to obtain Quarantine Clearance to berth and discharge ballast water in Australian waters.

Ship's particulars for vessels first port of call in Australia

1.	Vessel Name:	enter the current name of the vessel
2.	Voyage Number:	enter the current voyage number of the vessel
3.	IMO/Lloyds Number:	enter the vessel's IMO/Lloyd's number
4.	Radio Call Sign:	enter the current call sign of the vessel
5.	Last Port of Call:	enter the vessel's last port of call
6.	ETA Anchorage at First Port of Call:	if the vessel intends to anchor prior to berthing at the first Australian port, provide the vessel's expected time at anchorage, using the 24hr clock
7.	ETA Berth at First Port of Call:	using the 24hr clock, provide the vessel's expected berthing time at the first Australian port
8.	First Australian Port:	enter the vessel's first Australian port of call
9.	Berth:	if known, provide name and/or number of berth - an 'Unknown' answer will be accepted
10.	ETD First Port of Call:	enter the expected time and date of departure from the first Australian port of call
11.	Next Port of Call:	enter the vessel's next port of call. If for any reason, the next port is unknown at time of reporting, an 'Unknown' answer will be accepted
12.	Net Tonnage:	enter the net tonnage of the vessel
13.	Number of Cargo Holds/Tanks/Decks:	indicate the number of cargo holds, tanks or decks within the vessel
14.	Vessel Type:	describe the type of vessel (eg. bulk carrier, passenger, livestock, etc)
15.	Country of Registry:	enter the country where the vessel is registered

16. De-ratting / Exemption Cert. Issue Date: enter the date the certificate was issued

17. Port of Issue: enter the port the Deratting / Deratting Exemption Certificate was issued.

Please indicate if any details relating to your vessel (eg. name, call-sign) have changed since its last voyage to Australia. Failure to do so may result in unnecessary delays in processing the QPAR form. If information, such as berthing details, is unknown at the time of reporting, please state 'Unknown'. Any changes to arrival or departure times must be reported to AQIS.

Section: 2 – Quarantine pre-arrival information

This section is designed to assist AQIS in understanding the present quarantine condition of your vessel.

Quarantine condition includes human, animal and plant health, sanitation and waste. Details relating to these aspects are used to determine the potential quarantine risk of your vessel.

Questions 18 & 19 – reporting human health by exception

Questions 18 & 19 require details of the health of the crew and/or passengers only if there have been incidences of illness of an infectious nature, or if deaths have occurred. If there is a change in the health status after quarantine clearance has been granted and prior to berthing, AQIS must be notified immediately.

18. Have there been any deaths amongst the crew or passengers during the current voyage?

    YES _ NO _

    If YES, please state number of deaths ( ) and cause:

    Should a death or illness have occurred on the current voyage, enter the number of deaths / illnesses and cause as determined / suspected by the vessel's medical officer or Master.

19. Is there any person on the vessel during the voyage suffering from an illness that may have been caused by an infectious disease?

    YES _ NO _

    If YES, please state number of people with illness ( ) and cause:

Question 20 – animals on board

Question 20 requires details of any animals on board, including birds, fish, cats, dogs and monkeys.

20. Are there any animals on board the vessel? (Including birds & fish)

    YES _ NO _

    If YES, please give a description of the animal/s:

Details about the type, number and location of animal/s should be provided in the space under question 20. All animals will be subject to inspection at the vessel's first Australian port of call.

Questions 21, 22 & 23 – Asian gypsy moth

Questions 21, 22 & 23, require details relating to visits to Russian Far East Ports and Asian gypsy moth clearance.

21. In the past two years has your vessel been in any Russian Far East Port/s between 40° N, 60° N and west of 147° E during any period between July and September?

    YES _ NO _

    (If NO, go to Question 24).

22. If YES, since your last visit to the port/s, has your vessel been inspected and cleared as being free of **ASIAN GYPSY MOTH** by agricultural authorities in Australia, Canada, New Zealand or the USA?

    YES _ NO _

    (If YES, please forward relevant certificate to AQIS).

23. If NO, do you have a certificate on board the vessel issued by Russian Agricultural Authorities during your last visit to a Russian Far East Port, certifying that they had inspected the vessel and found it free of **ASIAN GYPSY MOTH** egg masses?

    YES _ NO _

    (If YES, please forward relevant certificate to AQIS).

    If your vessel has been issued certificates by agricultural authorities in Australia, Canada, New Zealand, USA or Russia indicating that it has been inspected and declared free of Asian gypsy moth, please ensure that a copy of the certificate is sent to AQIS with the QPAR form. AQIS will assess the validity of the certificate and indicate what procedures need to be taken. Vessels without valid certificates will be inspected on arrival at relevant Australian ports.

Questions 24 & 25 – livestock, grain and meal

Questions 24 & 25 require advice about whether your vessel has carried livestock, grain or meal in the last ten cargoes.

24. Have you carried livestock, grain or meal in the last 10 cargoes?

    YES _ NO _

    (If NO, go to question 26).

25. If YES, list below the type of cargoes, the loading port/s, the discharge port/s and cleaning performed since the livestock, grain or meal cargo was discharged. Livestock/Grain/Meal *(Delete whichever inapplicable).*

If your vessel has carried livestock (live animals as cargo, not ship's pets - which are covered in question 20); grain (including seeds) or meal (organic fertiliser, stock feed or meal that contains processed animal, plant or fish products) in its last ten cargoes, you are required to provide details of the product, the loading and discharging ports and the cleaning procedures that have been performed. Please forward any cleaning certificates to AQIS with this form. These three commodities are of quarantine concern due to potential contamination risks.

Question 26 – bees

Question 26 requires advice about whether you are confident there are no bees on board.

26. After the examination of the vessel and its cargo since leaving the last port of call, did you discover any **BEES** on board?

    YES _ NO _

AQIS relies on vessel crews to examine their vessel and its cargo soon after it has left its last port of call. Incursions of exotic bees in Australia have been attributed to 'hitch-hikers' on commercial vessels. If bees are found on board, their discovery must be recorded on the QPAR form.

Question 27 & 28 – crew changes and passengers disembarking

27. Will there be any crew changes or disembarking passengers while the vessel is in any Australian port of call?

    YES_ NO _

Indicate whether crew or passengers will be permanently leaving the vessel while in any Australian port.

28. If YES, specify the port/s and the number of crew/passengers that will be signing off/disembarking.

Indicate at which port/s crew will be signing off or passenger will be disembarking the vessel.

Section: 3 – Ballast water management

In this section, you are required to provide details about the ship's intended ballast water discharge and to advise AQIS whether or not the ship has performed any ballast water treatment / exchanges at sea prior to entering Australian ports or waters. This section also indicates whether or not the ship has performed a risk assessment using the AQIS Ballast Water Decision Support System (BWDSS) prior to arrival in Australian ports or waters.

Enter the name and IMO/Lloyd's number of the vessel in the first section at the top of the page.

Name of Vessel: IMO/Lloyd's No:

You must answer the ballast water management questions and follow the instructions that relate to the response provided.

Question 29 & 30 – Intention to discharge ballast water

29. Do you intend discharging any ballast water in Australian ports or waters?
(If NO, go to Declaration).

YES _ NO _

*If the answer to this question is **YES**, the vessel must have performed an approved treatment on all high-risk ballast water prior to discharge in Australian ports or waters. If the answer to this question is **NO**, you may proceed directly to the Declaration. Mariners are advised to manage all ballast water as though it will need to be discharged in Australian waters so that in the event of unforeseen circumstances, permission to discharge the ballast water may be given. Refer also to relevant section in 'Australian Ballast Water management requirements'.*

30. If YES, indicate all ports / locations of intended ballast water discharge in Australia.

1st port; 2nd port; 3rd port; 4th port; 5th port; 6th port; etc.

Question 30 requires information on all ports of intended ballast water discharge. Please list all ports of call in sequential order of visit. If discharge is not intended in any Australian ports or waters this question does not need to be answered.

Question 31 – ballast water exchanges

Question 31 relates to ballast water exchange undertaken by the vessel en-route to Australia. Vessels that have undertaken full ballast water exchange at sea (without having performed an AQIS BWDSS risk assessment) prior to entering Australian ports or waters should answer YES to this question.

31. Have you undertaken a full ballast water exchange at sea (independent of an AQIS BWDSS report) in a manner consistent with IMO guidelines, before arrival in Australian ports or waters?

YES_ NO _

(If YES, go to question 37).

Questions 32 and 33– Compliance Agreements

32. Does your vessel have a current Compliance Agreement with AQIS?

YES _ NO _

(If NO, go to question 34).

At the time of printing, there are no current compliance agreements for ballast water management between any vessels / fleets and AQIS. At this stage, AQIS attends and inspects 100% of vessels arriving in Australia from overseas. Compliance agreements may be reintroduced in the future. All vessels should answer No to this question in the meantime.

33. If YES, are you operating in accordance with this Compliance Agreement during the current voyage to Australia?

    YES _ NO _

    (If YES, go to Declaration).

    (See notes for Q32).

Questions 34 and 35 – Ballast Water Decision Support System (BWDSS)

Refer also to the attached document 'The Ballast Water Decision Support System'.

The BWDSS is an automated computer application that allows vessels to submit information about foreign ballast water uptakes and intended Australian discharge locations. The BWDSS automatically performs risk assessments based on data submitted and assigns a unique risk assessment number for each submission. The risk assessment numbers are specific to the voyage for which the data was submitted. A new submission must be made for every new voyage – even between the same ports because some of the factors that determine risk are linked to seasonal variations of salinity, sea temperature etc.

Mariners are advised that almost all, foreign-sourced, ballast water is deemed to be 'high-risk' to the Australian marine environment by the BWDSS. Mariners are further advised that if they are not confident about the use of the BWDSS, they can ensure their vessels' ballast water will be deemed to be 'low risk' by AQIS if they by conduct full exchanges at sea without recourse to the BWDSS at all.

Refer also to the attached document 'Australian Ballast Water management requirements'.

Questions 34 & 35 require information about data submitted if you accessed the BWDSS to obtain a risk assessment for foreign ballast water intended for discharge in Australian ports or waters.

34. Have you entered ballast tank information into the AQIS BWDSS to have a risk assessment performed on the ballast water currently in those tanks to be discharged in Australian ports or waters?

    YES _ NO _

    (If NO, go to Declaration).

    Australian law prohibits the discharge of high-risk ballast water in Australian waters. Refer to 'Australian Ballast Water Management Requirements' for definitions of high and low risk ballast water.

    Unless you have fully exchanged foreign ballast at sea by an approved method, you must submit details of ballast water uptake and intended discharge data to the BWDSS and receive a low-risk assessment, if you intend to discharge foreign ballast water in Australian waters. If you have received a low-risk assessment from the BWDSS this voyage, you should answer **YES** to this question. If you have not exchanged foreign ballast water at sea and you answer **NO** to this question, you will not be given permission to discharge ballast water in Australian ports or waters.

35. If YES, what is the Risk Assessment Number assigned to your vessel by the AQIS BWDSS?

    RAN:

    After ballasting data has been submitted to the AQIS BWDSS, a unique Risk Assessment Number (RAN) will be assigned to your vessel. The BWDSS may be accessed either through the Internet or through E-mail. The BWDSS automatically responds to lodgements by sending RANs via E-mail. Enter the RAN in the space provided at Q35. The RAN will indicate a low or high risk rating for the intended ballast water discharge. If your vessel is assigned a low risk rating on some or all tanks, permission will be given to discharge ballast water from those tanks but only in the ports specified by the low-risk RAN.

Question 36 – Ballast Water treatment on tanks assessed as 'high-risk'

Question 36 requires information on whether a treatment has been undertaken on all high-risk tanks.

36. If your AQIS BWDSS result was **HIGH** have you undertaken a ballast water treatment/exchange at sea before arrival in Australian ports or waters? YES_ NO _

    If your vessel is assigned a high-risk rating for any tanks, treatment (ocean exchange) of the ballast water in those tanks will be required prior to discharge in Australian ports or waters. Where an approved ballast water treatment cannot be undertaken prior to arrival in Australian ports or waters, you must contact AQIS as soon as possible to discuss the situation. Such communications may be either direct or via your ship's Agent. It is strongly recommended that if you are unable to manage your ballast water in accordance with Australian requirements, you communicate with AQIS prior to entering Australian waters and not later than sending in the QPAR under any circumstances.

37. If YES indicate below what ballast water treatment/exchange method you used?

    Sequential [empty/refill] / Flow Through / Dilution Method / Other

    If other, please specify:

    Ballast water treatment/exchange must be performed in line with the Australian ballast water management guidelines. For further information on these guidelines, please refer to the *Australian Ballast Water requirements* document. Mariners are advised that at the time of printing, the only acceptable method for ballast water management is ocean exchange by one of the methods specified in 'Australian Ballast Water management requirements'.

38. If treatment was not conducted fully in any of the tanks/holds intended for discharge in Australian ports or waters, please state reason:

    If an approved treatment has not been conducted on all high-risk tanks, the reason must be provided in Question 38.

Note: ship and crew safety is of paramount importance when undertaking ballasting operations. Masters should undertake ballasting operations in accordance with the International Maritime Organisation guidelines.

Section: 4 – Declaration

Shipping Agents / Masters are required to complete and sign the declaration to confirm that the information provided is correct. Shipping Agent contact details are also required.

Declaration:

I declare that the Master of the above-mentioned vessel has provided the information within this AQIS form. Declarations are to be held on board the ship for a minimum of two years and must be presented for inspection by a Quarantine Officer at any Australian port.

Declaration made by:

Printed Name:

Signature:

Rank/Position:

Date: / /

Shipping Agency Name:

Shipping Agency Phone No:

Shipping Agency Fax No:

Shipping Agency E-mail Address: (if applicable):

Correct completion of the QPAR form will ensure prompt processing by AQIS.

Note: granting quarantine clearance to a vessel does not release its cargo from being subject to quarantine. Goods require separate clearance.

It should also be noted that AQIS might reply by facsimile unless you state otherwise, in accordance with the Electronic Transactions Act 1999.

COMPLETING THE QUARANTINE PRE-ARRIVAL REPORT FORM (QPAR) - TELEX VERSION

Information may only be provided by Telex in the following order and under the specified numbered headings.

Section: 1 – Ship's particulars for vessels' first port of call in Australia

1. Vessel Name:
2. Voyage Number:
3. IMO/Lloyd's Number:
4. Radio Call Sign:
5. Last Port of Call:
6. ETA First Port of Call (as 24hr hh:mm dd/mm/yy):
7. ETA Berth First Port of Call (as 24hr hh:mm dd/mm/yy):
8. First Australian Port:
9. Berth:
10. ETD First Port of Call (as 24hr hh:mm dd/mm/yy):
11. Next Port of Call:
12. Net Tonnage:
13. Number of Cargo Holds/Tanks/Decks:
14. Vessel Type:
15. Country of Registry:
16. De-ratting /De-ratting Exemption Certificate Issue Date (dd/mm/yy):
17. Port of Issue:

Section: 2 – Quarantine pre-arrival information

18. Have there been any deaths among the crew or passengers during the current voyage?

    YES/NO

    If YES, please state number of deaths ( ) and cause:

19. Is there any person on the vessel during the voyage suffering from an illness that may have been caused by an infectious disease?

    YES/NO

    If YES, please state number of people with illness ( ) and cause:

20. Are there any animal/s on board the vessel? (including birds & fish)

    YES/NO

    If YES, please give a description of the animal/s:

21. In the past 2 years has your vessel been in any Russian Far East Port/s between 40°N and 60°N and west of 147° during any period between July and September?

    YES/NO

    If NO, go to Question 24.

22. If YES, since your last visit to the port/s, has your vessel been inspected and cleared as being free of **ASIAN GYPSY MOTH** by agricultural authorities in Australia, Canada, New Zealand or the USA?

    YES/NO

    If YES, please forward relevant certificate to AQIS.

23. If NO, do you have a certificate on board the vessel issued by Russian Agricultural Authorities during your last visit to a Russian Far East Port, certifying that they had inspected the vessel and found it free of **ASIAN GYPSY MOTH** egg masses?

    YES/NO

    If YES, please forward relevant certificate to AQIS.

24. Have you carried livestock, grain or meal in the last 10 cargoes?

    YES/NO

    If NO, go to question 26.

25. If YES, list below the type of cargoes, the loading port/s, the discharge port/s and cleaning performed since the livestock, grain or meal cargo was discharged. Livestock/Grain/Meal *(Delete whichever inapplicable)*

    If in the last 10 cargoes, list the type, the loading port/s, the discharge port/s and cleaning performed since the cargo was discharged

26. After the examination of the vessel and its cargo since leaving the last port of call, did you discover any **BEES** on board?

    YES/NO

27. Will there be any crew changes or disembarking passengers while the vessel is in any Australian port of call?

    YES/NO

28. If YES, specify the port/s and number of crew/passengers that will be signing off/disembarking:

Section: 3– Ballast water management

29. Do you intend discharging any ballast water in Australian ports or waters?

    YES/NO

    If NO, go to Declaration.

30. If YES, indicate all ports/locations of intended ballast water discharge in Australian ports or waters 1st port; 2nd port; 3rd port; 4th port; 5th port; 6th port

31. Have you undertaken a full ballast water exchange at sea (independent of an AQIS BWDSS report) in a manner consistent with the IMO guidelines, before arrival in Australian ports or waters?

    YES/NO

    If YES, go to question 37.

32. Does your vessel have a current Compliance Agreement with AQIS?

    YES/NO

    If NO, go to question 34.

33. If YES, are you operating in accordance with this Compliance Agreement during the current voyage to Australia?

    YES/NO

    If YES, go to Declaration.

34. Have you entered ballast tank information into the AQIS BWDSS to have a risk assessment performed on the ballast water currently in those tanks to be discharged in Australian ports or waters?

    YES/NO

    If NO, go to Declaration.

35. If YES, what is the Risk Assessment Number assigned to your vessel by the AQIS BWDSS?

    RAN:

36. If your AQIS BWDSS result was **HIGH**, have you undertaken a ballast water treatment/exchange at sea before arrival in Australian ports or waters?

    YES/NO

37. If YES, indicate which ballast water treatment/exchange method you used:

    Sequential [empty/refill] / Flow Through / Dilution Method / Other. If other, please specify:

38. If treatment was not conducted fully in any of the tanks / holds intended for discharge in Australian ports or waters, please state reason:

Note: Ship and crew safety is of paramount importance when undertaking ballasting operations, therefore, Masters should undertake ballasting operations in accordance with the International Maritime Organisation guidelines.

Agents Note: The telex version is to be transcribed on to the official Quarantine Pre-Arrival Report form (QPAR) if it is to be sent to AQIS. AQIS cannot accept QPAR information in telex form.

GUIDE TO COMPLETING THE AQIS BALLAST WATER LOG

General

All international vessels arriving at Australian ports or waters are required to manage their ballast water en-route to Australia. High-risk ballast water must not be discharged in Australian ports or waters.

AQIS has approved the following ballast water management options for the treatment of high-risk ballast water:

- Non-discharge of ballast water in Australian ports or waters – high-risk ballast water may be transferred from tank-to-tank on board
- Full ballast water exchange at sea by an approved method prior to arrival in Australian ports or waters.

Vessel Masters are required to complete a new *AQIS Ballast Water Log* for every voyage to Australia.

The *AQIS Ballast Water Log* must be retained on board the vessel for a period of two years and produced to AQIS upon request at any time during that period. Masters completing this log must also keep records of ballast water management in the ship's deck, engineering and / or dedicated ballast water handling logbook.

Special Instructions for Masters

Non-Discharge of High-Risk Ballast Water:

Mariners are strongly advised to manage all ballast water on board as though it may need to be discharged in Australian ports / waters. Vessels arriving in Australian ports with high-risk ballast water on board may be required to engage independent marine surveyors to certify quantity and location on board of high-risk ballast water to demonstrate non-discharge.

Fresh Water:

Fresh water from any source (including upriver ports) is deemed by AQIS to be low-risk. If some or all ballast water tanks intended for discharge are carrying water from a freshwater source (eg. potable water), write **'FRESH WATER ONLY'**, on the 'AQIS Ballast Water Log' in columns in sections 'C' (Exchange details). Tanks containing fresh water intended for discharge do not need to be entered into the AQIS BWDSS. You must answer question 36 on the 'Quarantine Pre-Arrival Report' stating **'FRESH WATER ONLY'** is contained in the ballast water tanks intended for discharge.

Completing the AQIS Ballast Water Log

Top Section - Vessel details

Ship's Name:	enter the name of the ship.
Year Built:	enter the year in which the ship was constructed.
IMO/(Lloyd's) No:	enter the ship's unique identification number, as used by the IMO.
Call sign:	enter the ship's call sign.
Master's signature:	Master of the ship to sign name in space provided.
Date:	enter the date you are making the declaration
Page Number:	enter both the number of this page and how many pages in total

Column A - Ballast water tanks/cargo holds

Tank: List all ballast tanks (including cargo holds used for ballast water) on board.

Full Capacity: Record the maximum capacity of each tank in cubic metres

Column B - Ballast water source

Name of ballast water uptake port: enter the port where ballast water was taken up for the voyage. If ballast water was taken up at sea, please record the location of uptake using latitude and longitude coordinates.

Uptake Date: enter the dates of ballast water uptakes. Please use DD/MM/YY notation – as in the example on the form.

Volume of ballast water taken up (m^3): enter the relevant volume, in cubic meters, of ballast water taken up at the place / date / time in question - as in the example on the form.

Column C - Exchange

Pump Identification

Identify pumps for ballasting and state CURRENT delivery rate. How much water per hour do the pumps currently deliver – from experience – not what they used to deliver when they were new. If you don't know how the pumps are performing, time the filling of a few tanks from empty to full to find out and keep records in the ballast water logbook or the deck logbook to show to AQIS.

Exchange Location (Latitude/Longitude)

Record start and end locations of deep sea ballast water exchange for each tank in Lat / Long coordinates as in the example on the form

Exchange Date & Time

Record start and end date and time for each tank – please use DD/MM/YY and 24 HR hh:mm (local time) formats as in the example on the form

List Pumps Used (Pump Number)

Record pump(s) used in exchange for each tank as in the example on the form

Empty / Refill Only – Residual volume when empty (m^3)

Only when using the empty refill method – record what volume was left in the tank at the end of the emptying cycle before refilling the tank – resultant mix of ballast water in each tank must contain no more than 5% of high-risk water.

Flow-Through or Dilution Only - Volume pumped (m^3)

Only when using the flow–through or Dilution methods, record the Volume of water pumped. That volume is calculated as follows:

Experiential Capacity of pump(s) used in this exchange (m3 / hour) x Hours the pump(s) was run

Percentage Exchanged:

Record the percentage of the tank's FULL capacity that was exchanged at sea. The percentage must be at least 95% in the case of Empty / Refill method exchanges and at least 300% in the case of Flow-through or Dilution method exchanges.

Column D - Intended Australian Discharge Port for Ballast Water

BW Discharge Port

Record name of intended Australian port at which this tank's contents will be discharged as in the example on the form

Discharge Date

Record date of intended discharge, in DD/MM/YY format, from this tank at this port as in the example on the form

Volume for Discharge (m^3)

Record volume intended to be discharged from this tank, in cubic metres, as in the example on the form.

Bottom Section

Ballast Water Tank Codes

The codes provided are suggested abbreviations for use in identifying ballast water tanks on board

Note: If there are insufficient rows on the form for all tanks, attach an additional form(s)

It is not necessary to send this form to AQIS prior to arrival unless you are specifically requested to do so.

ADDITIONAL INFORMATION

For more information, contact AQIS:

Internet

Home page: www.aqis.gov.au/shipsinc
Ballast Water Decision Support System (BWDSS): www.aqis.gov.au/shipsng, then follow the links to enter the BWDSS.

Email

Seaports Program: seaports@aqis.gov.au
Ballast Water Decision Support System (BWDSS): dssadmin@aqis.gov.au

Phone

+61 1800 551 011 (free call from within Australia)

Fax

+61 2 6272 3276

Your local AQIS office

Adelaide	(08) 8305 9700
Melbourne	(03) 8387 0100
Brisbane	(07) 3246 8755
Perth	(08) 9311 5333
Cairns	(07) 4030 7800
Sydney	(02) 8334 7444
Darwin	(08) 8999 2311
Tasmania	(03) 6233 3352

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Australian Government
Australian Quarantine and Inspection Service

Advice to Ships Masters on Ballast Water Record Keeping

In order to comply with Australian Ballast Water management requirements, ships' Masters must record the following ballast water information in the ship's deck, engine room and/or dedicated ship's ballast water logbook. AQIS will seek to verify reported ballast water management during the routine inspection that is usually conducted at every vessel's first port of arrival in Australia. Properly kept ships' records of ballast water management greatly assist vessels to avoid disruption to their schedules in Australian ports / waters.

The required records of ballast water management must be produced for inspection at any Australian port of call when requested by a Quarantine Officer. The records are to be maintained in a clear and concise manner. All AQIS reporting forms must be completed in English and be held on board the ship for a period of no less than two years.

Approved ballast water exchange methods are described in the document: 'Australian Ballast Water management requirements'.

INFORMATION TO RECORD ABOUT BALLAST OPERATIONS:

BW uptakes overseas:

- record start and finish dates, times and locations (24 hour clock, local time, locations recorded either as a port of uptake or in latitude and longitude co-ordinates)
- record the volume of all BW taken on board.

BW exchanges in the deep ocean:

All Methods:

- record start and finish dates, times and locations (24-hour clock, local time, locations recorded as latitude and longitude co-ordinates). Exchanges must be conducted outside the Australian 12 nm limit. AQIS recommends that ocean exchanges should be conducted well away from any land mass and in water of minimum depth 200m.
- method of exchange: acceptable methods at time of publication are: Empty / Refill; Flow-Through and; Dilution.
- depth of water where BW exchanges were conducted (recommended minimum depth 200 metres)
- BW pump/s used during each ballast operation
- records of BW pumps' performance to demonstrate experiential pumping capacity)

- amperage or kilowattage of the ships generators before, after and during the ballast operation
- BW exchange percentage
- date when the BW sea suction strainers were last inspected. Are they in good order and repair?
- record damage / repairs made to the BW equipment (including ballast pumps, tanks, piping etc)
- full capacity and actual volume of the BW tank being exchanged .

For Empty / Refill method:

Record tank soundings / residual volume at end of emptying cycle

For Flow-Through and Dilution Methods:

Calculate and record total volume of water pumped for every tank and determine percentage flushed through (must be at least 300% of each tank's FULL capacity).

AQIS DOCUMENTATION TO BE MAINTAINED AND HELD ON BOARD THE SHIP FOR A PERIOD TWO YEARS:

- all Quarantine Pre-Arrival Reports
- all ships ballasting information entered into the Australian Ballast Water Decision Support System (including lodgements sent by e-mail and Inmarsat-C)
- AQIS Ballast Water Log
- AQIS documents releasing ballast water from quarantine when in Australian waters and any quarantine directions issued by a quarantine officer (where applicable).
- details of any ballast water treatment/exchange performed prior to entering Australian ports or waters and any other information relating to the ships current BW arrangements (for the purpose of AQIS compliance verification)
- details of any unusual events regarding ballasting operations en-route to Australia.

Ballast Water Management Plans (BWMP):

While it is not an AQIS requirement for ships to have a Ballast Water Management Plan (BWMP) when entering Australian ports or waters, AQIS recommends that vessels develop BWMPs in accordance with IMO guidelines.
The recommended methodology for vessels wishing to develop a BWMP is the International Marine Organisation (IMO) 'Model Ballast Water Management Plan' as per IMO Resolution A.868 (20).

PLEASE PHOTOCOPY AS REQUIRED

Australian Government

Australian Quarantine and Inspection Service

AQIS BALLAST WATER LOG

Form is used to Australian Quarantine Act 1908 Section 27A

Ship's Name: _____ Year Built_____ IMO/Lloyd's No: _____ Call Sign _____

Master's Signature: Date: / / PAGE of

1) Did you use the Ballast Water Decision Support system (BWDSS)?

☐ Yes, If YES, enter Ballast Water Assessment Number (e.g. 20)
For tanks assessed as LOW risk: complete columns A, B and D
For tanks assessed as HIGH risk: complete columns A, B C and D

☐ No, *If NO, complete columns A, B, C and D*

Instructions for Exchange:
Exchange must be carried out to 95% volumetric exchange for empty/refill method and 300% for flow through or dilution method. Please fill in either the Empty/Refill columns or the Flow-Through columns depending on which method you used for each tank. (only one method per tank is acceptable)

Record **ocean depth** at which exchanges occurred (metres): Min: _____ Max: _____

(A) Ballast Water Tanks or Cargo Holds		(B) Ballast Water Source			(C) Exchange — Identify the **pumps used for ballasting** and their estimated **current** delivery capacity per hour (m^3/hr): Pump 1:_____ Pump2: _____ Pump3: _____					(D) Intended Australian Discharge Port for Ballast Water		
Tank	Full Capacity (m^3)	BW uptake PORT	Uptake Date	Volume of ballast water taken up (m^3)	Exchange Location (Latitude/Longitude) Start (S) End (E)	Exchange Date & Time Start (S) End (E)	List Pumps Used (Pump Number)	Empty/Refill ONLY Residual volume when empty (m^3)	Flow-through or Dilution ONLY Volume pumped (m^3)	Flow-through or Dilution ONLY Percentage Exchanged	BW Discharge Port	Discharge Date	Volume for discharge (m^3)
Eg FPT	1372	Osaka	2/12/03	1342	S: 38°18'N 137°24'E E: 33°15'N 140°38'E	S: 28/02/03 1600 E: 28/03/03 2030	1 & 2 (pumps)	N/A	4050	302%	Brisbane	05/03/03	1342
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							
					S: E:	S: E:							

BALLAST WATER TANK CODES: Forepeak = FPT Aftpeak = APT Double bottom = DB Bottom tank = BT Bottom side tank = BST Deep tank = DT Wing tank = WT Top side tank = TST Cargo hold = CH Heeling tank = HT Water ballast tank = WBT Port = P Starboard = S Centre = C Bilge = BGT Other = O (specify)

Form 026 - Date of Effect 01 March 2004

Ships completing this AQIS BW log must also enter the ballast water information into the ship's deck and engineering logbooks. A ship's logbook must be made available for inspection by a Quarantine Officer at any Australian port or any location within the Australian 12nm limit.

Transport Canada Transports Canada

TP 13617E

GUIDELINES FOR THE CONTROL OF BALLAST WATER DISCHARGE FROM SHIPS IN WATERS UNDER CANADIAN JURISDICTION

September 1, 2000

1.0 **Introduction**

1.1 The purpose of these guidelines is the protection of waters under Canadian jurisdiction from non-indigenous aquatic organisms and pathogens that can be harmful to existing ecosystems. When a new organism is introduced to an ecosystem, negative and irreversible changes may result including a change in biodiversity. Ballast water has been associated with the unintentional introduction of a number of organisms in Canadian waters and several have been extremely harmful to both the ecosystem and the economic well-being of the nation. These guidelines are intended to minimize the probability of future introductions of harmful aquatic organisms and pathogens from ships' ballast water while protecting the safety of ships.

1.2 Various methods have been proposed for protecting waters under Canadian jurisdiction from harmful aquatic organisms and pathogens that may exist in ballast water. The methods employed must meet the following criteria:

1.2.1 Safety of the ship and its crew must not be compromised.

1.2.2 Techniques utilized shall be effective at minimizing the potential of introduction of harmful aquatic organisms and pathogens from discharged water.

1.3 These guidelines have been developed by Transport Canada and Fisheries and Oceans Canada under the auspices of the Canadian Marine Advisory Council and as such reflect wide consultation with groups such as shipowners, environmental organizations, government departments and the United States Coast Guard.

1.4 In developing these guidelines, consideration and recognition has also been given to the protection of neighboring ecosystems.

1.5 Comments on the guidelines should be addressed to the Ballast Water Working Group of the Canadian Marine Advisory Council at

Tower C, Place de Ville
[illegible] floor
350 Sparks Street
Ottawa, Ont., Canada
K1A 0N8

c/o Mr. Tom Morris E-mail. morrist@tc.gc.ca
Tel 613-991-3170
Fax: 613-993-8196

1.6 These guidelines should not be seen as adding to or detracting from existing statutory or regulatory requirements which will prevail in the case of conflict with these guidelines. Statutory provisions dealing with ship-source pollution are included in the *Canada Shipping Act*, the *Arctic Waters Pollution Prevention Act* and the *Fisheries Act*.

2.0 **Short Title**

2.1 Theses guidelines may be cited by the short title "The Canadian Ballast Water Management Guidelines".

3.0 **Definitions**

3.1 For the purposes of these Guidelines:

"exclusive economic zone" consists of an area of the sea beyond and adjacent to the territorial sea of Canada that has as its inner limit the outer limit of the territorial sea of Canada and as its outer limit the line every point of which is at a distance of 200 nautical miles from the nearest point of the baselines of the territorial sea of Canada or as specified in the *Oceans Act*,

"foreign voyage" means a voyage extending beyond the area of a home-trade voyage and not being an inland or minor waters voyage,

"harmful aquatic organisms or pathogens" means non-indigenous aquatic organisms or pathogens which, if introduced into a particular sea area including estuaries or fresh water courses, may create hazards to human health, harm living resources or aquatic life, damage amenities, impair biological diversity or interfere with other legitimate uses of such areas,

"home-trade voyage" means a voyage, not being an inland or minor waters voyage, between places within the area following, namely, Canada, the United States other than Hawaii, St. Pierre and Miquelon, the West Indies, Mexico, Central America and the northeast coast of South America, in the course of which a ship does not go south of the sixth parallel of north latitude,

"home trade voyage, class I" has the same meaning as defined in the *Home-Trade, Inland and Minor Waters Voyages Regulations*, that is a home-trade voyage in the course of which a steamship goes anywhere within the limits of a home-trade voyage as defined in the Canada Shipping Act,

"waters under Canadian jurisdiction" means all internal waters of Canada, the territorial sea of Canada and waters in the exclusive economic zone of Canada, including the shipping safety control zones prescribed pursuant to the *Arctic Waters Pollution Prevention Act*.

4.0 **Application**

4.1 The Canadian Ballast Water Management Guidelines apply to all vessels subject to Vessel Traffic Services. These include the Eastern Canada Vessel Traffic Services Zone (ECAREG), the Arctic Canada Traffic Zone (NORDREG), and the Cooperative Vessel Traffic Services System on the west coast (CVTS Offshore).

4.2 The effective date for implementation of the guidelines is September 1, 2000.

4.3 These guidelines rescind and supercede the "Voluntary Guidelines for the Control of Ballast Water Discharges from Ships Proceeding to the St. Lawrence River and Great Lakes".

5.0 **Consistency with International Guidelines and Other Requirements**

5.1 These guidelines are intended to implement the International Maritime Organization's resolution A.868(20), "Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens", in waters under Canadian jurisdiction.

5.2 Vessels transiting waters under Canadian jurisdiction bound for Great Lakes ports in compliance with the mandatory ballast water regime of the United States fulfill the requirements of these guidelines.

5.3 Vessels transiting waters under Canadian jurisdiction bound for non-Canadian ports and subject to other national ballast water regimes should complete any ballast water exchange outside waters under Canadian jurisdiction or, in exceptional circumstances, undertake such procedures in the designated alternative exchange zones. Vessels are reminded of the need to contact the appropriate authorities to ensure conformity with the laws of the country of destination.

6.0 **Ballast Water Management Plan**

6.1 As noted in section 7.1 of IMO resolution A.868(20), every ship that carries ballast water should be provided with a ballast water management plan. The intent of such a plan is to provide safe and effective procedures for ballast water management.

6.2 The ballast water management plan should be specific to each ship and should be reviewed on the basis IMO Resolution A.868(20) by the flag administration or a recognized organization.

6.3 For flow-through systems, the tank boundary structure for a tank head equivalent to the full distance to the top of the overflow is to be

verified.

6.4 For sequential systems, the sequences indicated in the ship's ballast water management plan are to be approved for strength, stability, minimum draught forward and propeller immersion criteria. Sloshing, slamming and ballast inertia are to be dealt with as necessary. Where the criteria are not met, an operational envelope indicating the permissible significant wave heights for various speeds and headings is required to be developed as part of the ballast water management plan.

6.5 The ballast water management plan shall be included in the ship's operational documentation.

6.6 The Model Ballast Water Management Plan developed by the International Chamber of Shipping (ICS) and the International Association of Independent Tanker Owners (INTERTANKO) may be considered an appropriate reference document when developing the plan.

6.7 Canadian ships that carry ballast water and are making home trade voyage, class I or foreign voyages, should forward a copy of their ballast water management plans to the Regional Board of Steamship Inspection.

6.8 It should be noted that the stability of the ship, and any other safety considerations, remain the responsibility of the ship's master. Nothing in these Guidelines should be construed as an infringement upon that responsibility. In cases where ships are not provided with a Ballast Water Management Plan, masters should pay particular attention to the guidance on safety provided in Appendix 2 of IMO resolution A.868(20).

7.0 **Reporting Requirements**

7.1 With the exception of vessels not destined for a Canadian port, the Master of the vessel shall provide a fully completed ballast water report form as described in Annex 1 by facsimile transmission, or by other means as approved by the appropriate marine communications and traffic services officer.

7.1.1 The Master of the vessel shall provide the appropriate Marine Communication and Traffic Services Centre with the information as requested prior to entry into waters under Canadian jurisdiction.

7.2 Vessels subject to these guidelines that have not submitted a fully completed form in accordance with section 7.1 will be requested to provide the appropriate Marine Communication and Traffic Services Centre with the following information as part of the MCTS interrogative:

Whether a ballast water reporting form signed by the Master has been provided by facsimile to the appropriate agency (i.e. Transport Canada Marine Safety, port authorities or the U.S. Coast Guard) or has been submitted by electronic or other acceptable means.

Whether ballast water is being carried.

If the answer to (ii) is affirmative:

Whether the vessel has a Ballast Water Management Plan appropriate to that ship.

Whether the Ballast Water Management Plan has been reviewed by a classification society or flag administration.

Whether ballast water management procedures have been performed prior to entering Canada's exclusive economic zone

If the answer to (vi) is negative – 1) What is the reason for non performance

What procedures, consistent with the appropriate Regional Ballast Water Annex are proposed to protect Canada's waters prior to discharge of ballast.

7.3 In order to monitor information provided in ballast water report forms under this section, vessels may be boarded and samples collected. Delays to the ship shall be minimized when taking such samples and the results of their analysis shall be made available to the ships operator on request.

7.4 Under section 562.19 of the *Canada Shipping Act* it is an offence to refuse to provide information, or to knowingly provide false information to a marine communication and traffic services officer, where such information is requested for the promotion of environmental protection.

8.0 **Discharge of Ballast Water**

8.1 Subject to the appropriate regional ballast water annex as outlined in section 12, ballast water taken on in areas outside waters under Canadian jurisdiction should not be discharged in waters under Canadian jurisdiction, unless one of the ballast water management options specified in section 9 has been successfully performed.

8.2 In exceptional circumstances where the procedures in 8.1 can not be successfully performed, conditions of discharge may be specified by the appropriate regional authority as noted in Annexes II to V.

9.0 Ballast Water Management Options

9.1 Ballast Exchange

9.1.1 Vessels utilizing ballast exchange should conduct ballast exchange in locations where water depths are not less than 2000 metres, unless otherwise provided in the appropriate Regional Annex.

9.1.2 Alternative Exchange Zones – In exceptional circumstances, where it may not be possible to exchange ballast water due to weather sea or any other conditions the master feels may endanger human life or the safety of the vessel, alternative exchange zones may be utilized on notification of the appropriate marine communications and traffic services officer, as noted in section 7.3(vii). The use of alternative exchange zones may also be appropriate for vessels that are not able to comply with section 9.1.1 because they do not voyage into mid-ocean where water depths are greater than 2000 metres. Masters are advised to consult the appropriate Regional Ballast Water Management Annex.

9.1.3 Sequential Exchange - All of the ballast water should be discharged until suction is lost, and stripping pumps or eductors should be used if possible. Operations shall be logged.

9.1.4 Flow Through Exchange - If flow through methods are employed at least three times the tank volume should be pumped through the tank. Calculations indicating the amount of water to be utilized and pumping rates required to achieve this shall be recorded.

9.2 Non Release of Ballast Water

9.2.1 Ballast water may be retained on board.

9.3 Discharge to reception facilities

9.3.1 Vessels wishing to utilize this option should confirm procedures and availability of this service.

9.4 Alternative Methods

9.4.1 Environmentally sound methods of ballast water treatment that are acceptable to Transport Canada Marine Safety may be utilized. Any alternative method must be at least as effective in removing or killing harmful aquatic organisms and pathogens as the methods listed above.

10.0 Research

10.1 In order to further research into the effectiveness of ballast water management, vessels may be boarded and samples of ballast water may be collected for scientific analysis.

11.0 Ballast Tank Sediment Disposal

11.1 Disposal of sediments as a result of routine cleaning of ballast tanks should be carried out in mid ocean outside Canada's exclusive economic zone in accordance with the ship's ballast water management plan.

11.2 In waters under Canadian jurisdiction, sediments from the ballast tanks of ships trading on foreign voyages should be disposed of in land dumpsites approved for that purpose in accordance with the appropriate legislation or at sea.

11.3 Records shall be maintained of sediment removal in accordance with sections 11.1 and 11.2.

12.0 Regional Implementation

12.1 Recognizing that ecosystems are different within Canada, regional implementation of these guidelines is appropriate to account for differences in trade, ship type, geography, specific exotic species introduction risk, etc. Masters should be governed by the specific regional ballast water management procedures required for their vessel and voyage as outlined in annexes II, III, IV and V.

BALLAST WATER REPORTING FORM

1. VESSEL INFORMATION

Vessel Name	Type:	IMO Number:	**2. BALLAST WATER** Specify Units: m³, MT, LT, ST
Owner	GT:	Call Sign:	Total Ballast Water on Board:
Flag	Arrival Date	Agent:	
Last Port and Country:		Arrival Port:	Total Ballast Water Capacity:
Next Port and Country:			

3. BALLAST WATER TANKS

BALLAST WATER MANAGEMENT PLAN ON BOARD? YES ___ NO ___ HAS THIS BEEN IMPLEMENTED? YES ___ NO ___

TOTAL NO. OF TANKS ON BOARD _____ NO. OF TANKS IN BALLAST _____ IF NONE IN BALLAST GO TO NO. 5

NO. OF TANKS EXCHANGED _____ NO. OF TANKS NOT EXCHANGED _____

4. BALLAST WATER HISTORY: RECORD ALL TANKS THAT WILL BE DEBALLASTED IN PORT STATE OF ARRIVAL; IF NONE GO TO NO. 5

Tanks Code (List multiple sources/tank separately)	BW SOURCE				BW EXCHANGE circle one: Empty/Refill or Flow Through					BW DISCHARGE			
	DATE DD/MM/YY	PORT or LAT. LONG.	VOLUME (units)	TEMP (units)	DATE DD/MM/YY	PORT or LAT. LONG.	VOLUME (units)	% Exch.	SEA Hgt (m)	DATE DD/MM/YY	PORT or LAT. LONG.	VOLUME (units)	SALINITY (units)

BALLAST WATER TANK CODES: FOREPEAK = FP, AFTERPEAK = AP, DOUBLE BOTTOM = DB, WING TANK = WT, TOPSIDE = TS, CARGO HOLD = CH, OTHER = O

IF EXCHANGES WERE NOT CONDUCTED, STATE OTHER CONTROL ACTION(S) TAKEN. _____

IF NONE, STATE REASON WHY NOT: _____

5. IMO BALLAST WATER GUIDELINES ON BOARD (RES. A.868(20))? YES _____ NO _____

6. CANADIAN GUIDELINES FOR THE CONTROL OF BALLAST WATER DISCHARGE FROM SHIPS IN WATERS UNDER CANADIAN JURISDICTION ON BOARD? YES NO

ANNEX I

Annex II

Ballast Water Management Procedures for Vessels Proceeding to the West Coast of Canada

1.0 Ballast Water Reporting Forms shall be sent by facsimile to Western Canada Vessel Traffic Services

Facsimile (604) 666-8453

Phone (604) 666-6011

2.0 Ports of Vancouver, Nanaimo, and Fraser River

2.1 In addition, vessels entering the Ports of Vancouver, Nanaimo and Fraser River shall be subject to the Harbour Master Department Standing Operating Procedures.

2.2 Compliance with ballast management procedures as set out in section 9 are mandatory.

2.3 Procedures

2.3.1 Harbour Master's representatives when boarding vessel to conduct ballast checks will require to see one of the following:

Log book entry (in English)

Abstract of log book entry

Company or other administration form

Ballast Water Reporting form as per Appendix 1 giving details of the ballast water management procedure carried out. The details must include the following information:

position of ballast water exchange - if utilized - giving latitude and longitude

place where ballast water originally taken on board

amount of ballast water

ballast tanks which have had ballast management performed

details if ballast water management not performed (see note).

Note – It will be a defense against not performing a ballast exchange (if that is the ballast management procedure utilized) at sea for the following reasons

Stress or weather

Stability or hull stress concerns – **safety is paramount and the Master shall only carry out the procedure if it is safe to proceed.**

A copy of the above may be faxed to the applicable Harbour Master's Office

Vancouver (604) 665-9099

Fraser River (604) 524-1127

Nanaimo (250) 753-4899

2.3.2 In the event that the vessel is unable to supply the above information in the prescribed manner, then no ballast water will be allowed to be discharged until the following procedures have been undertaken:

1) Samples of ballast water will be drawn and analyzed by a Harbour Master representative.

2) Ballast water found not meeting test standards, will require the vessel depart the port and exchange ballast water in the outgoing current of the north side of Juan de Fuca Strait, west of Longitude 123 degrees 55 minutes west in at least 100 metres of water.

2.3.3 All charges for the movement and delay to the vessel will be for the vessel's account.

2.3.4 Vessels arriving from Ports in British Columbia, Alaska or the West Coast of the United States (North of Cape Mendocino) wishing to discharge ballast water are exempted from these provisions if the ballast water to be discharged originated from these waters. The Habour Master's representative conducting the ballast check will require to see a log book entry showing where the ballast water originated.

2.3.5 These Procedures will not be applied to vessels wishing to discharge less than 1000 metric tonnes of ballast water. However a Port Representative must be in attendance prior to discharge.

3.0 Alternative Exchange Zone

3.1 In exceptional circumstances as noted in section 9.1.2 of these Guidelines, ballast water exchange may be made in accordance with section 2.3.2(2) of this Annex.

Annex III

Ballast Water Management Procedure for Vessels Proceeding to the Great Lakes or St. Lawrence River West of 63 degrees West Longitude

1.0 Ballast Water Reporting Forms shall be send by facsimile to Eastern Canada Vessel Traffic Services (ECAREG)

Facsimile (902) 426-4483

Phone (902) 426-4956

Telex 019 22510

2.0 Vessels are asked to carry out ballast water management procedures as set out in section 9 of these Guidelines.

3.0 Alternative Exchange Zone

3.1 In exceptional circumstances as noted in section 9.1.2 of these Guidelines, ballast water exchange may be made in the internal waters of Canada within the Laurentian Channel in depths exceeding 300 metres. Such internal waters exchanges shall be restricted to the area southeast of 63 degrees west longitude.

3.2 In addition to the requirements above - for those ships that have not left the North American Continental shelf on their inbound voyage, if the ballast management procedure utilized is exchange, such exchange may be made in the internal waters of Canada, within the Laurentian Channel in water depths exceeding 300 metres. As above, such internal waters exchanges shall be restricted to the area southeast of 63 degrees west longitude.

4.0 A record of the salinity of the ballast water to be discharged into the Great Lakes / St. Lawrence River west of 63 degrees West longitude shall be entered in the ships log book.

5.0 Ships entering the Great Lakes / St. Lawrence Seaway system should be aware of the U.S. mandatory ballast water regime and the likelihood of joint boarding at Montreal by representatives of the United States Coast Guard, Transport Canada and the St. Lawrence

Seaway.

Annex IV

Ballast Water Procedures for Vessels Proceeding to Ports in Eastern Canada North of 60 degrees North Latitude

1.0 Ballast Water Reporting Forms shall be sent by facsimile to Northern Canada Vessel Traffic Services (NORDREG)

Facsimile (867) 979-4236

Phone (867) 979-5724

2.0 Alternative Exchange Zones

2.1 In exceptional circumstances as noted in section 9.1.2 of these Guidelines, ballast water exchange may be made:

for vessels proceeding to Hudson Bay ports - in Hudson Strait in depths exceeding 300 metres restricted to the areas southeast of 70 degrees west longitude.

for vessels proceeding to Higher Arctic ports – in Lancaster Sound in depths exceeding 300 metres restricted to the area southeast of 80 degrees west longitude.

Annex V

Ballast Water Procedures for Vessels Proceeding to Ports on the East Coast of Canada

1.0 Reporting

1.1 Reporting requirements under section 7 shall be fulfilled in accordance with the implementation of these guidelines.

1.2 Ballast Water Reporting Forms shall be sent by facsimile to Transport Canada Marine Safety.

Facsimile (902) 426-6657

Phone (902) 426-7725

E-mail: balabam@tc.gc.ca

1.3 Ballast water exchange and/ or ballast water management information provided will be verified on board the vessels, on a random basis.

2.0 Alternative Ballast Water Exchange Zones (ABWEZ)

2.1 The delineation of suitable alternative ballast water exchange zones and the determination of possible exemptions is subject to scientific studies and consultation with the appropriate scientific authorities. Locations for ABWEZ are being investigated and may be included in the Annex V at a future date. *In the meantime vessels are encouraged to comply with these guidelines as far as it is safe and practicable.*

3.0 Ballast water samples collection

3.1 The master of any vessel is asked to give a researcher collecting ballast water samples all reasonable assistance to enable the sampler to collect relevant ballast water samples and gather information in connection with the ballast water management program. *Information obtained during this process will be used in order to provide the scientific basis for the future development and implementation of Annex V.*

Canada

Chile:

National Monitoring Authority: Chilean Navy; Division for Maritime Territory and the Merchant Marine, Maritime Safety and Operations Department. .

Ports affected: All

Ships affected: All ships coming from abroad, ballasted with sea water. No exceptions are listed.

All ships coming from zones affected by cholera or by any similar contagious epidemic.

Implementation: Mandatory application.

Date of start: 10 August 1995

Methods acceptable:
Ballast water exchange in deep water. Entries in bridge and engine room logbooks, showing geographical co-ordinates, amount replaced and what percentage of total ballast capacity it represents.

Unwanted aquatic organisms or pathogens: Not defined.

Uptake control measures: None specified.

Sampling required: Not defined.

Records required: Log book entry as above.

Procedures if en route management is not possible:
In-tank treatment prior to discharge. Addition of 100 grams of powdered sodium hypochlorite, or 14 grams of powdered calcium hypochlorite, per tonne of ballast water, ensuring thorough mixing, and then allowing 24 hours before beginning to deballast.

Procedure if ballast water found to be unacceptable after sampling:
Not known.

For further information refer to: Chilean Declaration DGTM. and MM. ORD. NO. 12600/228 VRS. Order for Preventative Measures to Avoid Transmission of Harmful Organisms and Epidemics by Ballast Water. 10th August 1995

Israel:

National Monitoring Authority: Ministry of Transport, Administration of Shipping and Ports.

Ports affected: All

Ships affected: All ships destined for Israeli ports, wishing to pump out ballast water while in port or while navigating along the coast of Israel. No exceptions are listed.

Implementation: Mandatory application.

Date of start: 15 August 1994

Methods acceptable:
Ballast water that has not been taken on in open ocean, must be exchanged in open ocean, beyond any continental shelf or fresh water current effect. Masters will be requested to provide ships' inspectors (pilots) with a completed ballast water exchange report.

Ships bound for Eilat must exchange outside of the Red Sea, when practicable. Ships bound for Mediterranean ports must exchange in the Atlantic Ocean when practicable.

Unwanted aquatic organisms or pathogens: Not defined.

Uptake control measures: None specified.

Sampling required: Not defined.

Records required: Israel has issued a format for recording the status of ballast. A copy is enclosed.

Procedures if en route management is not possible:
Retention on board.

Procedure if ballast water found to be unacceptable after sampling:
Retention on board.

For further information refer to:

Israel Notice to Mariners No. 4/96 dated 19th April 1996.

Israel

Ballast Water Exchange

VESSEL NAME		PORT OF REGISTRY	OFFICIAL NUMBER
OVERALL LENGTH	BEAM	MOULDED DEPTH	PRESENT DRAFT FWD_____ AFT_____
OWNERS		AGENTS	
CARGO		LOADING PORT(S) (WITH TONNAGES)	
DATES			
WILL VESSEL DEBALLAST DURING THIS CALL IN ISRAELI PORTS Y / N IF YES SPECIFY UNITS M^3/MT/LT/ST/ _____			
FULL BALLAST CAPACITY (TONNES):		DISTRIBUTION (TANK NO. AND CAPACITY)	
WHERE WAS BALLAST TAKEN ON? (INCLUDE DATE) LOCATION_____ DATE_____ 19_____ LOCATION_____ DATE_____ 19_____			
WAS BALLAST EXCHANGED DURING VOYAGE YES_____ NO_____			
IF YES PLEASE INDICATE DATE AND LOCATION LOCATION_____ DATE_____ 19_____ LOCATION_____ DATE_____ 19_____			
MASTER'S NAME (PRINT)		MASTER'S SIGNATURE	
PLACE: DATE_____ 19_____		SHIP'S STAMP	

New Zealand:

National Monitoring Authority: New Zealand Ministry of Fisheries.

Ports affected: All

Ships affected: All ships entering New Zealand territorial seas carrying ballast water loaded within the territorial water of another country. No exceptions are listed.

Implementation: Compliance with guidelines requiring mid-ocean exchange of ballast water. An import health standard for ballast water came into effect on 30 April 1998 and revised on 13 June 2005, applying to ballast water loaded in another country and due for discharge in New Zealand. It requires that ballast water to be discharged has been exchanged in mid-ocean.

Use of reporting form prior to arrival in first New Zealand port, and on departure from final New Zealand port, is mandatory

Date of start: 1996 Mandatory measures from 30 April 1998.

Methods acceptable:

1. Ballast water exchange in deep water.
2. Use of fresh water in ballast tanks (<2.5ppt NaCl)
3. Use of approved on-shore treatment facility (none approved yet).
4. Use of approved in-tank treatment (none approved yet).

Unwanted aquatic organisms or pathogens: Not defined.

Uptake control measures: None specified. However, masters are expected to use their discretion and care when loading ballast water, avoiding where possible, taking ballast in shallow water, in areas where there are known to be active algae blooms or an outbreak of any disease communicable through ballast water, and in the vicinity of dredging operations.

Sampling required: Not defined.

Records required:

- Location and volume of ballast water loaded in other port
- location, volume, method and duration of exchange at sea
- location, volume and date of discharge in New Zealand.

Procedures if en route, management is not possible:

Until other treatment options are available, and if it can be shown that weather conditions and/or vessel design precluded safe exchange, and the ballast water for discharge was not loaded in an area listed in Annex 1 of the Import Health Standard, the ship must leave New Zealand without loading some, or all, intended cargo. Exempted vessels are asked to discharge the least amount of ballast water possible and discharge as far offshore as practicable.

For further information refer to:

New Zealand Import Health Standard for Ballast Water from All Countries.

New Zealand Ballast Water and Ships Hull De-fouling: a Government Strategy January 1998.

Ships-Guide to New Zealand Ballast Water Controls

Ballast water discharge in New Zealand waters

New Zealand has some of the least polluted seas in the world. Our unique marine environment is highly respected and enjoyed by all New Zealanders, and by many visitors from overseas.

However, New Zealand's territorial seas are under constant threat from unwanted foreign marine organisms carried on the hulls of ships and in ships' ballast tanks. Introduction of these organisms threatens our seafood industries, our environment and the health of our people.

Keeping our seas clean is very important, both culturally and economically to New Zealand.

We need your help to stop unwanted marine organisms entering New Zealand waters in, or on, vessels from overseas.

How you can help

Don't discharge

The easiest way to stop the introduction of unwanted marine organisms in ballast water is to avoid discharging ballast in New Zealand's territorial seas.

The safety and stability of your vessel are the only acceptable reasons for the discharge of ballast water in New Zealand's territorial seas.

If you do not have a real need to discharge ballast water while in New Zealand's territorial seas, then please do not do so.

If you must discharge ballast in New Zealand waters - you must first obtain permission
If you have loaded ballast water from another country's waters, you must not discharge it inside New Zealand territorial waters without permission.

Permission will be granted by a Quarantine Officer if it can be shown that ballast was exchanged adequately with mid-ocean water. Permission is given while the vessel is still en route, before arrival in New Zealand.

An exemption may be granted if it can be shown that an exchange of ballast water could not have been undertaken safely. Exemptions are granted while vessel is en route.

Some ballast water uptake locations are very high risk areas. No exemptions are available to discharge unexchanged water from these areas inside New Zealand's 12 mile territorial limit.

These areas include:

- Tasmania, Australia
- Port Phillip Bay, Victoria, Australia

Note - emergency discharge is permitted. Ship and crew safety is paramount.

Log all ballast water management undertaken

Vessels needing to discharge ballast within New Zealand must record in their logs where the ballast water was loaded. A New Zealand Quarantine Officer will ask to see this information. Quarantine Officers may also want to talk with crew members about the loading and exchange of ballast water, and to take ballast water samples for scientific testing. Also log the volumes, location and dates of all exchanges undertaken.

When you discharge ballast water in New Zealand territorial waters you must log the event. If you need to discharge water before arriving in port, you must still obtain permission from a New Zealand Quarantine Officer before commencing the discharge.

Complete the declarations (1 April 2004 is the commencement date for new forms and procedures but new forms can be used before this date)

The Word file below can be downloaded and printed off for completing by hand or the forms can be completed electronically." (left click them to view / complete, right click to download as Word file)

- Ballast water forms
- Ballast water forms - Narrow version
- Instruction for completing the Ballast Water Declaration Part 1 and 2

These forms can be downloaded and used as an electronic template customised with vessel details. Use your customised template to produce declarations for electronic completion with ballast water details each time you visit New Zealand waters.

Before arrival every ballasted vessel approaching New Zealand must complete Part 1 and, if intending to discharge in New Zealand, Part 2 (except for the discharges column). Copies of these are sent by fax or email to the ship's agent in New Zealand accompanying the Advance Notice of Arrival Form (available on www.customs.govt.nz).

A New Zealand Quarantine Officer may ask to see the originals of both these forms when you come into port and they will be collected at your final port of call in New Zealand once discharges have been completed and details given on Part 2."

What about sediment in tanks?

Under no circumstances may sediment from the cleaning of holds, ballast tanks or anchor chain lockers be discharged into New Zealand's territorial waters. Sediment or mud can only be landed and disposed of at a landfill approved by a New Zealand Quarantine Officer.

Mid ocean exchanges

Mid ocean ballast water exchanges will reduce the chance of you introducing unwanted marine organisms to New Zealand waters.

Mid ocean ballast exchanges must be carried out with ocean water at least 200 nautical miles offshore.

Flushing tanks

Mid-ocean exchanges can be successfully carried out by using either the "empty-refill" method, or the "flow-through" method. If the "flow-through" method is used, three times the tanks' volume should be pumped through the tanks to ensure sufficient dilution of the coastal water. If using the empty-refill method you must replace at least 95% of the volume of water in the tank.

Other ways you can help

Minimise the uptake of harmful aquatic organisms by not loading ballast water in:

- Known high risk areas such as those listed above
- Very shallow water
- Locations where propellers may stir up sediment, or

Locations where diseases such as cholera are known to be present in the water

Remember, New Zealand has rules controlling the discharge of ballast water - avoid expense and delays to your vessel by complying with these rules. Unapproved discharge will result in delays to your vessel and possible legal proceedings.

Locations

Biosecurity New Zealand
Address:
Pastoral House
25 The Terrace
Wellington
New Zealand
Postal address:
PO Box 2526, Wellington, New Zealand

Phone: +64 4 819 0436
Fax: +64 4 819 0731
Email: selena.henry@maf.govt.nz
Web: http://www.biosecurity.govt.nz
Hours: 8.30am-5pm

Compliance and Enforcement Group
Postal address:
PO Box 2526, Wellington, New Zealand

Phone: 0800 327 327
Email: animalwelfare@maf.govt.nz
Hours: 24 hours

IMPORT HEALTH STANDARD FOR SHIPS' BALLAST WATER FROM ALL COUNTRIES

Issued pursuant to Section 22 of the Biosecurity Act 1993
Dated: 13 June 2005

1. REVIEW

The original standard was issued by Ministry of Fisheries in May 1998. It was reviewed to include improved procedures and transition to the format of Biosecurity New Zealand, Ministry of Agriculture and Forestry (MAF) in June 2005.

Nothing in this standard is to be read as relieving ship masters of their responsibility for the safety of the vessel, passengers and crew.

2. APPLICATION

This import health standard (IHS) applies to ballast water loaded within the territorial waters of a country other than New Zealand and intended for discharge in New Zealand waters. The IHS does not apply to: ballast water that will not be discharged in New Zealand waters; ballast water loaded in New Zealand waters; or emergency discharge of ballast water.

3. GENERAL CONDITIONS

It is the responsibility of the Master of the vessel to ensure that the ballast water and any associated sediment, intended for discharge in New Zealand, comply with the conditions in the standard. Ballast water that does not comply with the conditions must not be discharged in New Zealand waters.

Compliance with these controls must be consistent with the safety of the crew and the vessel. Nothing in these controls is to be read as relieving the Master of their responsibility for the safety of the vessel.

4. DEFINITIONS

Ballast water - water, including its associated constituents (biological or otherwise), placed in a ship to increase the draft, change the trim or regulate stability. It includes associated sediments, whether within the water column or settled out in tanks, sea-chests, anchor lockers, plumbing, etc.

Internal waters - means:

- harbours, estuaries, and other areas of the sea that are on the landward side of the baseline of the territorial sea of a coastal state; and
- rivers and other inland waters that are navigable by ships.

Inspector - an inspector appointed under section 103 of the Biosecurity Act, 1993

New Zealand waters - means:
- the internal waters of New Zealand; and
- the territorial sea of New Zealand.

Territorial sea – For New Zealand this is the sea within 12 nautical miles of the seaward side of the baseline of the territorial sea. (See section 3 of the Territorial Sea, Contiguous Zone and Exclusive Economic Zone Act, 1977 for definition of New Zealand baseline)

5. REQUIREMENTS FOR BALLAST WATER

5.1 No ballast water may be discharged into New Zealand waters without the permission of an inspector.

5.2 An inspector will only permit ballast water to be discharged if satisfied that the Master has met one of the criteria in section 6 below.

5.3 Part I of the Vessel Ballast Water Declaration approved by the Ministry of Agriculture and Forestry must be completed for all vessels. It should be completed before arrival in New Zealand and sent accompanying the Advance Notice of Arrival to the Ministry of Agriculture and Forestry Quarantine Service (MAFQS) office at the ship's first port of arrival.

5.4 For vessels indicating intention to discharge ballast in New Zealand, Part 2 of the Ballast Water Declaration must also be completed, except for the columns under Question 3 for Ballast Water Discharged. This should be sent to MAFQS before arrival in New Zealand, along with Part 1, in order for a vessel to be granted permission to discharge ballast water or be granted an exemption.

5.5 Permission to discharge ballast water is granted when an inspector approves the discharge, signs the 'Discharge of ballast permitted' form, and sends this back to the ship. Discharge of ballast is denied when an inspector does not approve the discharge, signs the 'Discharge of ballast denied' form and sends this to the ship.

5.6 Before the ship leaves New Zealand the original of Part 2 must be completed with details of the discharge in New Zealand. The original signed declarations must be kept on board while in New Zealand. In addition the copy faxed or emailed from MAFQS to the ship detailing the MAFQS direction to the vessel must also be retained. These are uplifted by MAFQS at the last port of call in New Zealand.

5.7 Sediment which has settled in ballast tanks, ballasted cargo holds, sea-chests, anchor lockers or other equipment must not be discharged into New Zealand waters. If the ship needs to discharge sediment in New Zealand, the sediment must be landed and taken to a landfill approved by an inspector.

6. OPTIONS FOR SATISFYING AN INSPECTOR

Option 1
Demonstrating the ballast water has been exchanged en route to New Zealand in areas free from coastal influences, preferably 200 nautical miles from the nearest land and in water over 200m in depth. Accepted techniques are either emptying and refilling ballast tanks/

holds with an efficiency of 95% volumetric exchange or pumping through the tanks a water volume equal to at least three times the tank capacity. Tanks should be pumped no more than two at a time and, if two tanks are pumped together, they should be a symmetrical pair of tanks to ensure the safety of the vessel.

Option 2
Demonstrating the ballast water is fresh water (not more than 2.5 parts per thousand sodium chloride).

Option 3
Ballast water has been treated using a shipboard treatment system approved by MAF.

Option 4
Ballast is discharged in an onshore treatment facility approved by MAF.

Note - there are presently no treatment systems or facilities approved by MAF for the purposes of options 3 and 4.

7. EXEMPTIONS

It is accepted that in some circumstances exchange may not be possible. Exemptions are granted by the same process as granting permission to discharge. An exemption will generally be granted when it can be demonstrated that:

Exemption 1
- The weather conditions on the voyage in combination with the construction of the vessel have precluded safe ballast water exchange; and
- the ballast water was not loaded in any area listed in Annex 1.

Exemption 2
- The construction of the vessel has precluded ballast water exchange; and
- the ballast water was not loaded in any area listed in Annex 1.

In the case of weather conditions or vessel construction precluding the safe exchange of ballast water from Annex 1 areas, the vessel must either redistribute the ballast water around the ship's ballasting spaces in order to load cargo or, if this is not possible to accomplish with a suitable margin of safety, the ship must leave New Zealand without loading some, or all, intended cargo.

Exempted vessels are asked to discharge the least amount of ballast water possible and discharge as far offshore as practicable.

8. COSTS

The costs of inspection, analysis, identification, delays, and any other costs associated with this standard are the responsibility of the owner and/or charterer. These costs shall be actual, fair and reasonable.

9. ENQUIRIES

Unless indicated to the contrary on communications, enquiries concerning this IHS should be addressed to:

Team Manager, Border Standards
Biosecurity New Zealand
Ministry of Agriculture and Forestry
PO Box 2526
Wellington
NEW ZEALAND
FAX: 64 - 4 - 498 9888

10. OFFENCES AND PENALTIES

Providing incorrect information to an inspector is an offence under the Biosecurity Act, 1993 section 154(b). It carries a penalty for individuals of up to 12 months imprisonment and/or a fine not exceeding NZ$50,000, and for corporations a fine not exceeding NZ$100,000. Failure to obey the directions of an inspector is an offence under section 154(o). It carries a penalty for individuals of a fine not exceeding NZ$5,000, and for corporations a fine not exceeding NZ$15,000.

11. OBTAINING INFORMATION

Ship masters should communicate with MAFQS inspectors prior to their arrival in New Zealand waters to determine requirements or discuss their options if permission has been denied (these may include carrying out an exchange and resubmitting a new declaration). Communications should be directed to the MAFQS office at the intended port of arrival or one of the following:

MAF Quarantine Service
CPO Box 39
Auckland
Phone - (09) 303 3423
FAX - (09) 303 3037
Group Leader – 0272 924 820

MAF Quarantine Service
PO Box 3042
Wellington
Phone - 04) 473 8996
FAX - (04) 473 2079
Operations Manager 0274 361 345

MAF Quarantine Service
Private Bag 4765
Christchurch
Phone - (03) 328 7166
FAX - (03) 328 7186

ANNEX 1

Areas listed in this annex are considered particularly high risk areas. For this reason, ballast water loaded in these areas may not be discharged into New Zealand waters under any circumstances. This list may be modified as additional information becomes available.

- Tasmania, Australia
- Port Philip Bay, Victoria, Australia

NEW ZEALAND BALLAST WATER DISCHARGE REQUIREMENTS

Instruction for completing Ballast Water Declaration Parts 1 and 2

General

Part 1: Every vessel with ballast tanks must complete Part 1 before arrival in New Zealand.

Part 2: If intending to discharge ballast water in New Zealand complete Part 2 (except for the discharges column) before arrival.

Send forms by fax or email to the ship's agent in New Zealand with the Advance Notice of Arrival Form (available on www.customs.govt.nz).

MAF Quarantine Service will process these and give permission to discharge or other direction by completing and sending back the MAF section of Part 1. Masters please pay attention to this returned form as these are legal directions for your vessel unloading ballast in NZ waters.

If your forms are incomplete or wrongly completed, there may be a delay in granting permission while MAF requests more information via your ships agent.

It is recommended that detailed records (log) of ballast water movement are kept on board, along with the completed forms. This may be part of a comprehensive ship's Ballast Water Management Plan as recommended by IMO.

Completing Part 1

Top of form

Enter the vessel name, the date of arrival in New Zealand, and the port of arrival in New Zealand. The MAF inspector will fill in their name later.

Question 1

If your vessel is carrying ballast water tick the box **YES** and continue to next question.

If your vessel is not carrying ballast water tick the box **NO,** and only answer questions 5,6,7 and 8.

You are not required to complete Part 2 if your vessel is not carrying ballast water. The Master must sign and send in Part 1 only.

Question 2

List any ballast tanks loaded in these areas.

Note: Permission can be given for these tanks to be discharged in New Zealand only if the water in them has been thoroughly exchanged mid-ocean. No exemptions to the requirement to exchange can be given for these tanks even if the vessel is not physically capable of exchange. Discharge of

unexchanged water from these sources is permitted only if an emergency arises that threatens the safety of the vessel or the people aboard.

Question 3

Choose one option from 3A, B or C. These are the options for meeting the New Zealand requirements. You must indicate one option.

Option A: If selected complete questions 5-8. You are not required to complete Part 2 if your vessel is not discharging ballast. The Master must sign and send in Part 1 only.

Option B: If you are wishing to discharge any tanks in New Zealand you must exchange the tanks with mid-ocean water. Indicate which method you have used to exchange water in each tank: - Flow-through (F/T) and/or Empty/refill (E/R).

Option C: If your tanks are filled with fresh water, from a drinking water supply or from a freshwater river or lake at least 5 kilometres upstream from a river mouth or estuarine waters, you do not need to exchange before discharge in New Zealand. Please indicate when and where the fresh water was loaded.

Question 4

The only acceptable reason for not complying with 3 A, B or C is if this would put the safety of the ship and people aboard at risk.

If you are unable to comply please show the reason, 4A and/or B, and give details.

You must wait to receive an exemption before discharging in New Zealand.

Questions 5 to 8

These questions are solely for collection of information by New Zealand authorities. Please complete the questions and note the dates and locations.

Master's name and signature

The Master must sign this declaration

MAF's directions to vessel:

This part will be completed by the MAF inspector to show the inspectors decision. **Note:** For vessels with loading orders that may change, it is advisable to exchange coastal ballast water with mid ocean water in case you need to discharge ballast in New Zealand.

If you **change your intentions** and wish to discharge in New Zealand you must send in a new Ballast Water Declaration Part 1 and 2 to the MAF office of the port of next arrival and await permission.

Completing Part 2

Part 2 is only to be completed by vessels intending to discharge ballast water in New Zealand waters.

Question 1. Vessel Information

Give the information requested for our records. Use m^3 and m^3/hr for capacities.

Question 2. This voyage

Give date of arrival and expected departure from New Zealand.
Give port of first arrival and expected port of departure in New Zealand.
Give last and next overseas ports.
Fill in the total number of tanks that will be in ballast coming into New Zealand.
Fill in the total volume of ballast that will be carried into New Zealand.

Question 3. Ballast water discharged in New Zealand

These tables are to be completed to show the management undertaken on ballast water in tanks intended for discharge in New Zealand.
For each individual tank or pair of tanks, fill out a row starting with a description of the tank (tank number and type) using the codes shown below the table. Continue on another form if required.

Ballast water source at commencement of voyage includes:

- Date and port/location of loading,
- Volume of ballast water taken on there,
- Final volume of water in the tank

Ballast water exchanged includes:

- Whether exchanged by:
  - emptying and refilling of the tank,
  - or by flow through of water until 3 times the volume of the tank has been flushed through.
- Start and finish date and time
- Start and finish position
- Volume flowed through or volume being exchanged.
  - If flow through method used: Calculate volume from duration of pumping multiplied by effective pump capacity. [Example: Tank volume =100 m^3, pump capacity = 100 m^3/hr, 3hrs pumping flow through, then volume flowed through = 300 m^3]
  - For empty/refill: Record the volume of water emptied from the tank before the tank is refilled. [Example: Initial tank volume = 100 m^3. After pumping out tank until suction is lost, the volume remaining = 2m^3. If refill tank to 100 m^3, then volume exchanged = 98 m^3. **Note**: If tank is refilled to greater than the initial level (eg >100$m^{3)}$ the volume exchanged is still 98 m. The <u>volume remaining</u> (eg 2m^3) is of prime interest and should be recorded in your ship's ballast log for each E/R exchange.]

Ballast water discharged is completed after discharge in New Zealand. Includes:

- Date, port/location and volume of discharge.

Master's name and signature: The Master must sign the declaration.

Note: Ships carrying out a ballast exchange must also note the exchange in the ship's deck logbook. The ship's logbook must be made available for inspection by a quarantine officer at any New Zealand Port.

BALLAST WATER DECLARATION: PART 1

TO BE COMPLETED FOR ALL VESSELS ARRIVING IN NEW ZEALAND

Vessel's Name:	Arrival Date:	Arrival Port:	Inspector's Name:

BALLAST WATER

1	**Are you carrying ballast water?**	☐ YES ☐ NO	**If NO go to question 5**
2	**List any tanks loaded with ballast water in Port Phillip Bay, Victoria or Tasmania.**		**List Each Tank Number and Type (see codes below):**
3	**How will you comply with NZ's ballast water controls. (See NZ Import Health Standard for Ballast Water from all Countries.) Check the box indicating how you will comply**		**(A, B or C) below.**
	A. Not discharging any ballast water in New Zealand waters.	☐	
	B. Exchanging the ballast water mid-ocean in all tanks that are to be discharged in New Zealand waters. Indicate whether flow-through or empty/refill technique was used. Note: Flow-through requires 3 times the tank capacity to be pumped through the tank.	☐	**Flow through** ☐ **or Empty/refill** ☐
	C. Discharging only fresh water. State when and where the water was loaded.	☐	**Date loaded:** **Port or Position:**
4	**If you cannot comply, check the box (A &/or B) indicating the reason(s). Give details.**		
	A. Vessel is not physically capable of either empty/refill or flow-through exchange	☐	**Specify Details:**
	B. Exchange would have caused unacceptable risk to crew or vessel due to weather conditions	☐	**Specify Details:**

CLEANING. SEDIMENTS

5	**Do you intend to discharge sediment or other debris from ballast tanks/holds (excluding normal deballasting), anchors, chains or chain lockers in New Zealand waters? If YES, state when and where.** *Please note that sediments must be discharged into an approved landfill.*	☐ YES ☐ NO	**Date:** **Port or Position:**

CLEANING. HULL FOULING

6	**When and where was the vessel last dry-docked and cleaned?**		**Date:** **Port or Position:**
7	**Has the vessel been laid-up for 3 months or more since it was last dry-docked and cleaned? If YES, state when and where.**	☐ YES ☐ NO	***Date. Started:*** **Date: Finished:** **Port or Position:**
8	**Do you intend to clean the hull of the vessel in New Zealand? If YES, state when and where.**	☐ YES ☐ NO	**Date:** **Port or Position:**

Ballast tank codes: Upper=U, Lower=L, Forepeak=FP, Aftpeak=AP, Double Bottom=DB, Deep Tank=DT, Wing Tank=WT, Topside=TS, Cargo Hold=CH, Other (specify), Port=P, Starboard=S, (eg 3UWTP):.

MASTER'S NAME AND SIGNATURE:	MAF's directions to vessel:-	INSPECTOR'S SIGNATURE:		
	☐ **Vessel not discharging** (Contact MAF if intentions change)	☐ **Discharge of ballast permitted**	☐ **Discharge of ballast denied** (Contact MAF to discuss options)	☐ **Exemption granted** (This voyage only)

New Zealand Ministry of Fisheries. Pursuant to section 22 of the Biosecurity Act 1993. Revised April 2004

BALLAST WATER DECLARATION: PART 2

TO BE COMPLETED FOR ALL VESSELS DISCHARGING BALLAST WATER IN NEW ZEALAND

1. VESSEL INFORMATION		Vessel's Name:	IMO Number:	Vessel's Call Sign:
Flag:		Vessel's Owner:	Vessel's Agent:	Gross Tonnage (MT):
Type of Vessel:	☐ Bulk ☐ Container ☐ Tanker ☐ RORO/Cars ☐ Fishing		Other(specify) Date Built:	Ballast pumping capacity : Pump A Pump B
Total Number of Ballast Tanks On Board Vessel:		Total Ballast Capacity (specify units):		
2. THIS VOYAGE	Date of Arrival in New Zealand:		Arrival Port:	Last Overseas Port:
	Date of Departure from New Zealand:		Departure Port:	Next Overseas Port:
Total Number of Tanks in Ballast on Arrival in New Zealand:			Total Ballast Volume on Arrival in NZ (specify units; m3, MT):	

3. BALLAST WATER DISCHARGED IN NEW ZEALAND (If none, go to bottom of page) — **TICK HERE IF THIS SECTION IS A CONTINUATION OF ANOTHER FORM** ☐

IMPORTANT:
List the original **BALLAST WATER SOURCE(s)** for ballast taken on in countries other than **New Zealand**.
All tanks discharged in New Zealand that contained any ballast from another country prior to any exchange must be listed. Detail each ballast management operation for tanks listed.

TANK NO. and TYPE (see codes below)	BALLAST WATER SOURCE AT COMMENCEMENT OF VOYAGE				BALLAST WATER EXCHANGED (E/R = Empty then Refill F/T = Flow Through)					BALLAST WATER DISCHARGED		
	DATE LOADED (DD/MM/YY	PORT or LAT./LONG.	VOLUME LOADED (specify units)	FINAL VOLUME IN TANK (specify units)	E/R or F/T	START DATE FINISH DATE (DD/MM/YY)	START TIME FINISH TIME (HH:MM)	START LAT. LONG FINISH LAT. LONG.	VOLUME FLOWED THROUGH or being EXCHANGED (specify units)	DATE DISCHARGED	PORT or LAT./LONG.	VOLUME DISCHARGED (specify units)

Ballast tank codes: Upper=U, Lower=L, Forepeak=FP, Aftpeak=AP, Double Bottom=DB, Deep Tank=DT, Wing Tank=WT, Topside=TS, Cargo Hold=CH, Other (specify), Port=P, Starboard=S, (eg 3UWTP).

MASTER'S NAME AND SIGNATURE:

New Zealand Ministry of Fisheries. Pursuant to section 22 of the Biosecurity Act 1993. Revised April 2004

U.S.A.:

National Monitoring Authority: US Coast Guard (USCG).

Ports affected: All

- Ships affected: All ships carrying ballast and arriving from outside the US exclusive economic zone (EEZ).

Implementation: Mandatory reporting, voluntary ballast water management guidelines.

Date of start: 1999-07-01

Methods acceptable:

1. Ballast water exchange at sea, outside US EEZ.
2. Ballast water exchange in designated sea area within US EEZ.
3. Environmentally sound alternative ballast water management methods.
4. Discharge ballast water to an approved reception facility
5. Exchange ballast water in other waters approved by USCG Captain of the Port.

Unwanted aquatic organisms or pathogens: Not defined.

Uptake control measures: None specified.

Sampling required: Not defined.

Records required: The US has issued a format for recording the status of ballast. A copy is enclosed

Procedure if en route management is not possible: [not yet known]

Procedure if ballast water found to be unacceptable after sampling
Not yet known; controls are still voluntary.

For further information refer to: US Invasive Species Act. 1996

Full guidelines to be produced. The US Coast Guard (USCG) will be monitoring all ships to gauge compliance. After two years (or more), a report will be made, containing a recommendation as to whether the requirement should be made mandatory.

U.S.A. - Great Lakes and Hudson River:

National Monitoring Authority : US Coast Guard (USCG).

Ports affected: Great Lakes and Hudson River above the George Washington bridge.

Ships affected: All ships with ballast tanks, bound for the Great Lakes and / or the Hudson River above the George Washington bridge and entering from outside the US and Canadian Exclusive Economic Zones (EEZ), or which took on new ballast in a North American port after entering the EEZ.

Implementation: Mandatory in Great Lakes and Hudson River north of the George Washington bridge.

Date of start: Great Lakes - May 1993; Hudson River - December 1994

Methods acceptable:

1. Complete ballast water exchange at sea, outside US EEZ, in a depth of more than 2000 meters.
2. Retain ballast water on board ship.
3. Complete ballast water exchange in alternative designated areas approved in advance by the USCG Captain of the Port (COTP).
4. Alternative ballast water management practices approved in advance by the USCG. (Send requests to address below.)

Unwanted aquatic organisms or pathogens: Not defined.

Uptake control measures: None specified.

Sampling required: The USCG may sample ballast water and sediment, examine documents, and make appropriate inquiries to assess compliance.

Records required: A ballast water reporting form is available from the USCG for reporting ballast procedures.

Procedure if en route management is not possible:

1. Retain ballast water on board.
2. Complete ballast water exchange in alternative designated areas approved in advance by the USCG Captain of the Port.
3. Alternative ballast water management practices approved in advance by the USCG.

Procedure if ballast water found to be unacceptable after sampling

1. Failure to comply, and knowing violation may result in civil penalties.
2. USCG may request US Customs to withhold or revoke the clearance required by 46 USC app.91 of any owner or operator of a ship not in compliance with these regulations.

For further information refer to:

- US Code of Federal Regulations (33 CFR Part 151, Subpart C).
- US Nonindigenous Aquatic Nuisance Prevention and Control Act (16 US Code 4701, *et sec*)
- Commandant, (G-MSO-4); United States Coast Guard
  2100 2nd Street SW; Washington DC 20593-0001

Aquatic Nuisance Species

Every day, large quantities of ballast water from all over the world are discharged into United States waters. Along with this water are plants, animals, bacteria, and pathogens. These organisms range in size from microscopic to large plants and free-swimming fish. These organisms have the potential to become aquatic nuisance species (ANS). ANS may displace native species, degrade native habitats, spread disease, and disrupt human social and economic activities that depend on water resources. Any ship carrying ballast water is a potential invasion source.

In recent years there has been increased international concern for the threats to human health, aquaculture, and coastal environments from aquatic nuisance species and diseases. The United States Coast Guard is responding to these concerns through a comprehensive national ballast water management program. This program (1) promotes ballast water management for operators of all vessels in waters of the U.S. (2) provides voluntary ballast water management guidelines for all vessels entering U.S. waters from outside of the EEZ and (3) requires the reporting of ballast water management data by all vessels entering U.S. waters from outside of the EEZ. The U.S. Coast Guard encourages program participation from vessel operators. A mandatory reporting requirement, as detailed in this brochure, was established to monitor participation with the program and assess ballast water delivery patterns. The information gathered from these reports will influence future action.

BALLAST WATER Reporting Forms and Further Information

Reporting forms, instructions, regulations and additional educational material are available electronically through the Coast Guard Ballast Water Management Web Page:
http://www.uscg.mil/hq/g-m/mso/mso4/

Or contact:

Commandant, (G-MSO-4)
2100 Second Street, SW
Washington, DC 20593-0001
(202) 267-0500

Voluntary Guidelines

(For all vessels with ballast tanks on all waters of the United States)

- Avoid ballast operations in or near marine sanctuaries, marine preserves, marine parks, or coral reefs.
- Avoid taking on ballast water:
  - with harmful organisms and pathogens, such as toxic algal blooms
  - near sewage outfalls.
  - near dredging operations.
  - where tidal flushing is poor or when a tidal stream is known to be more turbid.
  - in darkness when organisms may rise up in the water column.
  - in shallow water or where propellers may stir up the sediment.
- Clean ballast tanks regularly.
- Discharge minimal amounts of ballast water in coastal and internal waters.
- Rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin.
- Remove fouling organisms from hull, piping, and tanks on a regular basis and dispose of any removed substances in accordance with local, State and Federal regulations.
- Maintain a vessel specific ballast water management plan.
- Train vessel personnel in ballast water and sediment management and treatment procedures.

Ballast Water Management Practices for All Vessels That Carry Ballast Water Into The Waters Of The United States After Operating Beyond The Exclusive Economic Zone (EEZ)

Mandatory for vessels entering the Great Lakes and the Hudson River North of George Washington Bridge
Voluntary for other Waters of the United States

- Exchange ballast water beyond the EEZ, from an area more than 200 nautical miles from any shore, and in waters more than 2,000 meters in depth;
- Retain the ballast water on board the vessel;
- Use an alternative environmentally sound method of ballast water management that has been approved in advance by the Commandant of the U.S.Coast Guard, or
- Discharge ballast water to an approved reception facility; or
- Exchange ballast water in other waters approved by the USCG Captain of the Port.

Safety

If the master determines that a ballast water practice is unsafe and the vessel is on a voyage to the Great Lakes or Hudson River, the vessel must contact the appropriate Captain of the Port to approve any alternate arrangements prior to the vessel's entry. Vessels may be required to either retain the ballast water on board, exchange it at an alternate exchange site approved by the USCG Captain of the Port, or use a Coast Guard approved treatment. A vessel bound for all other waters of the United States is not required to perform a ballast water management practice which the master has determined to be unsafe.

Mandatory Reporting and Recordkeeping Requirements for all vessels entering the Waters of The United States After Operating Beyond The Exclusive Economic Zone

The Master, Owner, Operator, Person in Charge, or vessel agent must send a signed copy of the following information to the U.S. Coast Guard. Copies of this information must be maintained on board the vessel for at least two years.

- Vessel's name, type, IMO number, flag, owner, gross tonnage, call sign, and agent
- Last port, arrival port and date, next port
- Total volume of ballast water capacity
- Total volume ballast water on board
- Total number of tanks: on board, used for ballast, to be discharged, underwent exchange, underwent alternative management
- Total number of tanks in ballast
- Is there a ballast water management plan on board? Was it implemented?
- Is there a copy of IMO guidelines on board?
- Location, date, volume, temperature of ballast when loaded for each tank.
- Description of alternative management method if used
- Reasons if no ballast treatment method used.
- Particulars of exchange if conducted including; volume exchanged; location; date; percent of tank volume exchanged, and sea height at time of exchange
- Location, date, volume, and salinity of ballast water to be discharged for each tank.

Where And When To Send The Required Information

Vessels bound for Great Lakes:

United States or Canadian Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo 315-764-3283 at least 24 hours before the vessel arrives in Montreal, Quebec.

Any other Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo **315-764-3283** at least 24 hours before the vessel arrives in Montreal, Quebec, or;

Complete the ballast water information section of the St. Lawrence Seaway required "Pre-entry Information from Foreign Flagged Vessels Form" and submit it in accordance with the applicable Seaway notice.

Vessel bound for the Hudson River north of the George Washington Bridge

Fax the form to the COTP New York at **718-354-4249** before the vessel enters the waters of the United States (12 miles from the baseline).

Vessel bound for all ports within the waters of the United States other than the Great Lakes or Hudson River north of the George Washington Bridge

Before the vessel departs from the first port of call in the waters of the United States send the form by one of the three following methods:

- Mail the form to the U.S. Coast Guard, c/o Smithsonian Environmental Research Center (SERC), P.O. Box 28, Edgewater, MD 21037-0028;
- Transmit the form electronically to the National Ballast Information Clearinghouse (NBIC) at www.serc.si.edu\invasions\ballast.htm); e-mail – ballast@serc.si.edu;, or
- Fax the form to the Commandant, U.S. Coast Guard, c/o the NBIC at 301-261-4319.

If any information changes, send an amended form before the vessel departs the waters of the United States.

Completion Instructions For Ballast Water Reporting Form

(Please write in English and PRINT legibly.)

Is this an Amended Ballast Reporting Form?: Check Yes or No. Amendments should be submitted if there are any differences between actual ballast discharges and discharge information reported in a prior form. Please mark "Yes" if this form amends a previously submitted ballast reporting form.

SECTION 1. VESSEL INFORMATION

Vessel Name: Print the name of the vessel clearly.

IMO Number: Fill in identification number of the vessel used by the International Maritime Organization.

Owner: Write in the name of the registered owner(s) of the vessel. If under charter, enter Operator name.

Type: List specific vessel type. Use the following abbreviations: bulk (bc), roro (rr), container (cs), tanker (ts), passenger (pa), oil/bulk ore (ob), general cargo (gc), reefer (rf). Write out any additional vessel types.

GT: What is the Gross Tonnage of the vessel?

Call Sign: Write in the official call sign.

Flag: Fill in the full name of the country under whose authority the ship is operating. No abbreviations please.

SECTION 2. VOYAGE INFORMATION

Arrival Port: Write in the name of your first port of call after entering the U.S. EEZ or St. Lawrence Seaway. No abbreviations please.

Arrival Date: Fill in the arrival date to the above port. Please use European date format (D/M/YYYY).

Agent: List agent used for current port.

Last Port: Fill in the last port at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.

Country of Last Port: Fill in the last country at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.

Next Port: Fill in the port at which the vessel will call immediately after departing the current port ("Current Port"="Arrival Port" above). No abbreviations please.

Country of Next Port: Fill in the country of "Next Port" at which the vessel will call immediately after current port. No abbreviations please.

SECTION 3. BALLAST WATER

Total Ballast Water on Board:

Volume: What was the total volume of ballast water on board upon arrival into the waters of U.S. EEZ? Do not count potable water.

Units: Please include volume units (m^3, MT, LT, ST).

Number of Tanks in Ballast: Count the number of ballast tanks and holds with ballast as vessel enters waters inside the United States EEZ.

Total Ballast Water Capacity:

Volume: What is the maximum volume of ballast water used when no cargo is on board?

Units: Please include volume units (m^3, MT, LT, ST).

Total Number of Tanks on Ship: Count all tanks and holds that can carry ballast water (do not include tanks that carry potable water).

SECTION 4. BALLAST WATER MANAGEMENT

Total No. of tanks to be discharged: Count only tanks and holds with ballast to be discharged into waters inside the United States EEZ or into an approved reception facility. Count all tanks and holds separately (e.g., port and starboard tanks should be counted separately).

Of tanks to be discharged, how many Underwent Exchange: Count all tanks that are to be discharged into waters of the United States or into an approved reception facility.

Of tanks to be discharged, how many Underwent Alternative Management: Count all tanks that are to be discharged into waters of the United States or an approved reception facility.

Please specify alternative method(s) used, if any: Specifically, describe methods other than Empty/Refill or Flow-Through used for ballast management.

If no ballast treatment conducted, state reason why not: This applies to all unexchanged tanks and holds being discharged into waters of the United States or into an approved reception facility.

Ballast Management Plan on board?: Is there a written document on board, specific to your vessel, describing the procedure for ballast management? This should include safety and exchange procedures (usually provided by vessel's owner or operator). Check Yes or No.

Management Plan implemented?: Do you follow the above management plan? Check Yes or No.

IMO Ballast Water Guidelines on board?: Is there a copy of the International Maritime Organization (IMO) Ballast Water Guidelines on board this vessel (i.e. "Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer Aquatic Organisms and Pathogens", [Res. A.868(20)])? Check Yes or No.

SECTION 5. BALLAST WATER HISTORY

(Record all tanks to be deballasted in port state of arrival: If none, go to #6)

Tanks/Holds: Please list all tanks and holds that you have discharged or plan to discharge into waters of the United States or into an approved reception facility (write out, or use codes listed below table). Follow each tank across the page listing all source(s), exchange events, and/or discharge events separately. List each tank on a separate line. Port and starboard tanks with identical ballast water histories may be included on same line. Please use an additional page if necessary, being careful to include ship name, date, and IMO number at the top of each. For tanks with multiple sources: list 3 largest sources from last 30 days on separate lines. If more than 3

sources, include a 4th line for the respective tank(s) that indicated "Multiple" in port column and list the remaining tank volume not included in the 3 largest sources (i.e., total tank volume minus volume of the 3 largest sources). See example #1 on sample ballast reporting form.

-BW SOURCES-

Date: Record date of ballast water uptake. Use European format (D/M/YYYY).

Port or latitude/longitude: Record location of ballast water uptake. No abbreviations for ports.

Volume: Record total volume of ballast water uptake, with volume units.

Temp: Record water temperature at time of ballast water uptake, in degrees Celsius (include units).

-BW MANAGEMENT PRACTICES-

Date: Date of ballast water management practice. If exchanges occurred over multiple days, list the day when exchanges were completed. Use European format (D/M/YYYY).

Endpoint or latitude/longitude: Report location of ballast water management practice. If an exchange occurred over an extended distance, list the end point latitude and longitude.

Volume: Report total volume of ballast water moved (i.e., gravitated and pumped into tanks, discharged to reception facility) during management practice , with units.

% Exch.: (Note: for effective flow through exchange, this value should be at least 300%).

$$\% \text{ Exchange} = \frac{\text{Total Volume added by Refill or Flow Through}}{\text{Capacity of Ballast Tank or Hold}} \times (100\%)$$

Method: Indicate management method using code (ER = empty/refill, FT = flow through, ALT = alternative method).

Sea Ht . (m): Estimate the sea height in meters at the time of the ballast water exchange if this method was used. (Note: this is the combined height of the wind-seas and swell, and does not refer to water depth).

-BW DISCHARGES-

Date: Date of ballast water discharge. Use European format (D/M/YYYY).

Port or latitude/longitude: Report location of ballast water discharge. No abbreviations for ports.

Volume: Report volume of ballast water discharged, with units.

Salinity: Document salinity of ballast water at the time of discharge, with units (i.e., specific gravity (sg) or parts per thousand (ppt)).

SECTION 6. TITLE AND SIGNATURE

Responsible officer's name and title (printed) and signature: Print name and title, include signature. (Signature not necessary on electronic forms.)

WHERE TO SEND THIS FORM

Vessels bound for the Great Lakes

United States or Canadian Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo, Massena Detachment **315 769 5032** at least 24 hours before the vessel arrives in Montreal, Quebec.

Any other Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo, Massena Detachment **315-769-5032** at least 24 hours before the vessel arrives in Montreal, Quebec, or:

Vessels bound for the Hudson River North of George Washington Bridge

Fax the form to the COTP New York at **718-354-4249** before the vessel enters the waters of the United States (12 miles from the baseline).

Vessels bound for all other United States Ports

Vessel bound for all ports within the waters of the United States other than the Great Lakes or Hudson River north of the George Washington Bridge.

Before the vessel arrives at the first port of call in the waters of the United States send the form by one of the three following methods:

- Mail the form to the **U.S. Coast Guard, c/o Smithsonian Environmental Research Center (SERC), P.O. Box 28, Edgewater, MD 21037-0028**;
- Transmit the form electronically to the National Ballast Information Clearinghouse (NBIC) at http://invasions.si.edu/ballast.html or e-mail it to ballast@si.edu;
- FAX the form to the Commandant, U.S. Coast Guard, c/o the NBIC at **301-261-4319.**

If any information changes, send an amended form before the vessel departs the waters of the United States.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is 35 minutes. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (G-MSO), U.S. Coast Guard, 2100 Second St. SW, Washington, DC 20593-0001, or Office of Management and Budget, Paperwork Reduction Project (2115-0598), Washington, DC 20503.

INSTRUCTIONS FOR BALLAST WATER REPORTING FORM

(Please write in English and PRINT legibly.)

Is this an Amended Ballast Reporting Form?: Check Yes or No. Amendments should be submitted if there are any differences between actual ballast discharges and discharge information reported in a prior form. Please mark "Yes" if this form amends a previously submitted ballast reporting form. Mark "No" if this is original submission for current voyage.

SECTION 1. VESSEL INFORMATION

Vessel Name: Print the name of the vessel clearly.
IMO Number: Fill in identification number of the vessel used by the International Maritime Organization.
Owner: Write in the name of the registered owner(s) of the vessel. If under charter, enter Operator name.
Type: List specific vessel type. Use the following abbreviations: bulk (**bc**), roro (**rr**), container (**cs**), tanker (**ts**),passenger (**pa**), oil/bulk ore (**ob**), general cargo (**gc**), reefer (**rf**). Write out any additional vessel types.
GT: What is the Gross Tonnage of the vessel?
Call Sign: Write in the official call sign.
Flag: Fill in the full name of the country under whose authority the ship is operating. No abbreviations please.

SECTION 2. VOYAGE INFORMATION

Arrival Port: Write in the name of your first port of call after entering the U.S. EEZ or St. Lawrence Seaway. No abbreviations.
Arrival Date: Fill in the arrival date to the above port. Please use European date format (DDMMYY).
Agent: List agent used for current port.
Last Port: Fill in the last port at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.
Country of Last Port: Fill in the last country at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.
Next Port: Fill in the port at which the vessel will call immediately after departing the current port ("Current Port"="Arrival Port" above). No abbreviations please.
Country of Next Port: Fill in the country of "Next Port" at which the vessel will call immediately after current port. No abbreviations please.

SECTION 3. BALLAST WATER

Total Ballast Water on Board:

Volume: What was the total volume of ballast water on board upon arrival into the waters of U.S. EEZ? Do not count potable water.
Units: Please include volume units (m^3, MT, LT, ST).
Number of Tanks in Ballast: Count the number of ballast tanks and holds with ballast as vessel enters waters inside the United States EEZ.

Total Ballast Water Capacity:

Volume: What is the maximum volume of ballast water used when no cargo is on board?
Units: Please include volume units (m^3, MT, LT, ST).
Total Number of Tanks on Ship: Count all tanks and holds that can carry ballast water (do not include tanks that carry potable water).

SECTION 4. BALLAST WATER MANAGEMENT

Total No. of tanks to be discharged: Count only tanks and holds with ballast to be discharged into waters inside the United States EEZ or into an approved reception facility. Count all tanks and holds separately (e.g., port and starboard tanks should be counted separately).
Of tanks to be discharged, how many Underwent Exchange: Count all tanks that are to be discharged into waters of the United States or into an approved reception facility.
Of tanks to be discharged, how many Underwent Alternative Management: Count all tanks that are to be discharged into waters of the United States or an approved reception facility.
Please specify alternative method(s) used, if any: Specifically, describe methods (other than exchange) used for ballast management.
If no ballast treatment conducted, state reason why not: This applies to all tanks and holds being discharged into waters of the United States or into an approved reception facility.
Ballast Management Plan on board?: Is there a written document on board, specific to your vessel, describing the procedure for ballast management? This should include safety and exchange procedures (usually provided by vessel's owner or operator). Check Yes or No.
Management Plan implemented?: Do you follow the above management plan? Check Yes or No.
IMO Ballast Water Guidelines on board?: Is there a copy of the International Maritime Organization (IMO) Ballast Water Guidelines on board this vessel (i.e. "Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer Aquatic Organisms and Pathogens", [Res. A.868(20)])? Check Yes or No.

SECTION 5. BALLAST WATER HISTORY

(Record all tanks to be deballasted in port state of arrival: If none, go to #6)

Tanks/Holds: Please list all tanks and holds that you have discharged or plan to discharge into waters of the United States or into an approved reception facility (write out, or use codes listed below table). Follow each tank across the page listing all source(s), exchange events, and/or discharge events separately. List each tank on a separate line. Port and starboard tanks with identical ballast water histories may be included on same line. Please use an additional page if necessary, being careful to include ship name, date, and IMO number at the top of each. For tanks with multiple sources: list 3 largest sources from last 30 days on separate lines. If more than 3 sources, include a 4th line for the respective tank(s) that indicated "Multiple" in port column and list the remaining tank volume not included in the 3 largest sources (i.e., total tank volume minus volume of the 3 largest sources). See example #1 on sample ballast reporting form.

-BW SOURCES-

Date: Record date of ballast water uptake. Use European format (DDMMYY).
Port or latitude/longitude: Record location of ballast water uptake, no abbreviations for ports.
Volume: Record total volume of ballast water uptake, with volume units.
Temp: Record water temperature at time of ballast water uptake, in degrees Celsius (include units).

-BW MANAGEMENT PRACTICES-

Date: Date of ballast water management practice. If exchanges occurred over multiple days, list the day when exchanges were completed. Use European format (DDMMYY).
Endpoint or latitude/longitude: Report location of ballast water management practice. If an exchange occurred over an extended distance, list the end point latitude and longitude.
Volume: Report total volume of ballast water moved (i.e., gravitated and pumped into tanks, discharged to reception facility) during management practice , with units.
% Exch.: (Note: for effective flow through exchange, this value should be at least 300%).

$$\%\ Exchange = \frac{\text{Total Volume added by Refill or Flow Through}}{\text{Capacity of Ballast Tank or Hold}} \times (100\%)$$

Method: Indicate management method using code (ER = empty/refill, FT = flow through, ALT = alternative method).
Sea Ht . (m): Estimate the sea height in meters at the time of the ballast water exchange if this method was used. (Note: this is the combined height of the wind-seas and swell, and does not refer to water depth).

-BW DISCHARGES-

Date: Date of ballast water discharge. Use European format (DDMMYY).
Port or latitude/longitude: Report location of ballast water discharge, no abbreviations for ports.
Volume: Report volume of ballast water discharged, with units.
Salinity: Document salinity of ballast water at the time of discharge, with units (i.e., specific gravity (sg) or parts per thousand (ppt)).

SECTION 6. TITLE AND SIGNATURE

Responsible officer's name and title (printed) and signature: Print name and title, include signature.

All dates are listed in DD/MM/YYYY format. This date is interpreted as 03 May 2004.

Marked as "No" indicating that information for this voyage has never been submitted before. The box would be marked "Yes" only if the Form contained amendments (updates) to previously submitted information.

Total Ballast On Board volume should always be greater-than or equal to the sum of the dischargevolumes listed in Section 5.

This value should match the number of tanks listed in Section 5.

These values should be less-than or equal to the Total No. Ballast Water Tanks to be discharged. These values represent the number of discharged tanks that were exchanged or managed.

Two paired tanks treated identically (same Source Date, same Source Location, same Management Information) can be listed on one line.

This volume is the sum of the two paired tanks' volumes.

All tanks listed must include Discharge information and Source information. They must also include any applicable Management information.

BALLAST WATER REPORTING FORM

IS THIS AN AMENDED BALLAST REPORTING FORM? YES ☐ NO ☒

1. VESSEL INFORMATION

Vessel Name:	NBIC RELIANT
IMO Number:	0000000
Owner:	Lion Shipping, LLC
Type:	Bulk Carrier
GT:	40124
Call Sign:	123ABC
Flag:	USA

2. VOYAGE INFORMATION

Arrival Port:	BALTIMORE	
Arrival Date:	03/05/2004	
Agent:	Gray Ship Management	
Last Port:	Bremerhaven	Country of Last Port: Germany
Next Port:	New York	Country of Next Port: USA

3. BALLAST WATER USAGE AND CAPACITY

Specify Units Below (m^3, MT, LT, ST)

Total Ballast Water On Board:

Volume	Units	No. of Tanks in Ballast
20229	m3	6

Total Ballast Water Capacity:

Volume	Units	Total No. of Tanks on Ship
30000	m3	17

4. BALLAST WATER MANAGEMENT

Total No. Ballast Water Tanks to be discharged: 6

Of tanks to be discharged, how many: Underwent Exchange: 5 Underwent Alternative Management: 0

Please specify alternative method(s) used, if any:

If no ballast treatment conducted, state reason why not: Operational time constraints

Ballast management plan on board? YES ☒ NO ☐ Management plan implemented? YES ☒ NO ☐

IMO ballast water guidelines on board [res. A.868(20)]? YES ☒ NO ☐

5. BALLAST WATER HISTORY: Record all tanks to be deballasted in port state of arrival. IF NONE, GO TO #6 *(Use additional sheets as needed)*

Tanks/ Holds (List multiple sources/tanks separately)	BW SOURCE				BW MANAGEMENT PRACTICES						BW DISCHARGE			
	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	TEMP (units)	DATE D/M/YYYY	ENDPOINT LAT. LONG.	VOLUME (units)	% Exch	METHOD (ER/FT/ ALT)	SEA HT. (m)	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	SALINITY (units)
DB P&S	21/04/04	54°44N 006°28E	4432 m3	10 C	29/04/04	47°28N 052°16W	4500 m3	100	ER	1.0	03/05/04	Baltimore	4432 m3	1.025 sg
DB	20/04/04	Bremerhaven Germany	2467 m3	10 C	29/04/04	47°21N 052°18W	2467 m3	98	ER	1.5	03/05/04	Baltimore	2467 m3	1.025 sg
DB	19/04/04	Bremerhaven Germany	2500 m3	10 C	29/04/04	47°21N 052°22W	2500 m3	100	ER	1.5	03/05/04	Baltimore	2510 m3	1.025 sg
AP	15/02/04	Klaipeda Lithuania	647 m3	5 C	29/04/04	47°18N 052°25W	1975 m3	304	FT	1.0	03/05/04	Baltimore	647 m3	1.0007 sg
CH	20/04/04	Bremerhaven Germany	10173 m3	10 C							03/05/04	Baltimore	10173 m3	1.025 sg
				C										sg
				C										sg

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP, Double Bottom = DB, Wing = WT, Topside = TS, Cargo Hold = CH, Other = O

6. RESPONSIBLE OFFICER'S NAME AND TITLE, PRINTED AND SIGNATURE: Chief Officer John Doe

Released 04-June-2004

Percent Exchange values are calculated using the following equation:

$$\% \text{ Exch} = \frac{\text{Total Volume Added by Refill or Flow Through}}{\text{Capacity of Tank or Hold}} \times 100$$

OMB Control Number 1625-0069

BALLAST WATER REPORTING FORM

IS THIS AN AMENDED BALLAST REPORTING FORM? YES ☐ NO ☐

1. VESSEL INFORMATION

Vessel Name:	
IMO Number:	
Owner:	
Type:	
GT:	
Call Sign:	
Flag:	

2. VOYAGE INFORMATION

Arrival Port:		
Arrival Date:		
Agent:		
Last Port:	Country of Last Port:	
Next Port:	Country of Next Port:	

3. BALLAST WATER USAGE AND CAPACITY

Specify Units Below (m³, MT, LT, ST)

Total Ballast Water on Board:

Volume	Units	No. of Tanks in Ballast

Total Ballast Water Capacity:

Volume	Units	Total No. of Tanks on Ship

4. BALLAST WATER MANAGEMENT Total No. Ballast Water Tanks to be discharged: ☐

Of tanks to be discharged, how many: Underwent Exchange: ☐ Underwent Alternative Management: ☐

Please specify alternative method(s) used, if any: _____

If no ballast treatment conducted, state reason why not: _____

Ballast management plan on board? YES ☐ NO ☐ Management plan implemented? YES ☐ NO ☐

IMO ballast water guidelines on board [res. A.868(20)]? YES ☐ NO ☐

5. BALLAST WATER HISTORY: Record all tanks to be deballasted in port state of arrival; IF NONE, GO TO #6 ***(Use additional sheets as needed)***

Tanks/ Holds List multiple sources/tanks separately	BW SOURCE				BW MANAGEMENT PRACTICES						BW DISCHARGE			
	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	TEMP (units)	DATE D/M/YYYY	ENDPOINT LAT. LONG.	VOLUME (units)	% Exch	METHOD (ER/FT/ ALT)	SEA HT. (m)	DATE D/M/YYYY	PORT or LAT. LONG.	VOLUME (units)	SALINITY (units)
				C										sg
				C										sg
				C										sg
				C										sg
				C										sg
				C										sg
				C										sg

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP, Double Bottom = DB, Wing = WT, Topside = TS, Cargo Hold = CH, Other = O

6. RESPONSIBLE OFFICER'S NAME AND TITLE, PRINTED AND SIGNATURE: _____

Released 08-June-2004

SUBMISSION INSTRUCTIONS

Vessels bound for Great Lakes:

United States or Canadian Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo **315-764-3283** at least 24 hours before the vessel arrives in Montreal, Quebec.

Any other Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo **315-764-3283** at least 24 hours before the vessel arrives in Montreal, Quebec, or;

Complete the ballast water information section of the St. Lawrence Seaway required "Pre-entry Information from Foreign Flagged Vessels Form" and submit it in accordance with the applicable Seaway notice.

Vessels bound for the Hudson River North Of George Washington Bridge

Fax the form to the COTP New York at **718-354-4249** before the vessel enters the waters of the United States (12 miles from the baseline).

Vessels bound for all other United States Ports

Before the vessel departs from the first port of call in the waters of the United States, send the form by one of the three following methods:

Email Transfer:
Using Word 97 or Word 6.0/95 form (downloadable above):

1) Fill out form on your personal computer and save file to your hard drive using the "ship's call sign" +"date".doc (e.g., if the vessel's call sign is AA1A and the date of arrival was June 16, then the file should be saved as "AA1A1606.doc"). Note: use *ddmm* date format and do not include year.
2) Close AA1A1606.doc file.
3) Open your email program and address email message to ballast@serc.si.edu
4) Using your email program's file attachment function, attach file AA1A1606.doc to email message.
5) Send email message to ballast@serc.si.edu

Other electronic forms will be posted on the Clearinghouse website as they become available.

-OR-
Mail to:
National Ballast Water Clearinghouse
Smithsonian Environmental Research Center
P.O. Box 28, 647 Contees Wharf Road
Edgewater, MD 21037

-OR-
Fax to SERC: (301) 261-4319

If any information changes, send an amended form before the vessel departs the waters of the United States.

PORTS IN BRAZIL - WATER BALLAST MANAGEMENT - BRAZILIAN WATERS

Pls note following comments over this subject:

a) The ballast water management plan (BWMP) available on board of your ships will have to be ratified by the classification society (CS), and same may be requested / checked by local port authorities as fm Jan/2006
b) Besides the (BWMP), the classification society will have to provide / issue a new certificate to the vessel - "Ballast Water Management Certificate", which may also be requested/checked by port authorities as fm Jan/2006. Fyg, all classification society offices are requesting between 60-90 days to comply with such demand, due to large amount of vessels to be inspected.
c) Above documents will be mandatory for all vessels calling Brazilian ports, no matter flag/age/ownership
d) Presently, the only mandatory document is the IMO BW form, which must be duly / complete filled-up by Master and surrendered to local port authorities max 24hrs prior arrival at port, otherwise vsl's berthing may not be granted. Just warships and coastal/support vessels are released to comply with such procedure;
e) After receiving the IMO BW form, the port authorities will check the information, and will decide to inspect the vessel or not. In case of non compliance, or wrong/misinformation, the vessel may not be allowed to come alongside.
f) In order to have owners/master/agents more acquainted to this new procedure and in order to adjust unexpected problems/situations, Brazilian port authorities will be more sensitive to deal with Ballast Water new regulation till Dec/05;
g) However, as fm Jan/06 onwards, port authorities may demand full compliance to their regulations and vsls that fail to comply with Ballast Water new regulation may not be allowed to come alongside, and/or even be heavy fined according to the law;
h) Fertimport is presently working on a specific form to be passed on to every vessel under our care and abt to call any brazilian port, in order to inform masters/owners how to proceed in this regard.
Pls be guided accdgly.

INTERNATIONAL MARITIME ORGANIZATION
4 ALBERT EMBANKMENT
LONDON SE1 7SR

Telephone: 020 7587 3152
Fax: 020 7587 3210

IMO

E

Ref. T5/1.22

BWM.2/Circ.3
7 February 2006

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

Additional information on Brazilian national legislation on ballast water managements for ships

A communication has been received from the Administration of Brazil concerning additional information on Brazilian national legislation on ballast water managements for ships.

At the request of the Administration of Brazil, the above-mentioned communication annexed hereto is circulated to Member States for their information and future action as appropriate.

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ANNEX

BRAZILIAN NAVY
BRAZILIAN PERMANENT REPRESENTATION TO THE INTERNATIONAL MARITIME ORGANIZATION
(79) Upper Richmond Road, Putney
London - SW15 2SH
Tel: (0)20 246 +[illegible]/86/86, Fax: (0)20 246 +[illegible]
e-mail: BrazilianRepresentation.IMO@ntlworld.com

REF: BWM/NatLeg

London, UK, 25 January 2006.

The Secretary-General
International Maritime Organization
4 Albert Embankment
London
SE1 7SR

Subject: **Mandatory National Legislation pertaining to requirements for Ballast Water**

Sir,

The Brazilian Permanent Representation presents its compliments and, in addition to our letter dated 28 July 2005, would like to inform you that, owing to the fact that a few ships have had some difficulties to be in compliance with the requirements for Ballast Water Exchange adopted by the National Legislation, the Brazilian Maritime Authority decided to postpone the enforcement of this requirement until 30th June 2006.

In this respect, I would be grateful if you could kindly arrange for the information enclosed at annex to be circulated to all IMO Member States.

Please accept, Sir, the assurance of my highest consideration.

MIGUEL ANGELO DAVEZA
Admiral
Permanent Representative
Head of the Representation

ANNEX

ADDITIONAL INFORMATION ON BRAZILIAN NATIONAL LEGISLATION ON BALLAST WATER MANAGEMENT FOR SHIPS

Through BWM.2/Circ.2 dated 22nd September, 2005, IMO issued a communication to Member States containing the summary of the Brazilian National Legislation on Ballast Water Management for Ships.

In that respect, the Brazilian Maritime Authority (BMA) has noticed that most ships are in compliance with the above mentioned rules, whereas only a few have experienced some difficulty in having the BWM Plan approved by its Flag Administration or their recognized Classification Societies.

Thus, in order to grant these ships, and others that might be in the same situation, additional time to be in conformity with that specific point, the Brazilian Maritime Authority issued an Administrative Act (Portaria nº 1.070/C) on 4th January 2006 postponing its enforcement until 30th June 2006.

From 4th January, 2006 until 30th June, 2006, the Brazilian Maritime Authority will accept a BWM plan approved by the shipowner, which means that a ship carrying ballast water must have a BWM plan".

MARITIME AUTHORITY REGULATION FOR SHIP'S BALLAST WATER MANAGEMENT

BRAZILIAN NAVY
PORTS AND COASTS DIRECTORATE
2005

INDEX

ALTERATIONS RECORD FORM

ALTERATION NUMBER	DOCUMENT THAT DETERMINED THE ALTERATION AND RESPECTIVE DATE	AFFECTED PAGES	ALTERATION DATE	SIGN

INTRODUCTION

1- History

The introduction of exotic aquatic organisms and pathogenic agents from various regions of the world in habitats outside their native limits, with potential to threaten the environment and the economies, has been a factor of great concern to the authorities of many countries.

Historically, it is unknown when this process, that can be called bio-invasion, started. However, one knows that, with the technological progress of the marine transportation, the ships became bigger, faster and begin to be used with higher frequency, allowing, therefore, for reducing trips transit time and intensifying commercial practices. As a consequence, these means of transportation have been appointed as the main vectors for the dissemination or these organisms, mainly, via incrustation in the hull of ships and platforms, as well as through the Ballast Water and its sediments, object of the present Regulation.

Researchers appoint as adverse consequences of the introduction of these invaders in the aquatic environment the loss of the local or regional biodiversity, the modification of the waterscapes, various economic prejudices, besides the proliferation of pathologic micro-organisms, as the one which causes the cholera, among others. Concrete situations, as the one described here below, evidence that the transfer of organisms, transported by the Ballast Water, determine the necessity of urgent measures.

The mussel zebra, Dreissena polymorpha, born in Europe, that has established itself in the Great Lakes, USA, and today occupies 40% of the North-American rivers, is causing losses of millions of dollars per year for incrustation removal and control (Gautthier & Stell, 1996).

In Brazil, the presence of exotic specimens had been noticed every now and then along the coast. However, as the golden mussel (Limnoperna fortunei) has come to scene, there was a drastic change in the way the problem was treated in the country. This fresh water mollusk, coming from the Asian South-East, was introduced in Argentina, through ballast water, in 1991. In 1998, its presence was noted in the estuary of the Jacuí River, close to Porto Alegre. Today, its occurrence is found, in great proportions, in the rivers Guaíba, Paraguai and Paraná.

The presence of the golden mussel, due to its great adaptation and reproduction capacity, has been causing losses in view of concentration in intakes and discharges of pipelines and their consequent blockage; the deterioration and premature obstruction of filters and gratings due to the enormous quantity of incrustations generated. Besides, when their death occurs, the mussel brings problems to the water treatment stations, in view of the great quantity of individuals to be disposed off and the bad smell, increasing the costs of their maintenance, in view of the necessity of cleaning and filter changing at a higher frequency.

The matter involves, in principle, two basic points: the risk to the health and the pollution of the aquatic environment caused by ships and platforms, when use Ballast

Water for consecution of their objectives and needs. In face of that, the Maritime Authority (MA) and the Sanitary and Environment Authorities, with regard to their specific competences as instituted in law, have worked in order to present possible solutions to mitigate the damages caused to the environment due to impounding, discharging and replacing Ballast Water in places considered improper or non authorized. For instance, one can cite the Ballast Water Management, the control and the monitoring of the de-ballasting, and mainly the establishment, by the MA, of the Regulation to take care of the theme.

2- PURPOSE

To establish requisites referring to the pollution prevention from ships in Brazilian Jurisdictional Waters (BJW), with regard to the Ballast Water Management.
The initial system will have as fundamental basis the change of the ballast water according to the International Maritime Organization (IMO) Assembly Resolution A.868(20), of 1997 and the International Convention for Ship's Ballast Water and Sediments Control and Management, adopted in February, 2004 and signed by Brazil in January 25th, 2005, and will be applied to all ships that may discharge Ballast Water in the BJW. The exemptions and exceptions will be dealt with in specific items.
As soon as more advanced methods for the Ballast Water treatment are developed, this Regulation will be adapted to attend the new situations.

3- CONSIDERATIONS ON THE BALLAST WATER MANAGEMENT

a) It is fundamental that the Ballast Water Management procedures are efficient and viable, technical and ecologically, and that they are implemented aiming at reducing the costs and the delay imposed to the ships to a minimum, obeying this Regulation;
b) The implementation of methods and procedures for the Ballast Water Management shows itself as a solution to mitigate the introduction of exotic aquatic organisms and pathogenic agents in the BJW;
c) The Ballast Water Management used for compliance with this Regulation must be safe to the ship, its equipment, crew and passengers; and not to cause more or greater environment impact than its absence;
d) There is an evident necessity of Ballast Water Management and equipment new technologies development, once the operational measures like the renewal of the Ballast Water in the ocean are not fully satisfactory. New methods of Ballast Water Management will be able to be accepted as alternatives, provided they guaranty, at least, the same level of protection to the environment, the human health, the property and the natural resources, and are approved by the Maritime Environment Protection Committee (MEPC), of the IMO; and
e) Environmental and sanitary information of seasonal and local character must be part of the Ballast Water Management Plan of the ports, where information on the areas of ballast impounding can be obtained.

4- CORRELATED LEGISLATION

4.1 - Law n° 6,938/1981 (Environment National Policy)

The Law n° 6,938/1981 has defined pollution, in a comprehensive way, aiming at protecting not only the environment, but also the society, the health and the economy. Therefore, the mentioned Law has defined in his article 3°, incise III, the pollution as:

"(...) pollution: the degradation of the environment quality resulting from activities that directly or indirectly;

a) harm the health, safety and the well-being of the population
b) create adverse conditions to the social and economic activities
c) affect unfavorably the biota
d) affect the esthetic and sanitary conditions of the environment
e) launch materials or energy in conflict with the established environment standards."

4.2 - Law n° 9,537/1997 (LESTA)

The Aquatic Traffic Safety Law (LESTA) has established various attributions to the MA, being, therefore, the basis for the preparation of this NORMAN. Thus, the LESTA prescribes that the MA will have to establish the preventive/normative requisites, in order to avoid comprehensively the marine pollution and, consequently, any damage that can be caused by Ballast Water, as described in art. 4°, incise VII, of the referred Law:

"Art.4° The attributions of the Maritime Authority are:
(...) VII – to establish requisites referring to the conditions of safety and habitability and for pollution prevention from ships, platforms or their supporting facilities."

4.3 - Law n° 9,605/1998 (Environment Crimes Law)

The Law n° 9,605/1998, that deals with environmental crimes as well as with environment administrative penalties, has defined in art. 70, comprehensively, the administrative environment penalty, and has establish that the non compliance with the environment prevention regulations constitutes motive for penalties application.
The Decree n° 3,179/1999, that has regulated the referred Law, besides defining what's environment infraction, has granted the competent organ (Maritime Authority), in art. 61, the possibility of issuing normative administrative acts, aiming at discipline the necessary procedures for the correct application of administrative penalties.

So, based in art. 61 of the above mentioned Decree combined with art.70 of the Law n° 9,605/1998, here below transcribed, the rules that discipline the penalties for non compliance with the preventive requisites collimated in this NORMAN were elaborated.

"Art. 70: one consider environment administrative infraction every act or omission that violates juridical rules for use, enjoyment, promotion, protection, and recovery of the environment.

§ 1º Are competent authorities to draw up environment infraction notice and to institute administrative proceedings the servants of the environment organs integrating the Environment National system – SISNAMA, designated for activity of inspection, as well as the Port Captaincy agents, of the Navy Ministry.

4.4 - Resolution RDC nº 217 dated November 21st, 2001

Finally, The National Agency of Sanitary Vigilance (ANVISA) has published the Resolution RDC nº 217, dated November 2001, that approves the Technical Regulation for the sanitary vigilance of the national territory ports, of ships that transport cargo and passengers. In art. 6º and 19, the Regulation requires that the ship, when requesting free pratique, delivers to the Sanitary Authority the Ballast Water Reporting Form duly filled. In the Resolution there is still provision on the possibility of sampling for identification of the presence of harmful and pathogenic agents, physical indicators and chemical components in the Ballast Water, to the discretion of the Sanitary Authority (art. 28).

5- DEFINITIONS

For the purpose of this Regulation the following definitions will be used:

MARITIME AUTHORITY AGENT – Ports and Coasts Directorate, Captaincies, Delegacy Agents, and Brazilian Navy Agencies;

BALLAST WATER – It is the water with its suspended particles admitted on board a ship in her ballast tanks, for controlling the trim, list, draft, stability or tensions in the ship;

BRAZILIAN JURISDICTIONAL WATERS (BJW) – It is considered waters under national jurisdiction: I – the interior waters: a) those found between the coast and a straight base line, from where the territorial sea is measured; b) those of the ports; c) those of the bays; d) those of the rivers and their estuaries; e) those of the lakes, lagoons and channels; f) those of the archipelagos; g) the waters between the shoals and the coast; II – marine waters, all those under national jurisdiction that are not interior ones;

ECOLOGICALLY SENSIBLE AREAS – Interior and marine water regions, defined by a Public Authority act, where the pollution prevention, control and the ecological equilibrium require special measures for protection and preservation of the environment, with regard to ship's traffic;

GROSS TONNAGE – Non dimensional parameter determined in accordance with the International Convention on Ships Tonnage, 1969, which represents the total volume occupied by all enclosed spaces of the ship;

COMPETENTE AUTHORITY – Marine Authority Agent;
MARINE AUTHORITY (MA) – Authority exerted directly by the Navy Commander, responsible for the safeguard of the human life and navigation at open sea and

interior waters, as well as for the environmental prevention of the pollution caused by ships, platforms and their supporting facilities;

PORT AUTHORITY – Authority responsible for the administration of the organized port, being his duty to inspect the port operations and to zeal in order that the services are carried out with regularity, efficiency, safety and respect to the environment;

SANITARY AUTHORITY - Authority that has directly under his responsibility, within his territorial jurisdiction, the application of the appropriate sanitary measures according to the Law and Regulations in force in the national territory as well as treaties and other international acts of which Brazil is signatory;

CABOTAGE – Merchant navigation conducted in coastal waters of a sole country or in limited maritime waters;

COMPANY – The owner of the ship or any other organization or person, such as operator, bare boat charterer that took from the owner the responsibility of operating the ship and that, on assuming such responsibility, has agreed in accepting all the obligations and responsibilities imposed by the International Code of Safe Management;

DEBALLASTING – Discharge of ballast water, used on board the ship's ballast tanks/holds, to the aquatic environment or receiving facilities;

BALLAST WATER MANAGEMENT – It comprises the mechanical, physical, chemical and biological processes, either individually or combined, for removing, turn harmless or avoid the admission or discharge of aquatic harmful organisms and pathogenic agents found in Ballast Water and sediments, when applied. Includes both the Ballast Water change in ocean waters and the water treatment;

NAVAL INSPECTION – Activity of administrative character that consists in inspection for compliance with LESTA, regulations and rules from it derived, and international acts and resolutions ratified by Brazil, in respect exclusively to the safeguard of life at sea and navigation, in open sea and interior waters, as well as the prevention of marine pollution by ships, fixed platforms and their supporting facilities;

PORT FACILITY OR TERMINAL – Facility explored by public or private right corporate entity , inside or outside the organized port, used in moving and storing cargo destined to or coming from transportation via waterways;

NATIONAL CABOTAGE NAVIGATION – That carried out exclusively in Brazilian Jurisdictional Waters (BJW);

SHIP – It means a vessel of any type operating in the aquatic environment, inclusive submersibles, floating apparatus, floating platforms, stationary units for storage and offloading (FSO) and production, storage and offloading stationary units (FPSO);

EXOTIC, HARMFULL AQUATIC ORGANISMS AND PATHOGENIC AGENTS – These are aquatic or pathogenic organisms that, if introduced in the sea, including estuaries, fresh water curses, may cause harm to the environment, to the public health, properties or resources, damage the biological diversity or interfere in other legitimate uses of such areas;

ENVIRONMENT ORGAN – Organ for environment protection and control of the federal, state and municipal executive branches, integrating the Environment National System – SISNAMA;

POLLUTION – Environment quality degradation resulting from activities that direct or indirectly harm the health, safety and well-being of the population, create adverse conditions to social and economical activities, affect unfavorably the biota, affect the environment esthetic or sanitary conditions and launch material or energy in non compliance with established international standards;

ORGANIZED PORT – Port instituted and equipped to attend the needs of navigation and moving and storing of goods, conceded or explored by the Union, whose traffic and port operations are under the jurisdiction of a Port Authority;

SHIP'S PROCEDENCE – Last port or call point of the ship before her arrival to the first port or call point subject to a Naval Inspection; and

PRESERVATION UNIT – territorial space and its environmental resources, including jurisdictional waters, with relevant natural characteristics, legally instituted by the Public Authorities, aiming at preserving and defining limits, under special administration regimen, to which adequate protection guaranties are applied.

6- REFERENCES

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SILVA DE MORAIS, Luis Carlos. Environment Right Curse. São Paulo: Atlas, 2001

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Law n° 9,605, dated February 12th, 1998.

Law n° 9,537, dated December 11th, 1997.

Law n° 6,938, dated August 31st, 1981.

Decree n° 3,179, dated September 21st, 1999, regulating Law n° 9,605/1998

Resolution – RDC – ANVISA n° 217, dated November 21st, 2001

Comment n° 37/2004, dated May 4th, 2004, of the Ports and Coasts Directorate.

International Maritime Organization (IMO). International Convention on Control and Management of Ship's Ballast Water and Sediments, 2004. London, 2004.

FREE TRANSLATION

International Maritime Organization (IMO). Guidelines for the Control and Management of Ship's Ballast Water, to Mitigate the Transfer of Harmful Aquatic Organisms and Pathogenic Agents – Resolution A.868(20). London, 1998.

CHAPTER 1

APPLICATION, EXCEPTIONS AND EXEMPTIONS

1.1- APPLICATION

The present regulation applies to all ships, national or international, equipped with ballast water tanks/holds, that utilizes the Brazilian ports and terminals. It is essential that the procedures for Ballast Water Management and sediments in it contained are efficient and, at the same time, environmentally safe, viable, that generate neither unnecessary costs and delays to the ship and its cargo nor imply in risk to its safety, its crew and to the navigation.

All possible efforts must be endeavored to avoid that a ship is unduly retained or delayed."

1.2- EXCEPTIONS

Exceptions are emergency or particular situations that dispense the application of the general guidelines (incise 2.3.3) established in this Regulation. All emergency situations must be immediately informed to the MA Agent.

The following situations are considered exceptions:

a) cases of force majeure or emergency, to safeguard the safety of human life or the ship;
b) when it is made necessary the admission or discharge of the Ballast Water and its contained sediments to guaranty the safety of a ship and the persons on board in emergency situations or saving of human life at sea;
c) in case of Ballast Water and its sediments accidental discharge resulting from damage to the ship or her equipment, provided that all reasonable precautions had been taken, before and after the occurrence or the disclosure of the damage or discharge, as to prevent or minimize the discharge, unless the shipowner, company, ship operator or responsible officer negligibly had caused the damage;
d) when the Ballast water and its sediments is taken in order to avoid or mitigate pollution incidents caused by the ship; and
e) when the Ballast water and its sediments discharge is made on the same local where the totality of that Ballast Water and its sediments where taken, provided no mixture with Ballast Water and sediments from other areas had occurred.

1.3- EXEMPTIONS

All ships exempt from complying with this Regulation must operate doing their utmost to avoid any contamination of the environment by discharging Ballast Water and its sediments.

The following ships are exempt:

a) any war ship, Navy auxiliary ship or any other ship owned by a State or by it operated and used, temporarily, solely in official non-commercial service;
b) ships with sealed tanks containing permanent Ballast Water not subject to discharge to the aquatic environment;
c) Port and supply boats;

d) Ships that due to their design characteristics do not permit ballast change, subject to prior request, made by the owner to the Ports and Coasts Directorate (DPC), including corresponding arguments;
e) Boats of sport and recreation used only for competition and recreation or those used for rescue and salvage, whose total length do not exceed 50 meters and with maximum Ballast Water capacity of eight cubic meters.

CHAPTER 2

INFORMATION, PROCEDURES AND BALLAST WATER MANAGEMENT

2.1- Information publishing

The present Regulation must be amply divulged by the MA, through its Agents and by the Navigation Agents, to the Shipping Companies, Syndicates related to the marine area and any other organs involved in ship operation.

2.2.1- Implementation

Every national or foreign ship that utilizes water as ballast must have a Ballast Water Management Plan aiming at supply safe and efficient procedures for this purpose. This plan must be included in the operational documentation of the ship, besides being specific for each ship and containing the following items:

a) detailed safety procedures for the ship and her crew associated with the Ballast Water Management;
b) detailed description of the actions to be taken to implement the Ballast Water Management;
c) to indicate the points where it is possible to collect the Ballast Water samples representative of the ballast the ship carries;
d) officer on board responsible to assure that the Plan is correctly implemented; and
e) to be written in the idiom the ship works with; if the idiom is not English, French or Spanish, a translation to one of these must be included.

2.2.2- Documentation

The documentation referring to the Ballast Water Management Plan of the Brazilian ships and chartered by Brazil must be approved by Classification Society accredited by DPC.

2.3- BALLAST WATER MANAGEMENT

2.3.1- Inspection

The ships that call at Brazilian ports or terminals are subject to Naval Inspection aiming at determine whether the ship is in conformity with this Regulation.

2.3.2- Remittance of the Ballast Water Reporting Form

The Reporting Form on Ballast Water (Annex A/Annex B), duly filled, must be sent to the Captaincies (CP), Delegacies (DL) or Agencies (AG) by the captains of the ships or his agents, with minimum antecedence of 24 hours from the time estimated for ship's arrival. Further, the ship must have on board, for a period of

at least two years, a copy of this form to attend the Naval Inspection, as per art. 4.2 of this Regulation.
For ships entering the Amazon basin, a copy of the form is also to be sent to the Santana Port Captaincy Delegacy, independently of their destination in that region.
The CP/DL/AG, on their turn, must resend the forms, with monthly periodicity to the Admiral Paulo Moreira Studies Institute (IEAPM).

2.3.3- General guidelines for ship's Ballast Water change

Upon changing the Ballast Water, one should keep in mind the safety aspects of the crew and the ship and do it within favorable meteorological conditions. The following measures must be taken:

a) the ships must arrange the Ballast Water change at least 200 miles away from the nearest land and in waters at least 200 meters deep, considering the procedures determined by this Regulation. It will be accepted the change of Ballast Water by any of the methods: Sequential, Continuous Flow and Dilution, as described in Annex C;

b) in the cases that the ship cannot make the Ballast Water change in conformity with item a, the change must be carried out as far as possible from the nearest land and, in all cases, at least 50 nautical miles away and in waters at least 200 meters deep;

c) it should not be required that a ship deviate from its voyage plan or delay the trip to comply with the dispositions in previous items. In this case, the ship shall present her vindication in accordance with Chapter 1 of this Regulation disposition;

d) it should not be required from a ship that is making the Ballast Water change that she complies with items a and b, if the Captain decides in a reasonable way that such change would threaten the safety or stability of the ship, her crew or passengers due to adverse meteorological conditions, excessive loads to the ship, failure in equipment or any extraordinary condition;

e) when the ship utilizes the method of Continuous Flow or Dilution for changing the Ballast Water, she must pump, at least, three times the volume of the tank;

f) upon making the Ballast Water change the ships must do it with an efficiency of at least 95% of the volumetric Ballast Water change;

g) only the tanks/holds that had their water changed will be allowed to de-ballast;

h) ships that do not make the de-ballast must, the same way, present the Reporting Form on Ballast Water (Annex A/Annex B);

i) The MA Agent must, whenever dispose of information supplied by the environment organs, of public health, or more, of universities or research institutions, communicate to the marine agencies with regard to areas of their jurisdiction, where the ships should not take Ballast Water due to known conditions (for instance, area or areas known for containing flowering events, infestations or population of harmful aquatic organisms or pathogenic agents). When possible, the MA Agent will inform the localization of any alternative area or areas for taking or discharging Ballast Water, as well as areas where dredging is being carried out. Such

information, in the future, will be consolidated in a Ballast Water Management Plan of the ports; and

j) It is prohibited to discharge Ballast Water in Ecologically Sensible Areas and in Preservation Units (UC) or in other preventive areas established by the environment and sanitary organs, in the BJW, when plotted in nautical chart.

2.3.4- Sediments

The Ballast Water sediments may only be discharged to the sea in the same conditions established for the Ballast Water change specified in items a and b, incise 2.3.3, or in facilities or reception services for these sediments when available in ports and terminals.

2.3.5- Specific guidelines for the case of platforms

a) the drilling rigs or production platforms are subject to the procedures for Ballast Water change by the occasion of their arrival in Brazil coming from foreign port or international or foreign waters;

b) the floating production platforms are exempt from complying with the procedures of Ballast Water changing from the moment of their installation in the operation site and during the period they remain in the location; and

c) the drilling rigs are exempt from complying with the procedures for Ballast Water changing when their move take place in territorial waters and in the Brazilian Exclusive Economic Zone (ZEE).

2.3.6- New techniques

Meanwhile new technologies and new systems of management and Ballast Water treatment are developed, to avoid, mitigate and control the transportation by Ballast Water of exotic or pathogenic aquatic organisms, provided they are evaluated and accepted by the MA, the DPC will establish, timely, the appropriate regulatory instructions.

CHAPTER 3

PARTICULAR SITUATIONS

3.1- IMPOSSIBILITY OF COMPLYING WITH THE GENERAL GUIDELINES FOR CHANGING THE BALLAST WATER

When , due to emergency situations, or in face of the region hidrography, the general guidelines prescribed in the incise 2.3.3, cannot be complied with, the rules described here below will be observed.

The particular rules, except those occurred in face of emergency situations, may be modified any time by the MA, provided they are supported by scientific evidences.

3.2- EMERGENCY SITUATIONS

The dispositions of this Regulation will not be applied when it is necessary to safeguard the human life or the ships, in cases of force majeure due to weather inclemencies or in any other case that constitutes danger to human life or a real threaten to the ships, if the Ballast Water discharge configures the sole means of

avoid the threaten and if there is high probability that the damages caused by the de-ballasting turn to be smaller than those that would occur otherwise.

3.3- CABOTAGE

3.3.1- Ships coming from overseas

Ships coming from overseas that have the need to de-ballast in the BJW, must have the totality of its Ballast Water changed before arriving to the first Brazilian port or terminal.

3.3.2- Transportation between fluvial ports.

All ship engaged in cabotage must change the tanks/holds Ballast Water they intend to discharge, when navigating between fluvial ports of different fluvial basins.

In order not to cause a saline impact when discharging sea water changed during the trip, in the port of destination, the ship will have to change once the tank volume again in the areas defined in article 3.4.

Consider, to the effects of this Regulation, the Amazon, Sudeste and Paraguai-Paraná fluvial basins and their fluvial ports. The list of the main national ports and their geographic coordinates is shown in Annex D, as well as an illustrative map of their space distribution, in Annex E.

3.4- TWO BALLAST WATER CHANGES

3.4.1- Amazon River

Ships bound for sailing in the Amazon River, coming from international navigation or from distinct fluvial basin, must carry out two Ballast Water change. The first to avoid transferring exotic and/or pathogenic organisms, to be carried out as described in the general guidelines (incise 2.3.3) in case of international navigation, and in case of cabotage the change can be of, at least, once the volume of the tank, even when the ship uses the continuous flow or the Brazilian dilution method. The second change, to reduce the salinity of the Ballast Water, must be carried out in the segment between the 20 meter isobathic and Macapá. In case of ships with Ballast volume smaller than or equal to 5,000 m^3 the limit will be the Jari River estuary. In this second change, it will be necessary to pump only once the volume of the tank, both to cabotage and international navigation.

3.4.2- Pará River

The procedure for the Pará River must be identical to the one for the Amazon River: the ships carry out the two changes, the first as described in incise 2.3.3 in case of international navigation, and in case of cabotage the change can be of at least once the tank volume. The second change must occur away at least sixty miles from Salinopolis up to the Ponta do Chapéu Virado beacon (Mosqueiro Island), pumping out only once the tank volume.

3.4.3- Reporting Form referring to the second change

The second change must be documented in a second reporting form, that must be sent to the Oriental Amazon Port Captaincy, by the time of ship's arrival to the Amazon basin port/terminal. In addition, the ship has to keep one copy on board, for a period of at least two years, at the disposal of the Naval Inspection.

CHAPTER 4

INSPECTION

4.1- INSPECTION SYSTEM

The inspection system is an essential component in the Ballast Water Management control, and, therefore, must be based in the adopted management regimen, to be coherent with the international practice and to be capable of evaluating whether the requirements of the Port State were complied with and, if not, to ensure that appropriate measures or penalties are applied.

In case of violation of this Regulation, denunciation, emergency situation, or when relevant circumstances so justify, the MA agents must take measures that ensure the ship will not discharge Ballast Water, until she can do it without putting in danger the environment, the public health, the properties or the resources.

4.2- CONTROL

4.2.1- Procedure

The ballast water control must be carried out starting from the verification of the Ballast Water Management Plan and the Ballast Water Reporting Form (Annex A/Annex B). The Ballast Water Record Book and the Ballast Water International Management Certificate, when existent, must be analyzed, respectively, with regard to the performed Ballast operation records and its expiring date.

The following topics can be subjected to verification by the Naval Inspector:

a) in the Ballast Water Management Plan, to verify the Ballast Water change adopted by the ship;
b) to verify if the Ballast Water Reporting Form (Annex A/Annex B) was correctly fulfilled;
c) to verify the validity of the Certificate, issued by the competent Flag state Authority, when existent, whose validity period cannot exceed five years;
d) to audit the Ballast Water Record Book, when existent, and the ship's records that were made necessary for obtaining the accessory information (such as Log Book, Engine Log Book, Ship's Positioning Record Book, And Tank Sounding Record Book);
e) to verify whether the Ballast Water was carried out complying with the procedures of this Regulation.
f) To collect samples of the Ballast Water for future evaluation, when found necessary, and always in conformity with what is determined in the art 4.1; and
g) As a way to verify/confirm the information obtained on the Reporting Form (Annex A/Annex B), the Naval Inspector may take samples of the tanks/holds Ballast Water for, using a refractometer, check the salinity of the water.

4.2.2- Standardization

Both the Ballast Water Management International Certificate and the Ballast Water Register Book must follow the standard prescribed in the Ship's Ballast

Water and Sediments Convention (Supplements I and II of the referred Convention).

4.3- INSTRUMENTS FOR PENALIZATION

4.3.1- Procedure

It is forbidden any violation of the provisions of this Regulation inside the BJW, being established penalties according to the national laws. When this occur, the MA Agent must institute an administrative procedure in conformity with the legislation, being authorized to, in addition, take measures to warn, arrest or prohibit the ship to get into the port or terminal. To the discretion of the MA Agent, however, the ship can be allowed to leave the port or terminal aiming at discharging or changing the Ballast Water in accordance with the procedures prescribed by this Regulation.

4.3.2- Penalties and Sanctions

The fines applied by non compliance with the dispositions emanated in this Regulation will be determined in function of the seriousness of the infraction, coherent with the other penalties adopted in the international navigation and in accordance with the values established in the Decree nº 3,179, dated September 21st, 1999.

4.4- INFRACTION

It constitutes infraction every action or omission that violates the rules established in this NORMAN.

4.5- INFRACTION CONFIRMATION

The infraction and its perpetrator will be confirmed;

a) at the moment it occurs or during the inspection;
b) afterwards, by means of inquiry;
c) via administrative proceedings.

4.6- PERPETRATOR

Respond for the infractions prescribed by this Regulation;

a) the shipowner, natural person or legal entity, or who legally represent him;
b) the ship's charterer or operator, in case this is not operated by the owner; and
c) the natural person or legal entity that legally represents the ship and/or the platform.

4.7- COMPETENCE

4.7.1- MA Agents

It's up to the MA Agents (Art. 70, § 1º of the Law 9,605/1998), designated as Competent Authorities, to draw up environment infraction notices and institute administrative proceedings.

4.7.2- Ports and Coasts Director

It is up to the DPC as REPRESENTATIVE OF THE MARINE AUTHORITY FOR THE ENVIRONMENT POLUTION PREVENTION to judge, in last instance, the appeals on fines applied for violating Laws and Regulations

referring to the environment pollution prevention for undue discharge of Ballast Water in the BJW.

4.8- REGULATIONS AND SPECIFIC PROCEDURES FOR INSTITUTING ADMINISTRATIVE PROCEEDINGS

4.8.1- Administrative Proceedings

The administrative proceedings, prescribed in Art. 70 of the Law nº 9,605/1998 has as purpose the investigation of the facts that have come to the knowledge of the MA, for confirming possible infractions and their authors, as well as infractions verified in the act and during the inspections.

In the administrative proceedings, established in this Regulation, the opportunity for the parties to confront each other and the full defense are assured, with their inherent means and resources.

4.8.2- Term for investigating the environmental infraction

a) Infraction Notice

I – Drawn up the notice, the violator will have a 20 day time period to present his defense or refute the Infraction Notice, counting from the date the notice is acknowledged;

II – The judgment of the Infraction Notice must be rendered by the Competent Authority, with the decision duly substantiated, within 60 days, counting from the date the notice was acknowledged, presented or not the defense or refutation.

III – Considered the Notice valid, the penalty will be established and the violator notified; and

IV – The violator will have 5 days from receiving the notice to pay the fine.

The infraction notice must be signed by the violator, agent, or legal representative and by witnesses. In case the violator refuses to sign, a statement of fact will be issued by the Competent Authority, in the presence of two witnesses, in case he does not know signing, the notice will be taken at his request

b) Appeal to the last administrative instance

I – In case the defense is not judged justified and the violator disagree with the applied penalty, he may appeal to the decision, to the last administrative instance, through the Authority who rendered the decision, addressed to the Ports and Coasts Director (DPC), within 20 days counted from the date the MA Agent decision was notified.

The DPC will have thirty days to render his decision, duly substantiated, from the date the appeal was received;

II – appeal of any nature must be delivered to the Authority whose act one appeals against, in order that he sends it, together with his considerations and arguments, to the addressee Authority; and

III – in case of appeal put against decision in administrative proceedings, referring to other legal instruments that not the Law nº 9,605/1998, the appealing instances and terms prescribed in the respective instruments are to be observed.

4.9- Penalties Application

a) The administrative infractions are punished with the sanction of a single fine;

b) If the violator incurs, simultaneously, in two or more infractions, the corresponding sanctions will be applied him cumulatively

c) The single fine will be applied to the violator:
I – for irregularities that had being practiced; and
II – when obstruction is caused to the MA Agents inspection

d) The fine will have as basis the aggrieved juridical object;

e) The fine value is the value established by the Decree n° 3,179/1999, being the minimum of R$ 1,000,00 (one thousand reais), and the maximum of R$ 50,000,00 (fifty thousand reais);

f) The MA agent, upon drawing up the infraction notice, will indicate the fine applicable to the act, as well as, if pertinent, the remaining sanctions established by this Regulation, observing:
I – the seriousness of the facts, in view of the infraction motives and its consequences to the public health and environment
II – the antecedents of the violator, with regard to the compliance with the legislation of environment interest; and
III – the economic situation of the violator.

g) The competent authority upon analyzing the appeal may, on his own discretion or by request, independently of the applied fine, keep or reduce its value, respected the limits established in the incurred items, observing the previous dispositions, or, also, cancel the notice, if there is illegality or revoke it, following criteria of convenience and opportunity;

h) The competent authority, upon analyzing the administrative proceedings of the Infraction Notice, will observe, where pertinent, what is disposed in art. 14 and 15 of the Law n° 9,605, dated February 12th, 1998; and

i) It constitutes re-incidence the practice of an other environment infraction made by the same violator in the period of three years, classified as:
I – specific: making infraction of same nature; or
II – generic: making infraction of different nature.

In case of specific or generic re-incidence, the fine to be imposed for practicing the new infraction will have its value augmented to three times and twice, respectively.

4.10- ENROLLMENT IN THE FEDERAL OVERDUE TAX LIABILITY

Failure in paying the applied fine will imply in enrolling the violator in the Federal Overdue Tax Liability.

(Translator note: the Brazilian Federal Overdue Tax Liability is a Registrar whose recorded natural persons or legal entities are liable to immediate execution action, most for tax debts, once it constitutes an extra-judicial execution title in terms of the Brazilian Civil Proceedings Code)

4.11- OMITTED CASES

Those cases that are omitted or not foreseen in this Regulation will be resolved by the MA Agent.

ANNEXES:

ANNEX A– FORM FOR INFORMATION REFERRING WATER USED AS BALLAST

ANNEX B – "BALLAST WATER REPORTING FORM

ANNEX C – BALLAST WATER EXCHANGE METHODS

ANNEX D – LIST OF THE MAIN BRAZILIAN PORTS

ANNEX E – MAP OF THE MAIN BRAZILIAN PORTS

ANNEX F – ENVIRONMENT INFRACTION NOTICE

ANNEX G – INSPECTION FLOW-CHART

Mandatory Ballast Water Management for all vessels entering into Brazilian Ports .

With the NORMAM 20 (Standard of Brazilian Authority) being in force since 15 October 2005 all vessels , Brazilian and foreign flagged , entering into Brazilian ports are required to carry out ballast water management prior to reach the port .

In general the exchange of ballast water must be done in an area at least 200 miles from the coast and in water of a depth of at least 200 meters . There are exceptions when for safety of the vessel and crew that ballast exchange cannot be done in the area above mentioned .

Also , there are specific requirements for those vessels entering in Brazilian Rivers .

All Brazilian flag vessels and those foreign flagged vessels chartered by Brazilian Companies must have onboard a " Ballast Management Plan " duly approved by the Class Society of the vessel . In addition , all vessels must , thru her Master or its agent , send to port Authorities , 24 hours prior reaching the port , a Report on the ballast water exchanged when entered into Brazilian waters , copy of this report is to be kept onboard for verification of the port Authorities .

For further information and clarification please see attached the NORMAM 20 .

ANNEX C

METHODS FOR CHANGING THE BALLAST WATER

The change of Ballast Water in ocean areas offers, today, a means of limiting the transference of aquatic specimens via water used as ballast. Three methods were identified to carry out the change of the Ballast Water at sea:

1. The Sequential Method, in which the ballast tanks are drained and filled again with ocean water;
2. The Continuous Method, in which the ballast tanks are simultaneously filled and drained, via ocean water pumping;
3. The Brazilian Dilution Method, in which the ballast water is loaded though the tank top and, simultaneously, water is discharged from the bottom, at the same rate, in a way that the level of the water in the ballast tank is controlled to be kept constant.

ANEXO B

BALLAST WATER REPORTING FORM

1. SHIP INFORMATION

			2. BALLAST WATER
Vessel Name:	Type:	IMO Number:	Specify Units: M^3, MT
Owner:	Gross Tonnage:	Call Sign:	Total Ballast Water on Board:
Flag:	Arrival Date:	Agent:	
Last Port and Country:		Arrival Port:	Total Ballast Water Capacity:
Next Port and Country:			

3. BALLAST WATER TANKS Ballast Water Management Plan on board? YES _____ NO _____ Management Plan Implemented? YES NO

Total number of ballast tanks on board: _____ No. of tanks in ballast: _____ IF NONE IN BALLAST GO TO No. 5.

No. of tanks exchanged: _____ No. of tanks not exchanged: _____

4. BALLAST WATER HISTORY: RECORD ALL TANKS THAT WILL BE DEBALLASTED IN PORT STATE OF ARRIVAL; IF NONE GO TO No. 5.

Tanks/ Holds (List multiple sources per tank separately)	BALLAST WATER SOURCE					BALLAST WATER EXCHANGE Dilution (1), Flow Through (2) or Empty/Refill (3)						BALLAST WATER DISCHARGE			
	DATE DDMMYY	Port or Lat/Long *	Volume (units)	Temp (units)	Salinity (units)	DATE DDMMYY	Endpoint Lat/Long	Volume (units)	% Exch	Depth (m)	BW exchange method	DATE DDMMYY	Port or Lat/Long *	Volume (units)	Salinity (units)

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP; Double Bottom = DB; Wing = WT; Topside = TS; Cargo Hold = CH; Other = O

IF EXCHANGES WERE NOT CONDUCTED, STATE OTHER CONTROL ACTION(S) TAKEN: _____

IF NONE STATE REASON WHY NOT: _____

5: INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004 ON BOARD? YES_____ NO_____

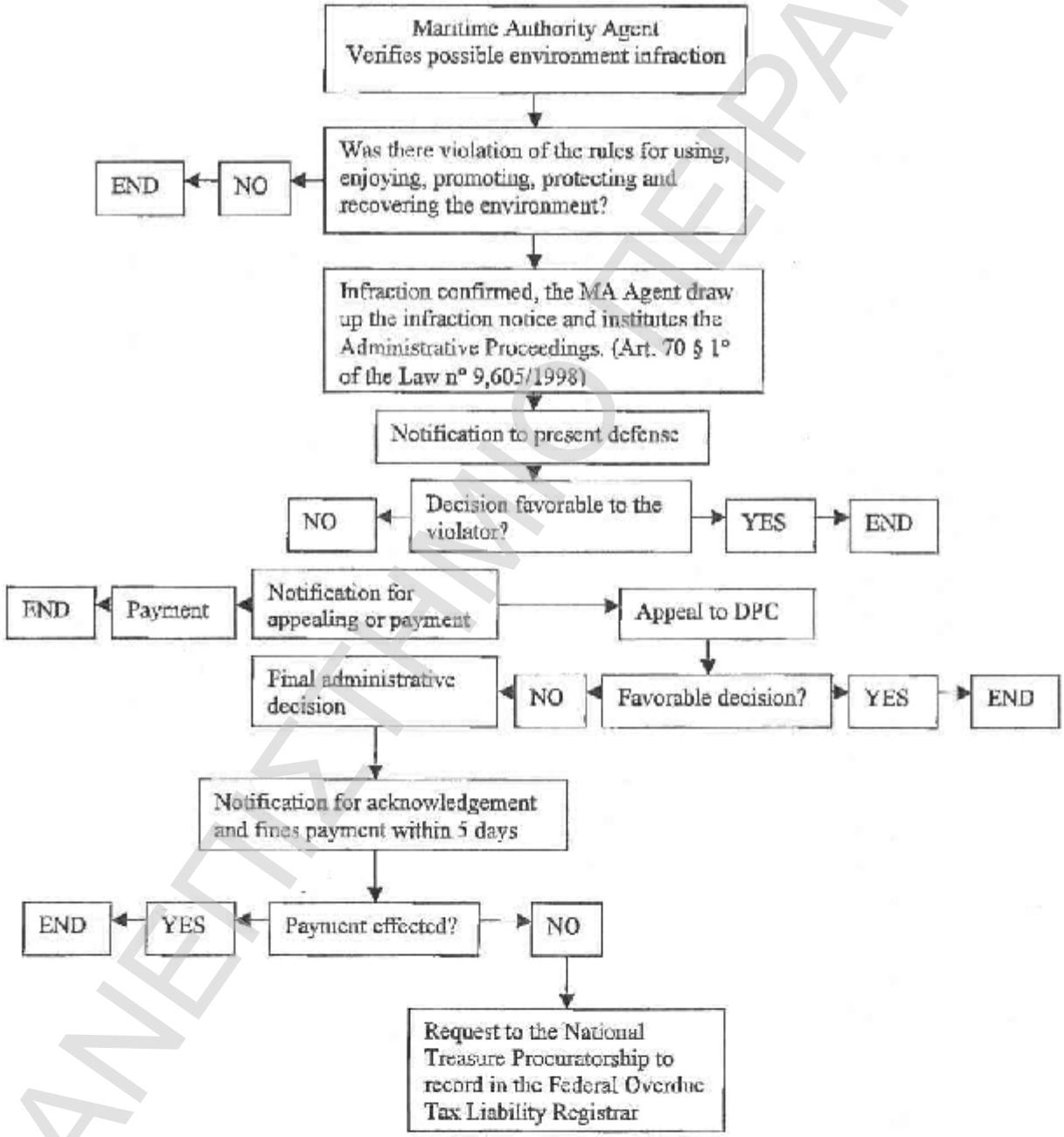
IMO BALLAST WATER GUIDELINES ON BOARD (RES. A.868(20))? YES_____ NO_____

RESPONSIBLE OFFICER'S NAME AND TITLE (PRINTED) AND SIGNATURE: _____

*Fulfil with Port's name, preferably.

ANNEX G

INSPECTION FLOW CHART



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Ref. T2-OSS/2.7.1

MSC/Circ.1145
13 December 2004

PRECAUTIONARY ADVICE TO MASTERS WHEN UNDERTAKING BALLAST WATER EXCHANGE OPERATIONS

1 The Maritime Safety Committee, at its seventy-ninth session (1 to 10 December 2004), approved the attached precautionary advice to Masters when undertaking Ballast Water Exchange operations, which should, at an appropriate time, be included in the Guidelines for Ballast Water Exchange, under development by the Organization.

2 In the interim, for ships flying their flag, Administrations are invited to consider the issue of compliance with the requirements of SOLAS regulation V/22, while such ships are conducting Ballast Water Exchange operations, taking into account the annexed precautionary advice.

3 Member Governments are invited to bring this precautionary advice to the attention of shipping companies, shipowners, ship operators, equipment manufacturers, classification societies, shipmasters and all parties concerned.

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ANNEX

PRECAUTIONARY ADVICE TO MASTERS WHEN UNDERTAKING BALLAST WATER EXCHANGE OPERATIONS

The Guidelines for Ballast Water Exchange, under development by the Organization, are expected to include, at an appropriate time, the following precautionary advice to Masters when undertaking Ballast Water Exchange sequences that involve periods when the criteria for propeller immersion, minimum draft and or trim and bridge visibility cannot be met:

1 During ballast water exchange sequences there may be times when, for a transitory period, one or more of the following criteria cannot be fully met or are found to be difficult to maintain:

.1 bridge visibility standards (SOLAS V/22);

.2 propeller immersion; and

.3 minimum draft forward.

2 As the choice of acceptable Ballast Water Exchange sequences is limited for most ships, it is not always practicable to dismiss from consideration those sequences where transitory non-compliance may occur. The practical alternative would be to accept such sequences provided an appropriate note is placed in the Ballast Water Management Plan to alert the ship's master. The note would advise the master of the nature of the transitory non-compliance, that additional planning may be required and that adequate precautions need to be taken when using such sequences.

3 In planning a Ballast Water Exchange operation that includes sequences which involve periods when the criteria for propeller immersion, minimum draft and or trim and bridge visibility cannot be met, the Master should assess:

.1 the duration(s) and time(s) during the operation that any of the criteria will not be met;

.2 the effect(s) on the navigational and manoeuvring capabilities of the ship; and

.3 the time to complete the operation.

4 A decision to proceed with the operation should only be taken when it is anticipated that:

.1 the ship will be in open water;

.2 the traffic density will be low;

.3 an enhanced navigational watch will be maintained including if necessary an additional look out forward with adequate communications with the navigation bridge;

.4 the manoeuvrability of the vessel will not be unduly impaired by the draft and trim and or propeller immersion during the transitory period; and

.5 the general weather and sea state conditions will be suitable and unlikely to deteriorate.
