

# ***CAPE ROGER***

## ***Specification for Annual Refit 2016***

### ***Drydocking***

***April 6, 2016 – May 18, 2016***

**Latest Copy: February 17 - 2016**



# CCGS Cape Roger

## Refit - Drydocking 2016

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<b>Preamble</b>		

## **1. INTENT**

These specifications are supplied to the shipbuilder or ship repairer, hereinafter referred to as the Contractor for the purpose of outlining the objectives, performance, standards and basic engineering requirements for the refit of the CCGS CAPE ROGER for the Canadian Coast Guard, Department of Fisheries and Oceans.

The intention is to provide sufficient information such that the Contractor, with this guidance and his own experience and knowledge of good marine practice, shall complete the work items herein by carrying out the engineering and production work, while conforming to the requirements of all applicable Regulatory Bodies.

Intent of this specification shall describe the necessary work involved in carrying out the ship's Drydock and Annual commencing April 6, 2016 and to be completed no later than May 18, 2016.

All work specified herein and all repairs, inspections and renewals shall be carried out to the satisfaction of the Owner's Representative and, where applicable, the attending Transport Canada Marine Safety Inspector. Unless otherwise specifically stated, the Owner's Representative is the Chief Engineer.

## **2. MANUFACTURER'S RECOMMENDATIONS**

The overhaul and installation of all machinery and equipment specified herein shall be as per the manufacturer's applicable instructions, drawings and specifications.

## **3. TESTING AND RECORDS**

All test results, calibrations, measurements and readings shall be properly tabulated, compiled and two type written copies shall be presented to the Owner's Representative and attending surveyors in a timely manner. At the completion of refit all reports, calibrations measurements etc. shall be provided to the Chief Engineer in a binder, tabbed and labeled to match the specification item.

## **4. WORKMANSHIP**

The contractor shall use fully qualified, certified and competent tradesmen and supervision to ensure a uniform high level of workmanship as judged by normally accepted shipbuilding standards and to the Owner's satisfaction.

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## **5. FACILITIES**

Contractor shall include all of the necessary labour and equipment required for the erection of access staging, rigging, lighting, tugs, pilotage, necessary craneage and line handling.

## **6. MATERIALS AND SUBSTITUTIONS**

All material shall be supplied by the contractor, and all materials shall be new and unused unless otherwise specified. All replacement material in the form of jointing, packing, insulation, small hardware, oils, lubricants, cleaning solvents, preservatives, paints, coatings, etc., shall be in accordance with the equipment manufacturer's drawings, manuals or instructions. Where no particular item is specified, or where substitution must be made, the Owner's representative must approve all material offered in advance of utilization.

## **7. REMOVALS**

Any items of equipment to be removed and subsequently reinstalled in order to carry out work specified or for access to carry out the work specified, shall be jointly inspected for damages prior to removal by both the contractor and Owner's representative.

## **8. EXPOSURE AND PROTECTION OF EQUIPMENT**

The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit which might become damaged by exposure, movement of materials, sand grit or shot blasting, airborne particles from sand, grit or shot blasting, welding grinding, burning, gouging, painting or airborne particles of paint. Any damage shall be the responsibility of the contractor. Government furnished equipment and materials shall be received by the contractor and stored in a secure warehouse or storeroom having a controlled environment appropriate to the equipment as per the manufacturer's instructions. The contractor shall cover all deck machinery and openings into the ship to prevent ingress of grit from blasting. The contractor will remove any and all coverings after the coating operations are complete.

## **9. LIGHTING AND VENTILATION**

Temporary lighting and/or temporary ventilation required by the contractor to carry out any item of this specification shall be supplied, installed and maintained in a safe working condition by the contractor and removed upon the completion of work.

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## **10. CLEANLINESS**

The contractor shall at all times, maintain the work areas in which his personnel have access in a clean condition and free from debris. Upon completion of this refit, the contractor shall ensure that the vessel is in a clean condition, free from all foreign material in any system or location placed there as a result of this refit. The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall dispose of any and all oil and water residue, which accumulates in the machinery space bilges as a result of any refit work detailed in this specification.

## **11. ASBESTOS**

Any and all insulation materials shall be asbestos free and approved for the required application.

## **12. ENTRY INTO CONFINED SPACES**

The Contractor shall be aware that the vessel is considered to be a Federal Work Place and thereby regulated by the Canada Labour Code.

Marine Chemist is described in "Canada Labour Code Part II, Marine Occupational Health & Safety Regulations" "General Interpretation" 1.1

Prior to entry, tank is to be certified "Safe for Workers" or "Safe for Hot Work" as required by Transport Canada Marine Safety TP3177E. Certificates shall be given to Chief Engineer and copies posted by the tank manhole and gangway.

In addition, the Contractor is required to keep a log of all personnel entering and leaving any enclosed space.

The Contractor is to supply the Owner's Representative with certificates issued by a marine chemist or other qualified person, in accordance with Part IX Confined Spaces of the Canada Labour Code, Part II before any cleaning painting or hot work is commenced in confined spaces or machinery compartments. Certificates are to clearly state the type of work permitted and are to be renewed as required by regulations. Copies of the certificates are to be posted in conspicuous locations for the information of the Ship's and Contractor's personnel.

The Contractor is to ensure that any work carried out in confined spaces as defined by the Canada Labour Code must comply fully with all provisions of the code.

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### **13. HOTWORK**

Any item of work involving the use of heat in its execution requires that the contractor advise the owner's representative prior to starting such heating and upon its completion. The contractor shall be responsible for maintaining a competent and properly equipped fire watch during and for one full hour after all hot work. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. The contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers shall not be used except in an emergency. The Contractor shall abide by the Coast Guard Hot work Policy. The policy is contractor shall be responsible to ensure the contractor's personnel including any sub-contractors shall follow the policy.

### **14. LOCKOUT AND TAGOUT PROCEDURES**

The Contractor shall be responsible to protect persons working on board the vessel while working on or near shipboard systems and equipment from accidental exposure to:

- Electrical currents
- Hydraulic
- Pneumatic
- Gas or stem pressure and vacuum
- High temperatures
- Cryogenic temperatures
- Radio frequency emissions
- Potentially reactive chemicals
- Stored mechanical energy
- Equipment actuation

The contractor, under the supervision of the Chief Engineer and his delegate, shall be responsible for the Lockout and Tagout of equipment and systems in listed in the specification.

The Contractor shall supply and install all locks and tags and shall complete the Lockout Tagout Log sheet provided by the Vessel.

The Contractor shall remove all locks and tags and complete the Lockout Tagout Log sheet provided by the Vessel.

### **15. PAINTING**

All new and disturbed steelwork that will not be on the underwater wetted surface of the ship's hull shall be protected with two coats of marine primer or as stated in the individual work item.

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## **16. WELDING**

Welding shall be in accordance with the Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E) The Contractor shall be currently certified by the Canadian Welding Bureau (CWB) in accordance with CWB 47.1 latest revision Division I, II or III at the time of bid closing.

The Contractor shall provide a current letter of validation from the CWB indicating compliance with standard CSA W47.1, Division I, II or III. (latest revision) with its bid.

The Contractor may be required to provide approved procedure data sheets for each type of joint and welding position that will be involved in this refit. The Contractor may be required to supply a current Welders Ticket for each individual welder that will be involved in this refit.

## **17. SMOKING**

The Public Service Smoking Policy forbids smoking in all Government ships in areas inside the ship where shipyard personnel will be working. The contractor shall inform shipyard workers of this policy and ensure that it is complied with.

## **18. RESTRICTED AREAS**

The following areas are out of bounds to shipyard personnel except to perform work as required by the specifications: all cabins, offices, Wheelhouse, Control Room, Engineer's office, public washrooms, cafeteria, dining room and lounge areas.

## **19. ELECTRICAL STANDARDS**

Any electrical installations or renewals shall be in accordance with the latest editions of the following marine standards:

- (a) TP 127E-TC Marine Safety Electrical Standards.
- (b) IEEE Standard 45 - Recommended Practice for Electrical Installation Shipboard.

If any cable installed within this contract is found to be damaged, shorted or opened as a result of the manner of installation, the entire length of cable shall be replaced and installed at no cost to the Department. Plastic tie-wraps may be used to secure wiring in panels or junction boxes only.



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## **20. DRAWINGS**

All drawings and drawing revisions that the contractor is requested to do in the execution of this contract shall be of a quality equal to that of the drawings that are requested to be updated. For example, drawings that have been lettered and dimensioned in a professional manner shall not be updated using freehand. Prints and reproductions that a contractor is required to provide shall be made on one piece of paper.

## **21. TRANSDUCERS**

The contractor shall not paint the transducers and all transducers shall be afforded the necessary protection during hull cleaning, blasting, burning, welding and coating operations.

## **22. SAFETY ANNEX**

The Contractor shall note that Canadian Coast Guard Ships are presently working under the International Safety Management System (ISM) code and each ship has a Fleet Safety manual on board. The Fleet Safety Manual shall be adhered to by contractors as the vessel is docked at a Federal facility during the contract period for items such as Hot Work, Confined Space Entry, Diving, Diving Operations, Lock Out and Tagout procedures. The Contractor shall be aware that the vessel is considered to be a Federal Work Place and thereby regulated by the Canada Labour Code.

The Contractor shall comply with the work requirements as outlined in the Canada Labour Code and applicable Provincial Regulations.

In addition, the Contractor is required to keep a log of all personnel entering and leaving any enclosed space.

An electronic copy of the Fisheries and Oceans Canada, Canadian Coast Guard Fleet Safety Manual (DFO 5737) - (Adobe Acrobat .PDF version) can be found at [http://142.130.14.20/fleet-flotte/Safety/main\\_e.htm](http://142.130.14.20/fleet-flotte/Safety/main_e.htm)

## **23. SUSPENSION OF WORK**

The Chief Engineer reserves the right to suspend work immediately when that work is being performed in contravention of the Coast Guard's Safety Management System. Work shall be allowed to resume when the Technical Authority, in consultation with the Contractor and PWGSC, is satisfied that the agreed-upon procedures are in place and being adhered to.

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**24. REGULATORY AUTHORITY INSPECTIONS**

The Contractor shall confirm a schedule of inspections with the regulatory authority (TCMS) for all work described in this specification and shall be responsible for calling them when inspections are required.

**25. VESSEL SECURITY**

There will be a Visitor Log at each main vessel access. Contractor shall ensure that all his employees and sub-contractor personnel sign-in when entering vessel and sign out when departing vessel. This requirement pertains to all visitors to the vessel including any Inspectors or vendors. These Visitor Logs will be available to the Shipyard's Security Personnel in the event of any emergency.

**26. WHMIS**

Any WHMIS-controlled products used onboard shall be accompanied by a current MSDS; any neutralizing chemicals or specialized protective equipment required shall be provided by the Contractor at all times these WHMIS-controlled products are onboard the vessel.

**27. TANK DRAIN PLUGS**

The contractor is to note that fuel and ballast tanks will be drained during this refit, so it is vital during the dry-docking procedure that no tank drain plugs be obstructed by docking blocks. The contractor is to refer to the vessel docking plan (Ferguson Industries Ltd No. 000-30, available from the Vessel's Representative) before drydocking the vessel.

**28. FIRE DETECTION AND SUPPRESSION SYSTEM**

If any Specification Item will require disturbing, removing or isolating any heat or smoke sensors the Contractor will advise the Chief Engineer before work commences.

The Ship's Crew will perform any such work. The Contractor should note that failure to observe proper precautions while performing work of this nature could result in system malfunction and spontaneous discharge of FM-200, Halon or CO<sub>2</sub>.

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**29. SHIP'S PARTICULARS**

L.O.A.	62.50M
BEAM	12.20M
DEPTH (mld) TO FOCSLE DECK	7.93M
FRAMING SPACING	60.96mm
DISPLACEMENT	1410.39LT
DATE AND PLACE BUILT	Ferguson Industries, Pictou, Nova Scotia, 1977

Spec item #: H-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Production Chart		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to provide enable the owner's representatives an accurate time line on production and completion dates for Coast Guard Operational services.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data****2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

**2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment and the automatic functions must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

**2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** The successful Contractor shall supply three (3) copies of a detailed bar chart showing the planned work schedule for the ship's refit. This bar chart shall show each specification item, the planned and actual start date, the duration and the completion date.
- 3.1.3** A critical path of work shall be identified, which shows the critical tasks that may delay the completion of the refit and if they shall not be completed within the estimated time frame. The critical path may exist due to labor constraints or tasks which cannot be completed concurrently with other tasks.
- 3.1.4** If work arises that affects the critical path, it shall be immediately brought to the attention of the Chief Engineer. Every effort shall be made to prevent the vessel from delay in completing the refit in the time provided. Regular QA procedures shall apply.
- 3.1.5** The bar chart shall be updated weekly and for each production meeting to reflect all changes to the actual production of the refit and changes to the anticipated completion dates of each individual item. The Contractor shall include on the updates to the production chart any work arising from PWGSC 1379 action that indicates the additional work shall impact the completion schedule for the vessel.
- 3.1.6** Three (3) copies of the weekly update shall be given to the Chief Engineer each week.
- 3.1.7** Contractor shall forward a copy of the weekly production chart to Public Works Contracting Officer and Vessel Maintenance Manager by e-mail.

### **3.2 Location**

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

**4.2.1** Testing of the system shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

#### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

### **Part 5: DELIVERABLES:**

#### **5.1 Drawings/Reports**

**5.1.1** Three copies of the original and three copies of each weekly update shall be given to the Chief Engineer one day prior to each weekly progress meeting.

**5.1.2** The bar chart shall be updated weekly or for each production meeting to reflect the actual production on the refit and changes to the anticipated completion dates of each individual item. The contractor shall include on the updates to the production chart any Work Arising from PWGS 1379 action, and indicate how the additional work shall impact the completion schedule for the vessel.

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: H-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Services		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the Contractor to supply and connect as specified, the necessary services to the vessel at the start of Drydocking and to disconnect the same services at the completion of the repairs.
- 1.2** This work shall be carried out in conjunction with the entire drydocking period under the supervision of the Chief Engineer. The contractor shall supply all material, equipment and tools to the point of onboard connection and quote on the cost of each individual service.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Date****2.1.1** General Arrangements**2.2 Standards**

- 2.2.1** All connections made to the ship and terminations made must be performed in a manner so as to not cause any hazards or safety concerns to the personnel staying and working onboard.

**2.3 Regulations**

- 2.3.1** All electrical and plumbing connections to the ship must be done so in accordance with local and federal regulations, including those stated in the Canada Shipping Act and Transport Canada Regulations. The contractor shall ensure any / all connections are secure and that no pollutants are released from the ship.

**2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated to the point of connection.

### Part 3: TECHNICAL DESCRIPTION:

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Spec item #: H-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Services		

#### 3.1 General

- 1) The following services are to be supplied and connected to the vessel during the refit period as applicable and disconnected when leaving. The contractor is to supply all material to the point of onboard connection. The bid price is to be broken down by item.
- 2) Metered electrical service 460 VAC, 3 phase, 60Hz, 300A continuous to be supplied and maintained. Quote on supplying 130,000 KWH to be adjusted up or down by 1379 action. Quote unit cost per KWH. A ground cable is to be solidly attached to ship's hull. The contractor is to supply and install the electrical cable and kilowatt-hour meter. The vessel's electrical cable is not to be cut. The 130,000 KWH quoted above is for the vessel's own use. The contractor is to supply separate electrical service for contractor items in this specification.  
  
( Item A ) Contractor shall include in quote the cost to connect shore power at start of refit and disconnect when refit is completed. Ships Shore power meter reading shall be taken and recorded by contractors Electrician and witnessed by Chief Engineer at time shore power connected at start of refit and when shore power is disconnected at end of refit. Chief Engineer shall log meter readings in log book.  
( Item B ) Contractor is to supply separate electrical supply for contractors use during refit to ensure owner is not charged for electricity consumed by contractor during the refit period.
- 3) Sea water connection to the ship's fire main, 80 psi, 2 1/2 inch diameter. Pressure is to be maintained to the vessel at all times. The connection is to be such that fully opening any 2 hydrants on the vessel will result in no noticeable decrease in the flow of water. A pressure reducing station with an isolation valve and pressure gauge shall be fitted before the International Shore Connection on board ship.
- 4) One fresh water connections to ship's domestic systems, minimum (1 1/2" @ 50 psi), through a regulator. Daily consumption is approx. 5 m<sup>3</sup> daily.  
  
( Item A ) Contractor shall include in quote cost to supply and install water meter to ships water supply line to determine water consumed during the refit period. Water meter reading shall be taken and recorded by contractors Project officer and witnessed by Chief engineer at the start of refit and when refit is completed. Readings shall be recorded in chief engineers daily log book.



- 5) One 3" sewage discharge line is to be fitted to the ship's overboard discharge. Contractor is to dispose of sewage. Quote to include necessary labor to modify/adapt as required for storm valve inspection and maintenance.
- 6) The contractor shall ensure adequate protection for all supplied water connections from ambient freezing.
- 7) Labor, material and services are to be supplied for the rigging of two separate and independent boarding gangways complete with safety nets and two handrails. The gangways are to be suitably illuminated for use at night. Access to both gangways is to be constantly maintained in a safe and secure manner clear of all obstacles.
- 8) Refuse containers are to be supplied on the helicopter deck. A quantity of 2 with a capacity of 5 m<sup>3</sup> each. Refuse is to be removed daily from the ship. This includes all sludge and scale from tank cleaning. The contractor is responsible for provision of suitable containers and any costs associated with waste disposal regulations that may be in place. This will include hazardous materials. The contractor is to advise the owner's representative of any such regulations or practices at the pre-refit meeting.

(Item A) Contractors supplied containers shall remain on the ship for the duration of the refit. Contractor shall include in quote the cost to have containers onboard .

- 9) Two independent and private telephone lines to be supplied. The service is not to be routed through the contractor's switchboard and all lines are to be totally independent. Both lines are to have long distance dialing capabilities. The cost of connections, removal and local service charges to be included. Long distance charges will be paid by 1379 action at the end of the refit. In the event that landline telephone service is not available the contractor is to provide 2 cellular telephones in lieu of the landlines.
- 10) The contractor is to bid on the removal of 10,000 liters of dirty oil and oily water mixture. Quote unit cost per each additional 1000 liters. For estimation purposes quote 3,000 liters of oil and 7,000 liters of water. This item is to be adjusted up or down upon proof of invoice. The quantities in this item are for the vessel's requirements and are not to be included with contractor requirements for completion of items in this specification.
- 11) One local Cable Television connection is to be supplied to the ship's internal system. The cost of connections, removal and service charges, if any, are to be included.
- 12) Internet connection is to be supplied to the ship's system to allow internet access from the ships computers.
- 13) The contractor is to provide labor and equipment to erect, as necessary, scaffolding and staging and temporary lighting to facilitate inspection by the Owner's Representative and attending Transport Canada Ship Safety Surveyors for any items in this specification. The scaffolding, staging and temporary lighting shall be removed when the work is complete.

- 14) Prior to any work commencing, the Contractor shall supply, install and secure temporary internal deck covering (fiberboard or masonite) in the following passageways and stairways: Bridge Deck, Foscle Deck, Main Deck and Lower Deck, approximately 160 m<sup>2</sup>. Contractors are to quote a price per sq. meter. The contractor will be responsible for maintaining the protective covering in an acceptable condition and repairing any deficiencies as directed by the Chief Officer. The contractor will replace, at the contractor's expense, any decks, including carpeting, damaged due to deficiencies in the temporary protective coating. The contractor will remove and dispose of the protective covering when directed by the Chief Officer at the end of the refit.
- 15) The Contractor is to ensure all spaces, compartments and areas of the ship where work was done are left in an "as clean as found condition." The cost of clean up is to be included in each specification item.
- 16) Contractor to supply 20 hours of crange, complete with operators, for the vessels use. Quote unit cost per hour for adjustment purpose.

### **3.2 Location**

3.2.1 N/A

### **3.3 Interferences**

**3.3.1** The Contractor shall be responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and TCMS Inspector.

### **4.2 Testing**

4.2.1 N/A

### **4.3 Certification**

4.3.1 N/A

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

5.1.1 The Contractor shall supply the receipts from the waste management company for the amounts removed. These amounts shall be adjusted up or down by PWGS 1379 action.

### **5.2 Training**

**5.2.1** N/A

### **5.3 Manuals**

**5.3.1** N/A

Spec item #: H-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
HVAC Duct Cleaning		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to insure entire cleaning of the vessels interior accommodation supply and exhaust ventilation. Contractor shall include an allowance of \$1000 for the repair of damaged dampers and sealing leaks shall be adjusted up or down by PWGSC 1379 action.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** #761/01 Accommodation Ventilation Diagram

**2.2 Standards**

- 2.1.1.** Contractor shall insure all inspection covers, vent fixtures, louvers, access plugs and diffusers that were removed for cleaning are properly re-installed once cleaning is complete. There shall be no plastic plugs installed, all plugs and patches shall be of metal and of the same gauge as the duct work being attached to.
- 2.1.2.** Ships' ISM, Hotwork, Fall Protection and Lock-Out Procedures must be strictly adhered to.

**2.3 Regulations**

- 2.1.1.** The cleaning, re-installation and any work on the duct work system must be in accordance with TCMS regulations and the Canada Shipping Act regarding ventilation systems onboard ships as well as TCMS TP 127E.

**2.4 Owner Furnished Equipment**

- 2.1.1.** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

Spec item #: H-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
HVAC Duct Cleaning		

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 3.1.1.** Contractor shall ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Electrical power shall be locked out to ventilation system prior to any work commencing.
- 3.1.3.** Vent fixtures / louvers into spaces shall be removed to enable access to ducting. Fixtures shall be remounted by contractor after cleaning is completed.
- 3.1.4.** Contractor shall clean ducting and distribution boxes on all three decks.
- 3.1.5.** Ducting to be cleaned shall include accommodation supply and exhaust, washroom exhaust ducting and the ducting in the laundry room for the ships' dryers.
- 3.1.6.** Ducting shall be cleaned of all residue and dust buildup. Contractor shall be responsible for disposal of residue and dust.

#### **3.2 Location**

- 3.2.1** The HAVC room is located on the stbd side of focsle deck.
- 3.2.2** The laundry room is located on the stbd aft side of the main deck.

#### **3.3 Interferences**

- 3.3.1** The contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

### **Part 4: PROOF OF PERFORMANCE:**

#### **4.2 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the Chief Engineer.

#### **4.2 Testing**

**4.2.1** After work is completed all systems shall be run up and proven operational in the presence of the chief engineer or his delegate.

**4.3 Certification**  
N/A

**Part 5: DELIVERABLES:**

**5.1 Drawings/Reports**

**5.1.1** Contractor shall supply Chief Engineer with both a typed and electronic copy of the overhaul report. Work report shall include overall condition of all associated duct work, any repairs made and any suggestions for improvement.

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: H-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Galley Duct Cleaning		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to clean the Galley Range Hood and Exhaust ducting.
- 1.2** This work shall be carried out in Conjunction with the following: Daily operations of the galley. The galley is operational from 05:00 hrs. to 19:00 hrs. Cleaning must be carried out outside these hours.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Galley Exhaust Trunking Drawing # - 340/05

### **2.2 Standards**

- 2.2.1** The galley ventilation can be a source for fire hazards and has to be cleaned in such a manner as to keep the possibility to a minimum. The contractor must adhere to the ships' ISM Hotwork, Confined Space, Fall Protection and Lockout Procedures.

### **2.3 Regulations**

- 2.3.1** The cleaning practice used must be an approved method and the waste shall be disposed of in accordance with local regulations.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor shall ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

Spec item #: H-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Galley Duct Cleaning</b>		

- 3.1.2** Electrical power shall be locked out to galley exhaust fan prior to any work commencing.
- 3.1.3** The contractor shall provide the services of a qualified HVAC representative to mechanically clean the above ducting. All ducting shall be cleaned thoroughly of grease, dust, dirt, debris, scale, rust, etc. The contractor shall be responsible for making penetrations for the cleaning equipment and the subsequent sealing following the work.
- 3.1.4** It will be necessary to remove ceiling panels in the Crew's Mess to access the applicable ventilation trunking. All items shall be replaced in good order upon completion of all work.
- 3.1.5** Mushroom vent head on the focsle deck, port side amidships, shall be removed and thoroughly cleaned of grease build-up. Mushroom vent shall be re-installed with new contractor supplied gasket.
- 3.1.6** Any wiring, piping, lighting, fixtures, fasteners, metal work, etc. that has been removed or repositioned to carry out this work shall be reinstalled in good order in its original location and condition.
- 3.1.7** The Galley will be in operation at the time of this cleaning. This work will have to be done between 1900 and 0500, daily. Contractor shall ensure that the Galley is left in a clean and sanitary condition before finishing each morning.

### **3.2 Location**

- 3.2.1** This system is located in the galley on the main deck and vent head is located on the focsle deck, amidships port side.

### **3.3 Interferences**

- 3.2.1.** Contractor shall be responsible for the identification of interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.2.** All work shall be completed to the satisfaction of the Chief Engineer, and local fire and safety authorities.

### **4.2 Testing**



Spec item #: H-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Galley Duct Cleaning		

**4.2.1** The ventilation system shall be tested after all work is completed to verify correct operation.

**4.3 Certification**  
N/A

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor shall provide the chief engineer with both typed and electronic copies of the work performed and pictures of before and after cleaning of the inside of the trunking and vent head.

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: H-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Fire Detection System Service		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to carry out annual testing of the ships' fire alarm and detection system to obtain TCMS credit.
- 1.2** Contractor shall report to the Chief Engineer prior to any work commencing with this item. All work shall be carried out in conjunction with the FM-200, Wet Chemical and CO2 systems Service and re-certification.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Notifier NFS2-640 (E)
- 2.1.2** Fire Detection and Alarm Wiring diagrams and Fire Detection Systems layout drawings, D-20020-1 to 3.

**2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

**2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment and the automatic functions shall be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations, and regulations in the Canada Shipping Act pertaining to fire detection systems on ships and regulation CAN/ULC-S536, Inspection & Testing of Fire Alarm Systems.

**2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

Spec item #: H-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Fire Detection System Service		

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Contractor shall obtain the service of a qualified technician to complete testing and inspection of the fire detection system.
- 3.1.3** Technician shall test the Notifier system panels, smoke and heat detectors, pull stations, alarm bells and fire door magnetic hold backs.
- 3.1.4** System consists of a master panel located in the wheelhouse and two mimic panels; one located in the machinery control room and one located in the quartermasters' station.
- 3.1.5** Technician shall test the system's battery backup power capabilities to ensure it meet's manufacturer's specifications.
- 3.1.6** All detector heads shall be tested for correct operation. The system consists of two zones with Zone 1 having 19 smoke and 3 heat detectors, Zone 2 having 44 smoke and 21 heat detectors.
- 3.1.7** All pull stations, 25 in total, shall be tested and proven operational.
- 3.1.8** All fire door magnetic hold backs shall be tested. There are a total of 15 fire doors located throughout the vessel; all fitted with magnetic hold backs which are de-energized via the fire detection panel when the system is activated.
- 3.1.9** All deficiencies shall be first reported to the Chief Engineer and then repaired or components replaced by the contractor though 1379 action.
- 3.1.10** Once all testing is completed the service technician shall return the system to normal operational status.

#### **3.2 Location**

- 3.2.1** Panels are located in the wheelhouse, machinery control room and the quartermaster's station. Detector heads, pull stations, bells, and doors are located throughout the vessel.

#### **3.3 Interferences**

- 3.3.1** Contractor shall be responsible for all interference items that may require attention during the annual inspection.

Spec item #: H-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Fire Detection System Service		

**Part 4: PROOF OF PERFORMANCE:****4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

**4.2 Testing**

**4.2.1** Testing of the system shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

**4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

**Part 5: DELIVERABLES:****5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

**5.2 Spares  
N/A****5.3 Training  
N/A****5.4 Manuals  
N/A**

Spec item # H-6	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Fixed Fire Suppression Systems</b>		

## Part 1: SCOPE:

- 1.1** The intent of this specification shall be for the contractor to perform the annual maintenance and inspection of the vessel's CO<sub>2</sub>, FM-200 and Range Guard fire protection systems. The contractor shall have the services of a field services representative (FSR) to carry out the annual inspection and maintenance of these systems;
- 1.2** The Contractor shall report to the Chief Engineer prior to any work commencing with this spec item. This work shall be carried out in conjunction with the servicing of the Fire Detection System and the portable fire extinguishers and, in a manner that does not compromise the ability to extinguish a shipboard fire.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

- 2.1.1** CO<sub>2</sub> System 74-265-1, 74-2651-2, 74-265-3
- 2.1.2** FM-200 System, National & Marine Fire Services Corp Dwg No NS1005 1 of 2 & NS1005 of 2.
- 2.1.3** 4 gal Range Guard Wet Chemical (Karbalo) Cylinder
- 2.1.4** List of cylinders:
- Engine Room, Cargo Hold, MCR, & Aux. Mach. Space: (15) x 100 lbs (located in CO<sub>2</sub> Room, Main Deck, Aft, Stbd Side)
  - Bow Thruster FM-200 room (Port Forward, near Ship's Office)
  - Lamp Room, located in Lamp Room (#301)
  - Paint Locker, located in Paint Locker (#300)
  - Galley, midship, main deck

### 2.2 Standards

- 2.2.1** Contractor shall be approved by Transport Canada to recertify these systems and recertification shall be done in accordance with the latest TC regulations concerning Marine Safety.

Spec item # H-6	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Fixed Fire Suppression Systems</b>		

**2.2.2** The ships' Ism Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

**2.3.1** All systems shall be labeled as being certified to use, date certified and name of company certifying.

**2.3.2** Testing shall be carried out in accordance to:

- TP 127E;
- IEEE 45 STD -2002;
- Lloyd's Classification Society Rules;
- C.S.A., Hull and Machinery Regulations;

### **2.4 Owner Furnished Equipment**

**2.4.1** Contractor shall supply all labour, materials, parts and equipment required to perform the required work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General :**

**3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

**3.1.2** The CO<sub>2</sub>, FM-200 and Range Guard fixed fire fighting systems shall be thoroughly examined and tested by a certified fire protection service company in accordance with TCMS requirements. All tests shall be witnessed by Owner's representative and attending TCMS Inspector.

( Item A ) Contractor shall include in quote the services of Field Service Representative ( FSR) to carry out work as per work specification. Quote shall include all expenses, meals ,travel and accomodations.(No allowances provided) Any parts required shall be covered by 1379 action upon proof of invoice.

**3.1.3** Upon completion of testing, CO<sub>2</sub>, FM-200 and Range Guard systems shall be reassembled and placed in working order.

- 3.1.4 Contractor shall confirm operation of all local and remote manual releases. All hand control levers pull handles, cables, cocks, and valves shall be checked and proven operational. The piping shall be blown through with compressed air or nitrogen to prove the lines are clear and that the time delays and sirens are operational. All pressure operated switches shall be proven operational.
- 3.1.5 Copies of inspection certificates shall be forwarded to Chief Engineer and TCMS Inspector.

### **3.2 Location:**

- 3.2.1 Engine Room, Cargo Hold, MCR, & Aux. Mach. Space: Fifteen x 100 lbs (located in CO2 Room, Main Deck, Aft, Stbd Side) Bow Thruster FM-200 room (Port Forward, near Ship's Office), Lamp Room, Located in Lamp Room (#301), Paint Locker, located in Paint Locker (#300), Galley

### **3.3 Interferences:**

- 3.3.1 Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection:**

- 4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and TCMS.

### **4.2 Testing:**

- 4.2.1 Chief Engineer and TCMS to be present for all testing.

### **4.3 Certification:**

- 4.3.1 This specification shall be carried out in order to obtain TCMS survey credit.  
The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1 Contractor to supply Chief Engineer with both a typed and electronic copy of all items carried out in the specification.

### **5.2 Spares**

<b>5.3</b>	<b>N/A</b>
<b>5.4</b>	<b>Training</b>
	<b>N/A</b>
<b>5.5</b>	<b>Manuals</b>
	<b>N/A</b>



Spec item #: H-7	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Refrigeration Systems Leak Testing		

## Part 1: SCOPE:

- 1.1 The intent of this specification shall be to carry out annual leak testing and oil changes on domestic refrigeration compressors, galley a/c unit, stand up fridge and freezer, crews' mess ice machine and desert cooler and mcr a/c unit.
- 1.2 This work shall be carried out on one compressor at a time as to not interfere with the ship maintaining operational temperatures in refrigerated rooms (applies to main system only).

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

- 2.1.1 2 Domestic Refrigeration systems, Blitzler type 2T2Y
- 2.1.2 Galley Freezer and Refrigerator, True
- 2.1.3 Galley Air Conditioning Unit
- 2.1.4 Crews' Mess Ice Machine, Symphony
- 2.1.5 Crews' Mess Desert Cooler, True
- 2.1.6 MCR Air Conditioning Unit, Comfort Aire

### 2.2 Standards

- 2.2.1 The ships' Ism Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.
- 2.2.2 The contractor shall leak test all systems according to Provincial Standards

### 2.3 Regulations

- 2.3.1 Regulations pertaining to the protection of the environment, Canada Shipping Act and Coast Guard Policies must be strictly adhered to following the release of halocarbons.

### 2.4 Owner Furnished Equipment

- 2.4.1 The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

Spec item #: H-7	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Refrigeration Systems Leak Testing		

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Annual leak testing shall be performed on the domestic refrigeration systems, galley a/c unit, stand up fridge and freezer, crews mess ice machine and desert cooler and mcr a/c unit.
- 3.1.3.** Contractor shall provide the services of a certified refrigeration contractor to perform the annual leak testing on all above mentioned systems.
- 3.1.4.** Lubrication requirements for Bitzer compressors (main system) operating with 134 a refrigerant, recommended BSE 32. Both the galley a/c unit and mcr a/c unit use R22 refrigerant.
- 3.1.5.** Contractor shall remove the sight glasses from each of the compressor sumps and remove the oil and any contaminants from the sump.
- 3.1.6.** Contractor shall supply and install new oil for both main compressors once the sight glasses have been cleaned and replaced. Approx. 4 litres of oil.
- 3.1.7.** Contractor shall provide a certificate/work order of their checks and pass it onto the Chief Engineer. As well they are to fill out the log book mounted on or near each refrigeration system.

### **3.2 Location**

- 3.2.1** Main refrigeration systems are located in the sewage compartment, galley a/c unit, standup fridge and freezer are located in the galley, ice machine and desert cooler are located in the crews mess and the mcr unit is located in the laundry room.

### **3.3 Interferences**

- 3.2.1.** Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of the Chief Engineer or his delegate.

**4.1.2.** N/A.

## **4.2 Testing**

**4.2.1** Copy of the test certificate shall be attached to each refrigeration unit and the Halocarbon Log, located in the sewage compartment, shall be filled out and signed.

## **4.3 Certification**

**4.3.1** Refrigeration technician shall possess a halocarbon certificate and number.

# **Part 5: DELIVERABLES:**

## **5.1 Drawings/Reports**

**5.1.1** Contractor shall supply Chief Engineer and TCMS with both a typed and electronic copy of the certificates and work completed on each system.

## **5.2 Spares** N/A

## **5.3 Training** N/A

## **5.4 Manuals** N/A

Spec item #: H-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port and Stbd Miranda Davits		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the contractor to supply the services of a Schatt Harding Representative to carry out an annual inspection on the vessels Miranda Davits. Contractor shall include allowances of \$5000 for the services of a FSR and \$5000 for parts for both the Miranda Davits and Life boat Davits to be adjusted up or down as required by PWGSC 1379 action.
- 1.2** This work shall be carried out in Conjunction with the following Lifeboat Davit Inspection.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Davit Type MRT 3900
- 2.1.2.** Winch unit G/A M902624 & M903384
- 2.1.3.** Sectional Arrangement S711550
- 2.1.4.** Manual in the ships' office

### **2.2 Standards**

- 2.2.1** The ships' Ism Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** All regulations from the Canada Shipping Act regarding the inspection and maintenance of Live Saving Equipment must be strictly adhered to.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

Spec item #: H-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Port and Stbd Miranda Davits</b>		

- 3.1.2.** The contractor shall supply the services of a Schatt Harding Representative to carry out an annual inspection on the Miranda Davits.
- 3.1.3.** Contact information for the FSR: Colin Edwards, Manager, Umoe Schatt Harding, Tel: 604-543-0849
- 3.1.4.** Electric motors shall be locked out as per ISM lockout procedure.
- 3.1.5.** The gearbox shall be completely drained of oil (11 litres of EP 100) and disposed of by the contractor.
- 3.1.6.** The gearbox covers shall be removed and the gear box and gears shall be examined for wear and contamination.
- 3.1.7.** Once the inspection is completed the covers shall be replaced with new contractor supplied gaskets. The oil shall be replenished with the correct type and quantity, owner supplied.
- 3.1.8.** The disc brakes and centrifugal brakes shall be opened and inspected. The condition of the brake linings, bearings and seals shall be inspected by the Schatt Harding representative and renewed if necessary.
- 3.1.9.** Pinion shaft, brake housing and cover plate shall be replaced on Stbd Davit Parts are owner supplied.

### **3.2 Location**

- 3.2.1.** The Miranda Davits are located on the port and stbd side of the Foc'sle deck.

### **3.3 Interferences**

- 3.2.1.** Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the Chief Engineer.

### **4.2 Testing**

- 4.2.1** Once all work is completed the davits will be tested, including launching of the boat; to be witness by the Chief Engineer and Chief Officer.

### **4.3 Certification**

- 4.3.1** Work report and certificate of compliance shall be given to the Chief Engineer upon completion of all work and after testing of equipment.

Spec item #: H-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port and Stbd Miranda Davits		

**Part 5: DELIVERABLES:****5.1 Drawings/Reports**

**5.1.1** Contractor shall arrange for the Schatt Harding FSR to provide both a type written and electronic copy of the reports detailing the inspections and his findings to the Chief Engineer.

**5.2 Spares**

N/A

**5.3 Training**

**5.3.1** FSR shall provide adequate training to show the proper operation and general maintenance of the required equipment to the ships' crew.

**5.4 Manuals**

N/A

Spec item #: H-9	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Port and Stbd Lifeboat Davits</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the contractor to supply the services of a Schatt Harding Representative to carry out an annual inspection on the Vessels lifeboats and lifeboats Davits. Contractor shall include an allowance of \$5000 for the services of a FSR to be adjusted up or down as required by PWGSC 1379 action.
- 1.2** This work shall be carried out in Conjunction with Inspection of Miranda Davits.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Davit Type SPG(L) 5400/3100  
**2.1.2.** Electric Winch Type BE5500  
**2.1.3.** Order No: 1605/94070  
**2.1.4.** Brake unit : D406700E

### **2.2 Standards**

- 2.2.1** The ships' Ism Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** All regulations from the Canada Shipping Act regarding the inspection and maintenance of Live Saving Equipment must be strictly adhered to.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

Spec item #: H-9	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Port and Stbd Lifeboat Davits</b>		

- 3.1.2.** The contractor shall supply the services of a Schatt Harding Representative to carry out an annual inspection on the Lifeboat Davits.
- 3.1.3.** Contact information for the FSR: Colin Edwards, Manager, Umoe Schatt Harding, Tel: 604-543-0849
- 3.1.4.** Electric motors shall be locked out as per ISM lockout procedure.
- 3.1.5.** The contractor shall carry out an inspection of the brake assemblies on both Lifeboat Davits.
- 3.1.6.** The Gearbox shall be completely drained of oil and disposed of by the contractor.
- 3.1.7.** The Gearbox covers shall be removed and the Gearbox and gears shall be examined for wear and contamination.
- 3.1.8.** Once the inspection is completed the covers shall be replaced with new contractor supplied gaskets. The oil shall be replenished with the correct type and quantity, owner supplied.
- 3.1.9.** The contractor shall inspect the Lifeboat hooks and releases on both Lifeboats.
- 3.1.10.** The contractor shall check the hydrostatic release diaphragm on each Lifeboat.

### **3.2 Location**

- 3.2.1.** Lifeboat Davits are located on the Port and Stbd side of the Foc'sle deck.

### **3.3 Interferences**

- 3.2.1.** Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the Chief Engineer.

### **4.2 Testing**

- 4.2.1** Once all work is completed the davits shall be tested by the contractor, including launching of the boat; to be witness by the Chief Engineer and Chief Officer.

### **4.3 Certification**

- 4.3.1** Work report and certificate of compliance must be given to the Chief Engineer upon completion of all work and after testing of equipment.



Spec item #: H-9	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port and Stbd Lifeboat Davits		

**Part 5: DELIVERABLES:****5.1 Drawings/Reports**

**5.1.1** Contractor shall arrange for the Schatt Harding FSR to provide both a type written and electronic copy of the reports detailing the inspections and his findings to the Chief Engineer.

**5.2 Spares**

N/A

**5.3 Training**

**5.3.1** FSR shall provide adequate training to show the proper operation and general maintenance of the required equipment to the ships' crew.

**5.4 Manuals**

N/A

Spec item #: H-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchor Windlass</b>		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to prepare the anchor windlass for 5 year TCMS survey.
- 1.2** This spec shall also cover the inspection of the anchor chain fairlead rollers and chain stoppers.
- 1.3** This spec item shall be carried out in conjunction with spec item Anchors, Chains & Chain Lockers 5 year survey.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Manufacture: Burrard Iron Works Ltd  
Model: H4D  
Serial #: 260803
- 2.1.2** Hydraulic Motor: Rexroth/Bosch  
Axial Piston, Variable Displacement Motor, A6VM
- 2.1.3** Instruction & Service Manual 36-1, Ships' Office

**2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

**2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

**2.4 Owner Furnished Equipment**

Spec item #: H-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchor Windlass</b>		

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Contractor shall ensure power to the windlass is locked out prior to work commencing.
- 3.1.3** Contractor shall drain oil from base of gearbox and dispose of in accordance with provincial regulations.
- 3.1.4** Prior to disassembly of windlass, gearing backlash readings shall be taken and recorded.
- 3.1.5** Contractor shall disassemble the windlass to allow for inspection of all associated bearings/bushings, i.e. shafting, pedestal & wildcat, remove hydraulic motor pump, internal gearing and shafts, wildcats assemblies and brake pad/drum assemblies.
- 3.1.6** Hydraulic motor shall be overhauled and inspected, all parts shall be contractor supplied. Contractor shall include an allowance of \$5000 for parts.
- 3.1.7** Contractor shall clean all bearing housings and shafting to remove any scores that maybe present. All bearings/bushings and associated shafting shall be measured and recorded.
- 3.1.8** All gearing shall be visually inspected for signs of wear, broken or damaged gear teeth.
- 3.1.9** Wildcat assemblies shall be dismantled, cleaned, measured and inspected.
- 3.1.10** Fairlead rollers shall be dismantled, pins cleaned, measured and inspected, bearing shall be replaced, if required, with contractor supplied bearings. New grease fittings shall be installed upon re-assembly and grease ways shall be proven free and clear.
- 3.1.11** Brake assembly shall be dismantled, brake pads shall be measured and inspected, replaced if deemed necessary with owner supplied pads and bolts/screws. Drum assembly shall be cleaned and measured for "out of roundness", drum shall be machined if necessary back to true. Contractor shall verify with manufacture the minimum allowable thickness prior to commencing machining of the drum.
- 3.1.12** Brake assemblies shall be reinstalled and adjusted as required, to allow for maximum braking ability.
- 3.1.13** All pins, bushings, linkages on the brake hand assembly and wildcat assembly shall be checked and replaced as necessary, contractor to supply pins and/or bushings. All components to be proved free and operational.

Spec item #: H-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchor Windlass</b>		

- 3.1.14** All grease fittings shall be replaced, contractor supplied, and all grease ways shall be proven free.
- 3.1.15** Contractor shall rebuild windlass with new bearings, bushing, and oil seals, as required, contractor supplied. Once assembled, gearing backlash shall be measured and compared to previously taken readings.
- 3.1.16** All internals of windlass shall be wiped out with lint free rags, prior to windlass being closed up. Gearbox shall be filled with fresh oil, EP 220, owner supplied.
- 3.1.17** Contractor shall apply marine grade primer to all disturbed parts, as required during and after assembly.
- 3.1.18** Contractor is responsible to arrange TCMS for all inspections.
- 3.1.19** All work shall be completed to the satisfaction of the Chief Engineer and TCMS.

## **3.2 Location**

- 3.2.1** Anchor windlass in located on bow of the vessel, focsle deck.

## **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

- 4.2.1** Function testing of the anchor windlass shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer and Chief Officer.

### **4.3 Certification**

- 4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

Spec item #: H-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchor Windlass</b>		

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: H-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Emergency Generator Fuel Oil Tank 5 year Survey		

## Part 1: SCOPE:

**1.1** The intent of this specification shall be to open up, clean, inspect, and obtain 5 year TCMS certification of the Emergency Generator F/O Tank.

**1.2** This spec item to be carried out in conjunction with Bridge Deck Steel Renewal Spec Item.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

#### 2.1.1 As Fitted Drawings:

- Capacity Plan NMC560-7701
- Docking Plan NMC560-8001
- Hatches & Manholes 532-01

**2.1.2** Emergency Generator Fuel Oil Tank                      Frs. 49-51                      1.5 m<sup>3</sup>

### 2.2 Standards

**2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### 2.3 Regulations

**2.3.1** The testing and inspections of the tanks to be witnessed by the Chief Engineer and TCMS Inspector.

**2.3.2** The testing shall be in accordance to TCMS regulations.

### 2.4 Owner Furnished Equipment

**2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Spec item #: H-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Emergency Generator Fuel Oil Tank 5 year Survey		

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** The above listed tank shall be opened for cleaning, inspection, and 5 year survey by TCMS.
- 3.1.3** Ships' crew will pump out contents of emergency generator fuel oil tank. Contractor shall bid on removal of approx. 100 L of remaining fuel and dispose of in accordance with provincial regulations.
- 3.1.4** Contractor shall remove manhole cover to gain access to tank.
- 3.1.5** Prior to entry into the tank, tank shall be properly ventilated, to the exterior of the vessel, and certified "safe for entry" by a Marine Chemist. Copy of the certificate to be posted at the manhole and a copy to be given to the Chief Engineer.
- 3.1.6** Contractor shall rag out internals of the fuel oil tank.
- 3.1.7** The tank to be inspected by TCMS and Chief Engineer; contractor is responsible to arrange TCMS as required.
- 3.1.8** Tank manhole cover shall be reinstalled with new, contractor supplied, gasket. Any broken or damaged studs are to be replaced and anti-seize shall be used on all fastener threads. Contractor shall include in bid replacement of 2 studs per manhole and cost per unit of stud replacement, if extras are required to be adjusted up or down by PWGSC 1379 action.
- 3.1.9** Contractor shall conduct a pneumatic (air) or hydrostatic test on the tank, choice of contractor, test to be witnessed by TCMS and Chief Engineer. If using pneumatic test, contractor shall blank all pipe connections for air testing and ensure all blanks are removed after testing is complete. If using hydrostatic test contractor is responsible to dispose of water according to provincial regulations.
- 3.1.10** Contractor is responsible to arrange TCMS, as required, for all tank inspections and testing.
- 3.1.11** All work shall be completed to the satisfaction of the Chief Engineer.

### 3.2 Location

- 3.2.1** Tank located on bridge deck, port side, aft of bridge superstructure at frame locations indicated above.

### 3.3 Interferences

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

Spec item #: H-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Emergency Generator Fuel Oil Tank 5 year Survey		

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of TCMS and Chief Engineer.

### **4.2 Testing**

**4.2.1** Pneumatic (air) or hydrostatic testing of tank shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A



Spec item #: H-12	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Focsle Deck Plate Renewal</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to replace a section of deck plating on the focsle deck forward, port side between frames 67 & 68.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Drawing # 532-H-01, sheets 1 & 2, General Arrangement Bridge Deck, Focsle Deck, Main Deck, Lower Deck, Tank Top “As Fitted”.

### **2.2 Standards**

- 2.2.1** Contractor shall adhere to the vessels ISM hot-work procedures during removal and installation of this deck plate insert.

### **2.3 Regulations**

- 2.3.1** Welding shall be in accordance with the Canadian Coast Guard Welding Specifications for ferrous Materials, Rev. 4 (TP6151E).
- 2.3.2** Contractor performing the welding shall be certified by the Canadian Welding Bureau (CWB) at the time this work is performed.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor, and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.1.** Contractor shall ensure crane is locked out, hoses connected to deck penetrations in the affected area shall be removed and capped on both sides of the deck and clearly marked for reinstallation after all work is completed.

Spec item #: H-12	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Focsle Deck Plate Renewal</b>		

- 3.1.2.** Contractor shall remove all deckhead panels and insulation deemed necessary to properly access the underside of the deck for cutting, welding and allow for a proper fire watch to be carried out. The deck head panels are located in the forward end of the officers' mess and aft end of the ships' office.
- 3.1.3.** All furniture in the officers' mess and ships' office shall be protected against cutting and welding slag during the entire process.
- 3.1.4.** Contractor shall crop out a section of deck approximately 6" x 12" starting approx. 8" forward of the superstructure, area of plate is located inside the catch-all for the crane. Section of plate includes 4, 1/2" pipe penetrations that shall be renewed. Deck plating is 5/16" Grade "A" steel. Refer to picture at end of this spec for reference.  
  
(Item A ) Contractor shall include in quote cost per additional square foot replacement .( Remove ,supply and install )
- 3.1.5.** Contractor shall prepare the edges of both the existing deck and insert plate for welding. Welding shall be continuous and completed on both sides of the insert plate.
- 3.1.6.** After completion of all welds contractor shall arrange to have NDT (non destructive testing) completed on all welds and hose test on of the welded area. All testing shall be witnessed by TCMS and Chief Engineer.
- 3.1.7.** All bare and disturbed metal shall be given two coats of primer, contractor supplied.
- 3.1.8.** Contractor shall replace all deckhead panels, plus replace insulation that was previously removed from the officers' mess and ships' office with new.
- 3.1.9.** Contractor shall leave all affected areas in an "as found" condition.

## **3.2 Location**

- 3.2.1** Area of deck insert can be found on the focsle deck, port side between frames 67 &68, inside the deck crane catch-all.

## **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work to be carried out to the satisfaction of TCMS and Chief Engineer.

**4.1.2.** Contractor is responsible to arrange TCMS when required for inspection.

### **4.2 Testing**

**4.2.1** Contractor shall provide NDT to all completed welds and all welds shall be water tested with a fire hose to check for leaks.

### **4.3 Certification**

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the report of the work carried out.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Area of Foscle Deck Plate Renewal.



Spec item #:H-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bridge Deck Steel Renewal</b>		

## Part 1: SCOPE:

- 1.1** This document is intended to describe the technical scope of work associated with the crop and renewal of steel plate on the Bridge Deck on the CCGS Cape Roger.
- 1.2** The overall execution of this work involves various parties; thus this document outlines the delineation of responsibility, such that the installation Contractor may understand the broad objectives and be equipped with a baseline scope of work.
- 1.3** This specification shall be considered in conjunction with the associated drawings and reference documentation as listed in Section 3 of this document. The specification and drawings are intended to be complementary; should any technical or other requirement(s) relating to new and/or relocated equipment be indicated in either but not all of these documents, such requirement(s) shall be considered as part of the Contractor's scope of work.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

#### 2.1.1.

Name	Drawing/Doc. No.	
Eastern Technical Services Ltd - UT Measurement Report	15-671	Appendix A
Photographs	N/A	Appendix B
Poseidon Marine Consultants - Renewal Sketch	15-148-100	Appendix C

### 2.2 Standards

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### 2.3 Regulations

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing shall be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

Spec item #:H-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bridge Deck Steel Renewal</b>		

**2.3.4** The welding shall be in accordance with the Canadian Coast Guard Welding Specifications for ferrous Materials, Rev. 4 (TP6151E).

**2.3.5** The Contractor performing the welding shall be certified by the Canadian Welding Bureau (CWB) at the time this work is performed.

## **2.4 Owner Furnished Equipment**

**2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Contractor shall temporarily remove deck head of SNR Fisheries Officer's cabin and deck head of QM Station sufficient to allow access to complete steel renewal. Items to be temporarily removed/released include but are not limited to insulation, electrical, vents, equipment, furnishings, linings, etc. All items not being removed shall be adequately protected to prevent damage caused by hotwork.
- 3.1.3** Contractor shall drain, disconnect and temporarily remove fuel oil tank for emergency generator located on the bridge deck. Portion of the piping associated with the fuel oil tank shall be isolated, temporarily disconnected and removed as necessary to allow access to renewal area. Pipes shall be capped to prevent debris and contamination.
- 3.1.4** Grating and pipe supports currently fitted to the deck plate in way of renewal area shall be renewed.
- 3.1.5** Crop and renew area of Bridge deck plate (port side only) approximately between fr. 47-51 as detailed in Appendix C. Dimensions 48" long by 55" wide and 48" long by 27" wide. Total area, approx. 28ft<sup>2</sup> (5/16" plate). Once the area to be renewed is cropped out, the remaining deck edge shall be inspected by TCMS. Should the remaining edge not be of satisfactory thickness, the Contractor is to complete the renewal in accordance with Section A-A (Alternate Arrangement) as shown in Appendix C.

( Item A ) Contractor shall include in quote cost per additional square foot replacement (remove ,supply and install ).

- 3.1.6** Crop and renew portion of the longitudinal bulkhead in way of the SAR locker approximately frame 43-44 on the Bridge deck as detailed in the PMC sketch attached. Dimensions 26" long by 6" high. Total area, approx. 1ft<sup>2</sup> (5/16" plate).
- 3.1.7** Contractor shall crop and renew deck plate utilizing existing weld seams where practical.
- 3.1.8** Transport Canada Marine Safety are to be notified by the repairer at the following stages of repair:
  - When existing deck plating has been removed but prior to fit-up of new plate.
  - Upon completion of fit-up but prior to welding.
  - Upon completion of welding prior to painting.
- 3.1.9** Complete UT measurements on welds as required / requested by TCMS.
- 3.1.10** Upon completion of work, all new and disturbed steel and other surfaces shall be primed and painted in accordance with original paint scheme. All insulation, electrical, vents, equipment, furnishings, linings etc. shall be reinstated as original and any equipment reinstated shall be proven to the satisfaction of the Chief Engineer and CCG Inspectors.

### **3.2 Location**

- 3.2.1** Bridge deck aft of wheel house superstructure, port side of midship, location identified on attached drawings.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

- 4.2.1** Testing of the system shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

### **4.3 Certification**

- 4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

Spec item #:H-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bridge Deck Steel Renewal		

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1 Contractor to supply Chief Engineer with both a typed and electronic copy of all work associated with this spec. item and final report.

### **5.2 Spares**

### **5.3 Training**

### **5.4 Manuals**



## APPENDIX A UT Measurements

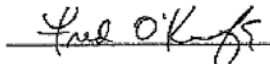
Visual Inspections  
Radiography & Ultrasonics  
Mag & Penetrant Inspections  
Eddy Current Testing  
Structural Steel & Torque

### Eastern Technical Services Ltd.

PO Box 13517, St. John's, NL., A1B 4B8  
709-726-4622 27 Austin St. FAX 726-4626

Technical Reports  
Engineering Studies  
Gas Free Testing  
Destructive Testing  
Insurance Reports

### Report

ETS No.: 15-671	Copy: Poseidon Marine Consultants - Mr. Deon Dyke ddyke@poseidonmarine.nf.ca
Date: 14 September 2015	Date Received: 14 September 2015
Client: Heddle Marine Service Inc., 30 Dundee Ave., Mount Pearl, NL., A1N 4R7	Inspected by: M. Tulk, B.Sc. Chem., ASNT TC-1A RT, UT,ET,MT,PT level II.
	Inspected by: A. Burgess, ASNT TC-1A UT,ET,PT,MT Level I.
Attn: Mr. Trevor Troke	Directed by: Fred O'Keefe, B.Sc., C.E.T. C.W.B. W178.2 Visual level III. CAN/CGSB 48.9712 & ASNT TC-1A RT (Gen. & A/S), UT,MT,PT,ET level III.
PO No. 20151766	Signed: 
Project: C.C.G.S Cape Roger - Deck Plating	
Testing Required: Ultrasonic Thickness Testing	N.D.E. Supervisor

#### Remarks

As requested, our technicians performed ultrasonic thickness measurements on the deck plating in way of the fuel oil day tank. All measurements have been reported in mm.s on the attached sketches.

#### Equipment Used.

Krautkramer DMS 2 digital thickness gauge (S/N 00MMRRF).  
Krautkramer TC560 probe (S/N 00M581).  
Various calibration blocks & 0.100 to 0.500 " steel step wedge.  
Ultragel couplant.

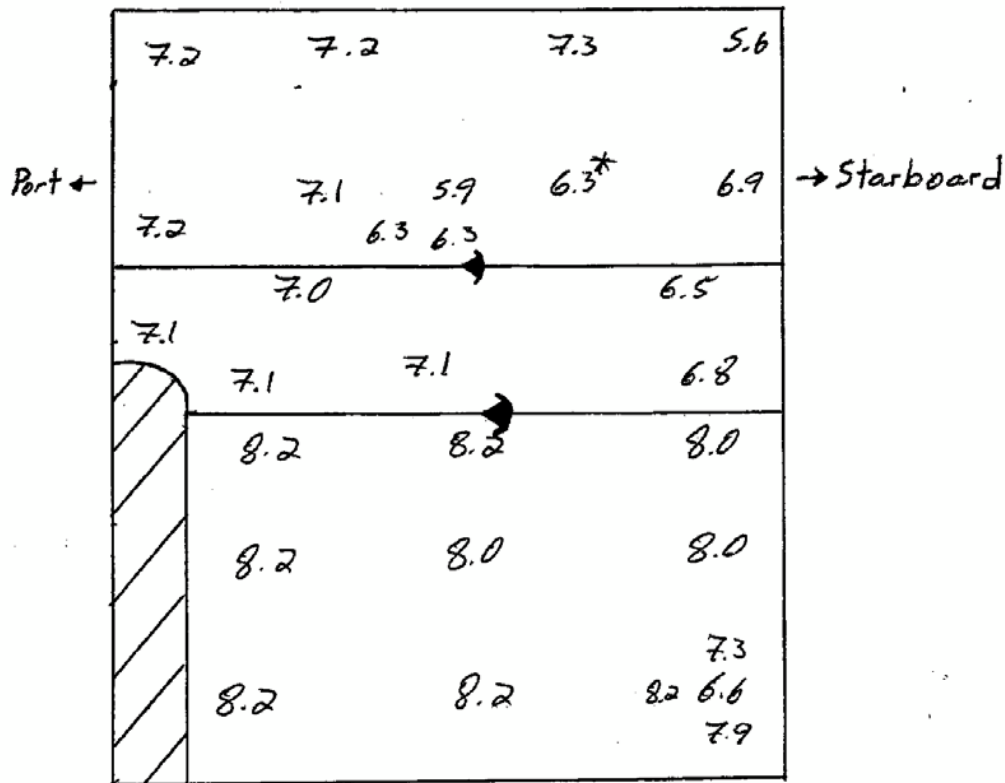
#### Deck Plate Thickness Readings Beneath F.O. Day Tank in mm's

7.1	7.3	7.2	7.2	7.3	7.2
5.5	5.7	6.8	6.2	7.1	6.3
6.7	5.4	4.8	5.6	6.0	6.3
5.9	6.0	5.9	5.9	5.9	5.7
5.3	7.3	6.8	6.4	6.9	6.0
5.1					

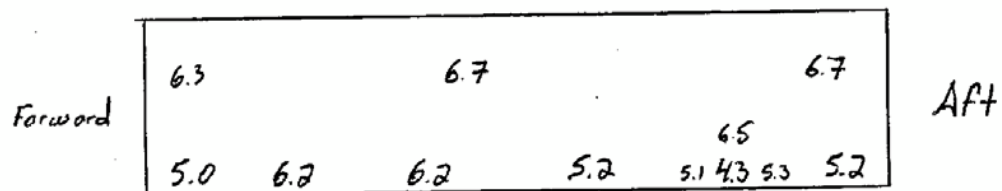
Port ←
→ Starboard

ETS No.: 15-671, Date: 14 September 2015.  
 Client: Heddle Marine Service Inc.,  
 Project: C.C.G.S Cape Roger - Deck Plating  
 Testing Required: Ultrasonic Thickness Testing

**Deck Plate Thickness Readings Aft of F.O. Day Tank in mm's**

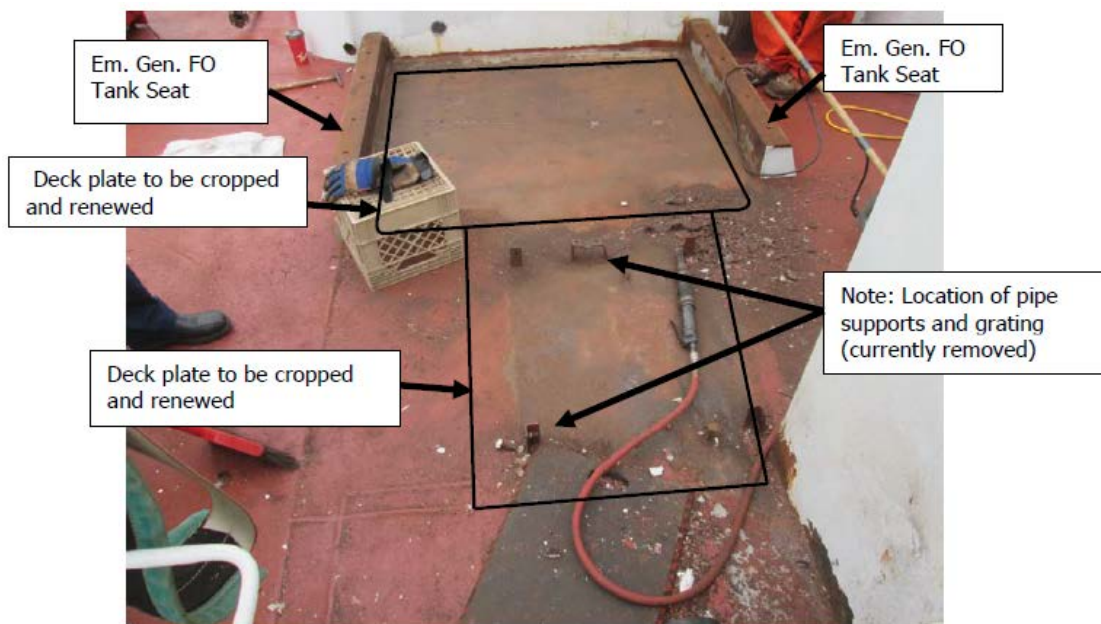


**Longitudinal Bulkhead Thickness Readings in mm's**



## APPENDIX B

### Photographs

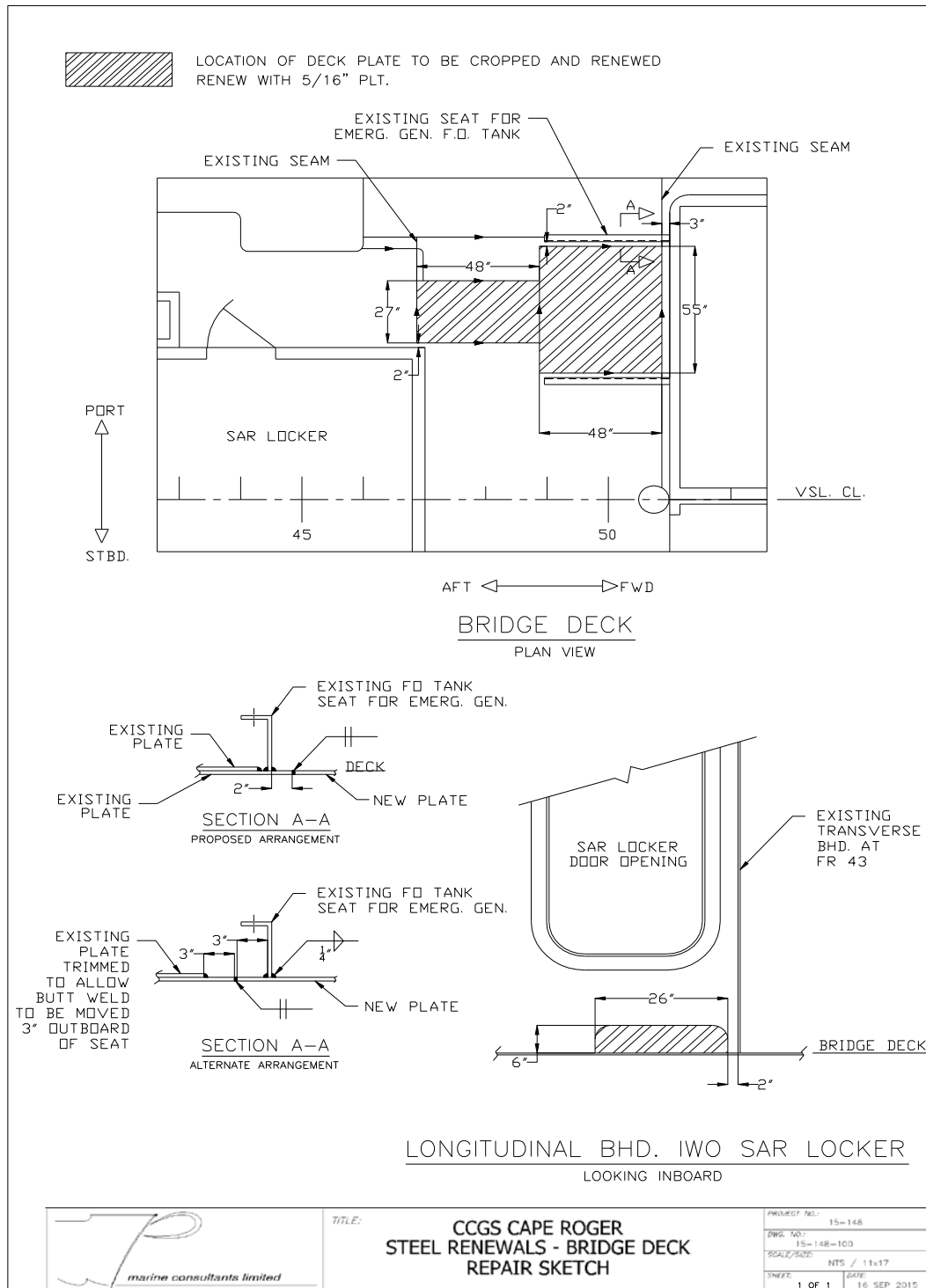


Photograph 1: Brigde deck looking forward.



Photograph 2: Longitudinal bulkhead for SAR Locker

## APPENDIX C Renewal Sketch



Spec item #: H-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>CO<sub>2</sub> Compartment &amp; Bosun's Locker Door Replacement</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to replace the exterior doors in both the CO<sub>2</sub> Compartment and Bosun's Locker with new 8 Dog Quick Acting Hand-wheel type doors.
- 1.2** Doors are owner supplied.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Joiner Systems Engineering Drawing 150517-001, which is attached.

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The welding shall be in accordance with the Canadian Coast Guard Welding Specifications for ferrous Materials, Rev. 4 (TP6151E).
- 2.3.3** The testing shall be in accordance to TCMS regulations and shall be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.4** The Contractor performing the welding shall be certified by the Canadian Welding Bureau (CWB) at the time this work is performed.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

Spec item #: H-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>CO<sub>2</sub> Compartment &amp; Bosun's Locker Door Replacement</b>		

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Ships' crew shall insure the smoke detector in each compartment is isolated prior to work commencing. Ships' crew shall also move any items from both compartments that may interfere with the removal of old doors and installation of new doors.
- 3.1.3** Contractor shall protect all remaining equipment in each compartment from welding, cutting and grinding debris.
- 3.1.4** Contractor shall remove any required insulation and paneling from the interior of the door frame and dispose of. Contractor shall install new insulation after spec item is complete, contractor supplied.
- 3.1.5** Contractor shall cut out existing door, complete with frame and dispose of.
- 3.1.6** Contractor shall install new door, ensuring bottom opening of door is a minimum of 24" above the deck, and installed according to manufactures recommended welding procedures to prevent distortion of the door frame.
- 3.1.7** After installation, the door must be proven operational and hose tested in the presence of both TCMS and chief engineer.
- 3.1.8** All bare and disturbed metal shall be given two coats of marine grade primer, contractor supplied.

## **3.2 Location**

- 3.2.1** Bosun's Locker and CO<sub>2</sub> Compartment are located on the main deck aft, port and stbd.

## **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

Spec item #: H-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>CO<sub>2</sub> Compartment &amp; Bosun's Locker Door Replacement</b>		

**4.2.1** Testing of the system shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.  
The contractor performing the welding shall be certified by the Canadian Welding Bureau (CWB) at the time this work is performed.

## **Part 5: DELIVERABLES:**

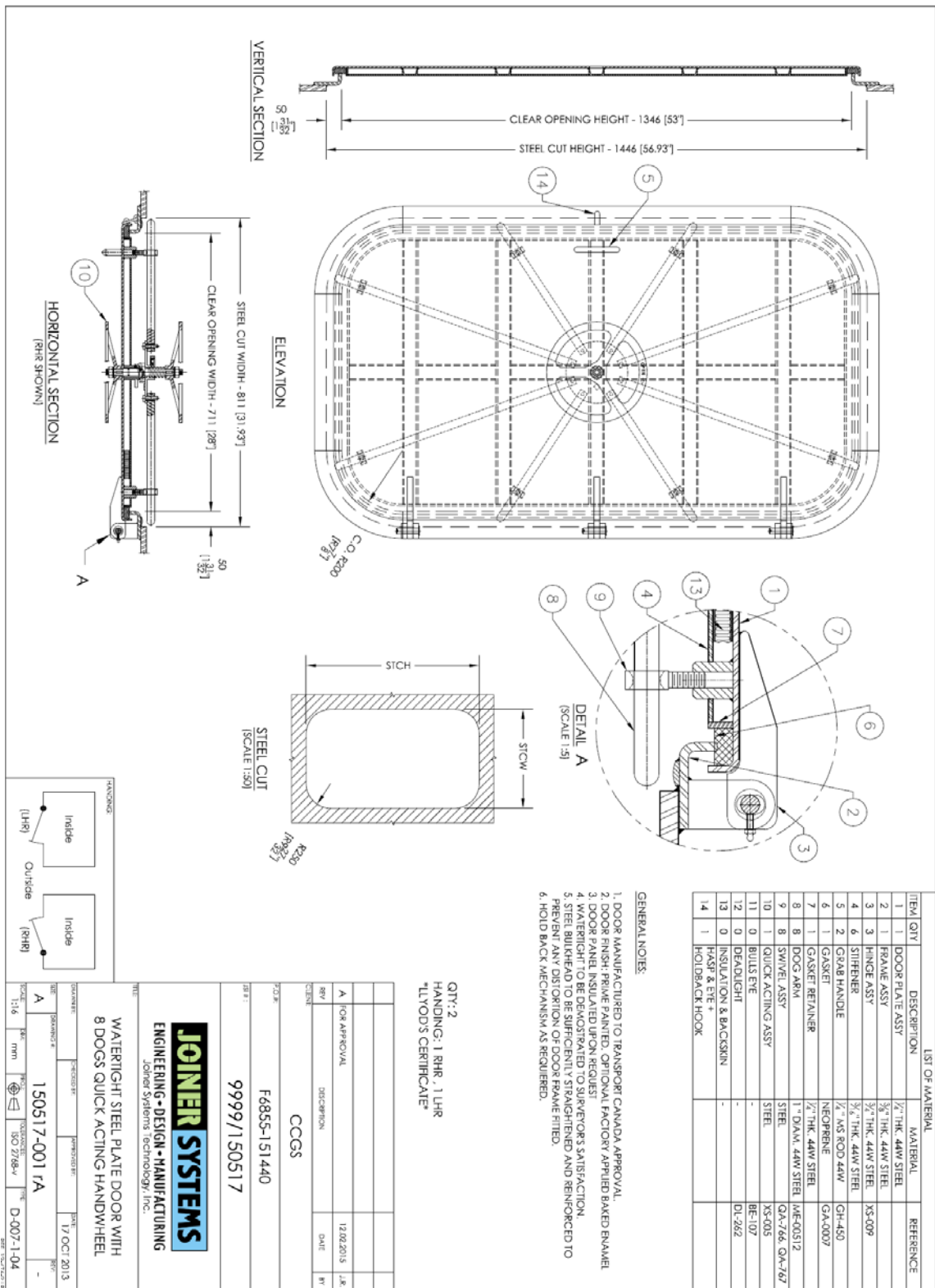
### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with a report of both a typed and electronic copy of all the work perform with this spec. item.

### **5.2 Spares N/A**

### **5.3 Training N/A**

### **5.4 Manuals N/A**





Spec item #: HD-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>DRYDOCKING</b>		

## **DRYDOCKING**

### **Part 1: SCOPE:**

- 1.1** The intent of this specification is for the vessel to be docked and undocked for the inspection and maintenance of the underwater section of the hull and associated equipment, with the necessary days required to carry out the specified work with reasonable time allowance to deal with any new work arising, as determined by PWGSC.
- 1.2** The contractor shall quote on the unit cost per additional lay day, and the unit cost per day for services.

### **Part 2: REFERENCES:**

- 2.1 Guidance Drawings/Nameplate Data** – Docking Plan – 000/03 (Ship's Office)
- 2.2 Standards**
- 2.2.1 The contractor shall use a certified docking master when docking and undocking the vessel. The contractor shall quote separately the cost to dock and undock the vessel.
- 2.3 Regulations**
- 2.3.1 CSA Marine Machinery Regulations
- 2.4 Owner Furnished Equipment**
- 2.4.1 The contractor shall supply all materials, equipment, labor & parts required to perform the specified work unless otherwise stated.

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 1.1** The contractor is responsible for the handling of all ship lines. Where tugs are required, the contractor shall provide them for docking and undocking.
- 1.2** The owner's representative shall supply a docking plan. This plan shall be returned to the owner's representative upon completion of work. (Minimum 1.2 m keel block height)
- 1.3** Hydrostatic testing of tanks while vessel is on dock shall be carried out uniformly so that excess local strain shall not ensue. Additional shoring for testing deep tanks shall be fitted when required.

Spec item #: HD-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>DRYDOCKING</b>		

- 1.4** A complete record shall be kept by the contractor of any weight movements, which take place during the dry-docking period. The inspection authority shall be informed of any adjustments of weights made by the contractor to the ship's docking condition.
- 1.5** All underwater valves shall be shut prior to undocking and checked for water-tightness during the undocking period by the contractor.
- 1.6** The dock shall be cleaned of all debris that will float and cause possible fouling or jamming of intake valves, transducers, shafting, etc. An examination for dock cleanliness shall be carried out prior to commencement of undocking by the contractor and to the satisfaction of the owner's representative.
- 1.7** Prior to flooding the dock the contractor shall re-check the security of keel/bilge blocks and docking plugs in the presence of the owner's representative. The condition of the vessel shall be the same at undocking as at the time of docking.
- 1.8** Crankshaft deflections for both Main Engines shall be taken and recorded prior to dry-docking the vessel and again within twenty-four hours after re-floating. Copies to be given to the Chief Engineer.
- 1.9** The contractor shall supply the services of a diver to confirm that the vessel is settling evenly on the bilge and keel blocks. Any keel or bilge blocks that are found to be in way of docking plugs, sea suction grids, transducers and dept sounder shall be moved at the contractor's expense.

### **3.2 Location**

**3.2.1.** N/A

### **3.3 Interferences**

- 3.3.1** The contractor shall be responsible for the identification of any /all interference items, their temporary removal, storage and refitting to the vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

### **4.2 Testing**

**4.2.1** N/A

Spec item #: HD-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>DRYDOCKING</b>		

### **4.3 Certification**

**4.3.1** This inspection is to be carried out in order to obtain TCMS credit.

4.3.2 The Contractor shall give the chief engineer a copy of the Docking Masters Certificate.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the overall report.

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: HD-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port & Stbd Fresh Water Tanks Survey		

## Part 1: SCOPE:

- 1.1** The intent of this specification shall be to open both port and stbd fresh water tanks for cleaning, inspection (5 year survey) and coating repairs. Both tanks shall be inspected by TCMS and Chief Engineer.
- 1.2** **NOTE:** The Contractor shall start / finish this item of work as quickly as possible so as to allow adequate curing time of any tank coating.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Capacity Plan 000/011  
**2.1.2** Capacity 22 m<sup>3</sup> each

### 2.2 Standards

- 2.2.1** Fleet Safety Manual 7.A.12 Potable Water Quality

### 2.3 Regulations

- 2.3.1** This ship is regulated by Transport Canada and all work performed shall be approved by TC and subjected to the inspection of the attending Marine Surveyor, Chief Engineer and NACE.

### 2.4 Owner Furnished Equipment

- 2.4.1** Contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

- 3.1.1.** Contractor shall open both port and stbd tank for inspection, TCMS certification, cleaning and coating touch up. Owner will provide the services of a NACE inspector to witness all coating applications.
- 3.1.2.** These tanks are used for the ship's drinking water, so proper protection must be worn by workers inside at all times to reduce the contamination and dirt accumulation from performing the work.

Spec item #: HD-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port & Stbd Fresh Water Tanks Survey		

- 3.1.3. The contractor shall sound and record the amount of water in each tank before starting work. Contractor shall pump out contents of both tanks and dispose of according to provincial regulations. Contractor shall quote on 5 cubic meters of water including any ice that may have formed at that time and also provide unit cost quote per litre for any additional to be adjusted up or down by PWGSC 1379 action.
- 3.1.4. Contractor shall remove manhole covers, remove any remaining water and dispose of according to provincial regulations.
- 3.1.5. Contractor shall quote on the removal and re-installation of the docking plugs for each tank, if removed they shall be given to the Chief Engineer for safe keeping until they are required to be re-installed.
- 3.1.6. Prior to entry into the tanks, the tanks shall be certificated "Safe for Entry" by a marine chemist and a copy of the certificate to be given to the Chief Engineer or his delegate and original posted at the tank entry.
- 3.1.7. Contractor shall provide each tank with a mechanical ventilation system to the exterior of the vessel. Blowers/extractors must ensure good air movement and good solvent vapor removal from the lowest point of the tanks, especially during the epoxy coating application and drying process.
- 3.1.8. Contractor shall hydro blast both tanks and chemically clean with a chemical approved by Provincial Health Services for its intended application. Proof of such approval shall be given to the Chief Engineer before any work commences.
- 3.1.9. Contractor shall quote on repairing 15 m<sup>2</sup> of tank coating and provide unit cost per m<sup>2</sup>, difference to be adjusted up or down with 1379 action.
- 3.1.10. The contractor shall quote on the cost to power tool / clean / re-apply coating.
- 3.1.11. Before coating begins Chief Engineer and NACE Inspector will inspect tanks to agree upon the total area in m<sup>2</sup> to be coated. After coatings are completed, affected areas will be inspected by Chief Engineer and NACE Inspector.
- 3.1.12. Contractor shall supply / use **Interline 925** epoxy coating applied at 5-6 mils per coat, two coats required, to repair any damaged sections of coating. Manufacturers procedures shall be strictly adhered to for application and drying time of this product.
- 3.1.13. The contractor shall keep the metal at least 16 degrees C. The ambient temperature during the curing period shall be maintained above 16 degrees C and the maximum relative humidity shall not be more than 60% as recommended by the manufacturer. **There will be absolutely no paint thinners used when mixing the coating for the freshwater tanks.** If needed the contractor shall construct an enclosure around the area of the exterior hull that bounds the fresh water tanks. The enclosure shall be fitted in a manner that ensures the environmental conditions are met (temperature and humidity) for coating application and curing.
- 3.1.14. The contractor shall supply sufficient personnel to maintain the equipment and correct environmental conditions until the coating has fully cured.

Spec item #: HD-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port & Stbd Fresh Water Tanks Survey		

- 3.1.15.** Contractor shall prove sounding pipes, vent pipes and suction pipes free and clear prior to tanks being closed up. Contractor shall check pipe connections on remote sounding bell housings to ensure they are tight. The tanks vent heads shall be removed, dismantled, cleaned and re-assembled to prove clear.
- 3.1.16.** Prior to tanks being closed up tanks shall be wiped clean including any foot prints, and all debris removed. Tank manhole covers shall be reinstalled with new, contractor supplied, o-rings. Any broken or damaged studs are to be replaced and anti-seize shall be used on all fastener threads. Contractor shall include in bid replacement of 2 studs per manhole and cost per unit stud replacement, if extras are required to be adjusted by PWGSC 1379 action.
- 3.1.17.** Contractor shall supply / fill both the Port & Stbd Fresh Water Tanks with fresh water and Super-Chlorinate the tanks as per section 7.A.12 of the Fleet Safety Manual. All taps throughout the vessel shall be opened to ensure the chlorine reaches associated piping. Super-chlorinated water shall be allowed to sit in the system for a minimum of 4 hours.
- 3.1.18.** Contractor to arrange TCMS to witness hydro test on each tank in order to obtain 5 year certification of the tanks.
- 3.1.19.** Contractor shall supply / neutralize / dispose of the Super-chlorinated water from both tanks as per provincial regulations with hydrogen peroxide.
- 3.1.20.** Contractor shall fill and flush each tank 2 times after super-chlorination water has been neutralized and removed and then fill the tanks a final time. Contractor shall collect a sample of the water at the furthest run from the tank and have it sent out to an independent certified laboratory for analysis. The laboratory results are to be given to the Chief Engineer when completed.
- 3.1.21.** All work shall be completed to the satisfaction of the Chief Engineer or his delegate.

## **3.2 Location**

- 3.2.1.** Tanks are located in the sewage compartment on port and stbd side of vessel between frames 52-56.

## **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

Spec item #: HD-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Port & Stbd Fresh Water Tanks Survey		

**4.1.2.** All work shall be completed to the satisfaction of the Chief Engineer and TCMS Inspector.

## **4.2 Testing**

**4.2.1** After completion of work, a sample of fresh water shall be taken from the furthest point from the tank and sent to an independent certified laboratory for testing, the testing parameters shall follow those set out in the Fleet Safety Manual, Section 7.A.12, Potable Water Quality. The laboratory results are to be given to the Chief Engineer.

## **4.3 Certification**

# **Part 5: DELIVERABLES:**

## **5.1 Drawings/Reports**

**5.1.1** The laboratory results from the testing of the water and an electronic copy of a final report indicating all work performed on the tanks are to be given to the Chief Engineer.

## **5.2 Spares** N/A

## **5.3 Training** N/A

## **5.4 Manuals** N/A

Spec item #: HD-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Water Ballast Tanks 5 year Survey		

## Part 1: SCOPE:

- 1.1** The intent of this specification shall be to open up, clean, inspect, touch up coatings and obtain 5 year TCMS certification of all water ballast tanks, there are 7 tanks in total.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

#### 2.1.1 As Fitted Drawings:

- Capacity Plan NMC560-7701
- Docking Plan NMC560-8001
- Hatches & Manholes 532-01

<b>2.1.2</b>	Fore Peak Tank	Frs. 89-98	23.86 m <sup>3</sup>
	Trim Tank	Frs. 81-89	19.86 m <sup>3</sup>
	#1 D.B. Tank Port	Frs. 67-76	5.91 m <sup>3</sup>
	#1 D.B. Tank Stbd	Frs. 67-76	5.91 m <sup>3</sup>
	#3 D.B. Tank Port	Frs. 50-57	Void
	#3 D.B. Tank Stbd	Frs. 50-57	Void
	Aft Peak Tank	Frs. 4-11	37.62 m <sup>3</sup>

### 2.2 Standards

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### 2.3 Regulations

- 2.3.1** The testing and inspections of the tanks to be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.2** The testing shall be in accordance to TCMS regulations.

### 2.4 Owner Furnished Equipment

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.



Spec item #: HD-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Water Ballast Tanks 5 year Survey		

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** The above listed ballast tanks shall be opened for cleaning, inspection, coating repair and 5 year survey by TCMS. Owner will provide the services of a NACE inspector to witness all coating applications.
- 3.1.3** All tanks shall be pumped to their lowest level by the ships' crew, resulting in approx. 1m<sup>3</sup> of water remaining in each tank and provide unit cost per litre for removal of additional amounts to be adjusted up or down by PWGSC 1379 action; contractor to dispose of the remaining water in accordance with provincial regulations.
- 3.1.4** Contractor shall remove all necessary manhole covers to gain access to tanks and docking plugs as required; docking plugs to be given to the Chief Engineer for safe keeping and returned as required.
- 3.1.5** Prior to entry into the tanks, tanks shall be properly ventilated and certified "safe for entry" by a Marine Chemist. Copy of the certificate to be posted at the manhole and a copy to be given to the Chief Engineer.
- 3.1.6** Contractor shall hydro blast tank internal surfaces to a minimum SSPC-SP2, but preferably SSPC-SPC12, if possible. Contractor is responsible for removal and disposal of debris from the tank.
- 3.1.7** Prior to any coating being applied, tank shall be inspected by NACE Inspector, Chief Engineer and TCMS. Chief Engineer and NACE Inspector shall determine the total area to be repaired in each tank prior to repairs commencing.
- 3.1.8** Contractor shall bid on coating repairs as follows: 100m<sup>2</sup> for Fore Peak Tank, 50m<sup>2</sup> for Trim Tank, 25m<sup>2</sup>/tank for each #1 D.B. tank, 25m<sup>2</sup>/tank for each #3 D.B. tank and 150m<sup>2</sup> for Aft Peak tank. Quote to also include cost per m<sup>2</sup> coating repair for additional area, if required. This shall be adjusted up or down by PWGSC 1379 action.
- 3.1.9** Contractor shall use Ameron Amercoat 235, contractor supplied, or other compatible / comparable corrosion prevention coating to coat the tanks. Contractor shall follow procedures recommended by the manufacture and NACE Inspector for application of this product to the tank internals.
- 3.1.10** Coating shall be applied to a wet film thickness of 5-6mil, or dry film thickness of 4mil. Tank coating shall be allowed to cure as per manufactures and/or NACE Inspectors recommendations.

Spec item #: HD-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Water Ballast Tanks 5 year Survey</b>		

- 3.1.11** Once cured the tank manhole covers shall be reinstalled with new, contractor supplied, o-rings. Any broken or damaged studs are to be replaced and anti-seize shall be used on all fastener threads. Contractor shall include in bid replacement of 2 studs per manhole and cost per unit stud replacement, if extras are required to be adjusted by PWGSC 1379 action. Docking plugs to be retrieved from Chief Engineer and reinstalled.
- 3.1.12** Contractor shall prove sounding pipes, vent pipes and suction pipes free and clear prior to tanks being closed up. Contractor shall check pipe connections on remote sounding bell housings to ensure they are tight.
- 3.1.13** The tanks vent heads shall be removed, dismantled, cleaned and re-assembled to prove clear.
- 3.1.14** Prior to closing, all tanks shall be inspected by Chief Engineer and NACE inspector.
- 3.1.15** Contractor shall conduct a hydrostatic test on each tank, test to be witnessed by TCMS and Chief Engineer. Contractor shall be responsible for the proper disposal of this water.
- 3.1.16** Contractor is responsible to arrange TCMS, as required, for all tank inspections.
- 3.1.17** All work shall be completed to the satisfaction of the Chief Engineer & TC Inspector.

### **3.2 Location**

- 3.2.1** Tanks located throughout the vessel at frame locations indicated above.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS, Chief Engineer and NACE Inspector.

### **4.2 Testing**

- 4.2.1** Hydrostatic Testing of tanks shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

Spec item #: HD-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Water Ballast Tanks 5 year Survey		

### **4.3 Certification**

- 4.3.1** The contractor performing this recertification shall be certified to do so by TCMS.  
This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Spec item #: HD-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Fuel Oil Tanks 5 Year Survey		

## Part 1: SCOPE:

- 1.1** The intent of this specification shall be to open up, clean, inspect, and obtain 5 year TCMS certification of all fuel oil tanks, 14 tanks in total.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

#### 2.1.1 As Fitted Drawings:

- Capacity Plan NMC560-7701
- Docking Plan NMC560-8001
- Hatches & Manholes 532-01

<b>2.1.2</b>	#2 D.B. FO Tank Port	Frs. 57-67	11.57 m <sup>3</sup>
	#2 D.B. FO Tank Stbd	Frs. 57-67	10.77 m <sup>3</sup>
	#4 D.B. FO Tank Port	Frs. 39-50	21.58 m <sup>3</sup>
	#4 D.B. FO Tank Stbd	Frs. 39-50	21.58 m <sup>3</sup>
	FO Port Settling Tank	Frs. 39-50	21.54 m <sup>3</sup>
	FO Stbd Settling Tank	Frs. 39-50	21.54 m <sup>3</sup>
	FO Port Deep Tank	Frs. 39-50	32.58 m <sup>3</sup>
	FO Stbd Deep Tank	Frs. 39-50	32.58 m <sup>3</sup>
	FO Port Dump Tank	Frs. 39-50	27.98 m <sup>3</sup>
	FO Stbd Dump Tank	Frs. 39-50	27.98 m <sup>3</sup>
	FO Stability Tank	Frs. 39-50	107.17 m <sup>3</sup>
	FO Day Tank	Frs. 39-43	28.85 m <sup>3</sup>
	FO Port Wing Tank	Frs. 11-21	52.24 m <sup>3</sup>
	FO Stbd Wing Tank	Frs. 11-21	52.24 m <sup>3</sup>

### 2.2 Standards

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### 2.3 Regulations

- 2.3.1** The testing and inspections of the tanks to be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.2** The testing shall be in accordance to TCMS regulations.

## **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** The above listed fuel oil tanks shall be opened for cleaning, inspection, and 5 year survey by TCMS.
- 3.1.3** All tanks shall be pumped to their lowest level by the ships' crew, resulting in approx. 1m<sup>3</sup> of fuel oil remaining in each tank, contractor to dispose of the remaining fuel oil in accordance with provincial regulations. Contractor to provide unit cost per liter for removal of additional amounts to be adjusted up or down by PWGSC 1379 action.
- 3.1.4** Contractor shall remove all necessary manhole covers to gain access to tanks.
- 3.1.5** Prior to entry into the tanks, tanks shall be properly ventilated, to the exterior of the vessel, and certified "safe for entry" by a Marine Chemist. Copy of the certificate to be posted at the manhole and a copy to be given to the Chief Engineer.
- 3.1.6** Contractor shall rag out internals of all fuel oil tanks.
- 3.1.7** All tanks shall be inspected by TCMS and Chief Engineer.
- 3.1.8** Tank manhole covers shall be reinstalled with new, contractor supplied, o-rings. Any broken or damaged studs are to be replaced and anti-seize shall be used on all fastener threads. Contractor shall include in bid replacement of 2 studs per manhole and cost per unit of stud replacement, if extras are required to be adjusted up or down by PWGSC 1379 action.
- 3.1.9** Contractor shall conduct a pneumatic (air) test on each tank, test to be witnessed by TCMS and Chief Engineer. Contractor shall blank all pipe and internal fitting connections for air testing and ensure all blanks are removed after testing is complete.
- 3.1.10** Contractor is responsible to arrange TCMS, as required, for all tank inspections and testing.
- 3.1.11** All work shall be completed to the satisfaction of the Chief Engineer & TC Inspector.

**3.1.12** Contractor shall prove sounding pipes, vent pipes and suction pipes free and clear prior to tanks being closed up. Contractor shall check pipe connections on remote sounding bell housings to ensure they are tight.

**3.1.13** The tanks vent heads shall be removed, dismantled, cleaned and re-assembled to prove clear.

## **3.2 Location**

**3.2.1** Tanks located throughout the vessel at frame locations indicated above.

## **3.3 Interferences**

**3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

**3.3.2** Ships' crew will transfer any remaining fuel onboard the vessel to allow access to specific tanks as required.

# **Part 4: PROOF OF PERFORMANCE:**

## **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of TCMS and Chief Engineer.

## **4.2 Testing**

**4.2.1** Pneumatic (air) testing of tanks shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

## **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

# **Part 5: DELIVERABLES:**

## **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

## **5.2 Spares N/A**

Spec item #: HD-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Spill, Dirty & Sludge Oil Tanks 5 year Survey		

## Part 1: SCOPE:

- 1.1** The intent of this specification shall be to open up, clean, inspect, and obtain 5 year TCMS certification of Spill, Sludge and Dirty oil tanks, 3 tanks in total.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

#### 2.1.1. As Fitted Drawings:

- Capacity Plan NMC560-7701
- Docking Plan NMC560-8001
- Hatches & Manholes 532-01

#### 2.1.2

Spill Oil Tank	Frs. 31-33	1.736 m <sup>3</sup>
Dirty Oil Tank	Frs. 29-31	1.736 m <sup>3</sup>
Sludge Oil Tank	Frs. 26-28	1.736 m <sup>3</sup>

### 2.2 Standards

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### 2.3 Regulations

- 2.3.1** The testing and inspections of the tanks to be witnessed by the Chief Engineer and TCMS Inspector.

- 2.3.2** The testing shall be in accordance to TCMS regulations.

### 2.4 Owner Furnished Equipment

- 2.4.1** The contractor shall supply all materials, equipment, and labor parts required to perform the specified work unless otherwise stated.

Spec item #: HD-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Spill, Dirty & Sludge Oil Tanks 5 year Survey		

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** The above listed tanks shall be opened for cleaning, inspection, and 5 year survey by TCMS.
- 3.1.3** Contractor shall remove contents of all 3 tanks and dispose of in accordance with provincial regulations. Contractor shall bid on removal of 5 m<sup>3</sup> of oily water mixture and provide unit cost per litre for removal of additional amounts to be adjusted up or down by PWGSC 1379 action.
- 3.1.4** Contractor shall remove all necessary manhole covers to gain access to tanks.
- 3.1.5** Prior to entry into the tanks, tanks shall be properly ventilated, to the exterior of the vessel, and certified "safe for entry" by a Marine Chemist. Copy of the certificate to be posted at the manhole and a copy to be given to the Chief Engineer.
- 3.1.6** Contractor shall rag out internals of all oil tanks.
- 3.1.7** All tanks shall be inspected by TCMS and Chief Engineer; contractor is responsible to arrange TCMS as required.
- 3.1.8** Tank manhole covers shall be reinstalled with new, contractor supplied, o-rings. Any broken or damaged studs are to be replaced and anti-seize shall be used on all fastener threads. Contractor shall include in bid replacement of 2 studs per manhole and cost per unit of stud replacement, if extras are required to be adjusted up or down by PWGSC 1379 action.
- 3.1.9** Contractor shall conduct a pneumatic (air) or hydrostatic test on each tank, choice of contractor, test to be witnessed by TCMS and Chief Engineer. If using pneumatic test, contractor shall blank all pipe / fitting connections for air testing and ensure all blanks are removed after testing is complete. If using hydrostatic test contractor is responsible to dispose of water according to provincial regulations.
- 3.1.10** Contractor is responsible to arrange TCMS, as required, for all tank inspections and testing.
- 3.1.11** All work shall be completed to the satisfaction of the Chief Engineer & TC Inspector.

### 3.2 Location

- 3.2.1** Tanks located in the engine room bilge between the port and stbd main engines at frame locations indicated above.



Spec item #: HD-5	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Spill, Dirty & Sludge Oil Tanks 5 year Survey		

### 3.3 Interferences

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## Part 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and Chief Engineer.

### 4.2 Testing

- 4.2.1** Pneumatic (air) or hydrostatic testing of tanks shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

### 4.3 Certification

- 4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

## Part 5: DELIVERABLES:

### 5.1 Drawings/Reports

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

### 5.2 Spares N/A

### 5.3 Training N/A

### 5.4 Manuals N/A

Spec item #: HD-6	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchors, Chains &amp; Chain Lockers</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to prepare the Port and Stbd anchors, chains and chain lockers for 5 year TCMS survey.
- 1.2** This work shall include cleaning, de-scaling, painting and inspection of anchors, chains and chain lockers.
- 1.3** This spec item to be carried out in conjunction with spec item anchor windlass 5 year survey.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Drawing #511/01A, Anchor Arrangements.
- 2.1.2** Chains are 193.5 m in length, 33 mm diameter, Grade UA2 and weigh 3900 kg.
- 2.1.3** Anchors weigh 1165 kg each.
- 2.1.4** Manhole covers, bitter end releases and chain locker drains are all located on the forward bulkhead of the bow thruster compartment.
- 2.1.5** Area of both lockers = 56 m<sup>2</sup>.

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment and the automatic functions must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Spec item #: HD-6	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchors, Chains &amp; Chain Lockers</b>		

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** With supervision from the Chief Officer the contractor shall remove the vessels anchors and chains and flake out on the dock for cleaning and inspection.
- 3.1.3** Contractor shall disconnect the “Bitter End” of the chain in the chain locker and at the anchor end, once flaked out on the dock.
- 3.1.4** Anchors and chains to be descaled, after which they shall be inspected by TCMS, Chief Engineer and Chief Officer. There shall be 20 measurements taken on each chain, Chief Officer to determine the location of the measurements. Any defects shall be dealt with by 1379 action.
- 3.1.5** Contractor shall change anchor chains end-for-end. Every shot (27.5 m) shall be marked with stainless steel wire and white paint. Chief Officer to be involved with marking of chain and to be completed to his satisfaction.
- 3.1.6** Contractor shall paint both anchors with one coat of marine primer and one coat of International black paint, both to be contractor supplied.
- 3.1.7** Prior to entry into the chain lockers, they shall be properly ventilated and certified “safe for entry” by a Marine Chemist. Copy of the certificate to be posted at the manhole and a copy to be given to the Chief Engineer.
- 3.1.8** Contractor shall open both port and stbd chain lockers for cleaning and inspection by TCMS, Chief Engineer and Chief Officer. False bottoms to be removed and both the false bottoms and chain lockers shall be descaled. Contractor is responsible to remove all debris from chain lockers and dispose of as per provincial regulations.
- 3.1.9** Contractor shall provide means for TCMS and Chief Engineer to inspect both the spurling and hawse pipes, i.e. scaffolding/ladder in the chain locker and man lift on the dock. Any defects found will be dealt with by PWGSC 1379 action.
- 3.1.10** Contractor shall remove both 1” drain bushings from the exterior of the chain lockers (found in bow thruster compartment), weld on 2 new 1” bushings, install 2 nipples and 2 stainless steel locking ball valves, all components to be contractor supplied.
- 3.1.11** Contractor shall apply one coat of International marine primer, at 3.5 mil DFT, to the interior of both chain lockers, this includes the false bottoms. Contractor shall bid on Area of both Lockers = 56 m<sup>2</sup> and bid per unit m<sup>2</sup> to be adjusted up or down by PWGSC 1379 action.
- 3.1.12** Contractor shall prove bilge lines from both port and stbd chain lockers free and clear.

Spec item #: HD-6	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Anchors, Chains &amp; Chain Lockers</b>		

**3.1.13** Contractor shall reinstall false bottoms in the chain lockers; connect the chains to the bitter ends and to the anchors (pin on shackle to be secured with lead). Chief Officer to provide assistance with retrieval of the anchors, via the windlass, and to ensure anchor chains are properly stowed in the chain lockers.

**3.1.14** Contractor is responsible to arrange TCMS for all inspections.

**3.1.15** All work shall be completed to the satisfaction of the Chief Engineer and TCMS.

### **3.2 Location**

**3.2.1** Chain lockers are located between frames 85-89, manhole covers located at forward end of bow thruster compartment.

### **3.3 Interferences**

**3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

**4.2.1** Testing of the system shall be to the satisfaction of and witnessed by TCMS and the Chief Engineer.

### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection report.

### **5.2 Spares N/A**

### **5.3 Training N/A**

Spec item #: HD-7	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Above W/L Hull Painting		

## **Part 1: SCOPE:**

**1.1** The intent of this specification is to affect repairs to the hull coating, touch up and coat the entire above water line hull and to paint all lettering and/or symbols.

**1.2** This work shall be carried out in conjunction with the Underwater Hull Painting.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

**2.1.1** Total above water line hull area is approximately 800 m<sup>2</sup>

### **2.2 Standards**

### **2.3 Regulations**

**2.3.1** Meet the satisfaction of an NACE Inspector.

### **2.4 Owner Furnished Equipment**

**2.4.1** It is noted that Canadian Coast Guard will provide the services of an independent NACE Inspector.

**2.4.2** The contractor shall supply all: materials, equipment, labor, including staging, rigging, scaffolding, enclosures, heating, painting equipment and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

**3.1.1** Contractor and Chief Engineer shall inspect the hull and agree upon a total square meter of hull to be grit blasted. Contractor to supply the required scaffolding and/or man lift to carry out the required inspection.

**3.1.2** Contractor shall grit blast all damaged areas of the hull coating to SA 21/2 on 100m<sup>2</sup>, edges feathered to provide a suitable surface for the new coating to adhere. Entire above waterline hull area, 100% to be sweep blast to SSPC-SP7.

Spec item #: HD-7	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Above W/L Hull Painting		

- 3.1.3** Contractor shall provide unit cost for grit blasting per square meter.
- 3.1.4** The waterline is clearly marked on the ship's hull and drawings, any clarification required shall be directed to the Chief Officer.
- 3.1.5** Prior to any grit blasting taking place contractor shall ensure all appropriate areas of the vessel are covered to prevent the ingress of grit. These areas include, but are not limited to, i) all exhaust outlets on top of the stack, ii) all tank vents, iii) all air intake and exhaust plenums, iv) all scupper pipes, v) all overboard discharges, vi) all sea bays and chest, vii) stern tube, viii) rudder stock gland, ix) zinc anodes and x) transducers.
- 3.1.6** All deck machinery including fall wires are to be protected, and any window/portholes that may be affected.
- 3.1.7** All sea bay grids shall be protected from both the grit blasting and hull coating and orifices shall be measured prior to and after completion of work to ensure their diameter hasn't been affected.
- 3.1.8** Contractor shall remove all grit from the hull prior to any painting application.
- 3.1.9** All blasted areas shall be painted and allowed to cure, inspected and passed by attending NACE Inspector prior to entire above waterline hull being painted.
- 3.1.10** Contractor shall provide unit cost for painting repair per square meter.
- 3.1.11** Paint to be applied according to the manufactures recommendation and to the satisfaction of the NACE Inspector.
- 3.1.12** Painting sequence shall be as follows: On bare metal there shall be 2 coats of primer followed by 2 coats of Coast Guard Red (Laurentide Red 000-722-M19) on the hull, or Coast Guard White (Laurentide White 700) on the stripes and lettering. Red primer to be used for red paint and white primer to be used on white paint, where required. Each coat of primer and paint shall be applied to 3 mil DFT.
- 3.1.13** All paint and primer shall be contractor supplied.

## **3.2 Location**

- 3.2.1** Hull from waterline to the upper bulwarks.

## **3.3 Interferences**

- 3.3.1** Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

Spec item #: HD-7	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Above W/L Hull Painting		

**4.1.1.** All work shall be carried out to the satisfaction of both the Chief Engineer and the attending NACE Inspector.

#### **4.2 Testing**

**4.2.1** The NACE Inspector shall be required to inspect the preparation and application of all hull coatings.

#### **4.3 Certification**

**4.3.1** Copy of the manufactures MSDS for the coating being applied shall be supplied to the Chief Engineer.

### **Part 5: DELIVERABLES:**

#### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of all items carried out in the specification.

#### **5.2 Spares** N/A

#### **5.3 Training** N/A

#### **5.4 Manuals** N/A

Spec item #: HD-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Underwater Hull Painting</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this spec is to affect repairs to the hull coating, touch up and coat the entire underwater hull and to paint draft marks and plimsoll marks.
- 1.2** This work shall be carried out in Conjunction with Above W/L Hull Painting.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Total underwater hull area is approximately 800 m<sup>2</sup>.

### **2.2 Standards**

### **2.3 Regulations**

- 2.3.1** Meet the satisfaction of an NACE Inspector.

### **2.4 Owner Furnished Equipment**

- 2.4.1** It is noted that Canadian Coast Guard will provide the services of an independent NACE Inspector.
- 2.4.2** The contractor shall supply all: materials, equipment, labor, including staging, rigging, scaffolding, enclosures, heating, painting equipment and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off
- 3.1.2** Contractor shall hydro blast the ships' hull within 2 hours of dry docking with a minimum of 6000 psi to remove all marine growth. Upon completion of hydro blasting the contractor and Chief Engineer shall inspect the hull and agree upon a total square meter of hull to be grit blasted. Contractor to supply the required scaffolding and/or man lift to carry out the required inspection.



Spec item #: HD-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Underwater Hull Painting</b>		

- 3.1.3** Prior to any grit blasting taking place contractor shall ensure all appropriate areas of the vessel are covered to prevent the ingress of grit. These areas include, but are not limited to, i) all exhaust outlets on top of the stack, ii) all tank vents, iii) all air intake and exhaust plenums, iv) all scupper pipes, v) all overboard discharges, vi) all sea bays and chest, vii) stern tube, viii) rudder stock gland, ix) zinc anodes and x) transducers.
- 3.1.4** All deck machinery including fall wires are to be protected, and any window/portholes that may be affected.
- 3.1.5** All sea bay grids shall be protected from both the grit blasting and hull coating and orifices shall be measured prior to and after completion of work to ensure their diameter hasn't been affected.
- 3.1.6** Contractor shall grit blast all damaged areas of the hull coating to SA 21/2 on 100m<sup>2</sup>, edges feathered to provide a suitable surface for the new coating to adhere. Entire underwater hull area, 100% to be sweep blast to SSPC-SP7.
- 3.1.7** Contractor shall provide unit cost for grit blasting per square meter.
- 3.1.8** Contractor shall remove all grit from the hull prior to any painting application.
- 3.1.9** All zinc anodes shall be removed and new anodes installed prior to application of hull coating.
- 3.1.10** All blasted areas shall be coated and allowed to cure, inspected and passed by attending NACE Inspector prior to entire underwater hull being coated.
- 3.1.11** Contractor shall provide unit cost for coating repair per square meter.
- 3.1.12** Coating to be mixed and applied according to the manufactures recommendation and to the satisfaction of the NACE Inspector.
- 3.1.13** All bare metal to be given one touch up coat of Amercoat 238 Abrasion Resistant Epoxy at 10 mils DFT (dry film thickness). Hull to be given a final coat of Amercoat 188 Low Friction Hull Coating at 10 mils DFT.
- 3.1.14** The waterline is to be cut in and all draft marks, load lines, thruster symbols, and hull symbols shall be painted using Laurentide White 700.
- 3.1.15** All coating and paints shall be contractor supplied.

### **3.2 Location**

- 3.2.1** Entire underwater hull area.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

Spec item #: HD-8	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Underwater Hull Painting</b>		

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work to be carried out to the satisfaction of both the Chief Engineer and the attending NACE Inspector.

### **4.2 Testing**

- 4.2.1** The NACE Inspector shall be required to inspect the preparation and application of all hull coatings.

### **4.3 Certification**

- 4.3.1** Copy of the manufactures MSDS for the coating being applied shall be supplied to the Chief Engineer.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of all work carried out in the specification.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Spec item #: HD-9	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Butts and Seams</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to insure that all Hull butts and seams are inspected and repairs made determined by TCMS and the Chief Engineer.

## **Part 2: REFERENCES:**

- 2.1** Guidance Drawings/Nameplate Data - N/A
- 2.2** Standards – N/A
- 2.3** Regulations – N/A
- 2.4** Owner Furnished Equipment – N/A

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** All Hull butts and seams that are determined as in need of repair are to be marked at time of inspection. They are to be cleaned to sound metal by air arc gouging or grinding and to be brought back up to original level by TCMS approved welding techniques and materials. Contractor to use welding rods suitable for use with Grade “A” steel. All work to be to the approval of TCMS and the Chief Engineer.
- 3.1.2.** The contractor shall quote on 1,500 m of linear hull weld repair including gouging plus unit cost per linear Meter to be adjusted up or down by PWGSC 1379 action. The contractor shall include the cost for six non-destructive (X-Ray) tests of the weld repair at locations indicated by the Chief Engineer
- 3.1.3.** The contractor is to quote the services of a person lift and operator for 8 hours for survey, plus unit cost per hour.

### **3.2 Location**

- 3.2.1.** All underwater hull plating.

### **3.3 Interferences**

- 3.3.1** Butts and seams falling in way of any fuel tanks will require the fuel tank to be gas-freed and certified safe for hot work. This can be done in conjunction with the F/O tanks 5 yr. Survey.

Spec item #: HD-9	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Butts and Seams</b>		

- 3.3.2** Butts and seams falling in way of ballast/void tanks that are painted will require interior paint work to be touched up in way of damage. The forgoing gas-freeing and painting will be handled by PWGSC 1379 action. The contractor shall include unit cost per tank for gas-free certificate and unit cost per square meter for tank coating repair. NOTE: The gas freeing can be done in conjunction with the Ballast Tank 5 yr. Survey.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

### **4.2 Testing**

- 4.2.1** N/A

### **4.3 Certification**

- 4.3.1** This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the overhaul report.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Ship's Side Suction &amp; Discharge Valves</b>		

## Part 1: SCOPE:

- 1.1** The intent of this item is to prepare the following ship side valves for inspection, lap sealing surfaces, and to reinstall these valves in good working order. The contractor will open up, completely dismantle, clean and lay out, all the valves listed below, for inspection by TCMS and the vessel's representative. All internal valve body surfaces to be wire brushed cleaned and all mating globe valve discs and seats will be lapped to ensure good contact. All debris resulting from the valve overhaul shall be removed ashore by the contractor.
- 1.2** Contractor to include in their bid an allowance of \$2000 for the machining, stud replacement, valve repair, & replacement. This allowance to be adjusted up or down by PWGSC 1379 action.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

QTY	SIZE	TYPE	DESCRIPTION	LOCATION	Field No.
2	8"	Gl.(SDNR)	M/E Port & Stbd Overboard	Fr. 28 – 29	1,2
1	2 ½"	Gl.(SDNR)	Bilge Port O/B	Fr. 32 – 33	3
1	4"	Angle	Bilge/Ballast Port O/B	Fr. 36 – 37	4
1	4"	Gl.(SDNR)	General Service Stbd O/B	Fr. 33 – 34	5
1	1 ¼"	Gl.(SDNR)	Air Comp. Stbd O/B	Fr. 29 – 30	6
1	2 ½"	Gl.(SDNR)	Gen. Port O/B	Fr. 24 – 25	7
1	2 ½"	Gl.(SDNR)	Gen. Stbd O/B	Fr. 27 – 28	8
1	2 ½"	Gl.(SDNR)	Gear Box Stbd O/B	Fr. 22 – 23	9
2	2 ½"	Gl.(SDNR)	Evap. Port & Stbd O/B	Fr. 21 – 22	10,11
1	1 ½"	Gl.(SDNR)	OWS Stbd O/B	Fr. 21 - 22	12
1	5"	Angle	Bilge / Inj. Stbd O/B	Fr. 36 – 37	13
1	2"	Gl.(SDNR)	B/T Stbd O/B	Fr. 83 – 84	14
1	1"	Gl.(SDNR)	Boiler Blowdown Stbd O/B	Fr. 34 – 35	20
1	¾"	Gl.(SDNR)	Refrigeration Port O/B	Fr. 56 – 57	22
1	2"	Gl.(SDNR)	Grey Water Port O/B	Fr. 56 - 57	1
1	3"	Gl.(SDNR)	Sewage Port O/B	Fr. 56 – 57	2
2	2 ½"	Angle	Evap. Port & Stbd S/W Suction	Fr. 19 – 20	16
1	3"	Angle	Emerg. Fire Pump S/W Suction	Fr. 19 – 20	17
1	2"	Angle	Sanitary S/W Suction	Fr. 19 – 20	23
2	2"	Angle	Vents Aft Sea Box	Fr. 19 – 20	24,25
1	12"	Gl.(SDNR)	High S/W Inlet Stbd	Fr. 38	15
2	12"	Angle	Low S/W Inlet Port & Stbd	Fr. 38	15

2	12"	Butterfly	Sea Bay inlet Port & Stbd	Fr. 38	
4	8"	Angle	S/W Circ. Pumps Suction	Fr. 38	
1	1 ½"	Gl.(SDNR)	S/W to Stern tube (in Shaft Tunnel)	Fr. 20	
1	1 ½"	Angle	Air Compressor S/W Suction	Fr. 38	
2	8"	Gl.(SDNR)	M/E S/W Re-Circ. Port	Fr. 30	
2	8"	Gl.(SDNR)	M/E S/W Re-Circ. Stbd.	Fr. 30	
1	2 ½"	Angle	B/T S/W Suct. Cargo Hold	Fr. 84	
5	3"		Vents for Sea Chest & Sea Bay	Fr. 38	
1			Vent for FWD Sea Bay	Fr. 84	
1	4"		Scupper Valve, Storeroom	Fr. 51-52	5
1	4"		Scupper Valve, Dry Stores	Fr. 51-52	6
1	4"		Scupper Valve, Port Aft E/R	Fr. 21-22	3
1	4"		Scupper Valve, Stbd. Aft E/R	Fr. 21-22	4

## 2.2 Standards

**2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

## 2.3 Regulations

**2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.

**2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.

**2.3.3** The testing shall be in accordance to TCMS regulations.

## 2.4 Owner Furnished Equipment

**2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

**3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

**3.1.2.** The contractor shall open up, completely dismantle, clean and lay out, all the valves listed below, for inspection by TCMS and the vessel's representative.

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Ship's Side Suction &amp; Discharge Valves</b>		

- 3.1.3.** All internal valve body surfaces shall be wire brushed cleaned and all mating globe valve discs and seats shall be lapped to ensure good contact.
- 3.1.4.** All debris resulting from the valve overhaul shall be removed ashore by the contractor.
- 3.1.5.** All Valves / parts shall be inspected by the Chief Engineer and attending TCMI. After inspection, valves shall be reassembled in good order using the best quality jointing and packing material, CCG approved. Any disconnections or other removals necessary for access to the valves to carry out this work shall be included in the quotation and all to be reassembled in good order.
- 3.1.6.** Contractor will exercise extra care when reinstalling butterfly valves such that rubber insert pieces are not bent or crimped between flanges, and that flanges are tightened down evenly.
- 3.1.7.** Contractor shall be responsible to correct any leaks detected during testing of overhauled valves.

### **3.2 Location**

- 3.2.1.** See chart above.

### **3.3 Interferences**

- 3.3.1** The contractor shall be responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

### **4.2 Testing**

- 4.2.1** Reassembled valves are to be functionally tested for proper operation and watertight to the satisfaction of the Chief Engineer and TCMS.

### **4.3 Certification**

- 4.3.1** This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Ship's Side Suction & Discharge Valves		

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the report for all work completed for this item.

**5.2 Spares**

**5.3 Training**

**5.4 Manual**



Spec item #: HD-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Sea Bay & Sea Chest Cleaning & Inspection		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the contractor to clean and paint the internal surfaces of the sea bay and sea chests on the vessel, and to replace the sacrificial anodes in these spaces.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.

Spec item #: HD-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Sea Bay &amp; Sea Chest Cleaning &amp; Inspection</b>		

- 3.1.2.** The contractor shall open up, hydro-blast (minimum water pressure of 6000 psi) all Sea-Bays and Sea Chest including all internal fittings, to ensure the removal of all marine growth, scale and rust, within 8 hours of Drydocking. The interiors of the sea bay/ sea chest shall be mechanically cleaned (power brushed) and all resulting debris removed from the vessel.
- 3.1.3.** The grids shall be removed from all sea bays for cleaning and inspection. The grid and inlet areas shall be cleaned and grid holes shall be mechanically reamed to the original diameter.
- 3.1.4.** Sea- Bays and Sea Chest to be given two coats of Amercoat Bar Rust 235 at 5 – 6 mils DFT per coat. Contractor shall bid on 76m<sup>2</sup> for the interior sea bay, and 41m<sup>2</sup> for both exterior sea chests, for a total surface area of 117 m<sup>2</sup> and include unit cost per m<sup>2</sup>. The surface area actually blasted and painted is to be adjusted up or down by PWGSC 1379 action.
- 3.1.5.** This painting shall be carried out sufficiently in advance of re-floating of the vessel to permit proper cure and drying of the paint / coating.
- 3.1.6.** The contractor shall replace all sacrificial anodes in the sea-bay and sea chest, a total of eighteen (18) 22 pounds, in the sea chest, and 10 in the sea-bay, for a total of 32 anodes. The contractor shall provide a unit cost per anode. Anodes to be installed prior to coating and to be protected from coating. Protective barrier to be removed prior to covers and grating being replaced.
- 3.1.7.** Upon completion of this work, grids to be reinstalled and bolts secured with locking arrangement. The contractor to supply and fit new stainless steel bolts (3/4 x 1 3/4") for grids, 60 bolts required.
- 3.1.8.** The contractor shall reinstall the manhole covers on the sea chest with new gaskets. The contractor shall bid on providing and installing 3 new studs for this manhole cover, and provide unit cost for replacement of studs to be adjusted up or down by PWGSC 1379 action.

### **3.2 Location**

- 3.2.1.** Manhole covers located in forward engine room bilge both port and stbd. Sea gates located on the exterior underwater hull of the vessel.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

Spec item #: HD-11	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Sea Bay & Sea Chest Cleaning & Inspection		

**4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

#### **4.2 Testing**

**4.2.1** Manhole covers shall be checked for watertight integrity once vessel is re-floated and any leaks corrected by the contractor and witnessed by the chief engineer.

#### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

### **Part 5: DELIVERABLES:**

#### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the report containing all work performed with this item.

#### **5.2 Spares** N/A

#### **5.3 Training** N/A

#### **5.4 Manual**

Spec item #: HD-12	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Zinc Anode Replacement</b>		

## **Part 1: SCOPE:**

- 1.1** The contractor shall remove / replace all wasted sacrificial zinc anodes on the hull and rudder. The old mounting brackets shall be cropped from the hull and the welds ground flush and new replacements installed prior to hull coating. Contractor shall quote on the removal / supply / replacement of 50 anodes and provide unit cost per anode to be adjusted up or down by PWGSC 1379 action.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

#### **2.1.1**

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

Spec item #: HD-12	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Zinc Anode Replacement</b>		

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Contractor shall cut all anodes and mounting brackets from ships' hull and rudder. Wasted anodes to be given to chief engineer for proper disposal.
- 3.1.3.** Contractor shall bid on the supply and installation of 50 new anodes – 22.5 lb each, and quote unit cost per anode replacement to be adjusted up or down by PWGSC 1379 action.
- 3.1.4.** All new anodes shall be affixed prior to hull coating. The anodes shall be protected during hull painting and the protection shall be removed prior to refloating.
- 3.1.5.** All work shall be carried out to the satisfaction of the chief engineer and TCMS.

#### **Part 4: PROOF OF PERFORMANCE:**

##### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

##### **4.2 Testing – N/A**

##### **4.3 Certification**

- 4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

#### **Part 5: DELIVERABLES:**

##### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection / work performed report.

##### **5.2 Spares N/A**

##### **5.3 Training N/A**

##### **5.4 Manuals N/A**

Spec item #: HD-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Rudder, Stock, Pintles & Bearings		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to remove and open up for overhaul and 5 year survey, by TCMS, rudder, rudder post, carrier bearing, pintle and bearing.
- 1.2** This work shall be carried out in conjunction with spec item Tailshaft, Bearings, Propeller and Mechanisms 5 year survey and inspection.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Drawings #'s 105-01, 500-01 & 501-01

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

### **2.4 Owner Furnished Equipment**

- 2.4.1** Contractor shall supply all materials, equipment and labor parts required to perform the specified work unless otherwise stated. This also includes scaffolding, staging, chain falls, craneage, slings & shackles that will be required to be erected in way of the rudder to facilitate removal and inspection.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

Spec item #: HD-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Rudder, Stock, Pintles &amp; Bearings</b>		

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Prior to any hot work taking place, the Contractor shall ensure that the area of work and any adjacent space is certified as gas free and suitable for hot work as per the preamble.
- 3.1.3.** Prior to erecting staging in way of the rudder, the Contractor shall ensure that the steering gear has been locked out and tagged out as per the preamble.
- 3.1.4.** The Contractor shall be responsible to arrange for TCMS survey when completing this specification item.
- 3.1.5.** Prior to any work commencing the contractor shall perform the following:
  - 1) Proof mark rudder palm and verify location of rudder, when set amidships and maximum port and stbd angle, with the wheelhouse steering control console; this shall be verified again when after completion of work and reinstallation.
  - 2) Proof mark the rudder stock to the steering gear crosshead.
  - 3) Measure and record clearance between rudder stock and Thordon bearing, lower pintle and bushing clearance and jumping collar clearance.
  - 4) Contractor shall remove drain plug from rudder and secure it after completion of the work in this specification.
  - 5) TCMS & Chief Engineer shall witness all the above.
- 3.1.6.** Contractor shall remove cover plate to gain access to pintle nut and remove nut; nut to be stored until reinstallation by contractor. Once all work in this specification is complete, rudder shall be reinstalled and pintle nut torqued, the cover plate shall be reinstalled with new contractor supplied gaskets and screws.
- 3.1.7.** Any Contractor attached lifting points which have been welded to the ship are to be removed prior the undocking of the ship and any disturbed coatings are to be repaired with the appropriate hull coating.
- 3.1.8.** Contractor shall unship the rudder to allow access for tailshaft removal as well as inspection of rudder by TCMS and Chief Engineer. The Contractor shall remove the securing arrangement from the palm bolts. Prior to removal, the Contractor shall permanently mark each bolt as to its original location. The Contractor shall include in the bid, the unit cost of removal, and fabrication of a palm bolt in the event one is damaged during removal. Actual adjustments shall be made through PWGSC 1379 action. Contractor is responsible for safe keeping of the rudder palm bolts during their removal.
- 3.1.9.** Rudder shall be air tested to 3 psi max to check for presence of cracks and leaks, this to be carried out in presence of TCMS and Chief Engineer. Plug to be reinstalled after testing with new contractor supplied seal.

Spec item #: HD-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Rudder, Stock, Pintles &amp; Bearings</b>		

- 3.1.10.** Should the rudder fail the pressure testing, the Contractor shall locate the problem area on the rudder and provide a repair option to the Owner. Once all repairs have been completed, the Contractor shall coat the internals of the rudder with an anti-corrosion coating by means of float coating. Actual cost of repair and coating to be adjusted by PWGSC 1379 action upon presentation of invoices.
- 3.1.11.** Cross head shall be disconnected from rudder stock and stock shall be removed from vessel to contractor's facilities for cleaning, measuring and inspection by TCMS and Chief Engineer.
- 3.1.12.** Rudder stock and bushings, pintle and bushing and rudder carrier bearing shall be measured and recorded and crosshead shall be checked for signs of wear. All shaft and bushings surfaces shall be cleaned prior to reinstallation.
- 3.1.13.** Upon completion of all inspections and to the satisfaction of both TCMS and Chief Engineer the rudder stock, crosshead and rudder shall be reinstalled, as long as installation does not interfere with other specifications, mainly spec item Tailshaft, Bearings, Propeller and Mechanisms.
- 3.1.14.** Contractor shall install eight rings of new 1" x 1" packing in the rudder stock gland, packing shall be contractor supplied. Gland to be loosely tightened and rechecked and adjusted as required during dockside and/or sea trials.
- 3.1.15.** Rudder palm bolts shall be tightened and secured with locking bars welded in place and inspected by TCMS and Chief Engineer.
- 3.1.16.** Once completely installed, the rudder shall be test swung easily and then rapidly from side to side to ensure freedom of movement and complete range of travel for multiple cycles. Alignment of the rudderstock and rudder are to be verified at zero helm once installation and testing has been completed as per initial findings . This testing shall be witnessed by the TCMS surveyor and Chief Engineer.

### **3.2 Location**

- 3.2.1** Rudder located at stern of vessel aft of propeller hub.
- 3.2.2** Crosshead and rudder carrier bearing located in the steering gear compartment.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be carried out to the satisfaction of TCMS and Chief Engineer.



Spec item #: HD-13	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Rudder, Stock, Pintles & Bearings		

## **4.2 Testing**

**4.2.1** Once rudder installation is complete, and work on the steering gear system is complete the rudder shall be tested and prove proper operation.

**4.2.2** When vessel is undocked the rudder stock gland shall be checked and tightened as necessary and again while the vessel is on sea trials.

## **4.3 Certification**

**4.3.1** This specification is to be carried out in order to obtain TCMS credit. Contractor is responsible for contacting TCMS when items are ready for their respective inspections.

# **Part 5: DELIVERABLES:**

## **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the overall work performed with this spec item report.

## **5.2 Spares N/A**

## **5.3 Training N/A**

## **5.4 Manuals N/A**

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

## Part 1: SCOPE:

- 1.1 The intent of this specification shall be to remove and open up for overhaul and 5 year survey, by TCMS, the oil distribution box, forward and aft shaft bearings, tailshaft, stern bearing and propeller hub and mechanism.
- 1.2 Contractor shall strictly adhere to manufacture's specifications for all work carried out in this specification.
- 1.3 Included in this specification shall be the draining, cleaning, inspection and filling of the controllable pitch propeller (CPP) hydraulic oil system and sump tank.
- 1.4 This work shall be carried out in conjunction with spec item Rudder, Stock and Pintles 5 year survey and inspection.
- 1.5 Contractor shall include in their bid an allowance of \$25000 to supply the services of a Field Services Representative (FSR) to remove shaft, dismantle and re-build the propeller hub and mechanism, inspect and gauge the stern bushing, overhaul the cpp oil distribution box, removal and installation of the sterntube seal and removal and reassembly of the SKF coupling. The FSR shall be responsible for all system(s) component adjustments required to bring the system within the operational functional requirements as per the manufacturer's recommended tolerances. Suggested FSR: Ron Van Der Linden, 902 468 1264, or 902 877 1099 or [ron.vanderlinden@wartsila.com](mailto:ron.vanderlinden@wartsila.com), Wartsila Canada Inc., Dartmouth, NS.

## Part 2: REFERENCES:

### 2.1 Guidance Drawings/Nameplate Data

- 2.1.1 LIPS Manual #5, Order # 210.1165, Propeller Hub, SKF Coupling, and Oil Distribution Box
- 2.1.2 Drawings #'s 220/01 Shafting Diagram, 220/02 Stern Tube,
- 2.1.3 #139 Sterntube Inner Seal, Wartsila type PSE Seal
- 2.1.4 Shaft Bearings, Lohmann & Stolterfoht, Diameter of shaft in Bearing – 370 mm
- 2.1.5 CPP System Hydraulics – 600 L Petro Canada Hydrex 68
- 2.1.6 Shaft Bearings (2 of) – 20 L each Energol DS3-153

### 2.2 Standards

- 2.2.1 The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

## 2.3 Regulations

- 2.3.1 The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2 The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3 The testing shall be in accordance to TCMS regulations.

## 2.4 Owner Furnished Equipment

- 2.4.1 Contractor shall supply all materials, equipment and labor parts required to perform the specified work unless otherwise stated. This also includes scaffolding that will be required to be erected in way of the propeller to facilitate removal and inspection.

## Part 3: TECHNICAL DESCRIPTION:

### 3.1 General

- 3.1.1. Contractor shall ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2. Prior to any work commencing the contractor shall perform the following:
  - 6) Measure and record tailshaft run out axially and radially, before and after docking of the vessel, prior to dismantling and subsequent reinstallation of all specification components.
  - 7) Measure the tailshaft wear-down in the presence of TCMS and Chief Engineer prior to dismantling and subsequent reinstallation.
  - 8) Verify centering mark on propeller blades to centering mark on propeller hub.
  - 9) Proof mark location of SKF coupling.
  - 10) Measure and record thrust clearance at thrust block prior to dismantling and subsequent reinstallation of all specification components.
- 3.1.2 Contractor shall erect scaffolding in way of the propeller to allow the above mentioned inspections to be carried out.
- 3.1.3 Rope guard shall be removed and then reinstalled after completion of all work described below.

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

- 3.1.4** Oil to be drained from the cpp system and sump tank, approx. 600 L, and contractor shall properly dispose of by provincial regulations. The entire system shall be flushed with new oil until all signs of dirt and water are removed. Sump tank to be opened and cleaned, low level alarm to be proven operational, and cover to be reinstalled with new contractor supplied gasket, after inspection by Chief Engineer or his delegate. System shall be filled with contractor supplied Hydrex AW68 oil and it shall be filtered at 3 micron absolute prior to being added to the system. All filters, owner supplied, on the system shall be changed and strainers cleaned. System shall be run up and purged of all air prior to job being considered complete and witness by Chief Engineer or his delegate.
- 3.1.5** Contractor shall ship the rudder to gain access for removal and reinstallation of propeller and tailshaft. Rudder position shall be verified prior to removal. Rudder to be reinstalled and proven operational upon completion of all work in this specification.
- 3.1.6** The drive for the feedback potentiometers, located on the oil distribution (OD) box are to be properly marked and disconnected prior to any pitching or removal of the blades. Potentiometers to be reconnected upon completion of all work.
- 3.1.7** Contractor shall open and clean for inspection by TCMS and Chief Engineer the OD box. After inspection the OD box shall be reassembled with new owner supplied seals and gaskets. Contractor shall also check the feedback potentiometers and linkages for condition and wear and replace as necessary with new owner supplied parts.
- 3.1.8** Contractor shall drain oil from both shaft bearings, approx. 20 L each and properly dispose of by provincial regulations. Top half of the bearing to be removed to facilitate shaft removal. Bearings to be flushed, cleaned, measured and inspected by TCMS and Chief Engineer. Oil coolers to be removed, inspected, flushed and proven clear, hydrostatically tested to 40 psi and witnessed by TCMS and Chief Engineer. Upon completion of all below described work bearing top halves to be reinstalled, scrapper rings properly set and bearings topped with new owner supplied Energol DS3-153 lube oil. Cover bolts to be torqued to manufactures specs. **NOTE:** Contractor to ensure the shaft is supported at all times when the bearings are removed.
- 3.1.9** SKF sleeve coupling shall be proof marked and shaft surfaces in way of the coupling thoroughly cleaned prior to coupling being removed. Coupling shall be thoroughly cleaned after removal and prior to reinstallation. Owner will supply high injection pump that is required for removal of the coupling. Hydraulic pressure required to remove the coupling shall be recorded. **NOTE:** While separating the sections of shafting extreme care shall be taken as not to place undue stress on the central oil supply line. The pitch must also be adjusted to full astern before dismantling of the SKF coupling.

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

- 3.1.10** Sterntube seal shall be removed and mating surfaces protected during and after removal. Seal to be inspected and any worn parts replaced, owner supplied. Seal to be inspected by TCMS and Chief Engineer. Seal to be reinstalled and set up after tailshaft is reinstalled.
- 3.1.11** Tailshaft and propeller to be removed as a complete unit and transported to the contractor's facility for propeller hub disassembly and inspection by TCMS and Chief Engineer. Tailshaft shall be properly supported during removal, transport to contractor's facility, at the facility and during reinstallation. Tailshaft shall be thoroughly cleaned, measured and readied for inspection. Contractor to ensure shaft and propeller hub are protected at all time while removed from the vessel. Contractor shall also support the internal oil feed supply line at all times.
- 3.1.12** Contractor shall clean the sterntube of any sludge or debris that may be present. Forward and aft sterntube bearings to be cleaned, measured and inspected by TCMS and Chief Engineer. Measurements are to be taken on the bore of each bearing in the vertical and horizontal direction at four equal points along the length of the bearing to check for ovality and uneven wear patterns.
- 3.1.13** Contractor shall remove all four propeller blades and dismantle the propeller hub and mechanism for inspection by TCMS and Chief Engineer. All components to be inspected and measured for wear and replaced as deemed necessary by FSR with new owner supplied parts. Contractor shall rebuild mechanism and hub with new owner supplied o-rings and seals. Propeller bolts shall be torqued and bolts locked. Lock bars to be welded as per manufactures locking bar welding procedures.
- 3.1.14** Upon completion of all work and inspections to all associated components included in this specification the tailshaft and propeller hub assembly shall be reinstalled in the vessel. Care must be taken to properly support the shaft during installation and to insure the device used to support the internal oil feed supply line is removed before the coupling is connected. SKF coupling to be reattached up to the original marks and final hydraulic pressure recorded. All threaded holes in the coupling shall be cleaned and sealed.
- 3.1.15** Any and all piping, fixtures, wiring, etc, removed or distributed during the shaft removal are shall be reinstalled in good order.
- 3.1.16** All work carried out on the OD box, SKF coupling, sterntube seal and propeller hub shall be in accordance with Wartsila FSR.

## **3.2 Location**

- 3.2.1** OD box located in the engine room forward of main gearbox between port and stbd main engines.
- 3.2.2** CPP sump located in the engine room aft of gearbox in the bilge. Filters and strainers located in same proximity.

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

**3.2.3** Shaft bearings, SKF coupling and stern tube seal all located in shaft tunnel of vessel.

**3.2.4** Tailshaft located in sterntube and propeller located at end of tail shaft.

### **3.3 Interferences**

**3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work to be carried out to the satisfaction of Chief Engineer, Wartsila FSR and TCMS.

### **4.2 Testing**

**4.2.1** Dockside trails shall be conducted to test the CPP system, sterntube seal, and shaft bearings. Contractor shall monitor the stern tube seal and shaft bearings for leakage and overheating. Contractor shall inspect the cpp system for oil leakage as well.

**4.2.2** A two hour sea trial shall be conducted to prove all system are operating properly and there are no leaks detected or overheating noted. Load to be applied from zero to full at 15 min intervals while temperature and pressures are recorded. Sea trials shall continue until Chief Engineer is completely satisfied with the results.

### **4.3 Certification**

**4.3.1** This specification is to be carried out in order to obtain TCMS credit. Contractor is responsible for contacting TCMS when items are ready for their respective inspections.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the overhaul report and all readings taken prior to, during and after overhaul and testing.

Spec item #: HD-14	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tailshaft, Bearings, Propeller & Mechanisms		

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: E-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Heating Boiler Inspection</b>		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the contractor to carry out annual maintenance on the Boilersmith Boiler and obtain credit from TCMS.
- 1.2** The contractor shall include in their bid an allowance of \$1000 for parts and \$2000 for the services of a burner technician to check and adjust as necessary the burner assembly; allowances to be adjusted up or down by PWGSC 1379 action.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** The boiler is a Boilersmith, Oil Fired, Model # CF3LS-35-O-15, 15 psi working pressure, Burner Model # CO-46.

**2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

**2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

**2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.



Spec item #: E-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Heating Boiler Inspection</b>		

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** The contractor is to ensure the boiler is properly locked out prior to work commencing on the unit.
- 3.1.3.** The contractor shall drain the boiler and properly dispose of its contents.
- 3.1.4.** There is a total of eight valves to be removed for inspection.
  - i. Main Stop Valve
  - ii. Safety Relief Valve
  - iii. Feed Water Pump Inlet Valve
  - iv. Feed Water Pump Outlet Valve
  - v. Boiler Feed Valve
  - vi. Blow Down Valve
  - vii. 2 Drain Valves
- 3.1.5.** The valves are to be removed and opened up for TC inspection. All valves are to be identified before removal to ensure they are returned to their proper locations.
- 3.1.6.** The valves and seats shall be lapped and new packing and gaskets installed upon reassembly by the contractor.
- 3.1.7.** The contractor shall remove all pressure relief valves from the boiler and send them to an accredited firm to have then re-certified and returned to the vessel, along with certificates.
- 3.1.8.** A certified burner technician shall check and adjust the burner parameters to achieve maximum efficiency and clean burning characteristics desired.
- 3.1.9.** The contractor shall test the function of the boiler, safety/pressure relief valves and all safety shut downs to the satisfaction of TCMS and the Chief Engineer. Any Defects/leaks in valves must be secured by the contractor at the contractor's expense.
- 3.1.10.** Once the boiler is tested and TCMS is satisfied, the contractor shall put the boiler back into service.

### **3.2 Location**

- 3.2.1.** Forward stbd side of engine room.

### **3.3 Interferences**

- 3.3.1** The contractor shall be responsible for the identification of all interference Items, their temporary removal, storage and refitting to the vessel.

Spec item #: E-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Heating Boiler Inspection</b>		

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer. The contractor shall be responsible for arranging the attendance of the TCMS and Chief Engineer.
- 4.1.2.** The contractor shall provide the Chief Engineer with Certificates verifying the tests completed on the pressure relief valves. Two copies required.

### **4.2 Testing**

- 4.2.1** All testing shall be carried out in the presence of the chief engineer and TCMS inspector.

### **4.3 Certification**

- 4.3.1** This inspection is to be carried out in order to obtain TCMS credit. Originals of all valve testing certificates shall be given to chief engineer.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the overhaul report.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Spec item #: E-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Dock Sea Trials</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification is to have the Contractor onboard to perform a minimum of three hours dockside trials, and four hours of continuous sea trials.
- 1.2** The intention of the dock trials is to run up the affected machinery during the past refit (Stbd Generator, shaft, bearings, od box, propeller, rudder) to operating temperatures and pressures, check for abnormal vibration and temperatures, record operating parameters from the generator.
- 1.3** The intention of the sea trial is to run the above mention machinery for 4 hours under Full Load to the satisfaction of the Chief Engineer.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

**2.1.1** N/A

### **2.2 Standards**

**2.2.1** N/A

### **2.3 Regulations**

**2.3.1** This ship is regulated by Transport Canada and all work must be approved by them, and subjected to the inspection of the attending TCMS Surveyor and Chief Engineer.

### **2.4 Owner Furnished Equipment**

**2.4.1** The contractor shall supply all materials, equipment, labor and parts to perform specified work unless stated otherwise.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

**3.1.1.** The contractor shall ensure there are sufficient personnel onboard to attend to/repair any faults directly related to the equipment worked on by the Contractor during the refit.

Spec item #: E-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Dock Sea Trials</b>		

**3.1.2.** The contractor shall ensure there are workers available to perform dock trials with the amount of load being limited to what the Owner's Representative feels is a safe level. This shall be performed for three hours to allow everything to rise to operating temperatures and settle out. Once this is deemed to be satisfactory by the Chief Engineer and TCMS Inspector, the sea trial shall be scheduled.

**3.1.3.** Sea trials shall be scheduled for four hours and the contractor shall ensure there are sufficient workers available to attend to any repairs required to affected machinery.

### **3.2 Location**

**3.2.1.** Main Engine Room

### **3.3 Interferences**

**3.3.1** The contractor shall be responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

### **4.2 Testing**

**4.2.1** These sea trials are to prove the integrity of the machinery worked on by the Contractor during the past refit, and shall be included in the reports delivered to the Chief Engineer.

### **4.3 Certification**

**4.3.1** This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** The operating condition of the equipment worked on shall be included in the three copies of the work reports in electronic format from the Contractor to the Chief Engineer at the end of refit.

Spec item #: E-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Auxiliary Diesel Stbd.		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification is to have the Contractor assist the Caterpillar FSR's with the overhaul of the Auxiliary Diesel Stbd.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Caterpillar Model 3406

### **2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

### **2.3 Regulations**

- 2.3.1** This ship is regulated by Transport Canada and all work must be approved by them, and subjected to the inspection of the attending TCMS Surveyor and Chief Engineer.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts to perform specified work unless stated otherwise.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off .
- 3.1.2.** Contractor shall bid an allowance of 300 man hours for 1 only personnel to assist the Caterpillar FSR with the overhaul of the Stbd S/S Gen prime mover under the direction of the Cat FSR's to be adjusted up or down by PWGSC 1379 action.

Spec item #: E-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Auxiliary Diesel Stbd.		

**3.2 Location****3.2.1. Main Engine Room****3.3 Interferences**

**3.3.1** The contractor shall be responsible for the identification of all interference items, their temporary removal, storage and refitting to the vessel.

**Part 4: PROOF OF PERFORMANCE:****4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of the TCMS and Chief Engineer.

**4.2 Testing**

**4.2.1** All tests performed shall be completed by the Cat FSR's and witnessed by the Chief Engineer & TCMS.

**4.3 Certification**

**4.3.1** This inspection is to be carried out in order to obtain TCMS credit.

**Part 5: DELIVERABLES:****5.1 Drawings/Reports**

**5.1.1** The operating condition of the equipment worked on shall be included in the three copies of the work reports in electronic format from the Contractor to the Chief Engineer at the end of refit.

**5.2 Spares**

N/A

**5.3 Training**

N/A

**5.4 Manuals**

N/A

Spec item #: L-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Insulation Testing		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the Contractor to test the insulation resistance of all electrical distribution systems onboard (Generators, Motors, Panels, Cables / Feeds, Heaters, Etc,,,,), using a 500 V DC "Meggar"-type Direct Indicating Ohm tester, provided by the contractor, to satisfy the annual requirements of TCMS. Contractor shall include an allowance of \$2000 for the tracing and repair of any/all ground faults detected to be adjusted up or down as required by PWGSC 1379 action.
- 1.2** This work shall be carried out in conjunction with the Annual Thermo Scan.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Contractor shall use EXCEL Spreadsheet, "Insulation Testing-MEGGAR" to record results from the insulation testing. The Chief Engineer will provide the Contractor with the electronic version of this document.

### **2.2 Standards**

- 2.2.1** Meggar readings shall be taken and recorded in accordance with normal Shipboard practices and procedures, keeping in mind that UPS and electronic equipment is susceptible to damage if meggered.
- 2.2.2** Contractor shall use a minimum of 500 V DC "Meggar"-type Direct Indicating Ohm tester.
- 2.2.3** CG Lockout Procedures, ISM Hotwork, Confined Space Entry and Fall Protection Procedures shall be strictly adhered.

### **2.3 Regulations**

- 2.3.1** Readings shall be recorded and acceptable according to the limits stated in TP 127 Electrical Code for ships.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

Spec item #: L-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Insulation Testing		

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Contractor shall megger all essential and non-essential circuits, generators switch boards and transformers onboard the vessel.
- 3.1.3.** Contractor shall inform Chief Engineer before any meggering is to take place as not to greatly disrupt normal shipboard activities.
- 3.1.4.** Contractor shall be responsible for the isolation of any and all electronic equipment throughout the vessel during megger testing. Care shall be taken not to test circuits while electronics (including voltage regulators), which may be damaged by high voltages, are connected.
- 3.1.5.** Contractor shall restore connections to all circuits tested and shall ensure that each of the circuits is operating correctly.
- 3.1.6.** A complete "Panel Index" and "Circuit List" is included with this spec.
- 3.1.7.** Contractor shall include an allowance of \$2000 for the tracing and repair of any/all ground faults detected to be adjusted up or down as required by PWGSC 1379 action.

#### **3.2 Location**

- 3.2.1.** Various locations throughout the vessel; refer to "Panel Index Binder", available upon request.

#### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that maybe encountered.

### **Part 4: PROOF OF PERFORMANCE:**

#### **4.1 Inspection**

- 4.1.3.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

#### **4.2 Testing**



Spec item #: L-1	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Insulation Testing		

**4.2.2** Any repairs to grounded circuits shall be retested, by the contractor, before being considered complete.

#### **4.3 Certification**

**4.3.1** The contractor shall provide current calibration certificates for all meters used during testing.

**4.3.2** This inspection is to be carried out in order to obtain TCMS credit.

### **Part 5: DELIVERABLES:**

#### **5.5 Drawings/Reports**

5.1.1 **5.1.1** Contractor shall submit three (3) signed type written copies of the final completed insulation tests and work completed to the Chief Engineer prior to the completion of Refit.

**5.6 Spares**  
N/A

**5.7 Training**  
N/A

**5.8 Manuals**  
N/A

## PANEL INDEX

PANEL	LOCATION	PAGE
Heating Distribution Panel #1	Main deck aft of control room door	2
Heating Distribution Panel #2	Main deck next to aft E/R stores	3
Heating Distribution Panel #3	Main deck in fwd E/R stores	4
Heating Distribution Panel #4	Foc'sle deck at top of fwd stairs	5
Heating Distribution Panel #5	Bridge deck	6
Misc Distribution Panel # <b>ES2-6</b>	Port main deck, E/R entrance	7
Workshop Distribution Panel # <b>E2-3</b>	Workshop main deck aft	7
Commissary Power Panel # <b>1 120V</b>	Aft galley	8
Commissary Power Panel # <b>2 440V</b>	Aft Galley	9
Commissary Power Panel # <b>3 220V</b>	Aft galley	10
Workshop Power Distribution # <b>ES1-3</b>	Workshop main deck aft	11
Power Distribution Panel # <b>ES1-4</b>	Quartermaster station, Foc'sle deck	11
Power Distribution Panel # <b>ES1-5</b>	Wheelhouse	12
Power Distribution Panel # <b>ES1-6</b>	Foc'sle fwd top of stairs	13
Power Distribution Panel # <b>ES1-7</b>	Main deck outside galley	14
Power Distribution Panel # <b>ES1-8</b>	Fwd E/R stores, main deck	15
Power Distribution Panel # <b>ES1-9</b>	Engine room, aft of port M/E	16
Power Distribution Panel # <b>ES1-10</b>	Engine room, stbd side by boiler	17
Power Distribution Panel	Quartermaster's station, Foc'sle deck	18
Heated windows & wipers	Wheelhouse	18
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Nav/Com Panel # <b>1 24Vdc</b>	Chart room, bridge deck	19
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Emergency Panel # <b>E2</b>	Top of stairs to main deck	21
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DC Distribution # <b>1</b>	Emergency generator room	25
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DC Distribution # <b>3</b>	Engine room stbd aft	26

## **List Of Circuits**

### **#1(PORT) S/S GENERATOR:**

SWITCHBOARD BREAKER -  
GENERATOR ARMATURE T0 -  
T1 -  
T2 -  
T3 -  
EXCITER FIELD -

### **#2 (STBD) S/S GENERATOR:**

SWITCHBOARD BREAKER -  
GENERATOR ARMATURE T0 -  
T1 -  
T2 -  
T3 -  
EXCITER FIELD -

### **460 VAC/3 PHASE ESSENTIAL MWSB:**

ESS 1 STEERING GEAR TRANSFER PANEL -  
ESS 2 CP HYDRAULIC PUMP -  
ESS 3 STBY M/E S.W. CIRC PUMP -  
ESS 4 ESSENTIAL MCC #1 -  
ESS 5 GENERAL SERVICE PUMP -  
ESS 6 S.W. CIRC PUMP PORT M/E -  
ESS 7 ESSENTIAL MCC #2 -  
ESS 8 STBY CP HYDRAULIC PUMP -  
ESS 9 S.W. CIRC PUMP STBD M/E -  
ESS 10 ESSENTIAL MCC #3 -  
ESS 11 E.R. VENT. MCC -  
ESS 12 DECK CRANE POWER PACK #1 -  
70  
ESS 13 SPARE -  
ESS 14 FRC DAVIT -  
ESS 15 SPARE -  
ESS 16 SPARE -  
ESS 17 460/115 V TRANSFORMERS -  
ESS 18 460/230 V TRANSFORMERS -

### **460 VAC/3 PHASE NONESSENTIAL MWSB:**

NONESSENTIAL TIE-IN BREAKER -  
NES 1 NONESSENTIAL MCC #1 -  
NES 2 NONESSENTIAL MCC #2 -  
NES 3 ACCOMODATION VENT. MCC -  
NES 4 HYDRAULIC POWER PACK #1 -  
NES 5 HYDRAULIC POWER PACK #2 -  
NES 6 GALLEY PWR DIST PANEL -  
NES 7 HEATING TRANSFORMERS -  
NES 8 R.O. UNIT -  
NES 9 SPARE -  
NES 10 AFT TOW WINCH -

### **MAIN SWITCHBOARD 115 VAC/3 PHASE DISTRIBUTION:**

**NL NAVIGATION LIGHTING PANEL W/H -**

ES1-1 COMM EQUIP PANEL #1 -  
ES1-2 NAVIGATION AIDS PANEL W/H -  
ES1-3 DISTRIBUTION PANEL WORKSHOP -  
ES1-4 DISTRIBUTION PANEL Q.M. STATION -  
ES1-5 BRIDGE DECK POWER & LIGHTING PANEL -  
ES1-6 FOCSLE DECK POWER & LIGHTING PANEL -  
ES1-7 MAIN DECK POWER & LIGHTING PANEL #1 -  
ES1-8 MAIN DECK POWER & LIGHTING PANEL #2 -  
ES1-9 MISC DISTRIBUTION PANEL E/R -  
ES1-10 MACHINERY SPACE POWER & LIGHTING PANEL -  
ES1-11 HEATING BOILER -  
ES1-12 SPARE –

**MAIN SWITCHBOARD 230 VAC/3 PHASE DISTRIBUTION:**

ES2-1 COMM EQUIP PANEL #2 -  
ES2-2 Q.M. POSITION 230V PANEL -  
ES2-3 WORKSHOP 230V PANEL -  
ES2-4 WELDER -  
ES2-5 HEATED WINDOW 230 V PANEL W/H -  
71  
ES2-6 MISC DIST 230V PANEL MAIN DECK –

**MAIN HEATING PANEL 230VAC/3 PHASE:**

T 1 HEATING PANEL #1 -  
T 2 HEATING PANEL #2 -  
T 3 HEATING PANEL #3 -  
T 4 HEATING PANEL #4 -  
T 5 HEATING PANEL #5 -  
T 6 AC COOLING PUMP -  
T 7 SPARE –  
T 8 SHAFT TUNNEL SPACE HEATER –

**ESSENTIAL MCC #1:**

ESS 2-1 C.P. HYDRAULIC P/P, PORT -  
ESS 3-1 STBY M/E S.W. CIRC P/P -  
ESS 4-1 DOMESTIC F.W. P/P -  
ESS 4-2 B/T HYDRAULIC P/P -  
ESS 4-3 D.O. TRANSFER P/P -  
ESS 4-4 PRELUBE P/P, PORT M/E -  
ESS 4-5 INBOARD AIR COMPRESSOR -  
ESS 4-7 L.O. WARM-UP P/P, PORT M/E -  
ESS 4-8 SANITARY P/P -  
ESS 4-9 SPARE –

**ESSENTIAL MCC #2:**

ESS 5-1 GENERAL SERVICE P/P -  
ESS 6-1 S.W. CIRC P/P, PORT M/E -  
ESS 7-1 BILGE & BALLAST P/P -  
ESS 7-2 SPARE -  
ESS 7-3 STBY SANITARY P/P -  
ESS 7-4 FRC F.O. P/P CONTROL PANEL -  
ESS 7-5 PRELUBE P/P, STBD M/E -  
ESS 7-6 J.W. WARM-UP P/P, PORT M/E -  
ESS 7-7 J.W. HEATER, PORT M/E -  
ESS 7-8 L.O. PREHEATER, PORT M/E -  
ESS 7-9 L.O. WARM-UP P/P, STBD M/E -  
ESS 7-10  
ESS 7-11 GEN J.W. HEATER, STBD -  
ESS 7-12 GEN J.W. HEATER, PORT -

**ESSENTIAL MCC #3:**

ESS 8-1 STBY CP HYD P/P -  
ESS 9-1 S.W. CIRC P/P, STBD M/E -  
ESS 10-1 STBY D.O. TRANSFER P/P -  
ESS 10-2 J.W. WARM-UP, STBD M/E -  
ESS 10-3  
ESS 10-4 STBY GEARBOX L.O. P/P -  
ESS 10-5 STBY DOMESTIC F.W. P/P (BOTTOM) -  
ESS 10-6 OUTBOARD (STBY) AIR COMPRESSOR -  
ESS 10-7  
ESS 10-8 J.W. HEATER, STBD M/E -  
ESS 10-9 L.O. PREHEATER, STBD M/E  
ESS 11 SPARE

**E/R VENTILATION MCC:**

ESS 11-1 ENGINE ROOM SUPPLY FAN #1 (PORT) -  
ESS 11-2 ENGINE ROOM SUPPLY FAN #2 (STBD) -  
ESS 11-3 AUX MACH COM'T SUPPLY FAN -  
ESS 11-4 ENGINE ROOM EXHAUST FAN -  
ESS 11-5 B/T COMPT SUPPLY FAN -  
ESS 11-6 EXHAUST FAN-SAR LOCKER -

**NONESSENTIAL MCC #1:**

NES 1-1 EVAPORATOR S.W. P/P, PORT M/E -  
NES 1-2 EVAPORATOR F.W. P/P, PORT M/E -  
NES 1-3 GREY WATER LIFT P/P -  
NES 1-4 GREY WATER DISCHARGE P/P -  
NES 1-5 DOMESTIC REFRIGERATION -  
NES 1-6 SEWAGE CONTROL PANEL -  
NES 1-7 G/B TURNING GEAR -  
NES 1-8 EVAPORATOR CIRC P/P -  
NES 1- 09 CALORIFIER "A"  
NES 1- 10 H.W. CIRC P/P #1

**NONESSENTIAL MCC #2:**

NES 2-1 L.O. PURIFIER -  
NES 2-2 F.O. PURIFIER -  
NES 2-3 EVAPORATOR S.W. P/P, STBD M/E -  
NES 2-4 EVAPORATOR F.W. P/P, STBD M/E -  
NES 2-5 SPARE -  
NES 2-6 OILY WATER BILGE P/P –  
NES 2-7 HANGER AIR COMPRESSOR  
NES 2- 8 CALORIFIER "B" -H.W. CIRC P/P #2 -  
NES 2- 9 H.W. CIRC P/P #2 -

**ACCOMODATION VENT. MCC:**

NES 3-1 ACCOMODATION SUPPLY FAN -  
NES 3-2 ACCOMODATION EXHAUST FAN -  
NES 3-3 GALLEY EXHAUST FAN -  
NES 3-4 TOILET EXHAUST FAN, FOCSLE/LOWER DECK -  
NES 3-5 TOILET EXHAUST FAN, MAIN DECK AFT -  
NES 3-6 FORWARD TOILET EXHAUST FAN -  
NES 3-7 SPARE -  
NES 3-8 SPARE –

**EMERGENCY GENERATOR:**

SWITCHBOARD BREAKER -  
GENERATOR ARMATURE T0 -  
T1 -  
T2-  
T3 -  
EXCITER FIELD –  
EMERGENCY FEEDBACK BREAKER -  
EMERGENCY GENERATOR TIE-IN BREAKER -  
SHORE POWER BREAKER –

**460 VAC/3 PHASE EMERGENCY DISTRIBUTION:**

EMS 1 TRANSFORMER 460/115V -  
EMS 1A SEARCHLIGHT -  
EMS 2 EMERGENCY FIRE P/P -  
EMS 3 BILGE P/P -  
EMS 4 W/T DOOR XFMR FOR INDICATORS -  
EMS 5 EMERGENCY MCC -  
EMS 6 EMERGENCY STEERING GEAR -  
EMS 7 STEERING GEAR TRANSFER PANEL -  
EMS 8 SPARE -  
EMS 9 SPARE -  
EMS 10 EMERGENCY GENERATOR J.W. HEATER -  
EMS 11 SPARE –

**EMERGENCY MCC:**

EMS 5-1 SPARES -  
EMS 5-2 HANGAR DOOR MECHANISM -  
EMS 5-3 BOAT DAVIT, PORT -  
EMS 5-4 BOAT DAVIT, STBD -  
EMS 5-5 HANGER TRACK HEATING  
EMS 5-6 SPARES –

**115 VAC/3 PHASE EMERGENCY DISTRIBUTION:**

E 1 NAV AIDS PANEL #1 -  
E 2 W/H & FOCSLE DK EMERGENCY LIGHTING -  
E 3 MAIN DK EMERGENCY LIGHTING -  
E 4 MACHINERY SPACES EMERGENCY LIGHTING -  
E 5 MISC ALARM/MONITORING & CONTROL PWR BATT CHGR -  
E 6 PORT SSG & M/E CONTROLS BATT CHGR -  
E 7 STBD SSG & M/E CONTROLS BATT CHGR -  
E 8 "B" BANK NAV/COMM BATT CHGR -  
E 9 FRC & L/B MISC POWER PANEL -  
E 10 FIRE ALARM SYSTEM -  
E 11 EMER. GEN. STARTING BATT CHGR -  
E 12 "A" BANK NAV/COMM BATT CHGR -  
E 13 SPARE PANEL, Q.M. STATION -  
E 14 UNDER-VOLTAGE TRIPS -

**PMC NAV LIGHTS PANEL:**

FOREMAST A - B -  
MAINMAST A - B -  
PORT A - B -  
STBD A - B -  
STERN A - B -  
FWD TOWING #1 A - B -  
FWD TOWING #2 A - B -  
AFT TOWING A - B -  
FWD ANCHOR A - B -  
AFT ANCHOR A - B -  
UPPER N.U.C. A - B -  
LOWER N.U.C. A - B -  
POWER A - B -  
SPARE A - B -

**PANELS BY DECKS****BRIDGE DECK****230 V HEATING PANEL #5:**

1 CHART ROOM -  
2 ARMS RM, COMPACTOR RM, BATTERY LK, HTR RELAY -  
3 W/H FWD HTR RELAY -  
4 RADIO RM & W/R -  
5 W/H STBD & PORT -  
6 20 A SPARE -  
7 15 A SPARE -

**115 V POWER & LIGHTING ES1-5:**

1 MOBILE STATELLITE PHONE -  
2 RECEPTACLES SRE DESK, LTS Rm 103 -  
3 RECEPTACLES W/H STBD & Rm 103, LTS W/H FWD -  
4 BRIDGE DK AFT LTS -  
5 F/L's FOCSLE DK FWD -  
6 PORT S/L -  
7 STBD S/L -  
8 F/L's BOAT DK AFT -  
9 RECEPTACLES CHARTROOM/STBD AFT BLKHD -  
10 LTS BRIDGE DK -  
11 REGULUS -  
12 OSL – ALDEBARAN 11 PORT SIDE

**230 V HEATED WINDOW & WIPER PANEL:**

- 1 HEATED WINDOWS #4, 5 & 6 -
- 2 15 A SPARE -
- 3 15 A STBD ECHO SOUNDER -
- 4 STBD BD LAN
- 5 HEATED WINDOWS #1, 2 & 3 -
- 6 15 A SPARE -
- 7 15 A SPARE -
- 8 WIPERS -
- 9 SPARE -
- 10
- 11 CLEARVIEWS P & S -
- 12 WIPER HEATERS -

**115 V NAVIGATION AIDS PANEL #1**

- 1 NAV LT CONTROL -
- 2 RECEPTACLES P & S/SKANTI-DATAHAIL -
- 3 ECHO SOUNDERS -
- 4 12V POWER SUPPLY CHART ROOM -
- 5 FAX/INMARSAT -
- 6 ELECTRIC LOG -
- 7 S- BAND TURNING UNIT -
- 8 LOUDHAILER/TALKBACK -
- 9 SPERRY RADAR -
- 10 EXICON VHF -
- 11 W/H-E/R ALARM -
- 12 RUDDER ANGLE INDICATOR -
- 13 RECEPTACLES, CHARTROOM FWD -
- 14 WHISTLE CONTROL -
- 15 UPS -
- 16 MORSE LT -
- 17 COMPUTER MONITOR COMM-
- 18 AUTO-PILOT ILL. -
- 19 CABLES\_UNKNOWN LEAD -
- 20 BRIDGE MASTER RADAR -

**115 V NAVIGATION AIDS PANEL #2:**

- 1 RECEPTACLES STBD WALL, SAILOR AM -
- 2 RECEPTACLES, PORT WALL Rm 101 -
- 3
- 4 15 A SPARE -
- 5
- 6 MAG. COMPASS LT -

**24 VDC NAV/COMM EQUIPMENT PANEL:**

- 1 SKANTI HF -
- 2 SKANTI HF -
- 3 GYROCOMPASS -
- 4 LORAN "C" -
- 5 SAILOR VHF -
- 6 FIRE DOOR PANEL -
- 7 CHART TABLE LT -
- 8 UNKNOWN LOAD -
- 9 SPARE -
- 10 ICS -



**12 VDC NAV/COMM PANEL #1:**

- 1 SKANTI -
- 2 SPARE -
- 3 SPARE -
- 4 SPARE -

**FOCSLE DECK****230 V HEATING PANEL #4:**

- 1 C/E's CABINS & W/R -
  - 2 CAPT's CABINS & W/R -
  - 3 2nd OFFICER, SNR F.O. -
  - 4 1st OFFICER, CHIEF OFFICER -
  - 5 FOCSLE DK W/R -
  - 6 20 A SPARE -
  - 7 EMERG. GEN. RM -
- 230 V Q.M. STATION POWER DIST. PANEL:
- 2 ISIS CHARGER -
  - 4 ISIS CHARGER –
  - 6 POWER SUPPLY TO FRIDGE COMPRESSOR –
  - 8 POWER SUPPLY TO FRIDGE COMPRESSOR –

**115 V Q.M. STATION POWER DIST. PANEL:**

- 1 STEAM HEATER CARGO HOLD -
- 2 WINDLASS SOLENOIDS -
- 3 STEAM REGULATING VALVE FAN ROOM -
- 4 SCIENTIFIC REQ. -

**115 V FOCSLE POWER & LIGHT ES1-6:**

- 1 RECEPTACLES FOCSLE S. FWD/ LTS Rm 200 -
- 2 RECEPTACLES/LTS Rm 206 & 207 -
- 3 RECEPTACLES/LTS Rm 206 & 207 -
- 4 RECEPTACLES Q.M. STN, BRIDGE DK P & S -
- 5 LTS, FOCSLE DK -
- 7 RECEPTACLES BRIDGE DK P & S, Rm 208 & 209 -
- 9 RECEPTACLES Rm 201, FOCSLE FWD, HALLWAY -
- 11 RECEPTACLES Rm 209/BRIDGE DK P., LTS Rm 209 -

**115 V W/H & FOCSLE EMERGENCY LIGHT PANEL E 2:**

- 1 E. LTS OFFICERS ACC/FOCSLE & BRIDGE STAIRS -
- 2 F/L's W/H TOP FWD -
- 3 E. LTS, BOAT DK -
- 4 F/L's BRIDGE DK MIDSHIPS -
- 5 F/L's FOCSLE DK MIDSHIPS -
- 6 E. LTS EMERG. GEN Rm, EXIT LTS Q.M. STN –
- 7. SARLIGHT –
- 8. GMDSS PONY PANEL ON BRIDGE –

**115 V FRC & L/B MISC POWER PANEL E 9:**

- 1 55 V RECEPT, S L/B -
- 2 RECEPT, TRASH COMPACTOR -
- 3 HANGAR LTS/RECEPTACLES -
- 4 55 V RECEPT, P L/B -
- 5 GALLEY FIRE SYS'T -
- 6 ISIS ALARM SYS'T SUPPLY -
- 7. FLOODLIGHTS FRC AREA –
- 8. LIFEBOAT AND FRC EMERG. LIGHTS –
- 9. FLOODLIGHTS WHEELHOUSE TOP AFT -

**115 V Q.M. STATION SPARE PANEL E 13:**

(ALL SPARE CIRCUITS)

**24 V DC DISTRIBUTION #1:**

- 1 GENERAL ALARM FUSE PANEL -
- 2 E. STOP SYS'T -
- 3 W/T DOORS -
- 4 TELEGRAPH -
- 5 EMERG. GEN. CONTROLS -
- 6 INSTRUMENT ILL. -
- 7 F/L's W/H TOP -
- 8 F/L's FRC P & S -

**MAIN DECK**

**460 V COMMISSARY POWER DIST. PANEL #2:**

- 1 GRILL -**
- 2 20 A SPARE -
- 3 DEEP FRYER -
- 4 BAKE OVEN -
- 5 40 A SPARE -
- 6 GALLEY RANGE -

**115/208 V COMMISSARY POWER PANEL #1**

- 2 MIXER -
- 8 HOT WATER DISP., OFFICER'S MESS -
- 10 POTATO PEELER -
- 13 SPARE -
- 14 FREEZER -
- 16 PROOFER OVEN -
- 17 SPARE
- 18 RECEPTACLE (FRIDGE) –
- 5 SEWAGE COMPARTMENT EXHAUST FAN –
- 11 SMOKE ROOM FAN –
- 12 UNKNOWN LOAD -
- 7 REFRIGERATOR-

**COMMISSARY POWER DIST. PANEL #3 - ES2**

- 1 TOASTER -
- 2 SPARE -
- 3 TOASTER -
- 4 FOSTER REFIGERATOR -
- 5 SPARE -
- 6 GARBARATOR 3Q -
- 7 SPARE -
- 8 DISHWASHER -
- 9 SPARE -
- 10 GALLEY AC UNIT -
- 11 SPARE -

**230 V HEATING PANEL #1:**

- 1 MCR -
- 2 PROG OFF CABIN 325 -
- 3 CABIN 319 & 321 -
- 4 WORKSHOP -
- 5 CABIN 320 & 322 -
- 6 CABIN 317 & 318 -

**230 V HEATING PANEL #2:**

- 1 OFFICER'S MESS -
- 2 CREW'S MESS (SMALL HTR) -
- 3 2nd COOK/CHIEF STEWARD -
- 4 GALLEY STEAM TABLE -
- 5 (ENGINEER'S OFFICE)
- 6 CREW'S LOUNGE -
- 11 CREW'S MESS (LARGE HTR) -

**230 V HEATING PANEL #3:**

- 1 SEAMAN COOK/ 2 SEAMEN, LWR DK. -
- 2 W/R #403, PROVISIONS Rm -
- 3 CABIN #405 -
- 4 CABIN #308 -
- 5 CABIN #303 -
- 6 W/R #304 -
- 7 BOSUN'S & STEWARD'S CABIN -
- 8 SEWAGE COMPT HTRS -
- 9 W/R #303, PAINT & LAMP Rm -
- 11 CABIN #406, STOREROOM -
- 12 FWD ROPE STORES HEATER -

**115 V WORKSHOP POWER DIST. PANEL ES1-3:**

- 1 WASHING MACHINE
- 2 RECEPTACLE S. AFT -
- 3 RECEPTACLE S. -
- 4 RECEPTACLE S. FWD -
- 5 SPARE -
- 6 SPARE -

**115 V MAIN DK POWER & LIGHT ES1-7:**

- 1 RECEPTACLES Rm #315, 321, 325 -
- 2 LTS 320, RECEPTACLES 316, LTS/RECEPTACLES 318 -
- 3 GALLEY RECEPTACLES -
- 4 LTS/RECEPTACLES Rm #308, 310, 314 -
- 5 WORKSHOP LTS, STBD HALLWAY RECEPTACLES -
- 6 LTS/RECEPTACLES Rm #324, 327 -
- 7 RECEPTACLES Rm #318, 320/LTS CO2 Rm, HALLWAY -
- 8 LTS/RECEPTACLES Rm #315, 317, 319, 321, 323 -
- 9 RECEPTACLES Rm #315, HALLWAY P & S -
- 10 GALLEY RECEPTACLES -
- 11 CREWS MESS FRIDGE AND ICE MACHINE -
- 12 GALLEY RECEPTACLE-
- 14 BLANK -
- 15 LTS GALLEY, Rm 313, 315 -
- 16 GALLEY RECEPTACLES -
- 17 SAPRE -
- 18 LTS MAIN DK, HALLWAY P, Rm #327/RECEPTACLES Rm #325, 326 -
- 19 RECEPTACLE HANGER-
- 20 HANGER RECEPTACLE -

**115 V MAIN DK POWER & LIGHT #2 ES1-8:**

- 1 SHIPS OFFICE -
- 2 RECEPTACLES Rm #307, LTS Rm #300, 304/ HEAT LAMP #2, Rm 304 -
- 3 RECEPTACLES OFFICER'S MESS, Rm 306, LTS Rm 309 -
- 4 LTS/RECEPTACLES Rm #301, 309; RECEPTACLES Rm #307, 309
- 5 RECEPTACLES HALLWAY, LTS E/R STRS. -
- 6 LTS/RECEPTACLES Rm #314 -
- 7 RECEPTACLES HALLWAY -
- 8 LTS HALLWAY, Rm #401 -
- 9 LTS/RECEPTACLES Rm #400 -
- 10 RECEPTACLES Rm #401 -
- 11 HEAT LAMP #1, Rm 304/LTS Rm #305, 310 -
- 12 EMERG LIGHT B/T COMPARTMENT, CARGO HOLD, ESCAPE HATCH

**230 V WORKSHOP POWER DIST. PANEL E2-3:**

- 1 SPARE -
- 2 DRYER #1 FWD -
- 3 DRYER #2 AFT -
- 230 V MAIN DL MISC DIST PANEL:
- 1 AUTRONICA -
- 2 MAHAK TORQUE -
- 3 LATHE
- 4 BOILER TREATMENT CHEM TANK

**115 V MAIN DK EMERGENCY LIGHT PANEL E 3:**

- 1 E. LTS, OFFICER'S MESS -
- 2 E. LTS MAIN DK AFT, MCR, WORKSHOP -
- 3 E. LTS, E 3 PNL CLOSET -
- 4 FUNNEL F/L's -
- 5 E. LTS HALLWAY, CREW'S MESS, LWR DK -
- 6 E. LTS MAIN DK FWD, HALLWAY, EXIT LTS -
- 8 E. LIGHTS MAIN DECK

## **LOWER DECK**

### **115 V MISC DIST. PANEL E/R: ESSI-9**

COUPLING START BLK, PORT -

1 G/B L.O. HTR -

2 ENGINE ROOM MONITOR-

3 STEERING FLAT RECEPTACLE -

4 MIG WELDER PLUG -

5 UNIT HTRS, AUX Rm/STEERING -

6 WATER QUALITY METERS -

7 UNIT HTRS, E/R -

8 CPP, MCR CONSOLE -

9 DRILL -

10 GRINDER -

11 OWS P/P -

12 DK MACHINERY SELECTOR SOLENOID -

13 B/T AUTO START PNL -

14 COUPLING START BLK, STBD -

15 B/T, MCR CONSOLE -

16 TELEGRAPH, CPP O.D. BOX -

### **24 V DC DIST #2:**

1 PORT S/S GEN CONTROLS -

2 PORT S/S GEN GOVERNOR -

3 PORT MAIN ENGINE CONTROL -

4 PORT M/E BLOCKING -

### **24 V DC DIST #3:**

1 STBD S/S GEN CONTROLS -

2 STBD S/S GEN GOVERNOR -

3 STBD MAIN ENGINE CONTROL -

4 STBD M/E BLOCKING -

## **TANK TOPS**

### **115 V MACH SPACES POWER & LIGHT ES1-10:**

1 E/R LIGHTING -

2 AUX RM/ ENGINEER STR LIGHTING -

3 LTS E/R, TUNNEL, HATCH COAMING, CHAIN LKR -

4 E/R LIGHTING -

5 LTS/RECEPTACLES, E/R -

6 LTS/RECEPTACLES PIPE TUNNEL, SEWAGE COMP'T -

7 LTS CARGO HOLD/HATCH -

8 FLUME TK DUMP V/V's -

9 CHLORINATOR -

10 E/R GAUGE LTS/E. LTS

11 GEN HTR PLUGS/RECEPTACLES -

12 BOILER FD P/P's -

### **115 V MACHINERY SPACES EMERGENCY LIGHTING PANEL E 4:**

1 E. LTS STEERING & AUX COMP'T -

2 STBD RECEPTACLES/LTS BELOW S/S GEN -

3 E. LTS, E/R -

4 LTS/RECEPTACLES, PIPE TUNNEL, SEWAGE COMP'T, B/T COMP'T -

5 WORK BENCH RECEPTACLE -

Spec item #: L-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Annual Electrical Thermo Image Scan		

## **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be for the contractor to address the requirements to survey the ship's electrical generators, switchboards and transformers (over 10 kVA) using Infrared Thermography as required by TCMS. Contractor shall include an allowance of \$2000 to correct any/all defects discovered during the thermo scan to be adjusted up or down as required by PWGSC 1379 action.
- 1.2** This work shall be carried out in conjunction with the Annual Insulation Testing.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

N/A

### **2.2 Standards**

- 2.2.1** All equipment connections shall be scanned in accordance and compliance with TCMS and TP 127E Ships' Electrical Standards.
- 2.2.2** Contract shall use certified equipment and produce imagery that is acceptable to TCMS.
- 2.2.3** CG Lockout Procedures, ISM Hotwork, Confined Space Entry and Fall Protection Procedures shall be strictly adhered.

### **2.3 Regulations**

- 2.3.1** Readings shall be recorded and acceptable according to the limits stated in TP 127 Electrical Code for ships.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and labor parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

Spec item #: L-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Annual Electrical Thermo Image Scan</b>		

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Contractor shall provide the services of a certified Infrared Thermographer who shall survey all required connections as identified by TCMS and the Chief Engineer.
- 3.1.3** The Contractor shall complete a thermal image scan of the Transformers (over 10 KVA).

Generator Breaker #1  
 Generator Breaker #2  
 Shore Power & Feedback Breaker  
 Main Switchboard 230 V bus  
 460V Essential Bus  
 460V Non-Essential Bus  
 115V Distribution Bus

- 3.1.4** Contractor shall include an allowance of \$2000 to correct any/all defects discovered during the thermo scan to be adjusted up or down as required by PWGSC 1379 action.
- 3.1.5** Contractor shall prepare a written report, detailing any defects or deficiencies discovered and the proposed corrective actions to the Chief Engineer and TCMS.
- 3.1.6** Chief Engineer shall supply contractor with a complete "Thermal Scan Chart" of all required connections upon request.

### **3.2 Location**

- 3.2.1.** Various locations throughout the vessel, Chief Engineer or his delegate will assist contractor with exact location.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

- 4.1.4.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

Spec item #: L-2	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Annual Electrical Thermo Image Scan</b>		

**4.2.3** Any repairs conducted shall be tested by the contractor and approved by both TCMS and the Chief Engineer before being considered complete.

### **4.3 Certification**

**4.3.1** The contractor shall provide current calibration certificates for all thermal imagery equipment used during testing.

**4.3.2** This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Once all repairs have been completed, the contractor shall provide the Chief Engineer with an image that is acceptable to the TCMS Inspector and the Chief Engineer not indicating any problem areas. (submit three (3) signed type written copies of the completed scan to the Chief Engineer prior to the completion of Refit. (Included shall be an IR Image and Normal Photographic Views of each deficiency ).Contractor to supply Chief Engineer and TCMS with both a typed and electronic copy of the report which shall also include readings taken and captured thermal imagery views.

### **5.2 Spares**

N/A

### **5.3 Training**

N/A

### **5.4 Manuals**

N/A



## Control Room, Main Switchboard

Cell #	Description	Inspected	Load	Result
1A	Generator # 1 Metering			
1B	Generator Controls			
1C	Generator # 1 Breaker			
2A	Generator # 2 Controls			
2B	Power Management System			
2C	Generator # 2 Breaker			
3A	Shore Power Metering			
3B	Tie breakers			
3C	460 Volt Breakers			
4A	Synchronizing Controls			
4B	Emergency Generator Metering			
4C	460 Volt Breakers			
5A	230 and 115 Volt Metering			
5B	115 Volt Breakers			
5C	230 Volt Breakers			
230 Volt Panel				

## Engine Room

Ships Service Generator # 1  
Ships Service Generator # 2

460 – 230 Volt Transformers, 3 X 25 kVA  
460 – 115 Volt Transformers, 3 X 20 kVA

## Emergency Generator Room

Emergency Generator, 238 kVA, 600 Volt.

Emergency Switchboard

1A	Emergency 600 Volt Dist.
1B	Aux Tie Breaker
1C	Bottom Termination Section
2A	Emergency Gen. Controls/Metering Yes
2C	Bottom Termination Section
3A	Metering Section
3B	Emergency 120 Volt Distribution
3C	Emergency 120 Volt Distribution

Emergency Transformers, 3 x 20 kVA (in Fan Room ) Yes

Spec item #: L-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Circuit Breaker Maintenance</b>		

## **Part 1: SCOPE:**

- 1.1** The intent of the specification shall be to perform annual maintenance on all vessel circuit breakers over 100kW and obtain Transport Canada certification for both Port & Stbd main Generator Breakers.

## **Part 2: REFERENCES:**

### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Port, Stbd & Emergency Generator Main Breakers, Merlin Gerin, M08 H2  
**2.1.2** Emergency Tie and Emergency Feed Back Breakers, Westinghouse, Series C, Type KD  
**2.1.3** Shore Power Breaker, Cutler Hammer, Series C, Type KD

### **2.2 Standards**

- 2.2.1** All work shall be carried out in accordance and compliance with TP 127E Ships' Electrical Standards.

### **2.3 Regulations**

- 2.3.1** Readings shall be recorded and acceptable according to the limits stated in TP 127 Electrical Code for ships.

### **2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.  
**3.1.2.** Contractor shall carry out annual maintenance on all the above mentioned breakers and do so in a manner that minimally impedes that normal operations of the vessels day to day activities.

Spec item #: L-3	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Circuit Breaker Maintenance</b>		

**3.1.3.** Annual maintenance to include, but not limited to the following items:

- i. Cleaning of circuit breakers
- ii. Testing of trip relays
- iii. Primary & Secondary Injection
- iv. Lubrication
- v. Checking for wear and alignment
- vi. Inspection of circuit break arc chutes

**3.1.3** All maintenance to be conducted to manufactures specifications.

**3.1.4** Breakers must be racked out and completely isolated from power prior to any work commencing on that breaker.

**3.1.5** Contractor shall report to Chief Engineer any defects found prior to repairs being carried out, any repairs or replacement will be adjusted by 1379 action.

**3.1.6** Contractor is responsible to arrange TC to inspect both port and stbd main generator breakers.

**3.1.7** After servicing, contractor shall prove all breakers operational in the presence of the Chief Engineer.

**3.1.8** Contractor shall include in quote allowance of \$3000.00 (Three thousand Dollars ) for required parts. This cost shall be adjusted up or down by 1379 action upon proof of invoice.

### **3.2 Location**

**3.2.1** Port & Stbd Generator Main Breakers, Emergency Feed Back Breaker and Shore Power Breaker are located in the machinery control room.

**3.2.2** Emergency Generator Main Breaker and Emergency Tie Breaker are located in the emergency generator room.

### **3.3 Interferences**

**3.3.1** Contractor is responsible for all interference items that maybe encountered.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of the Chief Engineer and TC inspector.

### **4.2 Testing**

- 4.2.1** Testing to be carried out by electrical contractor and Chief Engineer to be informed of any defects found.

### **4.3 Certification**

- 4.3.1** The contractor shall provide current calibration certificates for all meters used during testing.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

- 5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the work carried out and reading taken in this specification.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A

Spec item #: L-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Stbd Generator Alternator Overhaul		

**Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to prepare the alternator of the stbd generator set for inspection, cleaning and 5 year survey by TCMS.
- 1.2** This spec item to be carried out in conjunction with the overhaul of the Stbd Generator engine by Toromont Cat.

**Part 2: REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

- Caterpillar, Model #: SR4-B
- Serial #: 9FF01947
- Arrangement #: 9E-320

**2.2 Standards**

- 2.2.1** The ships' ISM Hot Work, Confined Space, Fall Protection and Lockout Procedures shall be adhered to at all times.

**2.3 Regulations**

- 2.3.1** The contractor performing the work on this system shall be fully certified to do so and shall be recognized by TC to certify this system.
- 2.3.2** The testing of this equipment and the automatic functions must be witnessed by the Chief Engineer and TCMS Inspector.
- 2.3.3** The testing shall be in accordance to TCMS regulations.

**2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, labor and parts required to perform the specified work unless otherwise stated.

Spec item #: L-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Stbd Generator Alternator Overhaul		

## **Part 3: TECHNICAL DESCRIPTION:**

### **3.1 General**

- 3.1.1.** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2.** Contractor to ensure the generator is “Locked Out” from starting air supply, fuel supply, electronic power supply and breaker is “Racked Out” prior to work commencing.
- 3.1.3.** Prior to starting any work on the alternator, the unit is to be meggered, air gaps measured and readings recorded.
- 3.1.4.** The unit is to be separated from the diesel engine; this to be completed in conjunction with contractor carrying out overhaul of the diesel.
- 3.1.5.** Contractor shall remove rotor from vessel to a certified contractors facilities for cleaning inspection, coating repairs as necessary, balancing and inspection by TCMS and Chief Engineer. Work on stator, same as above, to be completed in place unless deemed necessary to be removed for repairs.
- 3.1.6.** Bearing on rotor shaft to be replaced during reassembly, contractor supplied. Contractor shall bid an allowance of \$2000 for bearings / parts to be adjusted up or down by PWGSC 1379 action.
- 3.1.7.** Once reassembled unit is to be meggered and air gaps measured and recorded.
- 3.1.8.** Alternator to be re-coupled and re-aligned to the diesel in accordance with contractor conducting overhaul of diesel.
- 3.1.9.** During run up of the diesel, the alternator shall be monitored to ensure it is operating properly, electrical output to be measured and recorded, unit to be load tested for 1 hr.
- 3.1.10.** Contractor is responsible to arrange TCMS for all inspections.
- 3.1.11.** All work shall be completed to the satisfaction of Chief Engineer and TCMS.

### **3.2 Location**

- 3.2.1** Engine Room Stbd Side.

### **3.3 Interferences**

- 3.3.1** Contractor is responsible for all interference items that may require attention during the annual inspection.

Spec item #: L-4	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Stbd Generator Alternator Overhaul		

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

**4.1.1.** All work shall be completed to the satisfaction of TCMS and the Chief Engineer.

### **4.2 Testing**

**4.2.1** Function testing of the alternator shall be to the satisfaction of and witnessed by TCMS and Chief Engineer.

### **4.3 Certification**

**4.3.1** The contractor performing this recertification shall be certified to do so by TCMS. This inspection is to be carried out in order to obtain TCMS credit.

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Contractor to supply Chief Engineer with both a typed and electronic copy of the servicing/inspection / overhaul report.

### **5.2 Spares** N/A

### **5.3 Training** N/A

### **5.4 Manuals** N/A