



**CCGS W. Jackman**

**REFIT 2017**

**April 5<sup>th</sup> to May 1<sup>st</sup>**



Spec item #:	<b>SPECIFICATION</b>	TCMSB Field #:
<b>REFIT PREAMBLE</b>		

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<b>REFIT PREAMBLE</b>		

## **REFIT PREAMBLE**

### **1. INTENT**

The intent of this specification is to describe the necessary work involved in carrying out the ship's Annual Refit beginning April 5<sup>th</sup> and ending May 1<sup>st</sup>. All work specified herein and all repairs, inspections and renewals are to be carried out to the satisfaction of the Owner's Representative and, where applicable, the attending TC Marine Safety Inspector.

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

The overhaul and installation of all machinery and equipment specified herein shall be in accordance with 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 typewritten copies and one electronic copy shall be presented to the Owner's Representative and attending surveyors.

### **4. WORKMANSHIP**

The contractor shall use fully qualified, certified and competent tradesmen and supervision to ensure a uniform high level of workmanship. All work shall be subject to inspection by the Owner's Representative.

### **5. FACILITIES**

Quotation shall include all of the necessary labor and equipment required for the erection of access staging, rigging, lighting, tugs, pilot service, necessary cranes and line handling.

### **6. MATERIALS AND SUBSTITUTIONS**

Unless otherwise specified, all material is to be supplied by the contractor and all materials are to be new and unused. 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, the Owner's representative must approve all material offered.

### **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.

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

The contractor shall provide 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 in accordance with the manufacturer's instructions.

## **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.

## **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 oil and water residue, which accumulates in the machinery space bilge 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 ENCLOSED SPACES**

The contractor shall abide by the Coast Guard Enclosed Space Entry Policy. The policy is listed in the attached Safety Annex as section 7.D.9 and section 7.D.9 (N). Entry certificates shall clearly state the type of work permitted and shall renewed as required by the regulations.

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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 hotwork. 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 Hotwork Policy. The policy is listed in the attached Safety Annex as section 7.D.11 and section 7.D.11 (N). The contractor shall be responsible to ensure the contractor's personnel including any subcontractors shall follow the policy.

### **14. WELDING**

The primary contractor or subcontractor shall be certified by the Canadian Welding Bureau (CWB) to standard CSA W47.2M 1987, Division I, II or III - Certification of Companies for Fusion Welding of Aluminum. All welding shall be completed using Canadian Welding Bureau (CWB) Certified personnel and equipment. The required CWB certification must be in place for the appropriate material, personnel and process that is associated with this work.

### **15. 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.

### **16. 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 on 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. All other spaces metal tie-wrap to be used.

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## **17. 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 and in AutoCAD format. For example, drawings that have been lettered and dimensioned in a professional manner shall not to be updated using freehand. Prints and copies that a contractor is required to provide shall be made on one piece of paper.

## **18. 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.

## **19. OWNER'S REPRESENTATIVE**

Throughout this document, there is made reference to the Owner's Representative. For the purpose of this document, the Owner's representative is defined as the Chief Engineer of the Vessel, or in lieu of his/her presence, the Project Engineer, Small Vessels can be assumed to be the Owner's representative.

## **20. SEA TRIALS**

Prior to the completion of the refit, the vessel shall proceed on a one-hour sea trail with the Contractor's Representative on board. Results of the sea trail shall be documented by the Chief Engineer. Any noted deficiencies during the trial will be addressed.

Spec item #:	<b>SPECIFICATION</b>	TCMSB Field #:
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**VESSEL CHARACTERISTICS:**

**SHIP PARTICULARS:**

**DISPLACEMENT ..... 27.5 Tonnes**

**LENGTH OVERALL..... 15.77M (51' 9")**

**BEAM..... 5.18M (17')**

**FRAME SPACING..... Frame 0-3. 535mm (21")**  
**Frame 3-7. 575mm (23")**  
**Frame 7-23 650mm (25-1/2")**

Engines:

**Caterpillar 3408**

**Port: Arrangement # 7W7583 (530HP@ 2100RPM)**

**Stbd.: Arrangement # 7W7583 (530HP@ 2100RPM)**

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 01 SERVICES</b>		

**HD-01 SERVICES****Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to have the contractor provide services to the vessel while in dry-dock and afloat during the complete refit period and disconnected on termination of refit. Contractor shall supply all material to the point of onboard connection
- 1.2** This work shall be carried out in Conjunction with the following: Dry-docking

**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 N/A

**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 shall provide all the labor and material for the rigging of one contractor supplied boarding gangway complete with safety net and two handrails. The gangway shall be illuminated for safe use at night and shall be fitted to the satisfaction of the Commanding Officer.
- 3.1.2** Contractor shall provide electrical shore power of 240 volts ac single phase 100 amp. Contractor shall supply the power to the ship and connect from single-phase isolation transformer to 240/120 volt panel via the shore power plug. Contractor shall quote on supplying 2000 kilowatt hours and provide quote per additional kilowatt hour. Total kilowatt hours will be adjusted up or down by 1379 action at the conclusion of the refit. Meter readings shall be witnessed by owner rep. and contractor prior to connection and upon disconnection of the service. Contractor shall supply and install electrical meter for the ship during the refit period.

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 01 SERVICES</b>		

- 3.1.3.** Contractor shall provide fire protection for the vessel in the form of one hose 1 ½ inches in diameter, complete with approved fire nozzle, connected to a fully operable fire hydrant. The hose shall be long enough to reach all parts of the vessel. The hydrant shall have a wrench fitted at all times during the refit period.
- 3.1.4.** Contractor shall provide a suitable garbage container and empty it when it reaches 75% full. The contractor shall remove all refuse daily from the ship including all scale and sludge from tanks.
- 3.1.5.** Contractor shall quote on the disposal of 200 litres of oily water mixture from tanks and bilges. The contractor shall quote cost per each additional 50 litre. The contractor shall retain the services of a qualified disposal agent that shall comply with all provincial regulations and provide certification of proper disposal.
- 3.1.6.** Contractor shall supply and install deck protection Flooring Mask or equivalent to protect interior decks for the duration of the refit. The deck area is approximately 7.5 square meters.
- 3.1.7.** Contractor shall provide access for the vessels crew to washroom facilities including flush toilets and washbasins with hot and cold running water
- 3.1.8.** Contractor shall provide a location for use as an office by the Chief Engineer. The office shall be equipped with a desk and office style chair. The office shall be equipped with a phone. The office shall be equipped with a computer with internet and a printer (Windows 98 or higher). Contractor shall provide access to a fax machine.
- 3.1.9.** The successful bidder shall prepare and present a plan which outlines what action(s) will be taken in the event of a fire or unauthorized access
- 3.1.10.** At the end of the refit the contractor shall clean the vessel (bilge, decks, deck heads, bulkheads and all equipment) to the satisfaction of the owner's representative.
- 3.2 Location**
- 3.2.1** N/A
- 3.3 Interferences**
- 3.3.1** Contractor is responsible for the identification of interference items, their temporary removal, storage and refitting to vessel.

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

##### **4.1 Inspection**

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 01 SERVICES</b>		

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

**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** N/A

**5.2 Spares**

**5.2.1** N/A

**5.3 Training**

**5.3.1** N/A

**5.4 Manuals**

**5.4.1** N/A

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 02 PRODUCTION CHART</b>		

## **HD-02 PRODUCTION CHART**

### **Part 1 - SCOPE**

- 1.1** The intent of this specification shall be to have contractor provide a Microsoft Project production chart showing the start and completion dates for each item of work.
- 1.2** This work shall be carried out in Conjunction with the following:

### **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** N/A

**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.** The successful contractor shall supply three copies of a detailed bar chart showing the planned work schedule for the ships refit. These Microsoft Project charts shall be presented to the Chief Engineer upon the ships arrival at the Contractors premises. The bar charts shall show for each specific item, the start date, the manpower loading, the duration and the completion date. The contractor shall email a detailed bar chart to the Vessel Maintenance Manager Craig Barrett ([Craig.Barrett@dfo-mpo.gc.ca](mailto:Craig.Barrett@dfo-mpo.gc.ca)) upon arrival at Contractors premises.
- 3.1.2.** The production charts shall be updated weekly to reflect the actual production on the refit and changes to the anticipated completion dates of each individual specification item.

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 02 PRODUCTION CHART</b>		

**3.1.3.** Three copies of each weekly update shall be given to the Chief Engineer prior to each weekly production meeting. A copy shall be emailed to the VMM weekly.

**3.1.4.** Contractor shall include on the updates to the production chart any work arising from PWGSC 1379 action.

**3.1.5.** Contractor must immediately notify Chief Engineer if there is a potential ferit delay because of known work arising.

### **3.2 Location**

**3.2.1** N/A

### **3.3 Interferences**

**3.2.2.** Contractor is responsible for the identification of interference items, their temporary removal, and 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** N/A

### **4.3 Certification**

**4.3.1** N/A

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** N/A

### **5.2 Spares**

**5.2.1** N/A

### **5.3 Training**

**5.3.1** N/A

### **5.4 Manuals**

**5.4.1** N/A

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 03 HULL INSPECTION &amp; PAINTING</b>		

## **HD-03 HULL INSPECTION AND PAINTING**

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

- 1.1** The intent of this specification shall be to have contractor Hydro blast (1500-2000 psi) and completely clean the Aluminum Hull from the keel to the main deck, including both rudders and trim tabs. (The contractor shall bid on a total hull area of 112 sq.) meters.

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

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

##### **2.1.1 Contractor supplied stencils:**

- a) 2 Coast Guard 6 inch letters
- b) 2 Garde cotiere 6 inch letters
- c) 2 Fisheries and Oceans 3 inch
- d) 2 Peches et Oceans 3 inch
- e) 4 Canada
- f) 2 of 6 inch Maple Leafs

#### **2.2 Standards**

- 2.2.1** All coatings to be applied according to manufacturer's specifications.

#### **2.3 Regulations**

- 2.3.1** N/A

#### **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 shall inform Chief Engineer prior to starting work.

- 3.1.2** All staging , cranes, screens, lighting, shelter, heaters and any other support services, equipment, paint and materials necessary to carry out these specs. Shall be contractor supplied. The entire hull of the ship from the keel to the main deck, including both rudders and trim tabs shall be Hydro blasted and scraped clean of all marine growth and shall be water washed (1500-2000 psi) to remove any soluble salts

- 3.1.3** The hull shall be inspected by the contractor, Vessel Maintenance Manager and Chief Engineer and any areas of damaged hull coating shall be identified.

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 03 HULL INSPECTION &amp; PAINTING</b>		

- 3.1.4** Contractor shall include in bid repairs to 100 ft<sup>2</sup> of Hull coating. Contractor shall quote on unit cost per additional ft<sup>2</sup>. Any repair or application of damaged hull coating will be adjusted up or down by 1379 action.
- 3.1.5** Sea bay grids are to be protected during the application of coating and orifices shall be proved original diameter before undocking
- 3.1.6.** Contractor shall Hydro blast (1500-2000 psi) or mechanical buff the entire hull to SP-3 in preparation for the antifouling coating and CG red coating to be applied up to the main deck level.
- 3.1.7.** Contractor shall supply and apply the following coatings as per manufactures specifications:
- (a) 1 coat of Amercoat ABC # 4 Antifouling Red @3-4 mils DFT. to Underwater area only including rudders and trim tabs. The contractor shall bid on 72 sq. meters and include unit cost per sq. meter
  - (b) 1 coat of Amershield Polyurethane CG Red @ 3-4 mils DFT. Waterline to main deck. The contractor shall bid on 40 sq. meters and include unit cost per sq. meter.
  - (c) 1 coat of Amershield Polyurethane White & Black @ 3-4 mils. The CG white hull stripe with black outline
- 3.1.8.** Contractor shall reapply all draft markings using contractor supplied white paint (Amershield Polyurethane)
- 3.1.9.** Contractor shall supply and apply new Coast Guard self-adhesive white/Black vinyl lettering for the vessel markings as per original.
- 3.1.10.** Contractor shall reapply the vessel names and port of registry using contractor supplied white paint (Amershield Polyurethane) and stencils.
- 3.2 Location**
- 3.2.1** N/A
- 3.3 Interferences**
- 3.3.1** Contractor is responsible for the identification of interference items, their temporary removal, and storage and refitting to vessel.

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 03 HULL INSPECTION &amp; PAINTING</b>		

**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** N/A

**4.3 Certification**

**4.3.1** N/A

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

**5.1.1** Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

**5.2 Spares**

**5.2.1** N/A

**5.3 Training**

**5.3.1** N/A

**5.4 Manuals**

**5.4.1** N/A

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 04 DRYDOCKING</b>		

## **HD-04 DRY DOCKING**

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

- 1.1** The intent of this specification shall be to have contractor provide all equipment and services necessary to safely dock and undock the vessel.

### **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** N/A

#### **2.4 Owner Furnished Equipment**

**2.4.1** 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 shall provide all equipment and services necessary to dock and undock the vessel. Contractor shall be responsible to dock and undock the vessel using a certified Docking Master or other qualified person approved by the owners representative.

**3.1.2.** Contractor shall quote on the unit cost per day.

**3.1.3.** Contractor shall be responsible for the handling of all ships lines.

**3.1.4.** Contractor shall ensure that docking is in accordance with docking plan. Contractor shall reference the Docking Plan from the Chief Engineer on board the vessel.

**3.1.5** N/A.

#### **3.2 Location**

**3.2.1** N/A

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 04    DRYDOCKING</b>		

### 3.3 Interferences

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

## Part 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

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

### 4.2 Testing

**4.2.1** N/A

### 4.3 Certification

**4.3** N/A

## Part 5: DELIVERABLES:

### 5.1 Drawings/Reports

**5.1.1** Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

### 5.2 Spares

**5.2.1** N/A

### 5.3 Training

**5.3.1** N/A

### 5.4 Manuals

**5.4.1** N/A

Spec item #: HD-05	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 05 PROPELLER SERVICE</b>		

## **HD-05 PROPELLER SERVICE**

### **Part 1: SCOPE**

**1.1** The intent of this specification shall be to have the contractor remove, service and replace vessel propellers

**1.1.2** This work shall be carried out in Conjunction with the following: HD-04 Dry-docking

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

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

#### **2.2 Standards**

#### **2.3 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** The contractor shall remove both propellers (Hawboldt Mega five bladed propellers)

**3.1.2.** The contractor shall remove after inspection by C/E both propellers from the vessel and shall transport the propellers to/from Atlantic Propeller Repair, 12 Kyle Avenue, Donovans Industrial Park Mount Pearl. Contact: Earl Latham. Ph. 7479200

**3.1.3** The contractors bid shall include an allowance of \$2500.00 for the refurbishment and shipping of 2 propellers. The actual amount will be adjusted using PWGSC-1379 after the propellers are repaired. Allowance is for propeller service only.

**3.1.4** Contractor shall include in bid price costs to transport propellers to and from Atlantic Propeller.

**3.1.5** The Contractor shall re-install the propellers using 2 new 3/8 stainless steel bolts and locking wire on the Propeller cone.

Spec item #: HD-05	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 05 PROPELLER SERVICE</b>		

**3.1.6** Vessel to have dock and sea trials to ensure props installed properly.

**3.2 Location**

**3.2.1.** Fitted on tail shafts.

**3.3 Interferences**

**3.3.1** Contractor is 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.

**4.2 Testing**

N/A

**4.3 Certification**

N/A

**Part 5: DELIVERABLES:**

**5.1 Drawings/Reports**

**5.1.1** Two written & one electronic reports of all work carried out in this specification.

**5.2 Spares**

N/A

**5.3 Training**

N/A

**5.4 Manuals**

N/A

Spec item #:HD-06	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 06 STEERING OIL COOLERS</b>		

## **HD-06 STEERING OIL COOLERS**

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

- 1.3** The intent of this specification shall be to have the contractor clean the steering oil cooler and reseal at joins, associated piping from the main engine sea water discharge.
- 1.4** This work shall be carried out in Conjunction with the following: HD-04 Drydocking

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

**2.5 Guidance Drawings/Nameplate Data**

**2.6 Standards**

**2.7 Regulations**

**2.8 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:**

**3.2 General**

- 3.1.1.** The contractor shall remove both ends of the steering oil cooler and shall clean the tube stack.
- 3.1.2.** The contractor shall disassemble all ½” stainless steel piping from cooler to port and stbd main engine sea water supply and refasten using approve pipe sealer at all joins. System includes 30’ of piping with 30 joiners.
- 3.1.3.** The contractor shall reassemble the cooler ends using new gaskets, anodes and two ½ inch threaded street elbows – supplied by Chief Engineer.
- 3.1.4.** Vessel to have sea trials to ensure cooler and affected piping all sound.

Spec item #:HD-06	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 06 STEERING OIL COOLERS</b>		

### 3.4 Location

3.2.2. Fitted on aft bulkhead engine room.

### 3.5 Interferences

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

## Part 4: PROOF OF PERFORMANCE:

### 4.2 Inspection

4.1.3. All work shall be completed to the satisfaction of the Chief Engineer.

### 4.2 Testing

N/A

### 4.3 Certification

N/A

## Part 5: DELIVERABLES:

### 5.5 Drawings/Reports

### 5.6 Spares

N/A

### 5.7 Training

N/A

### 5.8 Manuals

N/A

Spec item #: HD-07	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 07 SEA BAY CLEANING AND PAINTING</b>		

## **HD-07 SEA BAY CLEANING AND PAINTING**

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

- 1.1** The intent of this specification shall be contractor open up, clean and paint the three sea bays. Contractor shall bid on a total area of 1 sq. meter and provide the unit cost per 0.5m<sup>2</sup>.
- 1.2** This work shall be carried out in Conjunction with the following: HD-04 Dry-docking & HD-03 Hull Inspection & Painting

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

- 2.1 Guidance Drawings/Nameplate Data**
  - 2.1.1** N/A
- 2.2 Standards**
  - 2.2.1** All coatings to be applied according to manufacturers' specs
- 2.3 Regulations**
  - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
  - 2.4.1** 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 shall inform Chief Engineer prior to starting work.
  - 3.1.2** Contractor shall remove the sea bay grids and water blast the sea boxes and grids.
  - 3.1.3** Contractor shall ensure that the slotted holes in the grids are punched clean.
  - 3.1.4** Contractor shall have Chief Engineer inspect sea bays prior to applying coating.
  - 3.1.5** Contractor shall supply and apply the same paint coatings as outlined for the underwater hull, 1 coat of Amercoat ABC # 4 Antifouling Red @3-4 mils DFT.as per manufactures specifications.
  - 3.1.6** Contractor shall replace the sea bay grids using new 316 stainless steel fasteners and locking wire.

Spec item #: HD-07	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 07 SEA BAY CLEANING AND PAINTING</b>		

### 3.2 Location

3.2.1 Port main suction @ Frames 12 – 13

3.2.2 Stbd. Main suction @ Frames 12 – 13

3.2.3 Fire Pump suction @ Frames 8 – 9

### 3.3 Interferences

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

## Part 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

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

### 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 Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

### 5.2 Spares

5.2.1 N/A

### 5.3 Training

5.3.1 N/A

### 5.4 Manuals

5.4.1 N/A

Spec item #: HD-08	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 08 PIPELINE INSPECTION</b>		

## **HD-08 PIPE LINE INSPECTION**

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

- 1.1.1** The intent of this specification shall be to have the contractor visually inspect the sea water and bilge piping for visual signs of corrosion on the outside.
- 1.2** This work shall be carried out in Conjunction with the following: HD-04 Drydocking

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

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

- 2.1.1** VBBB1\_92-100-02 Piping Arrangement Sea Water System  
VBBB1\_92-100-03 Piping Arrangement Bilge & Fire Systems

#### **2.2 Standards**

- 2.2.1** N/A

#### **2.3 Regulations**

- 2.3.1** N/A

#### **2.4 Owner Furnished Equipment**

- 2.2.1** 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 shall inform Chief Engineer prior to starting work.
- 3.1.2** Contractor shall visually inspect all sea water piping and bilge piping for signs of corrosion and deterioration while piping in existing locations as identified by Chief Engineer.
- 3.1.3** The contractor shall inform Chief Engineer any defects found with piping.
- 3.1.4** Contractor shall include in quote (20) twenty hours for the inspection, removal and installation of pipes. If piping is to be replaced cost of new piping shall be covered by PWGSC 1379 action.
- 3.1.5** The contractor shall pressure test new pipes at 20 psi, which must be witness by Chief Engineer.

Spec item #: HD-08	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 08 PIPELINE INSPECTION</b>		

**3.1.6** Contractor shall reinstall pipe using new contractor supplied stainless steel bolts and new approved gasket..

**3.2 Location**

**3.2.1** The piping is located on both sides of engine room and the bilge spaces.

**3.3 Interferences**

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

**Part 4: PROOF OF PERFORMANCE:**

**4.1 Inspection**

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

**4.2 Testing**

**4.2.1** All new piping shall be pressure tested at 20 psi for a 10 minute period prior to installation..

**4.3 Certification**

**4.3.1** N/A

**Part 5: DELIVERABLES:**

**5.1 Drawings/Reports**

**5.1.1** Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

**5.2 Spares**

**5.2.1** N/A

**5.3 Training**

**5.3.1** N/A

**5.4 Manuals**

**5.4.1** N/A

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
HD - 9		ZINC ANODES

**HD-09 ZINC ANODES****Part 1: SCOPE:**

- 1.1** The intent of this specification shall be contractor to remove existing anodes and replace with new sacrificial zinc anodes on the hull, the rudders, the trim tabs and the tail shafts. Anodes will not be applied until vessel is ready to be put back in the water.
- 1.2** This work shall be carried out in Conjunction with the following: HD-04 Dry-docking & HD-03 Hull Inspection & Painting

**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 N/A

**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 shall inform Chief Engineer prior to starting work.

**3.1.2** Contractor shall supply and install 12 zinc anodes.

**3.1.3** Contractor shall supply all stainless steel fasteners to secure all anodes.

**3.2.1 Location**

- 3.2.1**
- a) 2 anodes bolted to the transom 9x6x1 ½ in.
  - b) 2 anodes bolted to the keel teardrop shape 3x9x1 ¼ in.
  - c) 2 anodes installed between frames 7& 13 teardrop shape 3x9x1 ¼ in.
  - d) 1 anode on each trim tab 6 ½ in circ.
  - e) 2 anodes installed on collars on each shaft 2 ¾ in. inside diameter.

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
HD - 9		ZINC ANODES

### 3.3 Interferences

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

### Part 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

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

#### 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** Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

#### 5.2 Spares

**5.2.1** N/A

#### 5.3 Training

**5.3.1** N/A

#### 5.4 Manuals

**5.4.1** N/A

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 10 TAILSHAFT REMOVAL &amp; INSPECTION</b>		

## **HD- 10 TAILSHAFT REMOVAL AND INSPECTION**

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

- 1.1 The intent of this specification shall be to have the contractor remove, inspect and re-install vessel tail shafts.
- 1.2 This work shall be carried out in Conjunction with the following: Dry docking

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

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

VBBB1\_190-100-04\_SHAFTING ARRANGEMENT  
 190-100-05 STRUT  
 191-100-01 RUDDER STOCK ASSEMBLY

#### **2.2 Standards**

#### **2.3 Regulations**

#### **2.4 Owner Furnished Equipment**

- a. 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 shall inform Chief Engineer prior to starting work.
- 3.1.2 Contractor shall confirm with Chief Engineer that all affected systems are isolated locked out and tagged prior to starting work.
- 3.1.3 Contractor shall inform and arrange Transport Canada Marine Safety Inspector for inspection of this work as per Division 3 Report.
- 3.1.4 Contractor shall remove the Port and Starboard rope guard to measure and record the amount of Tail Shaft Bearing wear down for the Port and Starboard shafts prior to shaft disassembly. A Type written copy of measurements to be provided to Chief Engineer and vessel maintenance manager prior to removal of the Propeller shafts.

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 10 TAILSHAFT REMOVAL &amp; INSPECTION</b>		

- 3.1.5** Contractor shall remove the Port and Starboard Rudder to facilitate removal of the propeller shafts assemble and reinstall rudders after work is completed. Rudderstock shall be supported in steering gear compartment when rudder is removed by chain fall to ensure complete weight not on seal and reinstall when work is completed.
- 3.1.6** Contractor is to remove the Port & Starboard propeller shaft to gearbox coupling and disconnect the pitch actuator rod and all other items in order for Propeller shaft removal. Measurements shall be taken prior to disconnection.
- 3.1.7** Contractor shall disconnect Lo-Rez flex coupling from shaft. Chief Engineer has the manual in his office.
- 3.1.8** Contractor shall remove grounding brush/ reinstall after shaft is installed in ship.
- 3.1.9** Contractor shall take and record the bearing measurements vertical and horizontal in three positions on the inboard and outboard bearings for the Port & Starboard shaft bearings. Two Type written copies and one electronic copy to be provided to Chief Engineer prior to work proceeding.
- 3.1.10** Contractor shall take and record measurements on the Port and Starboard shaft in three positions vertical and horizontal at the location on the shafts where the shaft is rotating on the Thordon bearings.
- 3.1.11** Contractor shall give Chief Engineer a copy of the Port and Starboard Shaft Bearings measurements when the measurements are taken.
- 3.1.12** Contractor shall include in quote the cost to remove the existing shaft Thordon bearing on the port and starboard side and install new owner supplied propeller shaft Thordon bearings. Contractor shall break down quote per side.
- 3.1.13** Contractor shall include all cost for the machining of the new bearings. Contractor shall quote per side for credited purpose if work is not required.
- 3.1.14** Contractor shall transport the Port & Starboard propeller shaft to machine shop to remove existing propeller. Contractor shall include all transportation and crane charges in quote for propeller shaft to and from Machine shop. Contractor shall include in quote machine shop to rotate the propeller shaft in the lathe to check for trueness. Contractor shall reinstall propeller.
- 3.1.15** Contractor shall replace the inside bulkhead mounted stuffing box Hawbolt packing with new for the Port and Starboard Shaft

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 10 TAILSHAFT REMOVAL &amp; INSPECTION</b>		

- 3.1.16** Contractor shall include in cost an allowance of 5000.00 the Services of Wartsilla FSR to install new owner supplied shaft bulk head seals for the Port and Starboard shafts. Contractor shall arrange Wartsilla FSR in advance.
- 3.1.17** The contractor shall hook up a pressurized water hose to the inside connection of the stern tube from inside the ship to confirm a sufficient water flow at the outside end of the stern tube from the Port and starboard Stern Tube and witnessed by Chief Engineer.
- 3.1.18** Contractor shall test steering in conjunction with Bridge, steering gear compartment and looking at rudders for correct operation prior to ship undocked.
- 3.1.19** All work shall be in accordance with the manufacturer's recommendations and to the satisfaction of TCMS Inspector and the Chief Engineer.
- 3.1.20** Contractor shall include in cost to carry out one hour dock trial and four hour sea trial.

## **1.2 Location**

- 1.2.1** Engine room

### **3.3.1 Interferences**

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

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

### **4.1 Inspection**

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

### **4.2 Testing N/A**

### **4.3 Certification N/A**

## **Part 5: DELIVERABLES:**

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

Spec item #: HD-10	<b>SPECIFICATION</b>	TCMSB Field #:
HD - 10 TAILSHAFT REMOVAL & INSPECTION		

- 5.1.1 Two written copies & one electronic copy of all work carried out in this specification including all readings.**
- 5.2 Spares N/A**
- 5.3 Training N/A**
- 5.4 Manuals N/A**

Spec item #: HD-11	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 11 LIFE RAFT SERVICING</b>		

## **HD-11 LIFE RAFT SERVICING**

### **SCOPE:**

#### **Part 1: Scope**

**1.1** The intent of this specification shall be to have contractor remove, (two of) six person life rafts from ship, and transport the rafts to an Original Equipment Manufacturer (OEM) authorized service centre for Transport Canada annual inspection. Contractor shall return life rafts to ship and install after inspection.

**1.2** This work shall be carried out in Conjunction with the following: Drydocking

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

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

**2.1.1** N/A

##### **2.2 Standards**

N/A

##### **2.3 Regulations**

**2.3.1**

##### **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 shall inform Chief Engineer prior to starting work.

**3.1.2** Contractor shall remove (two of ) six person life rafts from the vessel and safely transport the life rafts to an O.E.M authorized service center for Transport Canada Annual inspection. Contractor to have liferafts certification

**3.1.3** Contractor shall return life rafts to ship and when complete. Contractor shall include in quote all transportation costs and crane services to remove and install rafts on ship.

**3.1.4** Contractor shall install life rafts onboard ship in the respective locations and secure with new Transport Canada Approved Hydrostatic release mechanisms

Spec item #: HD-11	<b>SPECIFICATION</b>	TCMSB Field #:
<b>HD - 11 LIFE RAFT SERVICING</b>		

**3.1.5** Contractor shall have an allowance of allowance of \$ 2500.00 total for the OEM servicing of life rafts and replacement of hydrostatic releases mechanisms. This allowance may be adjusted up or down by 1379 action upon proof of OEM invoice.

### **3.2 Location**

**3.2.1** Fitted in cribbing on the freeboard deck, one forward and one aft.

### **3.3 Interferences**

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

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

### **4.1 Inspection**

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

### **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** Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

### **5.2 Spares**

**5.2.1** N/A

### **5.3 Training**

**5.3.1** N/A

Spec item #: E-1	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 1 VOID TANK INSPECTION</b>		

**E-1 VOID FUEL TANKS****Part 1: SCOPE:**

**1.1** The intent of this specification shall be to have the contractor remove covers and positive floatation foam from double bottom and saddle voids for inspection. These voids, 21 in total, will be opened up, gas freed and cleaned out for inspection and testing, witnessed by a Transport Canada Marine surveyor.

**1.2** This work shall be carried out in conjunction with the following: Drydocking

**Part 2: REFERENCES:**

**2.1 Guidance Drawings/Nameplate Data :** To be supplied by owner

**2.2 Standards**

**2.3 Regulations**

**2.4 Owner Furnished Equipment**

- a. 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** The contractor remove manhole/inspection covers in a safe manner from one DB void and two saddle voids in lavatory space, one DB void and four saddle voids in fwd survivor space, nine DB voids in engine room space, one DB void aft survivor space, three DB voids in Steering space. 21 spaces in total all having manhole covers.

**3.2.1** The contractor shall remove and store fitted equipment to gain access to the holes in the lavatory and fwd. survivor space saddle voids

**3.3.1** The contractor shall remove sealed displacement foam, which shall be tagged and returned to its original location upon completion of spec. The contractor shall identify any damaged bags and replace them with new. Any cost on replacement foam shall be raised as an extra and covered under PWGSC 1379

Spec item #: E-1	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 1 VOID TANK INSPECTION</b>		

**3.4.1** The Contractor shall store the removed bags in a secure, heated rodent free area. The space of approximate volume of 20 m cubed until ready for reinstall in vessel.

**3.5.1** The contractor shall clean all affected voids and have them air tested to the satisfaction of Transport Canada requirements.

**3.6.1** The contractor shall reinstall all foam that is in good condition and replace damaged with new.

**3.7.1** The contractor shall close up all the voids and install new gaskets to all the covers. All affected fitted equipment shall be restored to its original placement.

**3.8.1** Final closure cannot be completed until Transport Canada and Chief Engineer is satisfied with its inspection.

### **3.2 Location**

**3.2.1** Steering flat, aft survivor space, engine room, forward survivor space, lavatory space.

### **3.3 Interferences**

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

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

### **4.1 Inspection**

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

### **4.2 Testing N/A**

### **4.3 Certification N/A**

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

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

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

<i>Spec item #:</i> E-1	<b><i>SPECIFICATION</i></b>	<i>TCMSB Field #:</i>
E - 1 VOID TANK INSPECTION		

**5.4 Manuals N/A**

Spec item #: E-2	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E – 2 STBD. MAIN ENGINE FUEL LINE REPLACEMENT</b>		

## **E-2 REPLACE FUEL LINES**

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

**1.1** The intent of this specification shall be to have the contractor obtain the services of a Caterpillar FSR to replace eight ( 8 ) fuel lines and three ( 4 ) fuel flex lines on the Stbd. Main Engine.

**1.2** N/A

### **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** N/A

#### **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 shall inform Chief Engineer Prior to starting work.

**3.1.2** Contractor shall ensure with Chief Engineer all affected systems are isolated, locked out and tagged prior to starting work.

**3.1.3** Contractor shall arrange and provide services of Toromont Cat Field Service Representative. (FSR) to remove existing 8 fuel injector lines from high pressure pump to the injectors and replace with new owner supplied injector lines on Port Main Engine.

Spec item #: E-2	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E – 2 STBD. MAIN ENGINE FUEL LINE REPLACEMENT</b>		

**3.1.4** Contractor shall have Toromont cat supply and install 4 fuel flex hoses put as per existing flex lines.

- a) There are 3 flex fuel lines approximately 6 foot long and one line approximately 4 foot ¼ inch diameter with swivel ends fittings as per existing hoses.
- b) One flex line from main fuel filter housing to fuel transfer pump inlet.
- c) One flex line comes from fuel oil transfer pump to the roll over tank.
- d) One flex line comes from roll over tank to hand pump arrangement.
- e) One flex line comes from main fuel filter housing to fuel pressure switch.

**3.1.5** Contractor shall include in quote all costs regarding Toromont Cat FSR to carry out this work, including travel, hotel and all other expenses. No allowances provided.

**3.1.6** Contractor shall include in quote the cost for replacing 16 fuel injector line clamps and (16) clamp isolators on fuel injection lines. Any additional parts required will be covered by 1379 action upon proof of invoice.

**3.1.7** The FSR shall run up the Port Main Engine when vessel is put back in water and demonstrate to the Chief Engineer that there are no leaks.

**3.1.8** N/A

### **3.2 Location**

**3.2.1** Engine Room

### **3.3 Interferences**

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

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

### **4.1 Inspection**

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

### **4.2 Testing**

**4.2.1** N/A.

<i>Spec item #:</i> E-2	<b><i>SPECIFICATION</i></b>	<i>TCMSB Field #:</i>
E – 2 STBD. MAIN ENGINE FUEL LINE REPLACEMENT		

#### **4.3 Certification**

**4.3.1** N/A.

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

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

**5.1.1** Contractor shall provide Chief Engineer with two type written reports and one electronic copy of what work was carried out when work is complete.

**5.1.2** Spares

**5.1.3** N/A

##### **5.2 Training**

**5.2.1** N/A

##### **5.3 Manuals**

**5.3.1** Caterpillar 3408 marine service manual.

Spec item #: E-3	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 3 FUEL TANK GAUGES</b>		

**E-3 FUEL TANK GAUGES****Part: 1 SCOPE:**

**1.1** The intent of this specification shall be to have the contractor obtain the services of Pennecon Energy Technical Services to replace the owner supplied sending units on the port and stbd. side fuel tanks.

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

**2.1.1** Owner supplied Electrical Line 1 Drawing

**2.1.2** NA.

**2.2 Standards**

**2.2.1** N/A.

**2.3 Regulations**

**2.3.1** N/A

**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 shall inform Chief Engineer prior to starting work.

**3.1.2** Contractor shall ensure with Chief Engineer that systems are isolated, locked out and tagged prior to starting work.

**3.1.3** Contractor shall include in quote an allowance of \$1600.00 for Installation of new owner supplied fuel tank sending units by Jason Bourne of Pennecon Energy Technical Services. This cost shall be adjusted up or down by 1379 action upon proof of invoice.

Spec item #: E-3	<b><i>SPECIFICATION</i></b>	TCMSB Field #:
<b>E - 3 FUEL TANK GAUGES</b>		

**3.1.4** Contractor shall make all necessary repairs to the wiring system for the fuel gauges.

**3.1.5** Contractor shall supply and install all necessary additional parts to complete the repairs to the fuel gauge lights.

**3.1.6** Contractor shall demonstrate to the Chief Engineer that the lights are working properly and that the all pertaining systems are working properly.

### **3.2 Location**

**3.2.1** Wheel house

### **3.3 Interferences**

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

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

### **4.1 Inspection**

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

### **4.2 Testing**

**4.2.1**

### **4.3 Certification**

**4.3.1** N/A.

## **Part: 5 DELIVERABLES:**

### **5.1 Drawings/Reports**

**5.1.1** Chief Engineer shall provide the contractor with a clear drawing of the system.

### **5.2 Spares**

**5.2.1** N/A

### **5.3 Training**

**5.3.1** N/A

### **5.4 Manuals**

**5.4.1** N/A

Spec item #: E-4	<b>SPECIFICATION</b>	TCMSB Field #:
E - 4 PORT GEAR BOX ALARM		

## **E-5 PORT GEAR BOX ALARM**

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

- 1.1 The intent of this specification shall be to have the contractor obtain the services of a Marine Electrician to check out the alarm on the port gear box.
- 1.2 This work shall be carried out in Conjunction with the following: Drydocking

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

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

- a. 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**

- a. The contractor shall in form the Chief Engineer prior to starting work.
- b. The contractor shall ensure with the Chief Engineer that systems are isolated locked out and tagged prior to starting work.
- c. The contractor shall make all necessary repairs to wiring harness for the gear box low pressure alarm.
- d. The Contractor shall supply all necessary parts to complete the repair to the port gear box alarm.
- e. The contractor shall demonstrate to the Chief Engineer that the alarm is gone and that the low pressure alarm is not ringing in during idle on the main engine.

Spec item #: E-4	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 4 PORT GEAR BOX ALARM</b>		

### 3.2 Location

3.3.1 The port gear box pressure gauge is located in the engineers panel in the wheel house

### 3.3 Interferences

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

## Part 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

4.1.5. All work shall be completed to the satisfaction of the Chief Engineer. Contractor shall inspect the operation of trim tabs before and during sea trials.

### 4.2 Testing N/A

### 4.3 Certification N/A

## Part 5: DELIVERABLES:

### 5.5 Drawings/Reports

### 5.6 Spares N/A

### 5.7 Training N/A

### 5.8 Manuals N/A

<i>Spec item #:</i> E-5	<b><i>SPECIFICATION</i></b>	<i>TCMSB Field #:</i>
<b>E - 5 MAIN ENGINE THERMOSTAT REPLACEMENT</b>		

**E-6 REPLACE MAIN ENGINES THERMOSTATS****Part 1: SCOPE:**

- 1.1 The intent of this specification shall be to have the contractor obtain the services of a Caterpillar FSR to replace the thermostats in both main engines.
- 1.2 This work shall be carried out in Conjunction with the following: Drydocking & Sea Water Cooler Cleaning

**Part 2: REFERENCES:**

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

- a. 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**

- 3.2.1 The FSR shall remove the old thermostats from both main engines.
- 3.3.1 The FSR shall drain down both main engines and store engine coolant in a clean container as coolant is to go back in use
- 3.4.1 The FSR shall install new(2) new Contractor Supplied thermostats in both main engines
- 3.5.1 The FSR technician shall demonstrate that the thermostats are working well in both main engines during sea trials and there are no coolant leaks visible.

**Location**

- 3.2 The thermostats are located at the front of each main engine

Spec item #: E-5	<b><i>SPECIFICATION</i></b>	TCMSB Field #:
<b>E - 5 MAIN ENGINE THERMOSTAT REPLACEMENT</b>		

### 3.3 Interferences

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

## Part 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

4.1.6. All work shall be completed to the satisfaction of the Chief Engineer. FSR technician shall demonstrate to the Chief Engineer that the thermostats are working

### 4.2 Testing

N/A

### 4.3 Certification

N/A

## Part 5: DELIVERABLES:

### 5.1 Drawings/Reports

### 5.2 Spares

N/A

### 5.3 Training

N/A

### 5.4 Manuals

N/A

Spec item #: E-6	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 6 INSPECTION OF STARTING SYSTEM</b>		

## **E-6 MAIN ENGINES STARTER INSPECTION**

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

- 1.1 The intent of this specification shall be to have the contractor obtain the services of a FSR to check out the starting system on both Caterpillar main engines.
- 1.2 This work shall be carried out in Conjunction with the following: HD-04 Drydocking

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

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

#### **2.2 Standards**

#### **2.3 Regulations**

#### **2.4 Owner Furnished Equipment**

- a. 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**

- a. The FSR shall check the operation of each engine starting operation.
- b. The FSR shall check out the start button operation in the wheel house.
- c. The FSR shall diagnose why both main engines are starting slowly.
- d. The FSR shall run up both main engines and demonstrate to the Chief Engineer that both engines are starting properly.

Spec item #: E-6	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 6 INSPECTION OF STARTING SYSTEM</b>		

**3.2 Location**

**3.2.1** The Starting station is located in the engine room and also in the engineer's panel located in the wheel house.

**3.3 Interferences**

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

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

**4.1.7.** All work shall be completed to the satisfaction of the Chief Engineer. FSR shall demonstrate to the chief engineer prior to sea trials.

**4.2 Testing**

N/A

**4.3 Certification**

N/A

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

Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out when the work specification is complete.

**5.2 Spares**

N/A

**5.3 Training**

N/A

**5.4 Manuals**

N/A

Spec item #: E-7	<b>SPECIFICATION</b>	TCMSB Field #:
<b>E - 7 MAIN ENGINE SEA WATER COOLERS</b>		

## **E-7 MAIN ENGINES SEA WATER COOLERS**

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

- 1.1** The intent of this specification shall be to have the contractor remove both ends from main engine sea water coolers, clean and pressure tested to the satisfaction of owner rep.
- 1.2** This work shall be carried out in Conjunction with the following:  
HD-04 Drydocking and HD-03 Hull Inspection and Painting and& E-07 Main Engine Sea Water Coolers.

### **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** N/A

#### **2.4 Owner Furnished Equipment**

- b. 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 shall inform Chief Engineer prior to starting work.
- 3.1.2** Contractor shall ensure with Chief Engineer that all affected systems are isolated, locked out and tagged prior to starting work.

<i>Spec item #:</i> E-7	<b><i>SPECIFICATION</i></b>	<i>TCMSB Field #:</i>
<b>E - 7 MAIN ENGINE SEA WATER COOLERS</b>		

- 3.1.3** Contractor shall drain and store in clean containers, the jacket water coolant from both engines ( approx. 50 litres in each engine ) to allow for disconnection of piping to the heat exchangers
- 3.1.4** Contractor shall remove Port and Starboard main engine sea water coolers ends all piping required to clean coolers.
- 3.1.5** Contractor shall inform Chief Engineer for inspection of coolers when opened up and prior to cleaning.
- 3.1.6** Contractor shall assemble sea water coolers using new contractor supplied approved gaskets on the affected piping and new contractor supplied approved seals.
- 3.1.7** Contractor shall re-install the coolers using new contractor supplied anodes in the end covers.
- 3.1.8** Contractor shall supply and include in quote 8 gallons of Caterpillar Pre-mix antifreeze #238-8648 to make up for any spillage.
- 3.1.9** Contractor shall prepare and pressure test both coolers to manufactures specifications.

### **3.2 Location**

- 3.2.1** In Engine room outboard of the main engines

### **3.3 Interferences**

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

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

### **4.1 Inspection**

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

### **4.2 Testing**

- 4.2.1** As per manufactures specifications.

### **4.3 Certification**

Spec item #: E-7	<b>SPECIFICATION</b>	TCMSB Field #:
E - 7 MAIN ENGINE SEA WATER COOLERS		

4.3.1 N/A

## Part 5: DELIVERABLES:

### 5.1 Drawings/Reports

5.1.1 Contractor shall provide Chief Engineer with two type written reports and one electronic copy of what work was carried out when work is complete.

### 5.2 Spares

5.2.1 N/A

### 5.3 Training

5.3.1 N/A

### 5.4 Manuals:

5.4.1 N/A

Spec item #: L-01	<b>SPECIFICATION</b>	TCMSB Field #:
L - 01      Insulation Testing		

**L-01 INSULATION TESTING****Part 1: SCOPE:**

- 1.1 The intent of this specification shall be to have contractor conduct insulation testing on the main switchboard and on 8 circuit panels. Any readings below 2 Megs to be discussed with the owner's representative.
- 1.2 This work shall be carried out in Conjunction with the following: Drydocking

**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 N/A

**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 shall inform Chief Engineer prior to starting work.

3.1.2 Insulation testing to be carried out on the following:

3.1.1.1 Main switchboard (33 circuits)

3.1.1.2 240/120 vac shore power panel (14 circuits)

3.1.1.3 FWD power panel E-5 (10 circuits)

3.1.1.4 WH power panel E-1 (13 circuits)

3.1.1.5 12 VDC Nav panel E-3 (10 circuits)

3.1.1.6 24 VDC Nav panel E-2 (10 circuits)

3.1.1.7 24 VDC HVAC Power panel E-6 (6 circuits)

3.1.1.8 Power panel E-7 (12 circuits)

3.1.1.9 Nav light panel (10 circuits)

3.1.3 Contractor shall inform Chief Engineer immediately any readings below 2 Megs. Any repairs required may be corrected using 1379 action.

Spec item #: L-01	<b>SPECIFICATION</b>	TCMSB Field #:
L - 01		Insulation Testing

**3.2 Location**

- 3.2.1 Main switchboard in aft.cabin.
- 3.2.2 Shore power panel in Lazerette.
- 3.2.3 1 panel in fwd. cabin.
- 3.2.4 The others are all in the wheelhouse

**3.3 Interferences**

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

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

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

**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 Contractor shall provide Chief Engineer two type written copies and one electronic copy in a report of what work was carried out.

**5.2 Spares**

- 5.2.1 N/A

**5.3 Training**

- 5.3.1 N/A

**5.4 Manuals**

- 5.4.1 N/A

Spec item #: L-02	<b>SPECIFICATION</b>	TCMSB Field #:
<b>L – 02 FIRE DETECTION, CO SMOOTHING &amp; PORTABLE EXTINGUISHERS</b>		

## **L-02 FIRE DETECTION, CO SMOOTHING & PORTABLE EXTINGUISHERS**

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

- 1.1** The intent of this specification shall be to have the contractor obtain the services of a certified technician to test and ensure the correct operation of the smothering system and the fire detection system and 11 portable fire extinguishers. Contractor to recertify the above items to have expiry dates correspond with annual refit.
- 1.2** This is a Kidde Fenwal system with 2 cylinders and the fire detection panel is an Edwards System Technologies. This is to be carried out to the satisfaction of a Transport Canada Marine Surveyor.
- 1.3** This work shall be carried out in Conjunction with the following:
- 1.3.1** Drydocking.

### **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** N/A
- 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 shall inform Chief Engineer prior to starting work.
- 3.1.2** The contractor shall test the operation of each signal device, zone indication and alarm bell operation. Chief Engineer and Transport Canada Marine Safety Inspector shall witness all testing on the systems.
- 3.1.3** Contractor shall have the fire detection system, CO2 system and portable fire extinguishers inspected by certified Original Equipment Manufacturer (OEM) authorized service center.

Spec item #: L-02	<b>SPECIFICATION</b>	TCMSB Field #:
<b>L – 02 FIRE DETECTION, CO SMOOTHING &amp; PORTABLE EXTINGUISHERS</b>		

**3.1.4** Contractor shall have all items in this specification recertified for expiration date to correspond with the annual refit.

**3.1.5** Contractor shall arrange Transport Canada Marine Safety Inspector.

**3.1.6** The contractor shall tabulate the results and provide a copy of the results and a certificate of compliance to the Chief Engineer.

**3.1.4** All work shall be completed by a certified technician.

**3.2 Location**

- 3.2.1** a) CO2 bottles are on the outside aft. Deck.
- b) Fire detection panel is in the wheelhouse stbd. side.
- c) Heat sensors, smoke detectors and portable fire extinguishers are located all through the ship.

**3.2.2 Portable Fire Extinguisher**

Type	Location	Serial #:
a) Dry Chemical (5 lb – ABC)	Wheelhouse Aft	ZV-711001
b) Dry Chemical (2.5 lb - ABC)	Wheelhouse Fwd.	XC-473039
c) Dry Chemical (10 lb –ABC)	Fwd. Survivors Aft	ZV108900
d) Dry Chemical (5 lb -ABC)	Fwd. Survivors Fwd.	ZV-711251
e) Dry Chemical (5 lb – ABC)	Head	ZV-710981
f) Dry Chemical (5 lb – ABC	Engine Room Fwd.	ZV-710973
g) Dry Chemical ( 5 lb –ABC)	Engine Room Aft	ZV-710962
h) Dry Chemical (10 lb –ABC)	Aft Survivors Fwd.	ZV-108826
i) Dry Chemical (5 Lb – ABC)	Aft Survivors Aft	XY- 781581
j) Dry Chemical (5 lb -ABC)	Steering Gear	ZV-710949.
k) N/A.		

**3.3 Interferences**

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

**Part 4: PROOF OF PERFORMANCE:**

**4.1 Inspection**

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

Spec item #: L-02	<b>SPECIFICATION</b>	TCMSB Field #:
<b>L – 02 FIRE DETECTION, CO SMOOTHING &amp; PORTABLE EXTINGUISHERS</b>		

**4.2 Testing**

**4.2.1** N/A

**4.3 Certification**

**4.3.1** Contractor shall provide certificates of all inspections carried out.

**Part 5: DELIVERABLES:**

**5.1 Drawings/Reports**

**5.1.1** Contractor shall provide Chief Engineer with two type written copies of what work was carried out and when work was completed.

**5.2 Spares**

**5.2.1** N/A

**5.3 Training**

**5.3.1** N/A

**5.4 Manuals**

**5.4.1** N/A