



CCGS W. George

REFIT 2018

May 9th to June 27th



Spec item #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

Table of Contents

REFIT PREAMBLE 2

HD-01 SERVICES..... 7

HD-02 PRODUCTION CHART 10

HD-03 HULL INSPECTION AND PAINTING 13

HD-04 DRY DOCKING..... 16

HD-05 TRIM TAB CYLINDER OVERHAUL & CABLE REPLACEMENT 18

HD-06 HEAT EXCHANGER CLEANING AND PAINTING 20

HD-07 SEA BAY CLEANING AND PAINTING..... 22

HD-08 PIPE LINE INSPECTION 24

HD-09 ZINC ANODES 26

HD-10 FUEL TANK CLEANING 28

HD-11 LIFE RAFT SERVICING 29

HD-12 VOID TANK INSPECTION 31

HD-13 ALTERNATOR REPLACEMENT..... 35

HD-14 MAIN ENGINES OVERHAUL & INSPECTION 37

HD-15 GEARBOX INSPECTION..... 41

HD-16 DECK LIGHT REPLACEMENT..... 43

E-01 NEW ALARM PANEL INSTALL... 46

L-01 INSULATION TESTING 48

L-02 FIRE DETECTION, CO SMOTHERING & PORTABLE EXTINGUISHERS 50

Spec item #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

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 May 9th and ending June 27th. All work specified herein and all repairs, inspections and renewals are to be carried out to the satisfaction of the Chief Engineer 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.

Spec item #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

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.

Spec item #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

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.

Spec item #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

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 #:	SPECIFICATION	TCMSB Field #:
REFIT PREAMBLE		

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	SPECIFICATION	TCMSB Field #:
HD - 01 SERVICES		

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 two 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	SPECIFICATION	TCMSB Field #:
HD - 01 SERVICES		

- 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 to be adjusted by 1379. 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 7 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.

Spec item #: HD-01	SPECIFICATION	TCMSB Field #:
HD - 01 SERVICES		

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-02	SPECIFICATION	TCMSB Field #:
HD - 02 PRODUCTION CHART		

HD-02 PRODUCTION CHART

Part 1 - SCOPE

- 3.2.1** The successful contractor shall supply three hard copies to Chief Engineer and forward one electronic copy to the vessel's Senior Vessel Maintenance Manager Craig.Norman@dfo-mpo.gc.ca and to the PWGSC Contracting Officer that is assigned to this vessel.
- 3.2.2** The chart shall show for each specification item, the start date, the manpower loading, the duration, and the completion date. The Contractor shall include on the updates to the production chart any Work Arising from PWGSC 1379 action and indicate how the additional work will impact the completion schedule for the vessel.
- 3.2.3** A critical path of work shall be identified, which shows critical tasks that may delay the completion of the refit if they are not completed within the estimated time frame. The critical path may exist due to labor constraints or tasks that cannot be completed concurrently with other tasks.
- 3.2.4** If work arises that affects critical path, it shall be immediately brought to the attention of the Chief Engineer, VMM and PWGSC Contracting Officer. Every effort shall be made to prevent completion delay.

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

Spec item #: HD-02	SPECIFICATION	TCMSB Field #:
HD - 02 PRODUCTION CHART		

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 Norman (Craig.Norman@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.

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 for a delay because of unknown work arising.

3.2 Location

3.2.1 N/A

3.3 Interferences

3.3.2. 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

Spec item #: HD-02	SPECIFICATION	TCMSB Field #:
HD - 02 PRODUCTION CHART		

- 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	SPECIFICATION	TCMSB Field #:
HD - 03 HULL INSPECTION & PAINTING		

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 150 mm letters
- b) 2 Garde cotiere 150mm letters
- c) 2 Fisheries and Oceans 75mm
- d) 2 Peches et Oceans 75mm
- e) 4 Canada
- f) 2 of 150mm 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

Spec item #: HD-03	SPECIFICATION	TCMSB Field #:
HD - 03 HULL INSPECTION & PAINTING		

- 3.1.3** The hull shall be inspected by the contractor, NACE Inspector, Vessel Maintenance Manager and Chief Engineer and any areas of damaged hull coating shall be identified.
- 3.1.4** Contractor shall include in bid repairs to 112 m² of Hull coating. Contractor shall quote on unit cost per additional ft². 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:
- 3.1.7.1 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
- 3.1.7.2 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.
- 3.1.7.3 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	SPECIFICATION	TCMSB Field #:
HD - 03 HULL INSPECTION & PAINTING		

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	SPECIFICATION	TCMSB Field #:
HD - 04 DRYDOCKING		

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	SPECIFICATION	TCMSB Field #:
HD - 04 DRYDOCKING		

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	SPECIFICATION	TCMSB Field #:
HD - 05 TRIM TAB CYLINDER OVERHAUL & CABLE REPLACEMENT		

HD-05 TRIM TAB CYLINDER OVERHAUL & CABLE REPLACEMENT

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to have the contractor remove trim tab cylinders, have them refurbished with new seals and reinstall cylinders. Also install new indicator push-pull cables
- 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**

3.4.11 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 port and starboard trim tab hydraulic rams.
- 3.1.2 The contractor shall have the hydraulic rams refurbished by a certified hydraulic shop to the satisfaction of the owner's rep and reinstall.
- 3.1.3 The contractor shall ensure that the trim tab hydraulic circuit is fully operational and ensure trim tabs operate correctly before and during sea trials.
- 3.1.4 The contractor shall remove fitted push-pull cables for trim tab position indicators and install owner supplied cables
- 3.1.5 The contractor will have to remove fitted cable stay tab from the hull and reposition on the hull to accommodate the new cables. The tabs to be of new materials and welded to the hull.

Spec item #: HD-05	SPECIFICATION	TCMSB Field #:
HD - 05 TRIM TAB CYLINDER OVERHAUL & CABLE REPLACEMENT		

3.1.6 The tab to be of the same dimensions of the removed tab. (5cm x 14 cm x .635cm) marine grade aluminium

3.1.7 The contractor shall repaint the finished work to the same guidelines as hull painting spec HD- 3

3.2 Location

- a. Trim tabs are located on port and starboard aft of vessel.

3.3 Interferences

- a. 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. 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:

5.1 Drawings/Reports Supply 2 written and 1 electronic copy of report of all work carried out including hydraulic company reconditioning of the rams.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #:HD-06	SPECIFICATION	TCMSB Field #:
HD - 06 HEAT EXCHANGER CLEANING & PAINTING		

HD-06 HEAT EXCHANGER CLEANING & PAINTING

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to have the contractor remove main engine sea water coolers, have them cleaned and pressure tested to the satisfaction of owner rep.
- 1.2 This work shall be carried out in Conjunction with the following: Drydocking and HD-10

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 drain and store in clean containers, the jacket water coolant from both engines (approx: 350lt) to allow for disconnection of piping to the heat exchangers
- 3.1.2 The contractor shall remove port and stbd main engine sea water coolers and have them cleaned and air pressure tested to the satisfaction of chief engineer
- 3.1.3 The Contractor shall re-install the coolers using new gaskets in affected piping and new cooler seals and anodes in the end covers.
- 3.1.4 The contractor shall supply 8 gallons of Caterpillar Pre-mix antifreeze #238-8648 to make up for any spillage.
- 3.1.5 Contractor shall prepare and pressure test both coolers to manufacturers specifications

Spec item #:HD-06	SPECIFICATION	TCMSB Field #:
HD - 06 HEAT EXCHANGER CLEANING & PAINTING		

3.2 Location

3.2.1 In Engineroom, 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** Coolers must be pressure tested to manufacturers specifications to the satisfaction of the attending TC inspector and the Chief Engineer.

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 #: HD-07	SPECIFICATION	TCMSB Field #:
HD - 07 SEA BAY CLEANING AND PAINTING		

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 0.5m².
- 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 and NACE inspector, 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.

Spec item #: HD-07	SPECIFICATION	TCMSB Field #:
HD - 07 SEA BAY CLEANING AND PAINTING		

3.1.6 Contractor shall replace the sea bay grids using new 316 stainless steel fasteners and locking wire.

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 paint prep and coating shall be completed to the satisfaction of the Chief Engineer and attending owner supplied NACE 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 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	SPECIFICATION	TCMSB Field #:
HD - 08 PIPELINE INSPECTION		

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. Piping for inspection to be identified by Chief Engineer.
- 3.1.5** The contractor shall pressure test new pipes at 20 psi, which must be witness by Chief Engineer.

Spec item #: HD-08	SPECIFICATION	TCMSB Field #:
HD - 08 PIPELINE INSPECTION		

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-9	SPECIFICATION	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. Anodes must be protected until put back in the water from paint and grit blast.

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-9	SPECIFICATION	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	SPECIFICATION	TCMSB Field #:
HD - 10 FUEL TANK CLEANING		

Fuel Tank Cleaning

Part 1: SCOPE:

1.1 The intent of this specification shall be to have the contractor remove the remaining fuel from three fuel tanks and dispose of it in an approved way. These tanks will then be gas freed, opened up and cleaned out for inspection and testing to be 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

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 empty all three tanks and remove the manhole covers.

3.1.2 The contractor shall use the services of a chemist to make sure the tanks are safe for entry according to Coast Guard practices as outlined in the fleet safety manual. Confined space entry is required for anyone entering any confined space in the ship.

3.1.3 The contractor shall clean all sludge from the tanks. Contractor shall arrange for Transport Canada to inspect each fuel tank.

Spec item #: HD-10	SPECIFICATION	TCMSB Field #:
HD - 10 FUEL TANK CLEANING		

3.1.4 The contractor shall close up the tanks using contractor supplied gasket material after the Transport Canada Surveyor has it inspected.

4.1 Location

4.1.1 Port db fuel tank (1220 litres) cover is located in fwd cabin.
 Stbd. Db fuel tank (1220 litres) cover is located in fwd cabin
 Reserve db fuel tank (570 litres) cover is located in engine room

4.2 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.3 Inspection

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

4.4 Testing

N/A

4.5 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 #: HD-11	SPECIFICATION	TCMSB Field #:
HD - 11 LIFE RAFT SERVICING		

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 dated as close to end refit as possible usually last week of refit.

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.

Spec item #: HD-11	SPECIFICATION	TCMSB Field #:
HD - 11 LIFE RAFT SERVICING		

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

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 Provide safety certificates for inspections to be given to Chief Engineer.

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 #: HD-12	SPECIFICATION	TCMSB Field #:
HD - 12 VOID TANK INSPECTION		

Void Tank Inspection

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, wing and saddle voids for inspection. These voids, 43 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 shall 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.
- 3.1.2** The contractor shall remove inspection covers in a safe manner to access wing voids; 2 in steering flat, 4 in aft survivor space, 6 in engineroom, 6 in forward survivor space, 2 in lavatory and fore peak void, 22 spaces in total.

Spec item #: HD-12	SPECIFICATION	TCMSB Field #:
HD - 12 VOID TANK INSPECTION		

- 3.1.3 The contractor shall remove and store fitted equipment/panels to gain access to the inspection holes and reinstall all affected to pre refit condition.
- 3.1.4 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 a extra and covered under PWGSC 1379
- 3.1.5 The Contractor shall store the removed bags in a secure, heated area. The space of approx volume of 20 m cubed.
- 3.1.6 The contractor shall clean all affected voids and have them air tested at 10 psi for 30min or the satisfaction of owners rep and Transport Canada requirements
- 3.1.7 The contractor shall close up all the voids installing new gaskets to all the affected covers.
- 3.1.7.1** Final closure cannot be completed until Transport Canada & Chief Engineer is satisfied with its inspection.

3.2 Location

- a. Steering flat, aft survivor space, engineroom, Fwd survivor space, lavatory space.

3.3 Interferences

- a. 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

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

4.2 Testing

N/A

Spec item #: HD-12	SPECIFICATION	TCMSB Field #:
HD - 12 VOID TANK INSPECTION		

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 #: HD-13	SPECIFICATION	TCMSB Field #:
HD - 13 ALTERNATOR REPLACEMENT		

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to have the contractor remove an alternator from one Main Engine and replace with an owner supplied unit.
- 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

- 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 the alternator (Leece-Neville # A0012272AA, 24 V 280 amp) from main engine, insuring all wiring is well marked for reassembly.
- 3.1.2. The Contractor shall reinstall owner supplied unit, using new owner supplied belts.

3.2 Location

- a. The alternators are located on the forward inboard side of the main engines

3.3 Interferences

Spec item #: HD-13	SPECIFICATION	TCMSB Field #:
HD - 13 ALTERNATOR REPLACEMENT		

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

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 #: HD-14	SPECIFICATION	TCMSB Field #:
HD - 14 MAIN ENGINES OVERHAUL & INSPECTION		

Part 1: SCOPE:

- 1.1** The intent of this specification shall be to have the contractor subcontract both main engine overhauls to Toromont Cat. This work shall be carried out in conjunction with the following; dry-docking.

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

3.1.1. The contractor shall insure the subcontractor shall have Caterpillar certified technician(s), with at least 5 years experience working on 3408 model engines, complete the following main engine overhauls. The approximate time required to overhaul both engines is 25 working days (5 weeks). Contractor shall supply one laborer to assist the subcontractor for the entire overhaul period when required.

3.1.2. The Contractor shall supply and install two load bearing I-beams, one over each engine, at a height identified by the Caterpillar technician. The beams shall be braced and capable of taking the full weight of each engine. The beams and bracing shall be temporarily installed with no damage to surrounding machinery, hull, etc. The I-beams shall be removed upon completion of the engine work. The Contractor shall supply all equipment and materials required to assist the mechanical with moving and flipping each engine during the overhaul.

Spec item #: HD-14	SPECIFICATION	TCMSB Field #:
HD - 14 MAIN ENGINES OVERHAUL & INSPECTION		

3.1.3. The contractor shall remove the aft engine room and steering compartment watertight doors and store them suitably for reinstallation upon refit completion. The aft survivor space support pillar shall also be removed and stored

3.1.4. The contractor shall supply and install temporarily, a load bearing I-beam, braced and capable of carrying all engine and gearbox parts, aft of engine room to the steering compartment through the watertight doorways for transporting engine components ashore for overhaul. The steering compartment emergency hatch to be removed out of aft deck at same cutting marks noted in the deck and saved for reinstallation upon completion of refit. The I-beam to be removed on completion of refit and emergency hatch welded back into the deck to the satisfaction of the owners rep.

3.1.5. The Contractor shall have the subcontractor install all the required owner supplied parts, materials and labour to complete two main engine overhauls, possible items include (per engine);

- a. Replace fuel injectors
- b. Thorough inspection of crankshaft
- c. Recondition/exchange fuel delivery system (excludes plungers and barrels, if equipped)
- d. Recondition accessory drive, (bearings and seals)
- e. Inspect/recondition valve train
- f. Replace belts and coolant hoses
- g. Replace starters with new units
- h. Recondition/exchange oil pump
- i. Recondition/exchange cylinder packs (pistons, connecting rods (liners if equipped))
- j. Recondition/exchange turbocharger (1 per engine)
- k. Fill crankcase with new oil and install new oil/fuel/air filters
- l. Recondition/exchange cylinder head(s)
- m. Recondition/exchange water pumps
- n. Replace coolant regulator(s)
- o. Install new rod, main, and thrust bearings (plates)
- p. Install new front and rear drive train bearings
- q. Inspect camshaft & install new camshaft bearings
- r. Install gaskets and seals necessary to complete repairs
- s. Recondition/exchange engine oil cooler core (Test others)
- t. Refill system with Caterpillar Diesel engine oil
- u. Clean and test After cooler
- v. Clean and test Gearbox cooler
- w. Core Charges

3.1.6. Upon completion of the main engine overhauls the Contractor shall clean (degrease) the exterior surfaces of each engine and gearbox. The Contractor shall also steam clean the engine room bilges and deck plates. The Contractor shall remove all debris and liquid from the bilge areas after cleaning has been completed. Finally, the Contractor shall wipe clean all bilge areas and deck plates.

Spec item #: HD-14	SPECIFICATION	TCMSB Field #:
HD - 14 MAIN ENGINES OVERHAUL & INSPECTION		

3.1.7. Contractor shall conduct a “3-hour” sea trial with the Caterpillar mechanic on board. The vessel shall be operated by CCG personnel under the Contractor’s direction. The aim of the sea trial shall be to prove the safe and correct function of all systems and equipment worked on, added or disturbed as part of the main engine overhauls.

3.1.8. Contractor shall include all costs related to the above work including subcontractor costs in their bid. The Contractor shall provide a copy of all invoices issued by the subcontractor, upon completion of work, to the Chief Engineer to be adjusted by PWGSC 1379.

3.1.9. Contractor to include a 10K travel allowance with proof of invoice. FSR services to be based on 10 days for 1 person @ 10 hours per day. Contractor is to provide signed timesheets for hours. FSR hours above this time must be by approved 1379.

3.2 Location

Engine room, Aft Survivor Space and Steering Compartment

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:

Spec item #: HD-14	SPECIFICATION	TCMSB Field #:
HD - 14 MAIN ENGINES OVERHAUL & INSPECTION		

5.1 Drawings/Reports

5.2 Spares
N/A

5.3 Training
N/A

5.4 Manuals
Owner supplied

Spec item #: HD-15	SPECIFICATION	TCMSB Field #:
HD - 15 GEARBOX INSPECTION		

Part 1: SCOPE:

1. The intent of this specification shall be to have the contractor subcontract to a certified Twin Disc service center Toromont Cat, to have Twin Disc certified technicians(s), with at least 5 years experience working on MG model gearboxes, complete the main gearbox overhauls. This work shall be carried out in conjunction with the following; dry-docking.

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

- 3.1.1. The contractor shall subcontract the services of Toromont Cat as the Twin Disc authorized warranty service center, to inspect the two main propulsion gearboxes. Contractor to include a 10K travel allowance with proof of invoice. FSR services to be based on 10 days for 1 person @ 10 hours per day. Contractor is to provide signed timesheets for hours. FSR hours above this time must be by approved 1379

3.1.2.

- a. The contractor shall replace faulty lines using new pipe and fittings that will be supplied by the contractor. Materials and labor will be paid for using PWSG 1379 action and raised as a extra to the contractor

3.2 Location

- a. Pipes located on both sides of the engine room and in the bilge spaces

Spec item #: HD-15	SPECIFICATION	TCMSB Field #:
HD - 15 GEARBOX INSPECTION		

3.3 Interferences

3.3.2. 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.

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 #: HD-16	SPECIFICATION	TCMSB Field #:
HD - 16 EXTERIOR DECK COURTESY LIGHT REPLACEMENT		

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to have the contractor remove seven fitted courtesy lights and associated fittings on exterior of the wheelhouse with new marine LED down lights
- 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**
 - 3.1.1. The contractor shall remove seven light fixtures used for exterior deck lighting around the wheelhouse. These fixtures are screwed on pot light fixtures countersunk into wheelhouse.
 - 3.1.2. The contractor shall weld in new 3/16 inch, 11x6 inch aluminum plate inserts to fill space left by fixture removal and drill one inch passageway in the plate center to allow for wire run.

Spec item #: HD-16	SPECIFICATION	TCMSB Field #:
HD - 16 EXTERIOR DECK COURTESY LIGHT REPLACEMENT		

- 3.1.3. The contractor shall ensure that any areas where welding is completed, the interior side of work is exposed and any material removed shall be saved and installed as fitted.
- 3.1.4. The contractor shall paint the exterior of new work with one coat of aluminum primer and 2 coats of Matchless 700 white.
- 3.1.5. The contractor will install new owner supplied LED Courtesy downlights ensuring proper electrical connections are made and waterproofing to the interior is proven and lighting tested.

3.2 Location

- a. The light fixtures are located in seven locations low in the exterior of the wheelhouse, all workable without any height safety equipment

3.3 Interferences

- a. 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. Contractor shall inspect the operation of trim tabs before and during sea trials.

4.2 Testing

N/A

4.3 Certification

N/A

Spec item #: HD-16	SPECIFICATION	TCMSB Field #:
HD - 16 EXTERIOR DECK COURTESY LIGHT REPLACEMENT		

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-01	SPECIFICATION	TCMSB Field #:
E-01 NEW ALARM PANEL INSTALL		

Part 1: SCOPE:

- 1.3 The intent of this specification shall be to have the contractor obtain the services of Madsen Power Systems to install a pre-engineered alarm system in the engineers panel.
- 1.4 This work shall be carried out in Conjunction with the following: 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**

- 3.2.1** The contractor shall inform the chief engineer prior to starting work.
- 3.2.2** The contractor shall ensure with the chief engineer that systems are isolated, locked out and tagged prior to starting work.
- 3.2.3** The FSR shall inspect the panel as a unit and prove each alarm is working, to ensure that all are working as intended and fall within the default parameters set by manufacturers of monitored equipment or the chief engineer.
- 3.2.4** The Contractor shall supply all necessary parts to complete any repairs.
- 3.2.5** The Madsen FSR shall demonstrate to the chief engineer that all alarms are functioning properly.

Spec item #: E-01	SPECIFICATION	TCMSB Field #:
E-01 NEW ALARM PANEL INSTALL		

3.2.6 Contractor to include a 10K travel allowance with proof of invoice. FSR services to be based on 10 days for 1 person @ 10 hours per day. Contractor is to provide signed timesheets for hours. FSR hours above this time must be by approved 1379

3.4 Location

3.2.2. The alarm panel is located in the engineers panel in the wheel house

3.5 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:

4.2 Inspection

4.1.7. 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

5.1.1. All drawings and set points supplied by owner

5.6 Spares

N/A

5.7 Training

N/A

5.8 Manuals

N/A

Spec item #: L-01	SPECIFICATION	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	SPECIFICATION	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	SPECIFICATION	TCMSB Field #:
L – 02 FIRE DETECTION, CO SMOOTHING & PORTABLE EXTINGUISHERS		

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 and Chief Engineer.
- 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	SPECIFICATION	TCMSB Field #:
L – 02 FIRE DETECTION, CO SMOOTHING & PORTABLE EXTINGUISHERS		

3.1.4 Contractor shall have all items in this specification recertified for expiration date to correspond with the later part of 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 and transport Canada Inspector.

Spec item #: L-02	SPECIFICATION	TCMSB Field #:
L – 02 FIRE DETECTION, CO SMOOTHING & PORTABLE EXTINGUISHERS		

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 and one electronic copy 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