



CCGS Ann Harvey

Drydock 2013

Rev3

July – August



CCGS Ann Harvey

Refit Drydock 2013
Index

Table of Contents

Preamble	pg 3
H-01 Production Chart & Subcontractor Allowances	pg 10
H-02 Services	pg 11
H-03 Liferaft Servicing	pg 16
H-04 Fixed Fire Fighting Systems Annual Inspection and Maintenance	pg 18
H-05 Safety Valve Certification	pg 29
H-06 Servicing of Halocarbon Refrigeration/AC Systems	pg 31
H-07 Aviation Fuel System Servicing	pg 33
H-08 Accommodation and Dryer Duct Cleaning	pg 36
H-09 Galley Exhaust Trunk Cleaning	pg 42
H-10 Window Replacement	pg 44
H-11 Cargo Hatch Cover Overhaul	pg 46
H-12 Day Tank Cleaning	pg 49
H-13 Fuel Tanks Survey	pg 51
H-14 Ballast Tank Survey	pg 54
H-15 Pipe Tunnel Painting	pg 59
H-16 Transducer Compartment Inspection	pg 64
H-17 Anchors and Chains	pg 65
H-18 Port Sea Crane Installation	pg 67
H-19 Lifeboat, Davit and Miranda Davit Inspection and Repair	pg 70
H-20 Main Mast painting	pg 71
HD-01 Docking and Undocking	pg 75
HD-02 Tailshafts Bearings Wear-down Measurements	pg 77
HD-03 Stbd Propeller	pg 78
HD-04 Stbd Tailshaft Inspection	pg 80
HD-05 Hull Cleaning and Coating	pg 82
HD-06 Forepeak Tank	pg 87
HD-07 Seachests, Seabays and Sea Strainers	pg 90
HD-08 Impressed Current Cathodic Protection System Servicing	pg 94
HD-09 Storm Valves	pg 96

HD-10 Sea Connections	pg 98
HD-11 Central Cooling Sea Water Pump SDNR Valve replacement	pg 101
HD-12 Bow Thruster Oil Change.	pg 102
HD-13 Rudder and Rudder Trunk Anodes	pg 104
HD-14 Seatrials	pg 105
E-01 Windlass Survey	pg 106
E-02 Starboard Forward Mooring Winch Brake Lining Renewal	pg 109
E-03 No1 Boiler Survey (EO-150 Port)	pg 111
E-04 R/O Installation and Distiller Removal	pg 115
L-01 Fan and Motor Overhaul	pg 123
L-02 Breaker Renewal	pg 125

PREAMBLE

1. INTENT

The intent of this specification shall describe the necessary work involved in carrying out the ship's Annual Refit. All work specified herein and all repairs, inspections and renewals shall be carried out to the satisfaction of the Owner's Representative and, where applicable, the attending TC Marine Safety Inspector. Unless otherwise specifically stated, the Owner's Representative is the Chief Engineer.

2. MANUFACTURER'S RECOMMENDATIONS

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

3. TESTING AND RECORDS

All test results, calibrations, measurements and readings are to be recorded. All tests are to be witnessed by the Inspection Authority, Technical Authority and where required, Transport Canada Marine Safety. The Contractor is responsible for contacting TC-MS when their presence is required for inspections or testing. The Contractor shall advise the Technical Authority in every case when Marine Safety arrives onsite for inspection of vessel's equipment or structure. The recorded test results, calibrations, measurements and readings from the entire refit specification shall be provided in 3 typewritten bound reports on 8.5" X 11" paper. The bound reports shall be tabbed as per table of contents in the refit specification. The bound reports shall be provided to the Chief Engineer prior to the end of refit.

The Contractor shall also provide reports/measurements/readings per individual specification item within the timeline indicated to the Chief Engineer.

4. WORKMANSHIP

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

5. FACILITIES

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

6. MATERIALS AND SUBSTITUTIONS

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

7. REMOVALS

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

8. EXPOSURE AND PROTECTION OF EQUIPMENT

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

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 and all oil and water residue, which accumulates in the machinery space bilges as a result of any refit work detailed in this specification.

11. ASBESTOS

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

12. ENTRY INTO ENCLOSED SPACES

The contractor shall abide by the Coast Guard Enclosed Space Entry Policy. The policy is listed in the a Coast Guard's Safety Management System, section 7.D.9 and section 7.D.9 (N). Entry certificates shall clearly state the type of work permitted and shall be renewed as required by the regulations. Additional copies of these certificates shall be posted in conspicuous locations for the information of ship and contractor personnel.

A fire zone shall be established and naked lights shall not be used within this zone until "gas-free" certification has been issued.

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

A number of spaces onboard the vessel are designated as Enclosed Spaces; these spaces are to be entered only under safe and controlled circumstances. The Contractor shall have in place an Enclosed Space Entry Permit system, equal to or better than the procedure contained in the Coast Guard's Safety Management System, section 7.D.9. Ship's breathing apparatus and EEBD's are not to be used except in an emergency.

13. Suspension Of Work

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

14. 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 Coast Guard's Safety Management System , 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.

15. LOCKOUT AND TAGOUT PROCEDURES

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

- electrical currents
- hydraulic
- pneumatic
- gas or stem pressure and vacuum
- high temperatures
- cryogenic temperatures
- radio frequency emissions
- potentially reactive chemicals
- stored mechanical energy
- equipment actuation

2. The contractor, under the supervision of the Chief Engineer and or the Electrical Officer, shall be responsible for the Lockout and Tagout of equipment and systems listed in the specification.

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

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

16. PAINTING

All new and disturbed steelwork that will not be on the underwater wetted surface of the ship's hull is to be protected with two coats of Contractor supplied primer. Unless otherwise stated in the individual specification item, the primer is to be International Paints, Interplate Zinc Silicate NQA262/NQA026 red. The paint is to be applied as per the manufacturer's instructions on their respective product data sheets. Finish coats are described in individual specification items.

17. WELDING

Welding shall be in accordance with the Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E)

The Contractor shall be currently certified by the Canadian Welding Bureau (CWB) in accordance with CWB 47.1 latest revision Division I, II or III at the time of bid closing.

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

The Contractor may be required to provide approved procedure data sheets for each type of joint and welding position that will be involved in this refit.

The Contractor may be required to supply a current Welders Ticket for each individual welder that will be involved in this refit.

18. 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.

19. RESTRICTED AREAS

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

20. 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.

21. DRAWINGS

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

Sign off and acceptance of jobs will not occur until any and all drawings are updated to the satisfaction of the Owner's representative.

22. 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.

23. 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.

24. Regulatory Authority Inspections

The Contractor shall confirm a schedule of inspections with the regulatory authority (TCMS) for all work described in this specification and shall be responsible for calling them when inspections are required and for ensuring the work is credited by the regulatory authority in the Chief Engineer's 'Hull and Machinery Survey Book'.

The contractor shall ensure the Chief Engineer is informed when the regulating authority is onsite such that the Chief Engineer can witness the inspections by the regulating authority.

Notwithstanding any errors, omissions, discrepancies, duplication or lack of clarity in these project requirements, it shall be the responsibility of the Contractor to ensure that the execution of the work specified herein is to the satisfaction of the Technical Authority and the Inspection Authority. Inspection of any item by the Technical Authority does not substitute for any required inspection by Transport Canada Marine Safety (TC-MS) or by the Inspection Authority.

25. Waste Oil Products

Disposal of waste oil products shall be carried out by the Contractor, or subcontractor, who has been licensed by provincial authorities for the disposal of petroleum products. Copies of certificates must be produced upon request. This must be in accordance with the Coast Guard Policy for Handling Fuel, Oil, and Waste Oil Products, which is part of the Fleet Safety Manual, section 7.C.3. a copy of which is in the attached safety annex.

26. WHMIS

The contractor shall provide current MSDS sheets for any WHMIS-controlled products used onboard or around the vessel at the start of the work period before the products are used. This includes at the minimum MSDS sheets for any solvents, cleaners, chemicals, coatings and blasting grits to be used. Any neutralizing chemicals or specialized protective equipment required shall be provided by the Contractor at all times these WHMIS-controlled products are onboard the vessel.

27. SAFETY ANNEX

The Contractor shall follow the Coast Guard Policies as outlined in the attached Safety Annex. This Annex contains excerpts from the Fisheries and Oceans Canada, Canadian Coast Guard Fleet Safety Manual (DFO 5737) and deals with contractor responsibilities for items such as Hot Work, Confined Space Entry, Diving, Diving Operations and Dry-docking.

SHIP'S PARTICULARS

Length O.A. -----	83.0 Metres
Breadth Mld. -----	16.2 Metres
Depth Mld. -----	7.75 Metres
Deep Draft -----	6.06 Metres
Displacement -----	5146 MT
Gross Tonnage -----	3853 Tonnes
Year built -----	1987

Rigging Weights

Tailshaft 24280 kg, Length 14.448 meters
Propeller 7200 kg
Stern tube 12,185 kg
Anchor (Complete) 2028 kg
Anchor Shank 549 kg
Rudder 17381 lbs
Rudder Stock 16958 lbs

Spec item #: H-01	SPECIFICATION	TCMSB Field # N/A
Production Chart & Subcontractor Allowances		

Part 1: Scope

- 1.1 The intent is to provide a means for tracking the progress of the refit.

Part 2: References

N/A

Part 3: Technical Description

Production Chart

- 3.1 The successful Contractor shall supply three copies of a detailed bar chart showing the planned work schedule for the ship's refit. This bar chart shall show, for each spec. item, the start date, the manpower loading, the duration and the completion date. The chart is also to highlight any critical paths.
- 3.2 The production chart shall be updated weekly or for each production meeting to reflect the actual production on the refit and changes to the anticipated completion dates of each individual item.
- 3.3 The production chart shall clearly indicate the arrival/departure dates of any Subcontractors/Field Service Representatives.
- 3.4 The production chart shall include the status and production on each 1379 arising.
- 3.5 Three copies of the production chart shall be given to the Chief Engineer **the day prior** to each Production Meeting. A copy shall be emailed to the Project Authority, Terry.Sheppard@dfo-mpo.gc.ca the day prior as well.
- 3.6 A copy of the original bar chart shall be provided via email to the PWGSC contracting Officer and Project Authority before the close of business on the day on the start date of the refit.

Subcontractors with Allowances

- 3.7 The Contractor shall provide a weekly update of the hours billed by the subcontractors along with their hourly rates.
- 3.8 The results shall be tabulated in an excel spreadsheet clearly indicating the Subcontractor, date(s), hours worked and hourly rate for the hours worked.
- 3.9 The update is to be emailed to Technical Authority, Contracting Officer and Project Authority the day prior to the weekly scheduled Progress Meeting.

Part 4: Proof of Performance

N/A

Part 5: Deliverables

- 5.1 Contractor shall provide a weekly production chart and excel spreadsheet for subcontractor allowances every week on the timelines indicated.

Spec item #: H-02	SPECIFICATION	TCMSB Field #
Services		

Part 1: Scope

The following services shall be supplied, fitted and / or connected upon arrival in dry-dock, maintained throughout dry-docking period and removed from the vessel on completion of the work period. The Contractor shall supply all material to point of onboard connection and all cranes/scaffolding required for connection/disconnection. The Contractor shall be responsible for any additional connections required when the ship is moved between dry-dock and alongside berth at Contractor's facilities. Services are required for the full refit / dry-dock period. Each item shall be priced separately.

Part 2: References

N/A

Part 3: Technical Description

- 3.1 The Contractor shall quote a global price and daily rates for all services supplied to the vessel during the contracted period. The Contractor shall supply all material to point of onboard connection. Quote to include all cranes/scaffolding required for connection/disconnection.
- 3.2 All service lines including discharges shall be arranged such that they cannot be pinched off or restricted by equipment operating under or around the vessel.
- 3.3 The Contractor shall quote on supplying the following:

3.3.1 Readings and Reports

Contractor shall collect and bind all reading and reports in a booklet form. Three (3) bound copies shall be delivered to the Chief Engineer prior to the vessel leaving the contractor's facility. Contractor shall also send an electronic copy (CR-ROM) of the Readings and Reports to the Technical Authority prior to the vessel leaving the contractor's facility.

3.3.2 Electrical Power

Metered electrical service 600 VAC, 3 phase, 60Hz., 440A continuous to be supplied and maintained. Quote on supplying 150,000 KWH and on unit cost per KWH; to be adjusted up or down by 1379 action. Contractor shall supply and install shore power cable.

Spec item #: H-02	SPECIFICATION	TCMSB Field #
Services		

- a. Note: Problems have been experienced in the past with one phase fuse blowing resulting in only two phases feeding the vessel. This caused electric motors on the ship to trip out on overload and the ship's emergency and auxiliary generators to start and attempt to come on line. Thus the electrical service is to be protected such that loss of a single phase at the contractor's end of the cable results in immediate opening of the remaining phases.
- b. A ground cable shall be attached to the ship's hull. Contractor shall supply and install cable.
- c. The contractor shall ensure compliance with the included **Transport Canada Marine Safety Bulletin – "Grounding Safety in Dry-dock"**.

Kilowatt-hour meter readings shall be taken from the ship's shore power meter located on the main switchboard. The meter readings shall be recorded by Contractor and the Chief Engineer's designate at the time of connection and disconnection.

3.3.3 Firemain

Water shall be maintained to the vessel's fire main at a pressure of 550 kPa (80 psi) and be continuous 24 hours per day. Supply line shall be fitted with an isolating valve and a pressure-regulating valve (with pressure gauge) which shall be located at two connections at extremities of the vessel as directed by the Chief Engineer on the ship. The vessels firemain is 2 ½ inches.

3.3.4 Gangways

The Contractor shall supply and erect two gangways, complete with safety nets, guardrails and adequate lighting to the satisfaction of the Commanding Officer on opposite sides of the vessel. Gangways shall be safe, well lit and structurally suitable for the passage of shipyard workers and ship's crew. Contractor shall maintain gangways in a safe condition throughout the duration of the dry-docking.

Ship's gangway shall not be used during the refit / dry-dock period except with the approval of the Commanding Officer and at no liability to CCG. Any movement of the gangways required by Contractor shall be at the expense of the Contractor.

The contractor is to ensure that should any ongoing work render a gangway unsafe the gangway will be barricaded during the work and un-barricaded immediately following the work. The contractor shall ensure that at no time both gangways are out of commission. This shall be carried out in consultation with the Commanding Officer.

3.3.5 Telephones

Two independent and private telephone lines shall be supplied; one to the Logistic Office fax machine and the other to the ship's phone system. The service is not to be routed through the contractor's switchboard and the line shall be totally independent.

Contractor shall supply a listing of shipyard telephone numbers, fire, police and emergency telephone numbers to the Chief Engineer when the ship arrives in Contractor's yard.

Spec item #: H-02	SPECIFICATION	TCMSB Field #
Services		

3.3.6 Potable Fresh Water

Potable water connection through a regulator to the ship's domestic system (2" @ 60 psi while the vessel is in drydock. Water supply to be connected to the fill station on the upper deck aft. Contractor shall use a new fresh water hose. The potable water line is to be new first use, approved for use with potable water and arranged such that there are no connections including joins lying on the ground or dock. This is to prevent possible contamination. Contractor shall provide current test results indicating the water meets provincial drinking water standards before being connected. Pressure to be maintained at all times. The flow rate is to be such that fully opening any two hydrants will result in no appreciable pressure drop. This will be tested by and to the satisfaction of the Chief Officer.

Contractor shall supply any fresh water and / or hot water required for the cleaning, testing or flushing of tanks as required by this specification from a source separate from the ship's potable fresh water connection.

Fresh water connection through a regulator to ship's HVAC air conditioning units (2" connection @ 35 psi) connected to the air conditioning heat exchanger port side aft in the main engine room. Contractor shall further provide an exhaust return hose overboard for the heated air conditioning cooling water.

One fresh water supply through a regulator to the ship's refrigeration units (2" connection @ 30 psi.) connected to flange outside the MCR. Contractor shall further provide an exhaust return hose overboard for the heated air conditioning cooling water.

3.3.7 Overboard Connections

Overboard discharges during the drydocking period shall include the following listed below. The Contractor shall connect hoses to the overboards which shall be lead away from the ship's side to appropriate location for disposal.

1. Sewage Treatment Tank Overboard, port side aft
2. Galley Drains (minijet) Overboard, stbd side midships
3. Grey Water Drains Overboard, stbd side midships
4. Central Cooler Discharge (for HVAC air conditioning), overboard port side midships
5. Refrigeration units cooling water overboard. Connected at flange outside MCR. Hose must be run from flange to overboard.
6. Air Conditioner Cooling Water Overboard. Hose must be run from the Air Conditioning Cooler located aft in port main engine room at tanktop level.

Note: These connections shall be made within four (4) hours of ship dry-docking.

Spec item #: H-02	SPECIFICATION	TCMSB Field #
Services		

3.3.8 Garbage Removal

A suitable garbage container with cover shall be provided for the duration of the refit. Garbage container shall be a minimum of 6 m³ and shall be placed on the Main Deck in a location agreed upon by the Contractor and the Chief Officer. The garbage container shall be emptied every 2 days or more often if required.

3.3.9 Berthing

Berthing and mooring facilities shall be suitable for a vessel of this size and shall be to the satisfaction of the Commanding Officer.

During the contract period, if the ship is not in the dry-dock, the ship shall be berthed at the Contractor's wharf at a safe and secure berth with adequate water at extreme low tide to ensure the vessel will not touch bottom.

Contractor is responsible for all movements of the vessel during the contract period, including arrangements and costs for line handlers, tugs, pilot's and slipping of the lines from the Contractor's wharf on departure of vessel from yard upon completion of the refit.

3.3.10 Cleaning

Contractor shall ensure all spaces, compartments and areas of the ship, external and internal, are left in an "as clean condition as found".

Cost of removing dirt, debris and cleaning up work areas to the "as clean a condition as found" shall be included in each specification item.

3.3.11 Oily Bilge Water

Contractor shall quote on removing 5000 gallons of oily-water from the ship's bilge's and tanks. The quotation shall include the cost of craning, pumping, trucking and disposal of oily mixture. Contractor shall provide the name of the firm contracted for the pumping and disposal of the waste oil. Contractor shall quote the cost of disposal of 1 m³ for adjustment purposes by 1379 action. Contractor will advise the Chief Engineer when oily bilge water shall be pumped out and a copy of the shipping manifest, indicating volume of oily-water removed, shall be given to the Chief Engineer. Contractor shall bid on assuming an oily water mixture of 25% oil and 75% water.

3.3.12 Cranage

Contractor shall bid on supplying general services of a dockside crane, driver and rigger for 10 lifts during dry-dock period as and when requested by Chief Engineer. Contractor shall quote a unit price per lift for loading and unloading the vessel to be adjusted up or down via 1379 action.

Spec item #: H-02	SPECIFICATION	TCMSB Field #
Services		

3.3.13 Television/Internet

Contractor shall supply one local cable television connection to the ship's internal system. Cable shall be connected as directed by the Ship's Electrical Officer. The cost of connections/disconnection and service charges shall be included in the contractors quotation. Contractor shall provide internet access to the vessel. Cable shall be connected as directed by the Ship's Electrical Officer. TV and internet shall be provided for 24hrs a day for the duration of the refit.

3.3.14 Compressed Air

Compressed air supply through a reducing station to deliver 105 psi, (36 CFM) constant pressure. This air supply shall be connected to the ship's service air system at the helicopter workshop service air fitting. Contractor shall quote on supplying compressed air to the vessel for a seven (7) day period, 12 hours per day, while the control air receiver relief valves are being overhauled and bow thruster breaker is being installed. Contractor shall quote on a unit price for additional 12 hr day.

3.3.15 Inspections

The contractor shall supply the necessary manpower and equipment to erect, as necessary, scaffolding to facilitate the inspection of the ship's hull as necessary by Marine Safety Inspectors and Ship's personnel. This will include scaffolding and equipment to access propellers, rudder, thruster, sea chests, anodes and hull seam repair inspection. The scaffolding shall be removed when the work is complete.

Spec item #: H-03	SPECIFICATION	TCMSB Field # N/A
LIFERAFT SERVICING		

Part 1: SCOPE

1.1 The intent of this specification is to perform annual servicing and certification of the vessel's life rafts and hydrostatic releases.

Part 2: REFERENCES

Guidance Drawings/Nameplate data

DESCRIPTION	LOCATION	SERIAL #
Zodiac 10 Persons	Officers Deck Port	XDC4EZ13C010 MFG – 03/2010
Zodiac 25 Persons	Officers Deck Port	XDC2FA68G011 MFG- 07/2010
Zodiac 25 Persons	Officers Deck Port	XDC8E24E010 MFG – 07/2010
Zodiac 6 Persons	Barge	XDCZ0508D000
DBC 10 Persons	Officers Deck Port	7936 MFG – 07/1997

Manufacturers Rep

Newfoundland Marine Safety Systems
Ken White
709-747-2175

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

2.2 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Spec item #: H-03	SPECIFICATION	TCMSB Field # N/A
LIFERAFT SERVICING		

Part 3: TECHNICAL DESCRIPTION

- 3.1 The contractor shall remove the liferafts and their hydrostatic releases from their stowed positions on the vessel and transport them to and from the contractor's premises, when designated by the vessel, for servicing.
- 3.2 Contractor shall subcontract the annual inspection and recertification of the liferafts by an approved Transport Canada service facility that meets OEM certification.
- 3.3 An allowance of \$15,000 shall be provided for the subcontractors work. This allowance shall be adjusted up or down via 1379 action upon proof of invoice.
- 3.4 The liferafts shall be removed and sent for servicing within 3 business days of the contractor being advised they are ready for removal. The liferafts are to be returned to the vessel within 15 working days after being removed.
- 3.5 The contractor is responsible for ensuring the liferafts are witnessed by TCMS as required and for providing certificates for the life rafts as appropriate.
- 3.6 The contractor will return the liferafts and their hydrostatic releases to the stowed position on the vessel.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 All liferafts are back aboard the vessel in their stowed positions.
- 4.2 All of the above work is completed to the satisfaction of the Commanding Officer.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

- 5.1 The contractor will provide a listing of the work that was performed including 'as found and as left condition'.
- 5.2 Certificates and work description are provided to the Commanding Officer.

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

Part 1: Scope

1.1 Contractor shall arrange for inspection, testing and recertification of all ship's fixed fire extinguishing systems, as described and listed below, by an authorized service provider. Proof of credentials and certification of service provider shall be made available to Chief Engineer.

Part 2: References

Guidance Drawings/Nameplate data

L1-2726365-01 Kidde Marine FM-200 System Layout

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

2.2 Sub-contractor shall supply the required materials and equipment.

Part 3: Technical Description

3.1 Contractor is to tender for "an authorized service provider" to complete all work as outlined in the specification including all Travel and Living expenses.

3.2 No components or parts shall be replaced without the prior consent of the Chief Officer. Any parts replaced shall be turned over to Chief Officer.

3.3 All certificates and service reports issued by the Contractor for this work must refer to each serviced component's serial number and location on the vessel.

3.4 Contractor is responsible for arranging Transport Canada Marine Safety for all fire fighting and fire detection system inspections.

3.5 All systems shall be left in an operational condition overnight.

3.6 Contractor shall inform Chief Engineer prior to making any system inoperable due to maintenance/inspection. All bottles shall be disconnected before tests are completed.

3.7 Final inspection of completed work shall be undertaken by Contractor's charge hand in the presence of the designated Ship's Officer. All work shall be to the satisfaction of the Chief Officer and TCMSB.

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

FM200 SYSTEMS

3.8 Twenty one (21) independent, Kidde fixed FM-200 fire extinguishing systems shall be thoroughly examined by qualified technicians and inspection certificates issued. Systems shall be inspected to current TCMSB standards and as per current Kidde FM-200 marine maintenance manuals for "ECS Series" and "ADS Series" FM-200 systems. Service provider must be currently certified by Kidde for this inspection service and must produce documentation to verify same. Inspection and testing of all equipment shall be witnessed by a senior Ship's Officer. See FM 200 System Data Chart below.

FM-200 SYSTEM DATA						
No.	PIPE NETWORK DESCRIPTION	CYLINDER SIZE LB/KG	CYLINDER QUANTITY	CYLINDER LOCATION	ENCLOSURE LOCATION	NOZZLE QTY
1	Main Engine Room Bilge Aft	200/90.7 ECS	1	Tank Top, 70, Port	FR 70 - 85 Tank Top	4
2	Main Engine Room Bilge Fwd	200/90.7 ECS	1	Tank Top, 100, Starboard	FR 85 - 97 Tank Top	4
3	Main Winchroom	600/272.1 ECS	1	ER Flat, 109, Starboard	FR 106 - 121 E.R. Flat	2
4	Central Stores	350/158.7 ECS	1	ER Flat, 45, Starboard	FR 13 - 30 E.R. Flat	2
5	Sewage Compartment	350/158.7 ECS	1	ER Flat, 41, Starboard	FR 15 - 35 Tank Top	2
6	Aviation Fuel Cofferdam	125/56.7 ECS	1	Main Deck, 25, CL	FR 4 - 13 Main Deck	2
7	Fwd Winchroom	125/56.7 ECS	1	Main Deck, 168, Port	FR 167 - 176 Main Deck	1
8	Paint Stores	20/9.0 ECS	1	Main Deck, 167, Port	FR 167 - 176 Main Deck	1
9	Bowthruster Compartment	125/56.7 ECS	1	Main Deck, 169, Port	FR 163 - 169 Tank Top	1
10	Bosuns & Rope Stores	200/90.7 ECS	1	Main Deck, 167, Port	FR 176 - 192 Main Deck	2
11	Emergency Generator Room	70/31.7 ECS	1	Boat Deck, 60, CL	FR 60 - 70 Boat Deck	2
12	Propulsion Motor Room Bilge	395/179 ADS	1	ER Flat, 51, Port	FR 42 - 54 Tank Top	2
13	Propulsion Motor Room Lower	675/306 ADS	1	ER Flat, 50, Port	FR 42 - 54 Tank Top	2
14	Propulsion Motor Room Upper	675/306 ADS	1	ER Flat, 41, Starboard	FR 30 - 54 E.R. Flat	3
15	Main Engine Room Lower	675/306 ADS	2	Boat Deck, 64, Port	FR 70 - 96 Tank Top	4
16	Main Engine Room Upper	395/179 ADS	2	Boat Deck, 65, Port	FR 78 - 105 E.R. Flat	8
17	Engine Room Casing & Stack	675/306 ADS	2	Boat Deck, 60, CL	FR 61 - 81 Boat Deck	6
18	Steering Gear	395/179 ADS	1	Main Deck, 2, Starboard	FR (-12) - 13 Main Deck	5
19	Purifier Room	225/102 ADS	1	ER Flat, 48, Starboard	FR 54 - 70 Tank Top	2
20	Cyclo Converter Room	395/179 ADS	1	ER Flat, 48, Port	FR 53 - 70 Tank Top	4
21	Transformer Room	395/179 ADS	1	ER Flat, 46, Port	FR 45 - 70 ER Flat	2

3.9 All manual and electric pull cables shall be inspected and tested.

3.10 All gas piping shall be inspected, blown through, proven clear and pressure tested.

3.11 All sirens, horns and bells shall be inspected and tested.

3.12 All gas cylinders shall be weighed and Net weight determined and recorded.

3.13 All time delay functions shall be tested and proven correct.

3.14 All pressure activated switches for fire alarm initiation shall be tested.

3.15 All pressure activated switches for shutdown functions shall be tested.

3.16 Contractor to visually inspect all FM200 bottles at deck level for possible excessive amounts of corrosion or rust accumulation of exterior of bottles. Chief Engineer shall be advised immediately if any problems are found.

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

3.17 System shall be properly reassembled in good working order. All cylinders shall be firmly secured in their respective mountings. Inspection certificates shall be submitted to TCMSB with three (3) typewritten copies given to the Chief Engineer.

GALLEY Amerex 3.5 Gallon Wet Chemical System

3.18 Contractor shall service and inspect the Amerex Wet Chemical System.

3.19 Contractor shall test and prove clear the piping and nozzles and ensure there are no foreign materials in the piping system that could prevent these systems from working correctly. All piping support brackets shall be verified in place and correctly fastened.

3.20 Contractor shall inspect cylinder, cylinder valve and control head assembly. Cylinder should not show evidence of corrosion or damage. Cylinder charge shall be determined and verified correct. All functions and adjustments of control head shall be verified correct.

3.21 Contractor shall clean linkages, cabling and pulleys and renew the fusible links in the canopy release cabling.

3.22 Operation of Fire-Shutter to Crew's Mess to be proven.

3.23 Contractor shall obtain a sample of the wet chemical in service; to be sent off to lab for testing to ascertain that wet chemical in service is in good order. Copy of lab testing shall be provided to Coast Guard.

3.24 Upon completion of the servicing of the above system all shall be reconnected in good order.

3.25 The vessel shall be given a minimum of 2 days notice prior to the commencement of this work to provide minimum disruption to the galley staff and crew.

CO₂ FIRE SMOTHERING SYSTEM INSPECTION

3.26 Contractor shall have maintenance and testing of Cargo Hold CO₂ system performed by qualified personnel.

3.27 The CO₂ fire fighting system shall be thoroughly examined and tested

a. As per Ship Safety requirements.

b. All tests to be witnessed by Owner's representative and attending Ship Safety Surveyor.

3.28 All bottles shall be disconnected before tests are conducted. Chief Engineer shall be advised prior to disconnecting. All hand control levers, pull handles, cables, cocks, and valves shall be checked and proven operational. The piping shall be blown through with dry compressed air or nitrogen to prove the lines are clear and that the time delays and sirens are operational. All pressure-operated switches shall be proven operational.

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

3.29 All CO2 bottles are to have their levels ascertained. Any recharging shall be done by 1379 action. The contents shall be recorded. Contractor shall replace any CO2 discharged.

3.30 List of bottles:

Cargo Hold (CO₂) 13 x 67.5 Lt. bottles located in the Forward FM200/CO2 Room

3.31 Manual release systems operated from:

- a. Manually at CO₂ bottles.
- b. Outside Fwd. FM200/CO2 Room.

3.32 Contractor to confirm operation of all local/remote manual releases.

3.33 Upon completion of testing CO₂ system shall be re-connected and in working order.

3.34 Copies of certificates shall be forwarded to Chief Engineer and TCMS Inspector

Helicopter Hanger Chemguard Twin Agent

3.35 Chemguard Twin Agent skid mounted unit consists of a 100L AFFF Foam Tank and a 500lb Purple K Dry Chemical Tank. Each tank is fitted with a nitrogen driver cylinder.

3.36 Contractor shall ascertain level in nitrogen tanks. Any loss of nitrogen shall be dealt with by PWGSC 1379 action and the cause of the loss rectified.

3.37 Contractor shall take a sample of the AFFF and send off to lab for analysis to determine that AFFF is within recommended guidelines.

3.38 Contractor shall open Purple K Dry Chemical tank to inspect its content. Contractor shall thoroughly mix its content to ensure there is no caking of the agent occurring.

Fixed Foam Firefighting System – Monitors & Hose Reels

SECURIPLEX Balanced Pressure Proportioning System

Model: 1015-118

(500 litre three percent AFFF concentrate.)

Located: FM200 Room- Port Side Boat Deck

3.39 Contractor shall perform the annual inspection and servicing of the ship's fixed foam fire fighting system, as per manufacturer's recommendations.

3.40 Any recharging/repairs to be covered by PWGSC 1379 action.

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

3.41 The Contractor with the ship's Electrical Officer shall ensure lockout/tagout permits are in place and shall inform the Chief Engineer before work begins.

3.42 Pressure balancing valve to be carefully disassembled for inspection. Any deposits left by foam concentrate to be cleaned from valve internals. After inspection, valve to be reassembled in good order.

3.43 Level and contents of foam concentrate tank to be checked. Concentrate sample to be taken from foam tank. Sample to be tested and copies of results given to Chief Officer.

3.44 Condition of nozzles, valves, gauges, piping, hoses and hose reels, monitors and pumps to be checked.

3.45 Following testing/inspection the contractor will restore the system to operational readiness.

3.46 Contractor shall provide certificates and service reports of Inspection for the system inspected.

Notifier Fire Detection System

a. Contractor shall perform maintenance and inspection of the Notifier Fire Detection system completed by a qualified service provider.

b. Contractor shall test each device in the fire detection system for operation and ensure that it sounds and displays on the main panel on the bridge deck and the mimic panels in the control room and quarter master stations.

c. Contractor shall test the following devices listed in Device Location Table:

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance		

Testing Legend Table

Device	Description:	Manufacturer	Model
SP	Photo Electric Smoke Detector	Notifier	FSP851A
P	Manual Pull Station	Notifier	NBG-12
H	Heat Detector-Rate of Rise fixed Temp	Notifier	FST-851RA
FH	Heat Detector-Fixed Temperature	Notifier	FST-851A
FH	Heat Detector-Fixed Temperature	Notifier	FST-851HA
FEN	Fenwal Heat Detector	Notifier	225
ISO	Monitor Module	Notifier	B224BIA
MON	Monitor Module	Notifier	Fmm-101A
REL	Relay	Notifier	
ISO	Isolation Module	Notifier	ISO-X

Device Location Table

Device Location	Device Type	Device Location	Device Type
Bridge Deck			
Wheelhouse Console Port	PAN	Wheelhouse Top of Stair, 1D6	SP
Wheelhouse Port, 1D3	SP	Wheelhouse Locker, 1D7	SP
Wheelhouse Center, 1D5	SP	Under Wheelhouse Port, 1D2	SP
Wheelhouse Stbd, 1D4	SP	Under Wheelhouse Stbd, 1D1	SP
Wheelhouse Exit, 1M1	P		
Officers Deck			
Stair Tower, 1D8	SP	Chief Officer Day Room, 1D15	SP
Passage Stbd, 1D9	SP	Chief Officer Bedroom, 1D16	SP
Passage Stbd, 1M2	P	Chief Officer Lobby, 1D17	SP
Captains Day Room, 1D10	SP	Port Passage, 1D18	SP
Captains Lobby, 1D11	SP	Port Passage, 1M4	P
Captains Bedroom, 1D12	SP	Auxiliary Electrical Rm, 1D30	SP
Comm Officer Rm 311, 1D13	SP	Auxiliary Fan Supply Rm, 1D31	SP
1 st Officer Rm 307, 1D14	SP		

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all	
Fixed Fire Fighting Systems Annual Inspection/Maintenance			
Boat Deck			
Stair Tower, 1D19	SP	Port Passage, 1D28	SP
Stbd Passage, 1D20	SP	Port Passage Exit, 1M6	P
Stbd Passage, 1M3	P	Deck Locker 408, 1D29	SP
Storage Locker, 1D21	SP	FM200 Rm, 1D156	FH
Officers Lounge Port, 1D158	FH	Main E/R FM 200 LP, 1M67	LP
Officers Lounge Stbd, 1D159	FH	Helicopter Workshop, 1D152	FH
Derrick Control Room, 1D22	SP	Helicopter Hanger, 1M10	FEN
Officers Laundry, 1D157	FH	Helicopter Hanger Port, 1M9	P
2nd Officials Dayroom, 1D23	SP	AV Gas Fuel Cabinet, 1M8	FEN
2 nd Officials Bedroom, 1D24	SP	AC Fan Rm Port, 1D153	FH
Port Passage, 1D25	SP	AC Fan Rm Stbd, 1D154	FH
Elec Equipment Rm, 1D26	SP	EGen Rm, 1D155	FH
SAR Equipment Rm, 1D27	SP	EGen FM200 LP, 1M69	LP
Upper Deck			
Passage Fwd, 1D32	SP	Aft Stairs, 1D51	SP
QM Station Port, 1D33	SP	Aft Passage, 1D52	SP
QM Stn Port Indicator Unit		Ice Observer Cabin, 1D53	SP
Officers Mess Port, 1D150	FH	Passage Port, 1M17	P
Officers Mess Stbd, 1D151	FH	Bosun Cabin, 1D54	SP
Officers Pantry, 1D149	FH	Flight Engineer Cabin, 1D55	SP
Fwd Passage Stbd, 1D36	SP	Port Exit, 1M11	P
Sick Bay, 1D38	SP	Stationary Locker, 1D34	SP
QM Station Stbd, 1D37	SP	Helicopter Pilot Cabin, 1D56	SP
QM Stn Stbd Indicator Unit		Passage Port, 1D57	SP
Fwd Stairs, 1D35	SP	Exercise Rm, 1D58	SP
Chief Engineer Bedroom, 1D39	SP	Exercise Rm, 1D59	SP
CE Dayroom, 1D41	SP	Cadets Cabin, 1D60	SP
Stbd Passage, 1D40	SP	Logistics Officer Cabin, 1D62	SP
SE Bedroom, 1D42	SP	Port Passage, 1D63	SP
Senior Engineer Dayroom, 1D43	SP	Ships Office, 1D65	SP
Stbd Passage, 1D44	SP	Photocopy Rm, 1D66	SP

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all	
Fixed Fire Fighting Systems Annual Inspection/Maintenance			
Stbd Passage, 1M14	P	3 rd Officer Cabin, 1D67	SP
Engineers Office, 1D61	SP	2 nd Officer Cabin, 1D68	SP
Engineers Office, 1D64	SP	Medical Officer, 1D69	SP
2 nd Engineers Bedroom, 1D45	SP	Port Passage, 1D70	SP
3 rd Engineer Bedroom, 1D46	SP		
Stbd Passage, 1M15	P		
EO Bedroom, 1D47	SP		
Smoking Rm, 1D48	SP		
Center Aft Passage, 1D49	SP		
Stbd Passage, 1M16	P		
Cleaning Locker, 1D50	SP		
Lower Deck			
Potato Rm, 1D71	SP	Passage Mud Rm, 1D74	SP
Lobby Cold Storage, 1D72	SP	Passage Mud Rm, 1M18	P
Fruit/Veg Cold Storage, 1D73	SP	Dry Stores, 1D76	SP
Passage Fwd Mud Rm, 1D75	SP	SG Locker P Aft, 1D137	FH
Fwd Stair to Engine Rm, 1D77	SP	Steering Gear FM 200 Low Pressure, 1M61	LP
Fwd Stair Stbd, 1D79	SP	Canteen, 1D94	SP
Passage Stbd, 1D148	FH	Seaman Rm 642, 1D89	SP
Galley Aft, 1D147	FH	Seaman Rm 609, 1D95	SP
Galley Fwd, 1M30	MON	Port Passage, 1D96	SP
Galley Hood System, 1M20	P	Port Passage, 1M28	P
Stbd Passage, 1D144	FH	Aft Stair, 1D97	SP
Crew Mess Aft, 1D145	FH	Linen Locker, 1D98	SP
Incinerator Rm, 1D146	FH	Seaman Room 612, 1D99	SP
WT Door Power Locker, 1D106	SP	Seaman Rm 615, 1D100	SP
Chief Cook Cabin RM 657, 1D80	SP	Crew Lounge Aft, 1D140	FH
Cook/Steward RM 655, 1D81	SP	Crew Lounge FWD, 1D139	FH
Stbd Passage, 1D82	SP	Seaman Rm 617, 1D101	SP
Stbd Passage, 1M23	P	Lead Seaman Room 620, 1D102	SP

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all	
Fixed Fire Fighting Systems Annual Inspection/Maintenance			
Stair at Frame 70, 1D83	SP	Lead Seaman Room 622, 1D103	SP
Oiler Rm 652, 1D84	SP	Port Passage, 1D104	SP
Oiler Rm 650, 1D85	SP	Clean Locker, 1D105	SP
Ships Clerk Rm 647, 1D86	SP	Crew Laundry Rm, 1D138	FH
Stbd Passage, 1D87	SP	Linen Locker, 1D107	SP
Stbd Passage, 1M24	P	Boatswains Mate Cabin, 1D108	SP
Steward Rm 644, 1D88	SP	Passage Port, 1D109	SP
Clothing Store, 1D90	SP	Locker Room, 1D110	SP
Bonded Store, 1D91	SP	Passage Port, 1D111	SP
Stores Main Deck Rm 603, 1D93	SP	Main Deck FWD	
Stores Handling, 1D92	SP	CO2/FM 200 Room, 2D14	FH
Stores Handling, 1M26	P	Winch Rm FWD FM 200 LP, 2M68	LP
Steering Gear Fwd, 1D141	FH	On Deck FWD, 2M32	P
Steering Gear Stbd, 1D142	FH	Winch Rm Stbd, 2D115	SP
Steering Gear Port, 1D143	FH	Winch Rm Port, 2D114	SP
SG Locker P Fwd, 1D136	FH	Rope Stores Port, 2D15	FH
		Rope Stores Center, 2D16	FH
Rope Stores Stbd, 2D17	FH	Upper Hold Stbd Fwd, 2D9	FH
Paint Locker, 2M33	FEN	Upper Hold Port Fwd, 2D10	FH
Upper Bowthruster, 2D112	SP	Lower Hold Port, 2D11	FH
Lower Bowthruster, 2D113	SP	Lower Hold Cent Fwd, 2D12	FH
Upper Hold Port Aft, 2D7	FH	Lower Hold Stbd, 2D13	FH
Upper Hold Stbd Aft, 2D8	FH		
Engine Room Deck			
Winch Room Port Aft, 2D1	FH	AT Transformer Rm, 2M38	P
Winch Room Stbd Aft, 2D2	FH	Transformer Rm Stbd Fwd. 2D121	SP
Winch RM Port, 2D3	FH	Transformer Rm Port Fwd, 2D122	SP
Winch RM Port FWD, 2D4	FH	Transformer Rm Port Aft, 2D123	SP
Winch RM Stbd FWD, 2D5	FH	Transformer Rm Stbd Aft, 2D124	SP
Winch RM Stbd, 2D6	FH	Lower ER Center Aft, 2D31	FH
Winch RM FM 200 LP, 2M62	LP	Lower ER Port AFT, 2D32	FH
Upper ER at MCC, 2D19	FH	Lower ER Port Center, 2D33	FH

Spec item #: H-04	SPECIFICATION		TCMSB Field # 3N0090 all
Fixed Fire Fighting Systems Annual Inspection/Maintenance			
Upper ER at Workshop, 2D20	FH	Lower ER Port FWD, 2D34	FH
Outside Workshop, 2M34	P	Lower ER Center FWD, 2D35	FH
Upper ER Electrical Workshop, 2D21	FH	Lower ER Center FWD, 2D36	FH
Upper ER Stbd FWD, 2D23	FH	Lower ER Stbd FWD, 2D37	FH
Upper ER Stbd AFT, 2D24	FH	Lower ER Stbd Center, 2D38	FH
Upper ER Stbd AFT, 2D25	FH	Lower ER Stbd Aft, 2D39	FH
Upper ER @ Boiler, 2D26	FH	FM 200 ER Bilge Stbd LP, 2M63	LP
Upper ER Port Fwd, 2D27	FH	FM 200 ER Bilge Port LP, 2M64	LP
Upper ER Port AFT, 2D28	FH	Cycloconverter Rm Cent Port, 2D118	SP
Upper ER @ MCR, 2D29	FH	Cycloconverter Rm Cent Fwd, 2D119	SP
Upper ER @ Boiler, 2D30	FH	Cycloconverter Rm Stbd Fwd, 2D120	SP
ER Control RM Aft , 2D116	SP	Lower Prop Mot Rm Stbd Aft, 2D49	FH
ER Control RM Fwd, 2D117	SP	Upper Prop Mot Rm Stbd Aft, 2D45	FH
ER Control RM Exit, 2M35	P	FM200 LP Prop Motor Rm Port, 2M65	LP
Purifier Rm Aft, 2D53	FH	FM200 LP Prop Motor Rm Stbd, 2M66	LP
Purifier Rm Fwd, 2D54	FH	Sewage Compt Aft, 2D46	FH
Lower Prop Mot Rm Aft Cent, 2D52	FH	Sewage Compt Port, 2D47	FH
Lower Prop Mot Rm Fwd Cent, 2D51	FH	Sewage Compt Stbd, 2D48	FH
Lower Prop Mot Rm Port Aft, 2D50	FH	Central Stores Port, 2D125	SP
Upper Prop Mot Rm Stbd Aft, 2D44	FH	Central Stores Center, 2D126	SP

Spec item #: H-04	SPECIFICATION	TCMSB Field # 3N0090 all	
Fixed Fire Fighting Systems Annual Inspection/Maintenance			
Upper Prop Mot Rm Cent Fwd, 2D43	FH	Central Stores Stbd, 2D127	SP
Upper Prop Mot Rm Port Fwd, 2D42	FH	General Alarm Interface, 2M44	REL
Upper Prop Mot Rm Port Aft, 2D41	FH	Fire Door Release Interface, 2M49	REL
Upper Prop Mot Rm Port Cent, 2D40	FH		
Prop Motor Rm Exit, 2M40	P		

3.47 Contractor shall provide Fire Alarm device test and inspection record for all devices noted showing that they operated correctly or corrective action that was taken.

3.48 Any defects shall be addressed by 1379 action.

Part 4: Proof of Performance

4.1 Contractor shall provide proof of performance of the all of the above noted systems as indicated throughout.

Part 5: Deliverables

5.1 Contractor shall provide annual inspection certificates for all fire fighting systems .

5.2 Contractor shall provide foam analysis reports from labs to Coast Guard.

5.3 Contractor shall provide service reports indicating all inspections/work carried out.

Spec item #: H-05	SPECIFICATION	TCMSB Field # 3JJ030 (1 – 5 incl) & 3KK200(1 & 2)
SAFETY VALVE CERTIFICATION		

Part 1: SCOPE

The intent of this specification is to have 12 Safety Valves (pressure-relief) serviced and certified.

Part 2: REFERENCES

Guidance Drawings/Nameplate data

N/A

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

2.2 The Contractor shall supply all materials, equipment and parts required.

Part 3: TECHNICAL DESCRIPTION

3.1 Contractor shall dismount/remove the valves from their pressure vessels and label each as to origin. Ship's crew to isolate and relieve pressure from the pressure vessels prior to valve removal. List of the valves are as follows:

<u>Valve location</u>	<u>Qty.</u>
Emergency Gen. Receiver	1
Main air receivers	2
Whistle air receiver	1
Control air receiver	1
Dead ship air compressor	1
Main air compressors	4 (2 on each compressor)
Port Boiler Safety Relief Valve 1 ½" – 125 psi	
Stbd Boiler Safety Relief Valve 1 1/4" – 125 psi	

Note: Only one air compressor and one Main Air receiver to be out of service at a time.

Spec item #: H-05	SPECIFICATION	TCMSB Field # 3JJ030 (1 – 5 incl) & 3KK200(1 & 2)
SAFETY VALVE CERTIFICATION		

3.2 The Contractor shall transport the valves complete with their labels to a qualified local Test Facility. The Contractor shall have an allowance of \$5,000 for the cost of the subcontractor to test and set the valves. The actual amount to be adjusted up or down via 1379 action upon proof of invoice. The lift pressure of the valves to be set as per TCMS requirements.

3.3 Test facility shall service the valves, as required. Any servicing/replacements to be dealt with by 1379 action.

3.4 The serviced and certified valves are to be returned to the ship within 4 business days after removal from the ship. The serviced and certified valves complete with their labels shall be re-fitted in place using new gaskets and proven leak free.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

4.1 The Contractor shall supply three copies of each test certificate to the Owner's Representative within two days of the re-certified valves being re-installed on the vessel. The valve test certificates shall clearly identify the valve, Ship's name, valve function, the test pressure and the test date.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

5.1 A service report is to be provided for any repairs and/or adjustment required.

Spec item #: H-06	SPECIFICATION	TCMSB Field # N/A
SERVICING OF HALOCARBON REFRIGERATION and AC SYSTEMS		

Part 1: SCOPE

- 1.1 Contractor shall provide the following services;
- A) Annual Leak Testing of Domestic Refrigeration and Air Conditioning Systems.
 - B) Filter Drier and Oil changes on the Domestic Refrigeration Compressors (2 of)
 - C) Filter Drier and Oil changes on the main Accom HVAC A/C Compressors (2 of)
 - D) Filter Drier and Compressor Oil changes on the MCR and Radio Room A/C units

Part 2: REFERENCES

- 2.1 The Contractor's Qualified Refrigeration Technician(s) shall perform the following work on CCGS Ann Harvey's Refrigeration and Air Conditioning Systems. The Contractor shall provide to the Owner photocopies of the Refrigeration Technicians Certificate of Trade Qualifications prior to the commencement of the following work.

Owner Furnished Equipment

- 2.2 The Contractor shall supply all parts and consumables. Allow \$2,500.00 for parts and consumables to be adjusted up or down by 1379 on proof of detailed (c/w part numbers) invoices. The following parts and consumables shall be provided at a minimum:
- a) quantity 2 of Sporlan Filter-drier Cartridge P/N RC 4267
 - b) quantity 2 of Sporlan Filter-Drier Cartridge P/N 4864 7/8"
 - c) quantity 2 Gallons of Copeland Ultra 32 CC POE Synthetic Compressor Oil (3/4 Gallons each sump capacity plus quantity for 'flushing'.) Domestic Refrigeration Compressors Refrigerant R-134a
 - d) quantity 7 Gallons (some of which will be left for Ship's stores) of Compressor Oil Mineral Oil 150 for A/C Compressors Refrigerant R-22
 - e) quantity 1 of Evaporator Blanchard Ness Ltd Model LS-205A
 - f) quantity 1 of Liquid Line Drier Emerson P/N EKP-416

The certificated refrigeration technician(s) shall provide and use their own clean recovery cylinder for refrigerant 134a, Nitrogen cylinder and vacuum pump.

Spec item #:H-06	SPECIFICATION	TCMSB Field # N/A
SERVICING OF HALOCARBON REFRIG/AC SYSTEMS		

Part 3: TECHNICAL DESCRIPTION

- 3.1 The technician(s) shall with the assistance of the ship's Electrical Officer isolate and lock out the electrical power supply to the Domestic Refrigeration System for the duration of the work of component & seals renewal as required to correct the identified defects and to perform a thorough nitrogen pressurized leak test on the Domestic Refrigeration Systems.
- 3.2 Upon successful completion of all repairs and satisfactory nitrogen leak testing and drier renewals the system piping shall be evacuated of all air and moisture and the Domestic Refrigeration System returned to service.
- 3.3 The technician(s) shall log all work performed on these systems in both the local Logs and in the Halocarbon Book Log maintained in the Chief Engineer's bookshelf.
- 3.4 All systems shall be left in good running order on completion of work. All standby systems shall be left with their charges isolated in their condensers and standby systems shall be tagged to that effect. The tags shall be dated and signed.
- 3.5 All work shall be to the satisfaction of the Owner's Representative or Delegate. All work shall be carried out in accordance with provincial and federal environmental regulations and guidelines.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 Contractor shall provide 3 typewritten copies of the work conducted outlining specifically the Refrigeration System(s).

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

N/A

Spec item #:H-07	SPECIFICATION	TCMSB Field # N/A
AVIATION FUEL SYSTEM ANNUAL SERVICING		

Part 1: SCOPE

- 1.1 The intent of this spec is to recertify the equipment listed below. The Contractor shall install his own lock-outs on the Aviation Fuel System Supply Breaker # 10 on the Aft Load Center on the Motor Room Flat.

Part 2: REFERENCES

FSR - Cahill Instrumentation

Shawn Reid

Instrumentation Lead, CAHILL Instrumentation

Tel: 709.747.3800

Cell: 709.691.4572

Fax: 709.747.

Part 3: TECHNICAL DESCRIPTION

- 3.1 Contractor to bid with an allowance of \$6,000 for the services of the Field Service Representative to complete the tasks listed below.
- 3.2 Contractor shall dismount, transport, service and re-install the following components of the Aviation Bulk Fuelling System:
 - a) Dispensing Meter, Note: Contractor may service Dispensing Meter in Situ.
 - b) Flame Engulfment Relief Valve

Item 'a' is located in the Fuel Dispensing Cabinet Boat Deck Port Aft
 Item 'b' is mounted on the piping on the Towing Deck (Stbd Aft Main Deck)
- 3.3 All temporary openings created in the Aviation Fuel System are to be temporarily wrapped or sealed against the ingress of any contaminants.
- 3.4 The helicopter fuelling hose consists of one - 75 ft. length of 1.5" diameter. Aviation fuel hose with T1X15T Brass male couplings each end.
- 3.5 The contractor must use calibrated test equipment and current copies of the equipment calibration certification must accompany the hose certificates.

Spec item #: H-07	SPECIFICATION	TCMSB Field # N/A
AVIATION FUEL SYSTEM ANNUAL SERVICING		

- 3.6 The contractor will be responsible for ensuring testing is carried out to the satisfaction of the Chief Engineer and Transport Canada Marine Safety and for providing a copy of a Transport Canada Marine Safety form SI-26 Component Inspection Certificate in addition to a signed test certificate from the contractor.
- 3.7 Perform a static pressure test on all the hoses using diesel fuel to Manufacturers instructions regarding procedure, pressure value and number of cycles.
- 3.8 Upon satisfactory completion of hydrostatic testing the hose shall be completely drained of fluid and blown through with clean dry air.
- 3.9 The Contractor shall measure and record the static conductivity of the hose assembly and include same on the hose test certificate.
- 3.10 Contractor shall re-install items 'b' & 'c' with new Aviation Fuel compatible gaskets C.A.F. type with P.T.F.E. envelope. Contractor shall re-connect the tested and drained fuel hose using gas-rated pipe thread tape. The fuel hose shall be reeled back onto the storage reel once the fuel system has been tested and the hose connections proven tight. Contractor shall ensure that the bonding straps are re-installed on each flange as per original.
- 3.11 Contractor shall hand the new test certificates to the Owner's representative prior to the testing of the serviced system. Testing shall be conducted with the assistance of the Senior Engineer.
- 3.12 The Contractor shall exchange the in-service BSP relief valves with owner-supplied certified spares (Inside Aviation Cofferdam).
- A) Avgas Piping Pressure Relief Valve 1.5" BSP set at 12PSI
 - B) Avgas Piping Vacuum Relief Valve 1.5 BSP set at 0.5" Hg

The Aviation Fuel Tank Cofferdam is a ventilated and monitored Confined Space. Contractor shall comply with Owner's Safety Annex Confined Space Entry Procedure. The only purpose in entering the Cofferdam is to dismount valves 'd' & 'e' and install owner-supplied certified replacements. The dismounted BSP relief valves are to be handed to the Owner's Representative for certification in home port. The contractor shall use gas-line pipe sealant tape on the pipe threads. The valves are identical externally except for the etched pressure rating. The contractor is to take utmost care to install the owner-supplied certified replacement valves as original for orientation and spring tension.

Spec item #: H-07	SPECIFICATION	TCMSB Field # N/A
AVIATION FUEL SYSTEM ANNUAL SERVICING		

3.13 The contractor shall dismount and open for cleaning and inspection the relief vent pipe outlet flame screen “Flame Arrester assembly” located at aft end of Towing Deck.

3.14 Flame arrester assembly (12 bolts) and open same (4 bolts) for cleaning and inspection. The ‘element consists of 9 layers of 316 SS mesh 0.112 mm dia wire x 0.254 pitch. Cleaning to be by solvent and subsequent compressed air blow through; no mechanical cleaning shall be performed. Any defects seen in the flame screen to be brought to the attention of the Owner’s representative. The flame screen is to be re-assembled and re-installed in good order with anti-seize compound applied to the fastener threads.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 Contractor shall conduct a conductivity and static pressure test on fuel hose.
- 4.2 Contractor shall provide a Transport Canada Marine Safety form SI-26 Component Inspection Certificate in addition to a signed test certificate from the contractor.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

- 5.1 Contractor shall provide 3 typewritten service reports detailing work and inspections conducted.

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

Part 1: Scope

- 1.1 The intent is to clean the duct work for the Accommodation and Dryer Ducts by certified HVAC specialist.

Part 2: References

Guidance Drawings/Nameplate data

HVAC Diagram 72-263 Sheets 1 & 2 (Drawings to be provided to successful bidder)

Standards

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

- 2.2 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.
- 2.3 See 'Dryer Vent' image in Appendix A.

Part 3: Technical Description

Accommodation Duct Cleaning

- 3.1 The Contractor with the ship's Electrical Officer shall lock-out the affected HVAC Fan and A/C Compressor prior to start of work.
- 3.2 The Contractor shall complete the work on one 'side' at a time.
- 3.3 The contractor shall complete the ship's lockout/tagout procedure and forms but the contractor must supply their own locks and tags.
- 3.4 The contractor shall provide the services of a qualified HVAC technician to remove all grime, grit, dust and debris from the internal surfaces of the vessel's supply ducting. The Contractor shall have an allowance of \$7,000.00 for the services of the HVAC technician to be adjusted up or down by 1379 action upon proof of invoice.
- 3.5 The Contractor can use any of the current plugged access penetrations for the cleaning equipment. Any access penetrations opened shall be properly plugged following the work.

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

- 3.6 If any further openings in the ducting are requested by the Contractor they must be covered with screwed sheet metal panels, tape, and the insulation replaced in good order. The Chief Engineer shall be advised of the requirement and the need for it before any further openings are made.
- 3.7 All insulation removed is to be reinstalled in good order with all moisture barrier sealed as original and all taped seams re-taped with new approved tape for HVAC systems.
- 3.8 Contractor shall allow for the dismantling and re-installation of 50 ceiling panels to access various ventilation trunking, ducting, and tubes. The Contractor shall ensure that his workers are all informed as to the requirement for verifying the identification markings on the panels such that each panel is restored and well secured in its original position on completion of work and inspection. Note that other concurrent repair and maintenance work shall require the dismantling of ceiling panels. The Contractor for this work shall ensure his employees are aware that they shall not re-install any ceiling panels removed by other persons. The Chief Officer must be informed the ducting and outlets are ready for inspection prior to re-installation of the ceiling panels dismantled for this work only.
- 3.9 All items are to be replaced in good order upon completion of all work.
- 3.10 Any wiring, piping, lighting, fixtures, fasteners, metal work, etc. that has been removed or repositioned to carry out this work is to be reinstalled in good order in its original location and condition.
- 3.11 Port Accommodation Ventilation Located in Fan Room, Boat Deck
Capacity 5300 CFM
Officers Deck:
- | | | |
|-----------------------|---------|-------------|
| Chief Mates Dayroom | 194 CFM | 2 diffusers |
| Chief Mates Nightroom | 115 CFM | 1 diffuser |
| Spare Cabin Port | 140 CFM | 2 diffusers |
| Spare Cabin Starboard | 154 CFM | 2 diffusers |
| C/O Nightroom | 68 CFM | 1 diffuser |
| C/O Dayroom | 190 CFM | 2 diffusers |

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

Boat Deck:

Stbd Accommodation Ventilation: Located in Fan Room, Boat Deck, Capacity 5300CFM:

SAR Equipment Room	218 CFM	2 diffusers
Electronic Room	196 CFM	2 diffusers
Officials Nightroom	120 CFM	1 diffuser
Officials Dayroom	79 CFM	1 diffuser
Winch Control Room	211 CFM	3 diffusers
Laundry Room (NRV Fitted)	65 CFM	1 diffuser
Clothing Stores	64 CFM	1 diffuser
Officer's Lounge	228 CFM	4 diffusers

Upper Deck

Officer's Mess	320 CFM	3 diffusers
Q/M Station Port	32 CFM	1 diffuser
Nurse Cabin	119 CFM	1 diffuser
Second Mate Cabin	133 CFM	1 diffuser
Third Mate Cabin	117 CFM	1 diffuser
Log. Officer Cabin	112 CFM	1 diffuser
Photocopier Office	47 CFM	1 diffuser
Administration Office	170 CFM	1 diffuser
Engineer Drawing Office	57 CFM	1 diffuser
Helicopter Pilot Cabin	165 CFM	1 diffuser
Flight Engineer	132 CFM	1 diffuser
Bosun Cabin	143 CFM	1 diffuser
Ice Observer Cabin	175 CFM	1 diffuser
Officers Pantry (NRV Fitted)	67 CFM	1 diffuser
Sick Bay (NRV Fitted)	161 CFM	1 diffuser
Q/M Station Starboard	65 CFM	1 diffuser
C/E Nightroom	114 CFM	1 diffuser

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

Upper Deck

C/E Dayroom	179 CFM	1 diffuser
S/E Nightroom	122 CFM	1 diffuser
S/E Dayroom	158 CFM	1 diffuser
Second Engineer Cabin	151 CFM	1 diffuser
Third Engineer Cabin	147 CFM	1 diffuser
E/O Cabin	143 CFM	1 diffuser
Exercise Room	258 CFM	2 diffusers
Cadets Cabin	97 CFM	1 diffuser
Engineers Office	97 CFM	1 diffuser
Return Air Register	17"x12"	1 register

Main Deck

Crews Mess	492 CFM	2 diffusers
C/Cook Cabin	143 CFM	1 diffuser
Second Cook Cabin	200 CFM	1 diffuser
Oiler Cabin	187 CFM	1 diffuser
Oiler Cabin	194 CFM	1 diffuser
Oiler Cabin	161 CFM	1 diffuser
Steward Cabin	172 CFM	1 diffuser
Seamen Cabin	190 CFM	1 diffuser
Return Air Register 12"x8"	1 register Upper Deck	
Seaman Change Room	134 CFM	1 diffuser
Bosun Mate Cabin	140 CFM	1 diffuser
Clerk/Storekeeper Cabin	158 CFM	1 diffuser
Leading Seamen Cabin	175 CFM	1 diffuser
Linen Locker	45 CFM	1 diffuser
Laundry Room	120 CFM	1 diffuser
NRV Fitted for above 2 areas		

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

Main Deck

Seaman Cabin	157 CFM	1 diffuser
Seamen Cabin	158 CFM	1 diffuser
Seamen cabin	154 CFM	1 diffuser
Seamen Cabin	187 CFM	1 diffuser
Crew's Lounge	463 CFM	4 diffusers
Canteen	65 CFM	1 diffuser
Galley (NRV Fitted)	4 diffusers	
Return Air Register 12"x8"	1 register	

Dryer Duct Cleaning

- 3.12 Contractor shall clean 4 dryer exhaust ducting.
- 3.13 3 dryers are located in the Laundry Room on the Lower Deck and one dryer is located in the Laundry Room on the Boat Deck.
- 3.14 Contractor shall ensure 2 dryers are operational at all times.
- 3.15 Contractor shall open up cleanouts on the back of the dryers.
- 3.16 The exhaust ducting from the Laundry Room on the Lower Deck exhausts to the stbd breezeway on the Main Deck. Contractor shall ream out the exhaust ducting down from this point to the cleanouts below. Each dryer exhausts through a 4" gooseneck.
- 3.17 Contractor shall catch and remove lint deposits from dryer clean outs that are collected and fall from the cleaning.
- 3.18 The dryer located on the Boat Deck exhaust high on the port side superstructure. Contractor shall ream out this ducting from the dryer cleanout up until the reaming tool protrudes through the exhaust gooseneck on the superstructure. At this point the cleanout tool should be retracted back through the ducting and all loose lint and debris that falls and comes with the tool shall be collected.
- 3.19 Contractor shall reinstall cleanouts on back of dryers upon completion.

Spec item #: H-08	SPECIFICATION	TCMSB Field # N/A
Accommodation and Dryer Duct Cleaning		

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 The Chief Officer will inspect all spaces to ensure all removals are replaced.
- 4.2 Contractor to collect images and video of ducting before and after cleaning. Signoff will occur when all work is completed to the satisfaction of the Chief Officer.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

- 5.1 Service report to be provided to Chief Engineer.
- 5.2 Three copies of images and video to be forwarded to Technical Authority upon completion of work.

Spec item #: H-09	SPECIFICATION	TCMSB Field # N/A
GALLEY EXHAUST TRUNK CLEANING		

Part 1: SCOPE

- 1.1 Contractor shall clean Galley Exhaust Trunking in way of range hood to discharge on Upper Breezeway Deck to remove soft and hardened on deposits.

Part 2: REFERENCES

N/A

Part 3: TECHNICAL DESCRIPTION

- 3.1 Contractor with ship's Electrical Officer shall lockout the Galley Exhaust Fan Breakers.
- 3.2 The exhaust fans and motors are accessed by a bolted on steel plate located overhead at the front of the stbd breezeway just below the exhaust screen.
- 3.3 The access plate is sufficiently heavy and awkward that Contractor shall supply a minimum of two people for the access plate dis-mounting and re-installation (3 persons recommended). The fan motor leads shall be tagged and dis-connected and the fan/motor assemblies dismantled and transported ashore to Contractor's premises for cleaning and de-greasing.
- 3.4 The contractor shall lay protection down over the galley range, deep fat fryer etc to ensure no cleaning debris can contaminate the food handling surfaces. The contractor shall dismount the range-hood intake screens and lay same aside for cleaning.
- 3.5 The contractor shall lay protection down on the stbd breezeway forward in way of the exhaust trunking outlet to collect chemical and grease residue generated by this work.
- 3.6 The contractor shall provide and use an approved non-toxic residue-free high flashpoint cleaning agent and mechanical means to thoroughly clean and degrease the interior of the Galley Exhaust Trunking throughout its full length.
- 3.7 The Contractor shall supply to the Owner's representative a copy of the MSDS sheets and spec. sheets for the cleaning chemical(s) used in this work.
- 3.8 The Contractor shall take every precaution to protect the fusible link within the ducting intake hood. (Contractor to advise Owner's Representative when mechanical inhibition of the automatic Fire Smothering System is required).

Spec item #: H-09	SPECIFICATION	TCMSB Field # N/A
GALLEY EXHAUST TRUNK CLEANING		

- 3.9 In the event that the Contractor accidentally releases the Fixed Fire Smothering agent the Contractor shall subsequently re-charge and re-certify the Fire Smothering System at his own expense. He is also fully responsible for the clean-up of the Smothering Agent.
- 3.10 Contractor's estimate for labour and materials shall assume that the grease towards the discharge end of the exhaust trunking is hardened and persistent.
- 3.11 Subsequent to Owner's Representative's inspection as satisfactory the Fan/Motor assemblies shall be re-installed, re-connected; de-isolated and correct direction of rotation proven. Intake screens and access plate shall be re-installed in good order.

Location

- 3.12 Intake Galley Range Hood
Discharge: Upper Deck Breezeway Starboard Forward

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 Contractor shall contact C/E when cleaning is completed for a visual inspection.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

N/A

Spec item #: H-10	SPECIFICATION	TCMSB Field # N/A
Windows Replacement		

Part 1: SCOPE

The intent of this item is to replace four welded weather tight windows Officer's Deck with four new (Owner Supply) welded watertight windows. The two forward facing windows in the Commanding Officers Cabin 313 and Bedroom 314 are to be replaced with vertical sliding weather tight windows. On the ship's side in the Commanding Officers Cabin 313 one window will be replaced with a vertical sliding weather tight window and one window is to be replaced with a fixed weather tight window.

Part 2: REFERENCES

Reference Drawing: Window List Drg. No. 72-310 Sheet 9 (Drawings to be provided to successful bidder).

Standards

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION

- 3.1 **Location:** Commanding Officers Cabin 313 and Bedroom 314, on Officers Deck

- 3.2 **Window Specifications:**

Window, observation, 4 bulkhead cut out opening for all windows: 20 3/4" wide x 26 1/2" high x 5" radius on corners - glass thickness is .635". All windows are of welded frame mild steel construction.

Spec item #: H-10	SPECIFICATION	TCMSB Field # N/A
Windows Replacement		

3.3 All deck coverings (carpets/tiles) in the affected spaces shall be covered with masonite sheathing. All contents in the affected spaces shall be suitably protected from dirt debris and damage during the repairs. Interior fireproof enclosures approximately 4' x 5' x 7' shall be erected in areas directly adjacent to hot work operations (in front of window). Exhaust ventilation fan leading to outdoors shall be used in affected areas during all hot work operations. Contractor shall advise Owner before dust or smoke generating work is to occur and to confirm with the Owner that the relevant smoke detectors have been inhibited prior to starting the work.

3.4 Any items requiring removal to facilitate performance of specified work, as deemed necessary by the Contractor, shall be removed by Contractor and replaced in good order upon completion of specified work. This will include furniture, curtains, bulkhead lining panels, insulation, window boxes, electric heaters etc. All insulation that is removed shall be replaced with new approved insulation with moisture-barrier as per original. Note Ship's Electrical Officer shall isolate the electrical heaters prior to their removal.

3.5 The contractor shall crop out each window and dispose of it ashore. Care is to be taken to ensure that the bulkhead cut out opening is not enlarged during removal and will readily accept new window frame. Existing drip trays and drains shall be removed.

3.6 Contractor shall fabricate and install three new drip trays and drains for the vertical sliding windows. Drains shall be proven free. The window that is being replaced with fixed glass window shall have its drain plugged.

3.7 Bulkhead cut out opening shall be properly prepared to accept the new window and new window frame welded in place.

3.8 The contractor shall install each new window in good order. Welding and hotwork procedures shall be as outlined in the attached Preamble.

3.9 All new and disturbed steelwork shall be applied with two coats of primer.

3.10 The contractor shall fabricate and install window boxes to suit the new window installations. The new window boxes shall be of the same quality of material and construction as the original window boxes. The new contractor-supplied window boxes shall not be installed until satisfactory completion of the watertight integrity testing.

3.11 All items removed to facilitate performance of specified work shall be replaced in good order.

3.12 Upon completion, all areas affected by this specification shall be left in a clean, as found, condition.

Part 4: PROOF OF PERFORMANCE

4.1 Weather tight integrity of each window shall be proven using water spray at a pressure of 60 psi.

4.2 The Ship's Electrical Officer shall restore power to the electrical heaters and heaters shall be proven operational.

Part 5: Deliverables

N/A

Spec item #: H-11	SPECIFICATION	TCMSB Field # 3L031
Cargo Hold Hatch Cover Inspection and Repair		

Part 1: Scope

1.1 The intent of this specification is for the Contractor to overhaul and inspect the Cargo Hold Hatch Cover. This will include the hatch rollers, grease fittings and renew the gasket material on the cover sections. Note: the hydraulic Rams are not included on this item:

Part 2: Reference

Guidance Drawings/Nameplate data

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Guard Fleet Safety Manual (DFO 5737)

2.2 Guidance Drawings/Nameplate Data

Manual #21

- Cargo Hatch Drawing 12.674-1 Weatherdeck Hatch
- Cargo Hatch Drawing 3998 Top Hinge
- Cargo Hatch Drawing 3939-1 Bottom Hinge
- Cargo Hatch Drawing 3939-2 Bottom Hinge
- Cargo Hatch Drawing 23.594 Supporting End Hinge
- Cargo Hatch Drawing 12.675-1 Main End Hinge
- Cargo Hatch Drawing 12.682 Turning and securing
- Cargo Hatch Drawing 12.676 Roller and Roller brackets
- Cargo Hatch Drawing 11.722 Cleat M24-3

Nameplate Data: Hydraulic Weather-deck Hatch
Manufacturer: Velle Systemer A/S

Owner Furnished Equipment

2.3 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Part 3: Technical Description

- 3.1 Ship's crew is to isolate and lock out hydraulic power pack for the hatch cover at breaker **P-604-6 in the Center MCC, located in the Winch Room.**
- 3.2 The Contractor is to remove all four sections of the cover ashore for inspection and repair. Care is to be exercised so to not damage pins and gasket grooves.

Spec item #: H-11	SPECIFICATION	TCMSB Field # 3L031
Cargo Hold Hatch Cover Inspection and Repair		

- 3.3 A suitable covering is to be secured over the hatch coaming in way of removed cover so to prevent the ingress of water/dirt into the Cargo Hold area. Removal of any accumulation of rain water, dirt or debris will be the responsibility of the Contractor.
- 3.4 The hatch cover sections are to be placed in a safe area, out of the weather, prior to the commencement of any repairs or specified work. They are then to be inspected by the Chief Engineer (or designate).
- 3.5 Upon completion of any welding/hotwork repairs, the Contractor is to remove all of the old sealing gasket material; the gasket seating area to be power tool cleaned to remove all old glue and any accumulation of corrosion.
- 3.6 After inspection by the Chief Engineer (or designate), the gasket seating area and any disturbed coating is to be given one coat of Contractor-supplied marine-grade primer.
- 3.7 The Contractor to install new owner supplied gasket material with contact cement as per the manufacturer's instructions. Upon completion of the gasket installation, one coat of Owner-supplied white paint is to be applied to the entire bottom surface area of each hatch section. Care to be taken so no paint contacts the newly installed gasket material.
- 3.8 The Contractor to remove the three hydraulic actuating rams from their respective positions at the Main Deck level; all hoses and fittings are to be capped/plugged as required. Bearings and pin assemblies are to be cleaned. Grease passages proven clear, new Contractor-supplied grease fittings are to be installed and the rams reinstalled in their respective positions. A grease fitting with an extension is to be fitted to the center ram, lower bearing, to allow easy greasing; the extension to be suitably secured to pedestal.
- 3.9 All hydraulic fittings to be wrapped with Denso tape. Any disturbed areas to be given one coat of marine grade primer
- 3.10 The after port and stbd rollers and securing plates are to be removed and the rollers cleaned of old grease. New owner supplied counter sunk screws shall be installed in the plates upon reassembly.
- 3.11 The remaining four rollers will have their pins removed and the rollers and pins shall be cleaned of old grease and the rollers made operational. New contractor supplied cotter pins shall be installed to secure the roller pins.
- 3.12 All grease ways shall be cleaned and all grease nipples proven clear and operational.
- 3.13 All rollers, pins and bushings shall be measured in two directions in two different positions.
- 3.14 Any additional repairs shall be covered by 1379 action.

Spec item #: H-11	SPECIFICATION	TCMSB Field # 3L031
Cargo Hold Hatch Cover Inspection and Repair		

- 3.15 The hatch cover is to be returned to the vessel and re-installed. Securing dogs are to be adjusted to suit the newly installed gaskets.

Part 4: Proof of Performance

- 4.1 Upon reassembly of the rollers, the hatch shall be operated by ship's crew to ensure the rollers and hatch work correctly.
- 4.2 After the cover is secured it shall be hose tested with fresh water at 50 PSI. There shall be NO ingress of water into Cargo Hold area.

Part 5: Deliverables

- 5.1 Contractor to provide two type written copies of the roller readings to the Chief Engineer.

Spec item #: H-12	SPECIFICATION	TCMSB Field # N/A
Day Tank Cleaning and Inspection		

Part 1: Scope

1.1 The intent of this item shall be to open up the above tank for cleaning, inspection.

Part 2: References

Fuel Oil Day Tk Stbd Fr. 70 – 76 28.7 M³

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Fleet Safety Manual (DFO 5737)

Part 3: Technical Description

3.1 Contractor shall ensure confined space entry permits are in place.

3.2 Contractor shall check with Chief Engineer that lockout/tagouts are in place.

3.3 The tank will be pumped as low as possible by ship's staff. Contractor shall quote for the removal and disposal of 500 liters of oil/sludge residue. The disposal of all residues from the tank must be by a licensed waste oil disposal company. The total amount of residue, excluding residue from water washing of tank, shall be totaled and amount given to Chief Engineer. Contractor shall supply the name of the collection and disposal company to the Chief Engineer. Contractor shall quote unit cost for removal and disposal of 500 liters of oil/sludge for PWGSC 1379 adjustment. Contractor shall provide an accurate means of measuring the removed residue through the use of flow meters or tank sounding devices.

3.4 Contractors shall supply all ventilation and lighting equipment required for the gas-free certificates and maintain the equipment for the duration of the work. Gas-free certificates shall be renewed as required. Contractor shall quote a unit cost to gas-free a fuel oil tank for PWGSC 1379 adjustment.

3.5 Contractor shall remove manhole cover for access to tank. Chief Engineer shall be notified on removal of manhole cover and gas-free certificate for initial inspection. All dirt and debris found in tank shall be removed ashore and disposed of by Contractor to an approved location.

3.6 The tank internals are to be 100 percent high pressure washed at 3000 psi minimum. All water and residue from tank washing shall be pumped ashore and disposed of by Contractor. Tank shall be thoroughly wiped down with lint-free clean rags and all sludge deposits scraped off and disposed. During the water washing process, contractor will take care not to direct a stream of water at the tank level transducer. The level transducers must be covered up prior to any water washing of the tank. Each level transducer is located at a low point in the tank, usually adjacent to a manhole location. Exact location can be made by following the cable inside the tank.

Spec item #: H-12	SPECIFICATION	TCMSB Field # N/A
Day Tank Cleaning and Inspection		

3.7 After tanks have been cleaned, Contractor shall remove protective covers from the level transducers. Chief Engineer shall be notified for final inspection

3.8 CCG will advise Contractor when tanks can be closed up.

3.9 Before any tank is closed up, the manhole cover shall be inspected by the Chief Engineer. All tank fasteners shall be wire brushed clean and coated with an approved anti-seize compound. Contractors shall include in quotation to supply and install new ¼ inch thick nitrile gasket on the manhole cover.

3.10 Interferences

3.10.1 The vessel will have fuel onboard. The Contractor shall give the Chief Engineer 24 hours notice to allow the ships crew adequate time to transfer fuel from tank to tank.

3.10.2 During tank cleaning operations, Contractor shall provide protection to any internally mounted tank level transducers. Before closing up tanks, the Chief Engineer will confirm condition of tank level transducer.

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 The following inspections are required to be verified by the Contractor's Quality Assurance representative and CCG Technical Authority.

- Inspection of each fuel oil tank after cleaning.
- Final inspection of all tank prior to final "closing-up".

4.2 Testing

4.2.1 The following tests are to be performed on the Day Tank:

a. Witnessing of pneumatic test of Day Tank by TCMSB Surveyor and the CCG Technical Authority.

Part 5: Deliverables

5.1 The Contractor shall provide a Quality Assurance (QA) report indicating that all areas as defined in the specification have been inspected by the Contractor's QA Department and that all areas of defects established by this survey have been identified for remedial action.

Spec item #: H-13	SPECIFICATION	TCMSB Fields # 3L012, 3L013, 3L016, 3L017, 3L0198
Fuel Tanks Survey		

Part 1: SCOPE

1.1 The intent of this specification is to inspect and test the following fuel tanks for TCMSB 5 year survey credit:

Tank	Location	Capacity
No. 3 Fuel Oil Port	Fr. 152 – 163	108.6 M ³
No. 4 Fuel Oil Stbd	Fr 152 – 163	113.4 M ³
No. 7 Fuel Oil Port	Fr. 106 – 126	52.0 M ³
No. 8 Fuel Oil Stbd	Fr. 110 – 126	41.6 M ³
No 10 Fuel Oil Stbd	Fr. 70 - 96	104.5 M ³

Part 2: REFERENCES

2.1 Reference drawing 72-405 "Capacity Plan" (To be provided to successful bidder)

2.2 Canadian Coast Guard Fleet Safety Manual (DFO 5737)

2.3 Coast Guard ISM Confined Space Entry 7.D.9

Part 3: TECHNICAL DESCRIPTION

3.1 The ship's crew will pump the tanks down to the suction levels. Contractor shall lockout the fill and discharge valves for all tanks being opened for cleaning/inspection. Ships crew will advise of valve locations.

3.2 The contractor shall remove the manhole covers from the tanks and dispose of the residual oil for disposal ashore. The contractor shall quote the cost of removing and disposing of 4 Cubic Meters total volume of diesel fuel dregs from all the listed tanks combined. The quote shall also include a unit cost per additional 1 m³ and the total will be adjusted up or down by 1379 action on proof of disposal invoice.

Spec item #: H-13	SPECIFICATION	TCMSB Fields # 3L012, 3L013, 3L016, 3L017, 3L019
Fuel Tanks Survey		

3.3 The contractor shall ventilate each tank and provide mechanical ventilation to all areas of the tank. Each tank is to be gas freed, and certified safe for hot work and personnel to enter. Certificates shall be handed to the Chief Engineer prior to any personnel commencing work in each tank and a copy of these certificates shall be posted in a conspicuous area near the entrance to each tank.

3.4 The contractor shall thoroughly clean the internal surfaces of the tanks from debris, scale and sludge. All material and liquids remaining in the tank resulting from the cleaning shall be removed from the vessel and disposed of ashore on the same day as it is generated by the Contractor. All rusty areas are to be power tool cleaned. Contractor shall quote on power tool cleaning 2 m3 of rusty areas as well as provide a unit cost per additional 1 m3 to be adjusted up or down via PWGSC 1379 action. Contractor shall wipe down the internals of the tanks with lint free rags.

3.5 Following the cleaning of the tanks, the tanks shall be inspected by the Chief Engineer and a Marine Safety Inspector. Contractor shall provide a qualified Manhole lookout during these inspections.

3.6 The contractor shall clean the sealing surfaces around the manhole and cover and install the cover using new ¼ inch thick nitrile gaskets. The vents, sounding pipes and overflow pipes shall be proven clear. The level transmitter openings shall be cleaned with a soft tool and proven clear of sludge and the sounding pipe striker plates shall be checked for acceptable depth of pitting. Pipe brackets shall be confirmed sound.

3.7 Contractor shall quote on replacing 4 manhole cover studs. Contractor shall provide a unit cost to renew additional cover stud(s) which shall be adjusted up or down via PWGSC 1379 action.

3.8 The contractor shall quote a price on pneumatically testing to no more than 2.5 psi each tank to the satisfaction of the attending Marine Safety Hull Inspector. All tests shall be witnessed by the Chief Engineer as well as the Transport Canada Marine Safety Inspector. *Contractor is to note that the Overflow pipe connections are teed off the vent pipes for Double Bottom Fuel Tanks No's 7, 8 and 10 therefore the overflows on these tanks are to be blanked by solid gaskets at the overflow non-return valve at the vent tee. Chief Engineer to witness removal of these blanks and installation of new gaskets on completion of successful pressure testing of these tanks.*

Spec item #: H-13	SPECIFICATION	TCMSB Fields # 3L012, 3L013, 3L016, 3L017, 3L019
Fuel Tanks Survey		

3.9 The quote shall include the installation and removal of blanks/balloons for suction, sounding pipes, overflow pipes and vent head removals, additional tank entries for subsequent balloon adjustment or removal and **final inspection by Chief Engineer which will be carried out immediately prior to final closing of successfully tested tanks.** All testing is to be done as per the requirements of the attending Marine Safety Inspector. Contractor shall advise Chief Engineer in a timely manner when tanks are available for final inspection complete with a qualified Manhole Watch. Note that the quote is to include multiple tank entries for any tank where the contractor has improperly ballooned or blanked the tank openings on the initial attempts.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

4.1 Contractor shall have tank inspected and pressure test witnessed by TCMS for survey credit.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

5.1 Contractor shall provide copies of the waste oil disposal receipts and all relevant Safety Management System completed forms and checklists to the Chief Engineer.

Spec item #: H-14	SPECIFICATION	TCMSB Field # 3L002,3,4,5,6,7,8 & 9
Water Ballast Tanks Survey		

Part 1: SCOPE

1.1 The intent of this specification is to clean, inspect and test the following water ballast tanks for TCMSB 5 year survey credit and to renew the tanks internal corrosion protection. Note that the corrosion protection for the Wing Water Ballast Tanks will consist of sacrificial anodes renewal and the corrosion protection for the Double Bottom Ballast Tanks will consist of tank coating repairs. These tanks are Confined Spaces.

Tank	Location	Capacity
No. 1 Wing W/B Port	Fr. 163-175	41.3 M ³
No. 1 Wing W/B Stbd	Fr. 163-175	41.3 M ³
No. 2 Wing W/B Port	Fr. 152-163	55.1M ³
No. 2 Wing W/B Stbd	Fr. 152-163	55.1 M ³
No. 1 Double Bottom Water Ballast Port	Fr. 126-152 Docking Plug Fr.130.5 Port	50.8 M ³
No. 1 Double Bottom Water Ballast Stbd	Fr. 126-152 Docking Plug Fr.130.5 Stbd	50.8 M ³
No. 2 Double Bottom Water Ballast Port	Fr. 54-70 Docking Plug Fr. 55 Port	43.5M ³
No. 2 Double Bottom Water Ballast Stbd	Fr. 54-70 Docking Plug Fr. 55 Stbd	59.5 M ³

Part 2: REFERENCES

2.1 Reference drawing 72-405 "Capacity Plan" (To be provided to successful bidder)

2.2 Canadian Coast Guard Fleet Safety Manual (DFO 5737)

2.3 Coast Guard ISM Confined Space Entry 7.D.9

Spec item #: H-14	SPECIFICATION	TCMSB Field # 3L002,3,4,5,6,7,8 & 9
Water Ballast Tanks Survey		

Part 3: Technical Description

Water Ballast Tanks

- 3.1 The ship's crew will pump the ballast tanks down ('overboard') to the suction levels.
- 3.2 The contractor shall ensure that all necessary lockout/tagouts are in place.
- 3.3 The contractor will remove the manhole covers from all listed tanks. Note that this includes the aft and forward manhole covers for # 2 D/B W/B Tanks.
- 3.4 The Contractor shall remove remaining water from the D/B W/B Tanks which have docking plugs at Frames 55.5 and Frames 130.5 each P & S by dismounting of the respective docking plugs including locking bars. The docking plug shall be removed and given to the Chief Engineer.
- 3.5 The Contractor shall remove the remaining water from the W/B Wing Tanks (4 tanks affected) by use of submersible pumps and/or vacuum hoses. The cost of this shall be included in his bid price for this specification item. The Contractor shall allow for the removal and disposal of 100 gallons per tank including the labour required to move the suction between each frame.
- 3.6 The contractor will be responsible for all environmental requirements for disposal of tank residues.
- 3.7 Tanks are then to be certified safe for men to enter and hot work. One copy of gas free certificates for each tank shall be given to the Chief Engineer prior to men entering the tank and a copy of each certificate shall be posted in close proximity to the manhole cover for each tank
- 3.8 The Contractor shall provide the tanks with mechanical ventilation systems vented to the outside of the ship. Good ventilation must be provided and any blowers/extractors must ensure good air movement and solvent vapour removal from the lowest point in the tanks.
- 3.9 The Contractor shall renew all manhole cover studs found to be defective in the course of this work. Contractor shall include the cost for labour and materials to replace 60 manhole cover studs in his bid for this item. Contractor shall further quote the unit cost per stud replacement.

Spec item #: H-14	SPECIFICATION	TCMSB Field # 3L002,3,4,5,6,7,8 & 9
Water Ballast Tanks Survey		

Installation of Sacrificial Zinc Anodes in Wing Ballast Tanks

- 3.10 Contractor shall thoroughly clean the tanks of all scale, debris and sludge. All debris, rust and scale shall be removed from the vessel at a maximum interval of daily. Should the Contractor use fresh water pressure washing for any part of the cleaning the removal and disposal of the wash water shall be included in his bid price for this specification item.
- 3.11 The Contractor shall arrange for attendance of TCMS Hull Inspector and notify the Owner's Representative when the water ballast wing tanks are ready for preliminary inspection.
- 3.12 The Chief Engineer and attending TCMS surveyor will inspect the tanks. The inspections will include proving that all suction pipes, vent pipes, sounding pipes and transducer connections are clear and sound.
- 3.13 On completion of satisfactory inspection the Contractor to bid on removal of 44 wasted M24 zinc anodes from #1 Wing tanks and 40 wasted M24 anodes from #2 Wing tanks and replacing with new. Any anode that has wasted 50% shall be left in place. Contractor shall provide a unit cost to supply and install additional M24 zinc as the total quantity of anodes required will be adjusted up or down by 1379 action based on the tanks condition.
- 3.14 Following Owner's Final Inspection **and upon completion of all hotwork in the tanks** the tanks manhole covers shall be re-installed using new Contractor supplied manhole cover gaskets.
- 3.15 The Contractor shall dismount the water ballast wing tanks vent heads and fill the water ballast wing tanks with fresh water for hydrostatic testing to the satisfaction of the attending Transport Canada Marine Safety Hull Inspector and Owner's representative.
- 3.16 The Marine Safety Inspector shall determine the test method and boundaries to be inspected.
- 3.17 Contractor shall re-install tank vent heads using new gaskets and original stainless steel fasteners.

Spec item #: H-14	SPECIFICATION	TCMSB Field # 3L002,3,4,5,6,7,8 & 9
Water Ballast Tanks Survey		

Coating Repairs in Double Bottom Ballast Tanks

In the double bottom ballast water tanks listed above:

- 3.18 Contractor shall thoroughly clean the tanks of all scale, debris and sludge and arrange for attendance of TCMS Hull Inspector and notify the Owner's Representative when the double bottom water ballast tanks are ready for preliminary inspection.
- 3.19 The Chief Engineer and attending TCMS surveyor will inspect the tanks. The inspections will include proving that all suction pipes, vent pipes, sounding pipes and level transducer connections are clear and sound.
- 3.20 Rusty areas shall be power tool cleaned to SSPC SP-11 including feathering of transition to sound coating.
- 3.21 All bare areas shall be re-coated with one coat of Intershield 300 bronze and one coat of Intershield 300 aluminum at 5 mils DFT per coat. All coating repairs shall be performed in full compliance with coating Manufacturer's requirements for surface preparation, surface temperature, humidity restrictions and coating thickness. Contractor may use equivalent tank coating system products after presentation and acceptance by the attending TA of Manufacturer's Specifications and Material Safety Data Sheets for the equivalent products.
- 3.22 The contractor shall quote on touching up 30 square meters per tank (total 120 square meters) and the unit cost of touching up per additional square meter. The total touching up shall then be adjusted up or down by 1379. This unit cost is to include the surface preparation, labour and materials for each coating layer, environmental monitoring costs and overhead.
- 3.23 The forced ventilation of the tanks shall be maintained until the new coating areas are cured to the Coating Manufacturer's standard.
- 3.24 The Contractor shall advise the Owner when these tanks are deemed cured and provide a manhole lookout for the Owner to perform a Final Inspection of the tank internals.
- 3.25 The Chief Engineer or designate will be present when manhole covers are re-installed. The Contractor shall clean the sealing surfaces around the manhole and cover and install the covers using new ¼ inch thick neoprene gaskets. Anti seizing compound shall be used on all threads.

Spec item #: H-14	SPECIFICATION	TCMSB Field # 3L002,3,4,5,6,7,8 & 9
Water Ballast Tanks Survey		

- 3.26 The docking plugs shall be installed using new packing.
- 3.27 The contractor shall hydrostatically test each tank with fresh water. The contractor shall supply all necessary materials, fittings, and labor for the respective hydrostatic tests. Vent heads requiring removal for this testing shall be re-installed in good order with new gaskets upon completion of all work. Contractor to quote unit price per hydrostatic test including any and all environmental charges.
- 3.28 The contractor shall also quote on the unit price for air pressure testing of each tank.
- 3.29 The quotes for both alternatives shall include all labor and materials as well as any applicable disposal costs.
- 3.30 The Marine Safety Inspector shall determine the test method and boundaries to be inspected.
- 3.31 Upon completion of satisfactory testing the locking bars shall be re-installed on the docking plugs of the Double Bottom Water Ballast tanks.

Part 4: Proof of Performance

- 4.1 The Contractor is responsible for arranging TCMS for any inspections and to ensure that the items are signed off in the vessels Hull and Machinery Survey Record Book.

Part 5: Deliverables

- 5.1 For any chemicals including coatings used in the course of this work the Contractor is to provide the Owner with a copy of the chemical product's Specification and Material Safety Data Sheets.

Spec item #: H-15	SPECIFICATION	TCMSB Field # 3L031 Inspection
Pipe Tunnel Coating Repair and Inspection		

Part 1: Scope

1.1 The Contractor shall open up the Pipe Tunnel in the Engine room for cleaning, inspection, and bottom coating repair as required by Marine Safety.

Part 2: Reference

Guidance Drawings/Nameplate data

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

2.2 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated. Contractor shall provide to the Chief Engineer copies of product specifications and MSDS for all chemicals and coating products used.

Part 3: Technical Description

3.1 Pipe Tunnel Aft Manhole cover located in Main Engine Room shall be dismantled and the space shall be opened up and tested to ensure that it is gas free and safe for personnel to enter. One copy of gas free certificate shall be given to the Chief Engineer prior to men entering the tank and a copy of the certificate shall be posted in close proximity to the manhole cover. Forward Pipe Tunnel manhole located Lower Cargo Hold fwd end.

3.2 The Contractor shall provide the tank with a mechanical ventilation system, vented to the outside of the ship. Good ventilation must be provided and any blowers/extractors must ensure good air movement for the length of the space. The pipe tunnel is considered a confined space and the Contractor shall ensure the space is safe for entry under the Coast Guard Safety Management System.

3.3 The tunnel shall be thoroughly cleaned. Cleaning shall be by shop vacuum followed by a ragging with a handheld spray cleaner/degreaser. All residues shall be disposed of ashore.

3.4 There are areas of the tunnel bottom plating, vertical sides and supporting structure where the coating has failed and corrosion is occurring. The largest areas are in the 3 aftmost frame spaces and the 3 foremost frame spaces. The rest of the affected areas are fairly small and well separated. All these spot areas of corroding bare steel are to be power tooled to SSPC SP3. The dust so generated is to be collected as generated.

Spec item #: H-15	SPECIFICATION	TCMSB Field # 3L031 Inspection
Pipe Tunnel Coating Repair and Inspection		

3.5 The freshly prepared bare steel is to be immediately coated with one stripe coat to all welds and edges and one overall coat of Contractor-supplied Interbond 998 @ 14 mils DFT, as per the product manufacturer's. Fume extraction ventilation shall be maintained until this coating has cured. Contractor shall bid on an estimated total coating repair area of 30 square Meters and further quote on cost per square meter of surface preparation and coating repair for total area adjustment by 1379 action

3.6 Tunnel internals are then to be inspected by the Chief Engineer and a Marine Safety Inspector.

3.7 Sounding pipes, suction pipes and vents shall be proven clear; the bilge level alarms shall be proven operational and the Tunnel shall then be closed up using new 1/4" neoprene rubber manhole gasket.

3.8 Contractor shall quote a unit cost to replace manhole cover studs. Any studs broken in the removal and replacement of the manhole covers shall be renewed by 1379 action. The Chief Engineer shall inspect the Tunnel prior to final closing.

Part 4: Proof of Performance

4.1 Contractor shall contact TC and Chief Engineer for inspection of Pipe Tunnel upon completion of cleaning and coating repairs.

Part 5: Deliverables

N/A

Spec item #: H-15	SPECIFICATION	TCMSB Field # 3L031 Inspection
Pipe Tunnel Coating Repair and Inspection		



Spec item #: H-15	SPECIFICATION	TCMSB Field # 3L031 Inspection
Pipe Tunnel Coating Repair and Inspection		



Spec item #: H-15	SPECIFICATION	TCMSB Field # 3L031 Inspection
Pipe Tunnel Coating Repair and Inspection		



Spec item #: H-16	SPECIFICATION	TCMSB Field # 3L051 & 3L051
Port & Stbd Transducer Compartments Inspection		

Part 1: Scope

1.1 The Contractor shall open up the Port and Starboard Transducer Compartments in the Lower Cargo Hold tanktop aft for cleaning and inspection as required by Marine Safety.

Part 2: Reference

Guidance Drawings/Nameplate data

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

2.2 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Part 3: Technical Description

3.1 Port and Starboard Transducer Compartments manhole covers located in Lower Cargo Hold tanktop aft (inboard of No 1 Double Bottom Water Ballast Tanks) manholes shall be dismantled and the space shall be opened up and tested to ensure that it is gas free and safe for personnel to inspect. One copy of gas free certificate shall be given to the Chief Engineer prior to men entering the tank and a copy of the certificate shall be posted in close proximity to the manhole cover. Forward Pipe Tunnel manhole located Lower Cargo Hold fwd end.

3.2 The compartments shall be cleaned. Cleaning shall be by shop vacuum followed by a ragging with a handheld spray cleaner/degreaser. All residues shall be disposed of ashore. Compartments internals are then to be inspected by the Chief Engineer and a Marine Safety Inspector. SEW personnel will be advised their transducer equipment is available for service.

3.3 Upon completion of all work in these spaces the compartments shall then be closed up using new 1/4" neoprene rubber manhole gaskets.

3.4 Contractor shall include in his quote the replacement of 10 manhole cover studs and quote a unit cost to replace additional manhole cover studs. Quantity of studs found defective and renewed shall be adjusted by 1379 action.

Part 4: Proof of Performance

- Visual inspection on completion.

Part 5: Deliverables

N/A

Spec item #: H-17	SPECIFICATION	TCMSB Field # 3LL120 & 3LL140
Anchors and Chains		

Part 1: Scope

1.1 The intent of this spec shall remove both anchors and chains for cleaning and Inspection as per Marine Safety requirements. This work shall be carried out in conjunction with the Windlass, Chain Lockers and Forepeak Tank work.

Part 2: References

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Fleet Safety Manual (DFO 5737)

Part 3: Technical Description

- 3.1 Both chain locker access covers are located beneath the anchor windlass operator platform. A section of the platform shall be removed and subsequently replaced to allow good access to the chain lockers.
- 3.2 Both chain locker access covers shall be removed and both cable bitter ends let go. The port and starboard anchors with their respective cables (9 shots port and 8 shots stbd of 2" SL chain per side) shall be run out and ranged on the dock floor for inspection by the Chief Officer and attending Marine Safety inspector.
- 3.3 Both anchor cables shall be ranged in a suitable area for cleaning, inspection, and subsequent inspection. The joining shackles shall be broken at both anchors.
- 3.4 Each cable shall be hydro blasted clean. All seizing wire markings to be removed from each cable. All links and studs on each cable shall be hammer tested and visually inspected for defects. Any defective links and studs shall be marked for identification and brought to the attention of the Chief Officer.
- 3.5 The last two shots on each cable shall be removed and re-attached at the anchor end.
- 3.6 After inspection the joining shackles shall be re-assembled and the tapered pins sealed in place with lead. Cable shots shall be marked as per accepted marine practice using new seizing wire. The shot lengths shall be marked off with white paint and joining shackles shall be painted with red marine enamel.
- 3.7 The contractor shall sand blast both anchors to SSPC-SP-6 and shall apply two coats of Amercoat 238 Abrasion Resistant Epoxy (Black). Apply at 10 mils DFT per coat.
- 3.8 Anchors shall be reconnected and both units shall be stowed onboard, ensuring proper fleeting of the cables within the locker upon completion of all work in the Forepeak Tank and Chain Locker.
- 3.9 Bitter ends shall be attached in good order. The Chief Officer shall inspect the bitter ends and the chain lockers prior to closing the lockers.

Spec item #: H-17	SPECIFICATION	TCMSB Field # 3LL120 & 3LL140
Anchors and Chains		

3.10 Upon completion of all work both chain locker access covers shall be replaced in good order using new gaskets.

3.11 Any broken or defective manhole cover studs shall be renewed. Cost to be covered by 1379 action.

3.12 **Interferences**

Contractor to schedule this item in conjunction with the Forepeak Tank Coating renewal and the Windlass overhaul. The Forepeak Tank internal coating renewal will involve steel work in the Chain Locker which must be fully and satisfactorily completed prior to restowing of the Port Anchor Chain.

Contractor is to be aware that there will be a period in the drydock when the Main Switchboard is de-energized and the Windlass will be unavailable during this period.

Part 4: PROOF OF PERFORMANCE

4.1 Inspection as above

4.2 Testing N/A

Part 5: Deliverables

5.1 The Contractor shall ensure that TCMS Surveyor attends and inspects the Anchors and Chains for survey credit.

Spec item #: H-18	SPECIFICATION	TCMSB Field #
Port Sea Crane Renewal		

Part 1: Scope

1.1 The intent of this spec is to disconnect and remove the Port HIAB Sea Crane from its pedestal and lift it ashore. Lift the new Owner supplied Sea Crane onboard and bolt to the modified foundation, connect wiring, piping, etc and test operation to meet Owner's and TCMS requirements.

Part 2: Reference

Guidance Drawings/Nameplate data

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- a. Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Crane Weight 2700 kg (approx)

Boat Deck height approx 9 meters above LWL

Approximate volume of used hydraulic oil for disposal is 100 litres

Approximate volume of used gear oil for disposal is 25 litres

Owner Furnished Equipment

- 2.2 The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.
- 2.3 The Owner will supply the new Crane assembly c/w mounting frame containing the pumpset and hydraulic reservoir.

Part 3: Technical Description

- 3.1 Contractor shall ensure that the Port Stores Crane for removal is in the Parked position.
- 3.2 Contractor with ships crew shall apply lockouts/tagouts to isolate the electrical power to the existing port Hiab Stores Crane (Aft Load Centre 600 volt Breaker # 7 on Motor Room Flat and 120 Volt breaker EL104-4 in EL104 panel located in the Wheelhouse on the back of the Chart Table)

Spec item #: H-18	SPECIFICATION	TCMSB Field #
Port Sea Crane Renewal		

- 3.3 Contractor shall disconnect the hoses to/from the Control Valves assembly mounted on the outboard handrail and drain into pails/barrels for disposal the used hydraulic oil from all hoses.
- 3.4 Contractor shall dismount the mounting frame covers to allow good access to the Pumpset and Hydraulic Tank.
- 3.5 Contractor shall tag and disconnect the electrical power cables (4 off) from the crane systems and the externally mounted 120 VAC w/t receptacle.
- 3.6 Contractor shall pump/drain the hydraulic reservoir into the disposal barrel(s).
- 3.7 Contractor shall disconnect and drain the hoses on the hydraulic pump into the disposal container(s).
- 3.8 Contractor shall support the weight of the crane assembly and unbolt the eight 1" diameter bolts holding the slewing base and crane body to the mounting frame and transport the crane assembly ashore to custody of CG Technical Stores personnel.
- 3.9 Contractor shall unbolt the mounting frame c/w pumpset and hydraulic reservoir and accessories (12 Bolts) and rig and transport the mounting frame assembly ashore to the custody of CG Technical Stores Personnel.
- 3.10 Contractor shall remove the standing water from inside the base recess and clean the metal so exposed down to bright metal for inspection. Contractor shall include in his bid price \$1,000 for thickness testing of the exposed deck steel. This allowance shall be adjusted by 1379 action by invoice or by cancellation of the requirement.
- 3.11 Upon completion of satisfactory thickness testing the Contractor shall apply one coat of primer and two coats of anti-corrosive paint to the metal inside the mounting seat recess and to the seat frame surfaces.
- 3.12 The new Owner-supplied HIAB Model 201 Sea Crane c/w Crane Podium containing Power Pack shall be lifted into position oriented as the original crane with the long axis thwartships. Contractor shall take extreme care to not damage the kickpipes and electrical cables.
- 3.13 The podium shall be bolted to the seat using the new owner supplied fasteners to the torques as specified for Grade 8 unlubricated steel 1" UNC (769 foot pounds) in the standard progressing X torque sequence.
- 3.14 The podium covers shall be dismounted and the electrical connections shall be made to the pumpset electrical motor and heater(s).

Spec item #: H-18	SPECIFICATION	TCMSB Field #
Port Sea Crane Renewal		

3.15 The Control Valves block and associated electronics box shall be dismantled and secured to the handrail in the position of the original control valve block on a new support extension platform plate fabricated and installed by the Contractor as per the control valve block and electronics box arrangement of the stbd Hiab Crane installation.

3.16 Contractor shall fabricate and install extension hoses to the control valves and the hydraulic supply and return hydraulic lines as per the Stbd Hiab Crane installation. Contractor shall include in this spec item an allowance of \$5,000 for the fabrication and installation of the new hoses to be adjusted by 1379 action on proof of detailed invoice for the 12 new hydraulic hose assemblies c/w stainless steel fittings. Each hose assembly is to be rated for a minimum of 3500 PSI working pressure.

3.17 The Contractor shall dismount the transport securing devices and fill the crane hydraulic system tank with Owner-supplied hydraulic oil through a 3 micron offline filtration cart.

3.18 The Contractor shall de-isolate the electrical supply breaker and momentary start the pumpset motor to confirm direction of rotation and correct same if necessary.

3.19 The Contractor shall fill the slewing reservoir to the working level with Owner-supplied gear oil and lubricate the grease points as per the Manufacturer's lubrication chart.

3.20 The Contractor shall provide an allowance of \$2,000 for the services of a qualified hydraulic sub-contractor to purge the hydraulic system of air and commission the crane. This allowance shall be adjusted by 1379 action on proof of detailed service report and invoice.

Part 4: Proof of Performance

4.1 The correct operation and load testing of the Crane shall be demonstrated to the satisfaction of attending TCMS Deck Machinery Inspector and Owner's Representative.

Part 5: Deliverables

5.1 All documentation supplied with the Crane shall be handed to the Owner's Representative.

Spec item #:H-19	SPECIFICATION	TCMSB Field # N/A
Lifeboat, Lifeboat and Miranda Davit Inspection and Repair.		

Part 1: SCOPE

- 1.1 The intent of this spec is to inspect the Lifeboat, Lifeboat and Miranda Davits. Also to repair items with the Lifeboat and davits systems that were identified at last Annual Inspection by Schat FSR.

Part 2: Reference

Guidance Drawings/Nameplate data

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - a. Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Part 2: REFERENCES

Schat Harding
FSR - Ryan Fagan
Cell: 709.682.3805

Part 3: TECHNICAL DESCRIPTION

- 3.1 Contractor to bid with an allowance of \$8,500, to be adjusted up or down by 1379 action, for the services of the Schat Field Service Representative to complete the inspection of the Lifeboat, Lifeboat and Miranda Davits.
- 3.2 All parts for repairs shall be Owner supplied.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

N/A

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

N/A

Spec item #: H-20	SPECIFICATION	TCMSB Field # N/A
Main Mast Refurbishment		

Part 1: Scope

- 1.1 The intent of this item shall be to renew the paint coating on the Main Mast including platforms and extensions. The work will involve protecting the electrical fixtures, blasting the structure to bright metal, renewing corroded cable clamps, brackets and securing arrangements, and applying primer and two coats of Owner-supplied paint. The Contractor shall also extend the access platform to the Sea Tel Antenna Dome access plate and fabricate and install a handrail around the extended platform. The extended platform shall have a means of safe transition from the ladder to the platform which can be operated by a worker with only one hand free.

Part 2: References

Ship's Drawing # 72-54 Sheets 1 & 2 show the original structure and details of the Mast.

Standards

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- Canadian Coast Fleet Safety Manual (DFO 5737)

Part 3: Technical Description

- 3.1 Contractor shall with ship's crew ensure that all electrical circuits for equipment and devices mounted on the Main Mast are de-energized; locked out and tagged out.
- 3.2 Contractor shall take photographs of arrangements details, label tag, protectively wrap and dismount fixtures from their corroded mountings.
- 3.3 Contractor shall fabricate and install an extension to the existing stand beneath the Sea Tel Dome access plate such that the platform extends circumferentially a further meter and is 1.5 meter wide. The new plating shall be 1/4" thick with 1/4" x 3" flat bar stiffeners. The Contractor shall install a 1 Meter High hand rail around the newly extended platform suitable for securing of Fall Arrest Harnesses.
- 3.4 All the new steel shall be prepared and coated as the rest.
- 3.5 Contractor shall rig protective tarps to ensure that debris from removals grinding and cutting does not harm devices mounted on the mast

Spec item #: H-20	SPECIFICATION	TCMSB Field # N/A
Main Mast Refurbishment		

- 3.6 Contractor shall wrap sufficient protection around communication domes to ensure that there is no damage or blasting medium ingress to same.
- 3.7 Should the Contractor perform the work in stages shall rig horizontal tarpaulins to protect all newly coated surfaces from damage from blasting of adjacent areas.
- 3.8 Contractor shall include in the bid price all costs associated to renew 100 cable clips with corrosion resistant replacements and to renew mounting brackets for 10 watertight receptacles and 20 water-tight junction boxes. Contractor shall also include the cost to renew 6 bronze water-tight junction boxes; 20 water-tight corrosion resistant cable glands and 4 marine bronze water-tight receptacles; Kondu grade or equivalent.
- 3.9 Contractor shall allow \$2,500 for replacement of additional hardware, as deemed necessary by Chief Engineer or designate. Actual cost to be adjusted by 1379 on proof of detailed invoice.
- 3.10 After all protections and renewals, Contractor shall blast clean the surfaces of the mast, attachments and platforms to bright metal and apply a spray coat of primer followed after curing by two coats of Owner-supplied Coast Guard Buff paint. Each coat shall be confirmed to be of the Manufacturer's recommended thickness in the most vulnerable areas. Contractor to bid on preparing and coating approximately 150 sq meters of mast area.
- 3.11 The Contractor shall remove the temporary protection from the dismantled appliances, fixtures and cable and re-install them in good order to the refurbished or new mountings. The electrical cables will be re-secured to the mast with sufficient new cable clamps and studs to protect them from movement.
- 3.12 The electrical circuits shall be de-isolated and with CG SEW and crew assistance each circuit and device mounted on the Main Mast shall be proven operational.

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

- a.** The coatings and re-installations shall be visually inspected. The Contractor shall correct any defects in his workmanship at his expense.

Spec item #: H-20	SPECIFICATION	TCMSB Field # N/A
Main Mast Refurbishment		

4.2 Testing

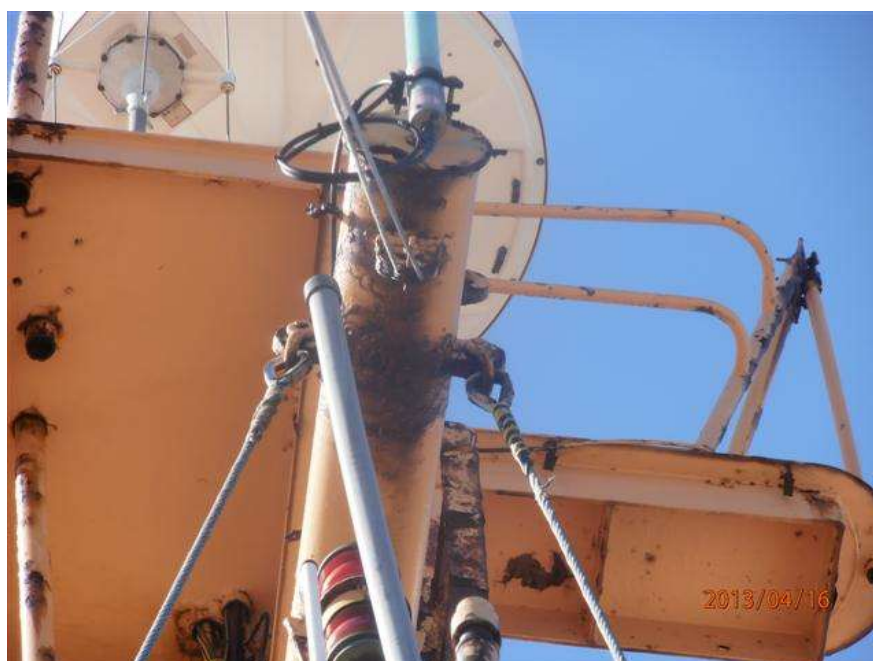
4.2.1 Each device and appliance on Main Mast shall be proven operational

Part 5: Deliverables

5.1 The Contractor shall provide a Quality Assurance (QA) report indicating that all areas as defined in the specification have been inspected by the Contractor's QA Department and that all areas of defects established by this survey have been identified for remedial action.



Spec item #: H-20	SPECIFICATION	TCMSB Field # N/A
Main Mast Refurbishment		



Spec item #: HD-01	SPECIFICATION	TCMSB Field # N/A
Docking and Undocking		

Part 1: Scope

1.1 The contractor shall bid on docking and undocking the ship, allowing sufficient lay days to carry out the specified work, with a reasonable time allowance for arising new work. The total cost shall include any tug and/or pilotage service cost.

Part 2: REFERENCES

2.1 The Contractor shall dock the vessel in accordance with the vessel's docking plan drawing # 72-63 (To be provided to successful bidder)

Part 3: Technical Description

3.1 The contractor shall quote the number of laydays required to complete the work outlined in the refit specification within the time frame allotted allowing a reasonable time allowance for arising work. In addition the unit layday cost for additional laydays shall be quoted for vessel on dock and for vessel floating. The unit cost for additional day of services shall also be quoted.

3.2 The docking shall be under the direct supervision of a Certified Docking Master. The docking arrangement shall provide a minimum of 14.513 meters clearance aft for withdrawal of tailshafts. The keel block heights shall be 4 feet (1.22M) or higher. Keel blocks must have a minimum port - starboard width of 2m to support both sides of the duct keel. The Contractor shall prepare blocks and necessary shoring to maintain the true alignment of the vessel's hull and machinery during the docking period.

3.3 The following information is to be recorded by the Contractor on Ship Condition Reports:

- a. Prior to docking, all tanks on vessel to be sounded and contents recorded. Copy to be signed by the ship's Captain, the Chief Engineer and Contractor's Docking Master.
- b. On docking, all tanks emptied to be listed, and copies held by Contractor and Chief Engineer.
- c. At undocking, all tanks to be refilled to obtain same draft and trim as at docking, and condition agreed by the Docking Master, the ship's Captain and the Chief Engineer.

Spec item #: HD-01	SPECIFICATION	TCMSB Field # N/A
Docking and Undocking		

3.4 The contractor shall supply the services of a diver to confirm that the vessel is settling evenly on the bilge and keel blocks (The contractor shall comply with CG Diving Policy as outlined in the Safety Annex). Quote to include any tug and/or pilotage service cost. The contractor shall ensure that docking blocks are directly in line with ship framing before vessel fully settles.

3.5 Contractor will be responsible for all line handling during docking and undocking operations.

3.6 The contractor shall ensure that docking blocks are clear of transducer faces and sea intake grids. Contractor shall further ensure that no keel block obstructs access to Frame # 70 Stbd to 700 mm fwd of frame 70 and immediately forward of Frame 54 to access #2 double bottom docking plugs.

3.7 The frame spacing is to be marked on the hull to aid in the initial hull survey by the Technical Authority & TCMS. Immediately after hydro-blasting, but prior to any grit blasting for the underwater hull coating, the Contractor is mark the frame spacing at 5 frame intervals from the stern post (Fr “0”); markings are to be in a contrasting colour, 6” in height, and are to be at the turn of the bilge, port and starboard. Where keel blocks align with the frame spacing, they are also to be marked in a similar manner, port and starboard

3.8 During undocking the Contractor shall ensure that sufficient personnel are in attendance to standby the numerous sea connections, stern tubes, sea chests, etc. that were opened up during dry-docking to correct any deficiencies that may arise.

Part 4: Proof of Performance

4.1 The Contractor shall dock the vessel in accordance with the vessel’s docking plan drawing # 72-63.

Part 5: Deliverables

5.1 At undocking, all tanks to be refilled to obtain same draft and trim as at docking, and condition agreed by the Docking Master, the ship's Captain and the Chief Engineer.

Spec item #: HD-02	SPECIFICATION	TCMSB Field # N/A
Tailshafts Bearings Wear-down Measurements		

Part 1: Scope

1.1 The intent of this item is to record the starboard forward and aft sterntube bearing clearance and the port aft sterntube bearing clearance within twenty-four hours of dry-docking the ship and prior to re-floating of the vessel.

Part 2: References

FSR, John Crane Mechanical Seal
 Barry Broderick
 Account Manager
 Wärtsilä Canada Incorporated
 27 Sagona Ave.
 Mount Pearl, NL,
 Canada A1N 4P8
 Phone: 709-747-4600
 Cell: 709-699-8126
 Fax: 709-747-4486
barry.broderick@wartsila.com

Part 3: Technical Description

- 3.1 Contractor is to have a John Crane Mechanical Seal FSR for the disassembly and assembly of stbd shaft seal. An allowance of \$5,000 to include all the local FSR expenses to be adjusted up or down by 1379 action for work on stbd sterntube seal. Coast Guard has spare parts should they be required for replacement upon disassembly/inspection completed by the FSR.
- 3.2 Aft sterntube bearings wear down readings shall be taken on the Port and Starboard shafts within twenty-four hours of the dry-docking the ship upon removal of rope guards. The Contractor shall use long feeler gauges. Clearances shall be measured by feeler gauge at after end of after bearing and; for the stbd shaft only forward end of stbd shaft forward bearing and dismounting of stbd sterntube forward seal by the Contractor. This is to be completed prior to any disturbing of shaft coupling.
- 3.3 The Chief Engineer is to witness the feeler gauge readings. Two typewritten copies of the feeler gauge readings shall be provided to the Chief Engineer within 24 hrs of the readings being taken.
- 3.4 Upon completion of all work on stbd shaft, feeler gauge clearance readings shall again be taken on after end of after bearing and forward end of forward bearing. The Chief Engineer is to witness the feeler gauge readings.
- 3.5 Contractor shall supply two new ring anodes as per attached drawing 'Corrosion Ring', and install one on the port shaft and one on the starboard shaft.
- 3.6 Both rope guards shall be re-installed in good order with longitudinal seams thwartships.

Part 4: Proof of Performance

N/A

Part 5: Deliverables

- 5.1 Typewritten copies of all readings shall be handed to Chief Engineer.

Spec item #: HD-03	SPECIFICATION	TCMSB Field # 3F006
STBD Propeller		

Part 1: Scope

1.1 The intent of this specification is to dismount the Stbd propeller for inspection and survey credit by Transport Canada Marine Safety Machinery Inspector.

Part 2: References

Wartsila CME Zhenjiang Propeller Material SUPERSTON 70

4 Blade Diameter 3.6 Meters Weight 7390 Kg Stbd Prop Serial # to be recorded

Part 3: Technical Description

3.1 The contractor shall ensure that all lifting and rigging shall be in compliance with the NL Occupational Health and Safety Regulations Sections 45 & 46 and Marine OSH part 12.

3.2 The contractor shall provide valid test certificates for all lifting devices.

3.3 The propeller pilgrim nut removal and fitting gear, which will be supplied by the vessel consists of hydraulic pump and fittings, special backing plate and other removal and re-installation tools. The Contractor shall be responsible for moving all tools from the ship to the drydock and returning and securing tools back on the ship after the work is completed.

3.4 The Contractor shall dismount the propeller cone, rope guard, ring anode and propeller. The Contractor shall scribe distinctive proof marks on the propeller and tailshaft and remove the propeller to a suitable protected nearby location. The contractor shall supply all equipment and gear for lifting the propeller including any brackets, slings etc that may require fabrication for this work as well as all associated labour.

3.5 **The Owner's representative and TCMS Inspector shall together witness and approve the final fits and installation of the propeller** to its respective shaft to ensure that the travel and fitting pressures are acceptable (temperature correction fitting table sheet provided to successful bidder)..

3.6 The Contractor's bid shall include the cost for three separate fits for the propeller. The fits shall include an initial fit without the key in place – 70% contact area required and a final fit with key installed – 70% contact area is required. The actual quantity of fits and associated costs shall be adjusted up or down using 1379 action. The Contractor shall include in his bid an allowance of \$3K for ND Testing of keyways/thread roots etc to be adjusted up or down by 1379 on proof of invoice. ND Testing, including spark testing of coating between liners shall be witnessed by TCMS Machinery Inspector and Chief Engineer.

3.7 The Contractor shall ensure that the propeller and tailshaft mating surfaces are thoroughly degreased, the tailshaft threads liberally coated with anti-seize compound and the propeller pushed up on the shaft with pilgrim nut to the required distance. Final push up distances, pressures, metal temperatures and key clearances (top and sides) shall be recorded and given to the Chief Engineer in three typewritten copies. The locking plates shall be modified (shortened/extended) as required to suit.

Spec item #: HD-03	SPECIFICATION	TCMSB Field # 3F006
STBD Propeller		

3.8 The contractor shall reinstall the anodes, rope guards and propeller cones. The propeller cones shall be fitted and filled with Contractor supplied tallow. All securing bolt heads/nuts shall be locked in position as per original installation using stainless steel locking materials. Contractor shall advise Owner's Representative when the fasteners are all secure and locked and ready for inspection. The contractor shall fair the cone bolts with cement after Owner's inspection of the locking arrangements.

3.9 The Contractor shall remove all welded lugs and welding shall be ground flush. The areas disturbed by lugs shall be treated as follows:

Abrasive blasted to SSPC-SP-10 Near White finish. Edges of existing coatings shall be 'feathered back' to allow a sound surface to accept the new coating. One touch-up coat of Amercoat 238 Abrasion Resistant Epoxy (Red Oxide) @ 10 mils DFT. One coat of Amercoat 238 Abrasion Resistant Epoxy (Black) @ 10 mils DFT. One coat of Amercoat 188 Low Friction Epoxy (Black) @ 10 mils DFT.

Part 4: Proof of Performance

- 4.1 Fit-up distances/pressures etc are received by C/E in three dated and signed typewritten copies.
- 4.2 Two typewritten copies of the NDT testing report delivered to the Chief Engineer.

Part 5: Deliverables

Spec item #: HD-04	SPECIFICATION	TCMSB Field # 3F009
STBD TAILSHAFT INSPECTION		

Part 1: Scope

- 1.1 Contractor shall remove stbd tailshaft for inspection and TCMS survey credit.

Part 2: Reference

- 2.1 See Ampower Shafting Manual and Drawings

2.2 Phillclad FSR Contact Information:

ALTEC Marine Inc.
1213 Labadie
Longueuil, QC J4N 1E2
Tel: 450-442-0603

Part 3: Technical Description

3.1 The Contractor shall dismantle the stbd propeller cone, propeller, rope guard, ring anode, and fasteners. The Contractor shall scribe proof marks on the propeller and tail shaft and remove the propeller to the dock floor. The contractor shall supply all equipment and gear for lifting the propeller and shaft including any brackets, slings, etc that may require fabrication for this work as well as all associated labor.

3.2 The shaft shall be supported from uncontrolled movement once uncoupled. The coupling guard shall be dismantled and laid aside such that it is protected from damage but out of the way of workers. The tail shaft shall be let go at the shaft coupling, motor end. Coupling flanges, nuts, and fitted-bolts shall be proof marked to ensure subsequent replacement in their respective original positions. The coupling guard, turning gear and brake assembly located in the motor room on the shaft shall be dismantled and moved aside to gain access to the pilgrim nut so as to permit shaft removal. The Pilgrim nut shall be removed and the coupling shall be jacked from the shaft. The Contractor shall ensure the coupling and shaft are properly supported at all times.

3.3 The John Crane mechanical stern tube seal shall be disassembled prior to removal of shaft to prevent damage to the seal components. All internal components shall be cleaned and checked for wear and defects as per the manufacturer's recommendations. Any components found to be defective to be replaced under 1379 action. Upon completion of seal removal, the tail shaft shall be withdrawn and properly supported. Contractor shall remove the tailshaft to the Contractor's shop or may support the tailshaft off the dock floor and construct a temporary shelter over the shaft. The temporary shelter shall allow for completion of hi-pot test and replacing the phillyclad, under manufacturers recommendation, should this be necessary as noted in 3.5 Contractor must include in the bid, but show separately, all cost associated with erecting, maintaining environmental conditions and dismantling temporary shelter.

NOTE: under no circumstances are lifting devices or accessories to apply any strain to the coating between liners.

The shaft shall be thoroughly cleaned and checked for wear and defects. Particular attention to be paid to the following areas:

- (1) Forward and aft keyways on shaft tapers.
- (2) Forward and aft shaft tapers
- (3) Forward and aft ends of each of the two liners where they meet the tail shaft.
- (4) Fwd and aft pilgrim nuts and threads particularly thread roots on shafting.

Spec item #: HD-04	SPECIFICATION	TCMSB Field # 3F002
STBD TAILSHAFT INSPECTION		

(5) Liner wear in way of Thordon bushings and condition of bushings. Forward and after liners outside diameter to be measured and recorded at forward and after ends of forward and after liners in 120 degree intervals i.e. 3 diameter measurements each at four axial positions. Measurement locations to be shown on a copy of the dimensioned tailshaft drawing.

(6) Fwd end of fwd liner in way of "CRANE" seal inflatable seal.

(7) Coating between liners.

3.4 Inspection of areas 1 & 4 under 3.3 above are to include crack detection inspection using dye penetrant. All materials shall be supplied by the contractor for testing. Inspection of area 3 above shall consist of thoroughly cleaning the coating but not to include any cutting, peeling, or otherwise disturbing the coating

3.5 The contractor shall conduct a Hi-Pot Test on the tail shaft, witnessed by Transport Canada and Technical Authority representative, to ensure that the Phillyclad coating is sound. The Contractor shall include in the bid, but show separately, cost for the complete replacement of the phillyclad coating. Include cost to heat the shelter to 20 degrees Celsius for 3 days. The contractor's bid shall include an allowance of \$8,500 for the product manufacturer's authorized technician expenses and services. To repair/replace the Phillyclad coating – the actual cost for replacing the Phillyclad coating will be adjusted up or down using 1379 action. Following any repair of phillyclad coating the shaft shall be retested to ensure integrity of coating system.

3.6 Prior to shaft installation, a complete set of dimensions of the bearings and liners will be taken, recorded and handed over to the owner's representative.

The contractor shall note that the original minimum inside diameters dry of 566.07 mm aft bushing and 562.02 mm fwd bushing pertained to unworn shaft liner diameters of 560 mm fwd and 564 mm aft.

3.7 Cooling water lines to the sterntube shall be proven clear and water flow to the sterntube to be proven adequate.

3.8 The area between the thordon full form bearings shall be mechanically cleaned (SSPC-SP-3) and coated with two coats of Amercoat 238 Abrasion Resistant Epoxy @ 10 mils DFT or to coating manufacturer's application procedure recommendations.

3.9 Upon completion of inspection and repairs, the Contractor shall assemble the shafting, turning gear, brake, mechanical seal and couplings as per manufacturer's recommendations, in good running order and to satisfaction of Owner's representative and attending Marine Safety Inspector.

3.10 Survey credits shall be obtained for each applicable item.

Part 4: Proof of Performance

4.1 Contractor shall provide 3 typewritten reports indicating shaft and stern tube measurements.

4.2 Upon undocking of the vessel, the shafting system shall be test run under load for 1 hour.

Part 5: Technical Description

N/A

Spec item #: HD-05	SPECIFICATION	TCMSB Field # N/A
Hull Cleaning and Coating		

Part 1: SCOPE

1.1. The Contractor shall clean the entire hull, repair any damaged coatings and paint from the keel to the top of the bulwarks.

Part 2: References

2.1 This work shall be carried out in conjunction with H-17, HD-02, HD-03, HD-04, HD-06, HD-07, HD-08, HD-09, HD-10, HD-11, HD-12 and HD-13.

Part 3: Technical Description

3.1 Contractor to protect all anodes and transducers from abrasion and coating. Protection to be removed before undocking. Transducers located as follows:

1. Speed Log Transducer Frame 161-162 port
2. Echo Sounder Transducer Frame 127 port and stbd

CAPAC Impressed Current Cathodic Protection Anode Locations:

- | | |
|-----------|----------------------------------|
| Frame 146 | Lower Cargo Hold, port side |
| Frame 146 | Lower Cargo Hold, starboard side |
| Frame 55 | Cycloconverter Room, port side |
| Frame 55 | Purifier Room, starboard side |

Locations of Reference anodes:

- Port Frame 84 (just fwd of boiler ship side blow down)
- Stbd Frame 28 (sewage compartment just aft of fwd bulkhead)

3.2 The contractor shall cover all deck machinery, and equipment including all Speedcrane blocks, cables and fittings and openings into the ship to prevent ingress of grit from blasting. The contractor will remove any and all coverings after the coating operations are complete.

Spec item #: HD-05	SPECIFICATION	TCMSB Field # N/A
Hull Cleaning and Coating		

3.3 The Contractor shall plug deck scuppers and discharges as well as taking other measures necessary to prevent any liquids from contaminating areas being prepared or coated. The plugs shall be hollow and contain extension tubes to allow precipitation run-off to run clear of the hull. He shall also take measures to ensure that no damage, unnecessary cleaning or any repairs result from either the hull preparation process or coating application. Grit for blast cleaning is not permitted to enter any part of the ship. The Contractor shall ensure that every opening into the vessel where grit can gain entry is suitably covered. Measures are also to be taken to ensure that surfaces and equipment other than those specified are not coated and that any inlets or discharges in the shell will not be blocked by the coating. The contractor is responsible for removing any over spray on the vessel as a result of this work. The contractor will remove any and all coverings and plugs after the coating operations are complete and sufficiently cured.

3.4 Coast Guard may retain the services of an independent consultant to verify that the surface preparation and coating, storage, preparation and application as per the specification. Payment for the consultant will be directly by Coast Guard outside of this contract.

3.5 The Contractor is to allow safe access to areas where work is being performed under this specification including storage and mixing areas as the consultant deems necessary for the purpose of verifying that the surface preparation, coating, storage, preparation and application are as per the specification.

3.6 Contractor shall clean the entire hull, repair any defective paintwork, and paint the upper ship's hull from the lightship drafts height to the top of the bulwarks.

3.7 The Contractor shall hydro blast the entire hull area including up the top of all bulwarks. high pressure fresh water washing (5000 PSI minimum) to remove all marine growth and allow a preliminary hull inspection. This shall include rudders, propellers and the thruster tube. All marine growth shall be removed. The contractor shall supply all coatings and paints for the underwater and above water areas of the hull.

3.8 The Chief Engineer and a Marine Safety Inspector will then inspect the entire hull.

Spec item #: HD-05	SPECIFICATION	TCMSB Field # N/A
Hull Cleaning and Coating		

Underwater Hull (Approx 2000 square meters)

3.9 The contractor shall include in his bid for this item the cost of all labour and materials for the underwater area coating repair for an area of 500 square meters. He shall further quote the unit cost per square meter for surface preparation and coating application as detailed below. The total area of coating repair shall be adjusted up or down by 1379 action based strictly on the pre-agreed area.

3.10 All **bare and rusted areas** shall be abrasive blasted to SSPC-SP-10 Near White finish. Edges of existing coatings shall be “feathered back” by blasting or suitable mechanical means to allow a sound surface to accept the new coating.

3.11 The Contractor’s Representative and Owner’s Representative will inspect the surface preparation before any coating is applied and come to a consensus on the total affected area.

3.12 Any areas marked up for further surface preparation are to be re-inspected by the contractor and Chief Engineer before any coating is applied.

3.13 One touch-up coat of Amercoat 238 Abrasion Resistant Epoxy (Red Oxide) OR EQUIVALENT to all bare areas. Apply at 10 mils DFT or to Coating Manufacturer’s Application Data specified thickness as appropriate.

3.14 One overcoat coat of Amercoat 238 Abrasion Resistant Epoxy (Black) to the affected and primed underwater hull area. Apply at 10 mils DFT or to Coating Manufacturers Application Data specified thickness.

3.15 One overcoat of Amercoat 188 Low Friction Epoxy (Black) to affected underwater hull area. Apply at 10 Mils DFT or to Coating Manufacturers Application Data specified thickness.

3.16 The contractor is to take DFT thickness readings between coats. The Chief Engineer is to witness the tests.

3.17 The contractor and Chief Engineer will inspect the touch-up coat areas and mark areas for further surface preparation between coats. Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any additional coating is applied.

3.18 Sea bay grids shall be protected during application of coating and orifice diameters shall be verified as original before undocking (i.e. not blocked or reduced).

3.19 The draft marks, load lines, thruster symbols, and all government symbols and icons shall be painted white using Amercoat 5450 Marine Alkyd Enamel (White). Apply two coats at 2 mils DFT per coat. Stencils for the Federal Identity Program Markings will be owner supplied.

Spec item #: HD-05	SPECIFICATION	TCMSB Field # N/A
Hull Cleaning and Coating		

Above Water Area (approx 600 square meters)

3.20 The contractor will remove the port and stbd gangways from the vessel before blasting begins. The gangways are to be reinstalled in good order following all work. This is to allow bulwark preparation and painting in way of gangway stowage area.

3.21 All bare and rusted areas shall be abrasive blasted to SSPC-SP-10 Near White finish. Edges of existing coatings shall be “feathered back” using blasting or suitable mechanical means to allow a sound surface to accept the new coating. Estimate 35% bare.

3.22 The contractor and Chief Engineer will inspect the surface preparation before any coating is applied and mark up areas for further preparation.

3.23 Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any coating is applied.

3.24 The entire hull area from the water line to the top of the bulwarks shall be sand swept in preparation for application of coatings as follows:

- a. Two coats of Amercoat 5105 – Alkyd Primer (Red Oxide) to all bare areas. Apply at 2-3 mils DFT per coat.
- b. Two complete coats of Amercoat 5450 Alkyd Marine Enamel (CG Red 509102). Apply at 2 mils DFT per coat.

3.25 The contractor and Owner’s representative will inspect the previous coat and mark areas for further surface preparation between coats. Any marked up areas are to be re-inspected by the contractor and Owner’s representative before any additional coating is applied.

3.26 The contractor is to take DFT thickness readings between coats. The Owner’s representative is to witness the tests.

3.27 All traces of grit used for blast cleaning shall be removed by the Contractor. Contractor to be responsible and liable for ensuring that the hull is clear and clean prior to, during and immediately after the coating application.

3.28 All staging, cranes, screens, lighting and any other support services, equipment, paint and materials necessary to carry out these specifications shall be Contractor supplied.

3.29 Suitable storage facilities shall be provided close to the work site for the material and equipment, to ensure they will be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application.

Spec item #: HD-05	SPECIFICATION	TCMSB Field # N/A
Hull Cleaning and Coating		

3.30 The mixing and spraying equipment shall be kept heated and protected as necessary, while in use, to ensure that the coating is maintained at the recommended temperature.

3.31 All coatings shall be applied in strict accordance with the manufacturer's instructions and recommendations.

3.32 The contractor will be responsible for removing all traces of grit and/or blasting residue from the vessel.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

4.1 N/A

Part 5: Deliverables

- 5.1 The contractor shall prepare a report that indicates;
- The areas on the underwater hull that were repaired.
 - Which areas were blasted and indicate the blast media type and air pressure
 - Which areas were coated with what type of product and how much coating was used.
 - Thickness measurements of the applied coatings
 - Atmospheric conditions (temp, humidity, dew point)
 - Temperature of the vessel hull.

Spec item #: HD-06	SPECIFICATION	TCMSB Field # 3L001 Insp & Test
Forepeak Tank		

Part 1: Scope

- 1.1 The intent of this item shall be to detach and remove the failed coating and tank corrosion debris then prepare and coat the tank internals with suitable sealing and anti-corrosive coatings as per coatings manufacturer's instructions. This work shall be performed in conjunction with the Windlass Survey i.e. Port Anchor and cable must be ranged on dock bottom to enable performance of work detailed in 3.4 below

Part 2: References

Ship's Drawings 72-01 sh.4, 72-02 sh.2,

Standards

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Fleet Safety Manual (DFO 5737)

Part 3: Technical Description

- 3.1 Contractor shall ensure that all relevant safety protocols and practices are adhered to.
- 3.2 The Forepeak tank shall be drained through the docking plug stbd at frame 174.
- 3.3 The Contractor shall open the Forepeak tank manhole cover located Foc'sle stbd and certify the tank Safe for Entry and Hotwork. The Contractor shall provide ventilation for the Forepeak Tank and robust liquid-proof lighting adequate for the safety of workers within the tank.
- 3.4 Contractor shall dismount the Port Chain Locker manhole cover as per spec item # H?? "Anchors and Chains" and certify the Port Chain Locker Safe for Entry and Hotwork. Contractor shall unbolt and temporarily secure aside the port chain locker false floor. Contractor may cut temporary access holes in the chain locker deck or bulkhead, no wider than convenient between the support angles of the dismounted False Floor. The access hole corners shall have a minimum 6" radius. The steel plating is 15 mm thick. and the maximum height of the vertical section of the access L shall be no greater than 1 Meter; the horizontal section shall extend no further than 60 cm aft of the forward Chain Locker bulkhead.
- 3.5 Contractors shall efficiently remove all standing water from the Forepeak Tank spaces. Contractor shall apply temporary protection to the tank valve stem, gland, extended spindle universals and the tank level transducer.

Spec item #: HD-06	SPECIFICATION	TCMSB Field # 3L001 Insp & Test
Forepeak Tank		

- 3.6 Contractor shall hydroblast the tank internal surfaces with sufficient pressure to detach all loose coating, scale, and rust.
- 3.7 Contractor shall remove all the resulting liquid and debris from the tank.
- 3.8 Contractor shall force warm dry air through the tank to prevent flash rusting of the newly bare sound steel.
- 3.9 The Contractor shall allow \$10,000.00 for supply of all materials and labour to renew ladder treads (1" steel square bar) and pipe and extended spindle brackets.
- 3.10 After internal repairs as 3.9 completed Contractor shall apply sealing and anti-corrosive coatings to all the internal surfaces of the Forepeak Tank (with a minimum clearance of 55mm to the new temporary access opening into the Port Chain Locker) with surface temperatures and humidity maintained in accordance with the coating manufacturer's specifications and instructions. Contractor shall pay particular attention to ensuring all welded seams are thoroughly and effectively sealed and coated. For bidding purposes the accessible surface area is estimated to be 120 square meters. Contractor shall monitor and record the temperatures and humidity to confirm that the required conditions are being maintained in all areas of the tank.
- 3.11 When the new coating layers have cured sufficiently according to the Manufacturer's specifications the tank shall be re-inspected. On satisfactory inspection by the Owner's Representative the temporary protection shall be removed from the extended spindle universals (which shall be re-greased), valve stem and gland and level transducer. The correct operation of the extended spindle shall be proven and witnessed from inside the Tank.
- 3.12 The tank atmosphere shall be tested for Hotwork safety and the section of grade 'A' steel cut out from the Port Chain Locker for access shall be edge dressed and re-installed in good order with full penetration multi-pass weld beads. The welding shall be performed in a sequence to minimize distortion. NDT shall be performed on the new welds. On acceptance of the weld quality by TCMS and the Owner's Representative the Contractor shall apply one coat of primer and two coats of anti-corrosive paint to both sides of the disturbed steel prior to re-installation of the Port Chain Locker False Floor.
- 3.13 The Forepeak Tank manhole cover shall be re-installed with new Contractor supplied gasket. Should any of the manhole cover studs require renewal they shall be brought to the attention of the Chief Engineer. Any manhole cover stud replacement required as a result of the Contractor's work shall be renewed at the Contractor's expense. All other manhole cover stud renewals shall be covered by 1379 action.

Spec item #: HD-06	SPECIFICATION	TCMSB Field # 3L001 Insp & Test
Forepeak Tank		

3.14 Upon refloating the vessel and after sufficient time has passed for full cure/immersion of the new tank coating the Forepeak Tank shall be hydrostatically tested with fresh water to the top of the vent pipes (tank vented port and stbd) to the satisfaction of the attending TCMS Inspector and the Chief Engineer.

3.15 Interferences

3.15.1 The port chain locker needs to be emptied promptly and false floor lifted and access hole cut as soon as practical to allow sufficient time for this work including manufacturer's curing time . Note that the aft bulkhead of the Chain Locker is a Fuel Tank bulkhead and the fuel tank will be full.

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 as above

4.2 Testing

4.2.2 The NDT testing of the temporary access plate prior to coating will include a dye-penetrant test to ensure there are no cracks or holes.

4.2.3 The hydrostatic testing of the tank will be performed with the vessel in the water.

Part 5: Deliverables

5.1 The Contractor shall provide a Quality Assurance (QA) report recording the humidity and air/surface temperature in the depths/extremities of the tank pre-coating and during coatings cure time. The Contractor shall also record coating layer DFT per layer in 20 random spots chosen by the Chief Engineer.

5.2 The Contractor shall provide the product specifications and MSDS of all chemicals and coatings used in the course of this work.

Spec item #: HD-07	SPECIFICATION	TCMSB Field # 3L030, 3L053, 3L054, 3L055, 3L056 & 3L057
SEABAY, SEACHESTS AND SEA STRAINERS		

Part 1: Scope

1.1 The Contractor shall open-up, clean and coat the internals of the ship's Sea Chests, Sea Bay and main sea strainers. This includes the tool-accessible areas inside the contained and adjacent pipe stubs.

Part 2: References

2.1 This work shall be carried out in conjunction with HD-05.

2.2 Propulsion Generator Room

Port high and low suction – Frs. 96-106

Stbd high and low suction – Frs. 96 - 106

R.O. & Distiller Sea Chest – Frs. 102-105 Stbd

Propulsion Motor Room

Aft Sea Chest – Frs. 51-54 Port

Part 3: Technical Description

Sea Chests

3.1 Contractor shall use hydro blasting at 5000 psi and mechanical means (power brushing) for the cleaning of the areas in this specification item. All debris shall be removed to the contractors' premises.

3.2 Contractor shall remove all marine growth, loose paint and scale.

3.3 The area of the sea chests and sea bays is 400 square meters. (Estimate 25% of the area will be bare). The sea chests will be cleaned to SSPC SP 3.

3.4 Contractor shall remove the manhole covers and grids from all sea chests and sea boxes for cleaning and inspection. The grid and inlet areas shall be cleaned and grid holes shall be mechanically reamed to the original diameter. Zinc anodes shall be inspected for wastage and renewed as directed specifically by the vessel's Chief Engineer. Quote total and unit price for supplying and fitting twenty (20) - M24 anodes.

Sea Chests are located as follows:

Propulsion Generator Room

Port high and low suction – Frs. 96-106

Stbd high and low suction – Frs. 96 - 106

R.O. & Distiller Sea Chest – Frs. 102-105 Stbd

Propulsion Motor Room

Aft Sea Chest – Frs. 51-54 Port

Spec item #: HD-07	SPECIFICATION	TCMSB Field # 3L030, 3L053, 3L054, 3L055, 3L056 & 3L057
SEABAY, SEACHESTs AND SEA STRAINERS		

3.5 The Contractor shall inform the Chief Engineer when the sea chests are open and cleaned. The Contractor shall hydro blast and power brush clean the spaces to SSPC SP 3 to the satisfaction of the Chief Engineer. Sea chests shall be inspected by the Chief Engineer and a Marine Safety Inspector.

3.6 Edges of existing coatings shall be “feathered back” by blasting or suitable mechanical means to allow a sound surface to accept the new coating.

3.7 The contractor and Chief Engineer will inspect the surface preparation before any coating is applied and mark up areas for further preparation.

3.8 All new zinc anodes and existing anodes with more than 50 % zinc remaining shall be protected from coating. Temperature sensors and adjacent valve discs and seats shall be protected from coating.

3.9 Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any coating is applied.

3.10 The bare areas in the spaces are to have two coats of anti-corrosive paint (Amercoat HMP 771 anti-corrosive (black) apply at 4-5 mils DFT per coat) applied as well as one full overcoat of anti-fouling paint (Amercoat ABC #4 anti-fouling (red) applied at 4 mils DFT per coat.) applied to the entire internal areas of the sea chests. Equivalent products may be used at the Contractor’s request provided that the Material Data, Safety Data and Application Data for any equivalent product are provided to the Owner and complied with.

3.11 The contractor and Chief Engineer will inspect the previous coat and mark areas for further surface preparation between coats. Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any additional coating is applied.

3.12 The contractor is to take DFT thickness readings between coats. The Chief Engineer is to witness the tests.

3.13 Upon completion of removal of the temporary protections applied as 3.8 and final inspection by the Chief Engineer with the assistance of a manlift operator as required; the grids shall be installed in good order and secured with locking arrangements on all fasteners. Locking bars shall be used. Tack welds on the bolt heads are not to be used. The contractor’s bid shall include the cost of labour and materials for the replacement of 32 defective threaded fasteners (M16 x 50). All fasteners shall be stainless steel.

Spec item #: HD-07	SPECIFICATION	TCMSB Field # 3L030, 3L053, 3L054, 3L055, 3L056 & 3L057
SEABAY, SEACHESTS AND SEA STRAINERS		

SEA BAY

3.14 The docking plug shall be removed to allow the sea bay to drain. The manhole cover (Fr. 96) shall be removed. The sea bay internal spaces including pipe stub internals shall be thoroughly cleaned to SSPC SP 3. The resulting debris including decaying sea life shall be collected and removed from the vessel promptly and frequently.

3.15 After inspection by the Chief Engineer and a Marine Safety Inspector, the bare areas shall have two coats of anti-corrosive paint (Amercoat HMP 771 anti-corrosive (black) apply at 4-5 mils DFT per coat) applied as well as one coat of anti-fouling paint over the entire surface area (Amercoat ABC #4 anti-fouling (red) apply at 4 mils DFT per coat.). The new zinc anodes, existing zinc anodes less than 50% wasted, temperature sensors and valve seats and discs shall be protected from coating.

3.16 The contractor's bid shall include the cost of the labour and materials to replace (16) - M24 zinc anodes as and where directed by the Chief Engineer. Quote unit cost per anode; actual number anodes required to be adjusted up or down by 1379 action.

3.17 Upon completion of inspection, anode renewal, coating repair and renewal, any repair work, removal of temporary protection from coating of zincs, sensors etc, and final inspection by the Chief Engineer; then the docking plugs and manhole covers shall be re-installed in good order using new contractor supplied jointing on manhole covers.

3.18 When all seabay work and sea connections work has been satisfactorily completed and all valves are re-installed in good order then the Sea bay shall be hydrostatically tested (fill to overflow the vent – static head test) with the test being witnessed by the Chief Engineer and a Marine Safety Inspector. Should it be necessary to drain the Sea bay for the purposes of hull coating touch-up, the docking plug shall be removed and on completion of being drained, the docking plug shall be installed with the locking bar welded over as per original.

Sea Bay Strainers Port and Starboard

3.19 Main sea strainers shall be opened for inspection, cleaning to SSPC SP 3, and reaming of strainer plate holes to original diameter.

3.20 The contractor and Chief Engineer will inspect the surface preparation before any coating is applied and mark up areas for further preparation.

3.21 Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any coating is applied.

Spec item #: HD-07	SPECIFICATION	TCMSB Field # 3L030, 3L053, 3L054, 3L055, 3L056 & 3L057
SEABAY, SEACHESTS AND SEA STRAINERS		

3.22 The strainers are to have two coats of anti-corrosive paint (Amercoat HMP 771 anti-corrosive (black) apply at 4-5 mils DFT per coat) applied as well as one coat of anti-fouling paint (Amercoat ABC #4 anti-fouling (red) apply at 4 mils DFT per coat.)

3.23 The contractor and Chief Engineer will inspect the previous coat and mark areas for further surface preparation between coats. Any marked up areas are to be re-inspected by the contractor and Chief Engineer before any additional coating is applied.

3.24 The contractor is to take DFT thickness readings between coats. The Chief Engineer is to witness the tests.

3.25 The contractor is to supply and affix (Bolted) one M24 tank anode to each strainer screen.

3.26 All manholes covers shall be closed up using 1/4" neoprene gaskets.

Part 4: Proof of Performance

4.1 The Contractor is responsible for arranging all inspections and to ensure TCMS inspects the spaces and signs off the items in the vessels Hull and Machinery Survey Record Book. The Contractor shall advise the Owner's Representative in advance to allow his/her attendance.

Part 5: Deliverables

5.1 At undocking the Contractor is to carry out leakage inspections and check for any ingress of water. Any leakage is to be corrected immediately, prior to undocking the vessel.

Spec item #: HD-08	SPECIFICATION	TCMSB Field # N/A
Impressed Current System		

Part 1: Scope

1.1 The impressed current cathodic protection hull anodes shall be inspected and those which are determined by inspection to be defective or deteriorated shall be renewed. There are a total of 4 protection and 2 reference anodes on the hull of the vessel.

Part 2: References

CAPAC Impressed Current Cathodic Protection
Manufacturer: US Filter - Electrocatalytic Inc.
Model # 58614 – 6, 150 amps

Reference : Installation Drawing Anode Elliptical, # 37060
CAPAC Instruction Manual
DWGs 72-67, 72-855

Protection Anode Locations:

Frame 146 Lower Cargo Hold, port side
Frame 146 Lower Cargo Hold, starboard side
Frame 55 Cyclo Converter Room, port side
Frame 55 Purifier Room, starboard side aft

Reference Anode Locations

Port Frame 84 (just fwd of boiler ship side blowdown valve)
Stbd Frame 28 (sewage compartment just aft of fwd bulkhead)

Part 3: Technical Description

3.1 The contractor in consultation with the ship's Electrical Officer will lock-out the power supply for the cathodic protection system. The Contractor is responsible to ensure that the circuits are isolated and locked-out prior to commencing any work.

3.2 The contractor shall remove the covers from the protection anode connection boxes in the above noted locations. The protection anode connection boxes shall be opened up for inspection only.

Spec item #: HD-08	SPECIFICATION	TCMSB Field # N/A
Impressed Current System		

3.3 The four hull protection and two reference anodes shall be inspected for defects. It will be necessary to rig staging for this inspection which shall be contractor supplied and installed. The undamaged anodes and any replacement anodes including the recessed reference anodes shall be protected from blasting and coating. Any defective anode found shall be replaced with owner supplied spares and dealt with by PWGSC 1379 action.

3.4 For Replacement Anodes ONLY(include in unit price above): The contractor shall clean a 14-foot diameter area around the center of each anode to bare metal for the renewal of di-electric and epoxy coatings.

3.5 The contractor shall apply a new dielectric shield around the affected elliptical anode for a 14-foot diameter area as per original. Contractor shall supply the Jotun Cathelco Shield Filler or Ameron140 equivalent dielectric coating. One coat of dielectric shield shall be applied to the fresh blasted hull around the elliptical anode for a at a 7-foot radius area around the anodes. The first layer of the coat shall be 1/16" thick applied by broad bladed putty knife or trowel; starting at the edges of the anode and working outwards. The remaining dielectric coating shall be applied around the anode at 2-foot diameter area. The Contractor shall mix and apply the dielectric compound as per manufacturers instructions. Contractor shall supply a copy of the product's MSDS to the Chief Engineer prior to applying the product.

3.6 For Anodes with dielectric shield damage of less than 40 % area: Contractor shall blast the exposed steel to bright metal and feather the damaged dielectric shield. The feathering and the missing shield area shall be repaired to 7-foot radius from center of anode as 3.5 above. Contractor shall allow in his bid for shield repair area of 12 square feet at 1/16" thick. The contractor shall take every care to avoid blasting damage to any anode and intact dielectric shield.

3.7 The contractor shall then coat the affected areas with the hull coating as per hull painting item of this spec. Note: The Hull coating must be applied before the dielectric coating has cured or else the Contractor must re-roughen the surface of the di-electric shield.

3.8 All work shall be performed as per manufacturers specifications and recommendations.

3.9 In addition to the total cost for this specification item, the contractor shall quote the unit cost per elliptical anode replacement (Owner-supplied Anode and Installation Kit). Include in the unit cost, work as detailed in 3.4 and 3.5 above.

Part 4: Proof of Performance

N/A

Part 5: Deliverables

5.1 Contractor shall provide 3 typewritten reports detailing findings of anode inspection/work. The DFT measurements shall be included in this report for the new coating.

Spec item #: HD-09	SPECIFICATION	TCMSB Field # 3L090
Storm Valves		

Part 1: Scope

1.1 The intent of this item shall be to open up the list of valves and their associated steam de-icing valves for cleaning, inspection and maintenance as per the quadrennial survey required by the Transport Canada Marine Safety Branch.

Part 2: References

Identification of valves.

Location	Description	Application
Propulsion motor room Frame 35 stbd	2" SDNR globe	OW separator
Propulsion motor room Frame 47 stbd.	3" SDNR globe	Sub fire pump
Generator room Frame 83 port.	2" right angle cock	Boiler blowdown
Generator room Frame 90 – 91 port.	4" SDNR globe	Ballast pump
Generator room Frame 89 – 90 port.	4" SDNR globe	Ballast pump
Generator room Frame 101 – 102 port.	12" butterfly	Central cooler
Generator room Frame 90 – 91 stbd.	4" SDNR globe	F/W distiller
Generator room Frame 92 – 93 stbd.	3" SDNR globe	Aux. Generator
Frame 29 in void tank # 6P	4" SDNR globe	Grey water drain
Frame 28 in void tank # 6P	3" SDNR globe	Sewage disch.
Frame 29 in void tank # 6S	3" SDNR globe	Grey water drain

Part 3: Technical Description

3.1 All valves and associated steam valves, where applicable, shall be suitably tagged such that they may be reinstalled in their original respective locations.

3.2 The contractor shall disassemble the overboard valves listed as well as their respective steam clean out valves. Spindles shall be removed from the valve bonnets, cleaned and laid out for inspection. The internals of the valve bodies, valves, and sealing surfaces shall be cleaned thoroughly. The 12 inch butterfly valve shall be removed, disassembled, cleaned and laid out for inspection.

3.3 Metal to metal seated valves shall be lapped to provide a watertight seal.

3.4 To insure that a watertight seal is maintained between the valve and valve seat, the Contractor shall remove all listed valves from the vessel for overhaul and pressure testing. All valves are to be pressure tested to 100psi and witnessed by Chief Engineer in contractors work shop prior to reinstallation onboard the vessel.

Spec item #: HD-09	SPECIFICATION	TCMSB Field # 3L090
Storm Valves		

3.5 Upon the completion of all work and satisfactory testing, all valves shall be assembled with new gland packing and jointing and installed in their respective positions in the correction orientation (all flow arrows pointing “overboard”) aboard the vessel.

3.6 The contractor shall supply all materials required to carry out the specified work.

Part 4: Proof of Performance

4.1 After re-installation, each valve will be test operated in the presence of the Owner’s Representative, fully opened to fully closed. Valves will then be left in their normal operating position.

Part 5: Deliverables

5.1 At undocking the Contractor is to carry out leakage inspections and check for any ingress of water. Any leakage is to be corrected immediately prior to undocking the vessel.

Spec item #: HD-10	SPECIFICATION	TCMSB Field # 3LL110 all
SEA CONNECTIONS		

Part 1: Scope

1.1 The intent of this item shall be to open up the listed valves for inspection, cleaning, and maintenance as per the quadrennial survey requirements for the Marine Safety Branch.

Part 2: References

Sea Suction Valve locations

Location	Description	Application
Port sea chest Fr. 96 – 106	4" butterfly valve	Air vent high chest
Port sea chest Fr. 96 – 106	4" butterfly valve	Air vent low chest
Port sea chest Fr. 96 – 106	¾" SDNR globe	Air inj. high chest
Port sea chest Fr. 96 – 106	¾" SDNR globe	Air inj. low chest
Port sea chest Fr. 96 – 106	1/2" SDNR globe	Steam inj. high chest
Port sea chest Fr. 96 – 106	1/2" SDNR globe	Steam inj. low chest
Port sea chest Fr. 96 – 106	8" butterfly valve	Recirc. high chest
Port sea chest Fr. 96 – 106	8" butterfly valve	Recirc. low chest
Port sea chest Fr. 96 – 106	16" butterfly valve	Sea inlet high chest
Port sea chest Fr. 96 – 106	16" butterfly valve	Sea inlet low chest
Stbd. sea chest Fr. 96 – 106	4" butterfly valve	Air vent high chest
Stbd. sea chest Fr. 96 – 106	4" butterfly valve	Air vent low chest
Stbd. sea chest Fr. 96 – 106	¾" SDNR globe	Air inj. high chest
Stbd. sea chest Fr. 96 – 106	¾" SDNR globe	Air inj. low chest
Stbd. sea chest Fr. 96 – 106	1/2" SDNR globe	Steam inj. high chest
Stbd. sea chest Fr. 96 – 106	1/2" SDNR globe	Steam inj. low chest
Stbd. sea chest Fr. 96 – 106	8" butterfly valve	Recirc. high chest
Stbd. sea chest Fr. 96 – 106	8" butterfly valve	Recirc. low chest
Stbd. sea chest Fr. 96 – 106	16" butterfly valve	Sea inlet high chest
Stbd. sea chest Fr. 96 – 106	16" butterfly valve	Sea inlet low chest
F/W gen. sea chest Fr. 102-106	4" butterfly valve	Air vent
F/W gen. sea chest Fr. 102-106	3" SL angle globe	F/W gen. Suction
F/W gen. sea chest Fr. 102-106	1 ¼" SL angle globe	R/O unit suction
F/W gen. sea chest Fr. 102-106	¾" SDNR globe	Air injection
Aft sea chest port Fr. 51-54	3" SL angle globe	Sub. Fire pump
Aft sea chest port Fr. 51-54	2.5" SL angle globe	Stern tube pump
Aft sea chest port Fr. 51-54	¾" SDNR globe	Air injection
Aft sea chest port Fr. 51-54	½" SDNR globe	Steam injection
Aft Sea Chest port Fr. 51-54	5" SL Globe	Vent Valve port

Spec item #: HD-10	SPECIFICATION	TCMSB Field # 3LL110 all
SEA CONNECTIONS		

Location	Description	Application
Sea Bay Fr. 96 – 102	16” butterfly valve	Sea inlet port
Sea Bay Fr. 96 – 102	16” butterfly valve	Sea inlet stbd.
Sea Bay Fr. 96 – 102	6” butterfly valve	Air vent port
Sea Bay Fr. 96 – 102	6” butterfly valve	Air vent stbd.
Sea Bay Fr. 96 – 102	5” SL angle globe	Fire pump suction
Sea Bay Fr. 96 – 102	3” SL angle globe	Aux. Gen. suction
Sea Bay Fr. 96 – 102	8” SL angle globe	Foam pump
Sea Bay Fr. 96 – 102	8” butterfly valve	Main S/W P/P aft
Sea Bay Fr. 96 – 102	8” butterfly valve	Main S/W P/P fwd
Sea Bay Fr. 96 – 102	8” butterfly valve	Main S/W P/P stby
Sea Bay Fr. 96 – 102	4” SL angle globe	Ballast pumps
Sea Bay Fr. 96 – 102	4” SL angle globe	Distiller / RO unit

Part 3: Technical Description

3.1 All valves shall be suitably tagged such that they may be reinstalled in their original respective locations.

3.2 Contractor shall include in this specification item an allowance of \$12,000 for repairs to defects in pipe stubs (particularly flange seams and faces) revealed in the course of sea connections inspection work. This allowance is to be adjusted up or down by 1379 action on proof of detailed time sheets. Chief Engineer shall be advised promptly when a piping defect is discovered in the course of this work so that photographic records may be taken.

3.3 The contractor shall dismount and disassemble the globe valves as listed. Spindles shall be removed, cleaned and laid out for inspection. The internals of the valve bodies, valves, and sealing surfaces shall be cleaned thoroughly cleaned, and laid out for inspection.

3.4 The butterfly valves shall be removed, disassembled, cleaned and laid out for inspection.

3.5 Metal to metal seated valves shall be lapped to provide a watertight seal.

3.6 The contractor shall provide a test method to insure that a watertight seal is maintained between the valve and valve seat for the screw type valves.

3.7 This test method must be confirmed to be acceptable to the attending Marine Safety Inspector.

Spec item #: HD-10	SPECIFICATION	TCMSB Field # 3LL110 all
SEA CONNECTIONS		

3.8 To insure that a watertight seal is maintained between the valve and valve seat, the Contractor shall remove all listed valves from the vessel for overhaul and pressure testing. All valves are to be pressure tested to 100psi and witnessed by Chief Engineer in contractors work shop prior to reinstallation onboard the vessel.

3.9 Following all inspections and tests, all valves shall be assembled with all new gland packing and all new appropriate jointing, as applicable and installed in good order in their original respective locations and orientations.

3.10 The contractor shall supply all materials required to carry out the specified work.

Part 4: Proof of Performance

4.1 After re-installation, each valve will be test operated in the presence of the Owner's Representative, fully opened to fully closed. Valves will then be left in their normal operating position.

Part 5: Deliverables

5.1 At undocking the Contractor is to carry out leakage inspections and check for any ingress of water. Any leakage is to be corrected immediately prior to undocking the vessel.

Spec item #: HD-11	SPECIFICATION	TCMSB Field # N/A
Central Cooling Sea Water Pumps SDNR Discharge Valves Servicing		

Part 1: SCOPE

Intent of this spec is to replace the listed valves with new Owner supplied valves.

Part 2: REFERENCES

N/A

Part 3: TECHNICAL DESCRIPTION

- 3.1 The following valves are to be isolated, drained, and removed adjacent piping. The removed valves are to be replaced by new owner supplied valves. Valves removed are to be taken ashore and disposed of.

Centre Main Sea Water Pump Discharge 8" SDNR Globe 150 #, Bronze
Forward Main Sea Water Pump Discharge 8" SDNR Globe 150#, Bronze
Aft Main Sea Water Pump Discharge 8" SDNR Globe 150#, Bronze

- 3.2 Valves removed shall be taken ashore and disposed of.

- 3.3 Contractor shall draw to the attention of the Owner's representative any significant pipe, fitting or flange wastage observed in the course of this work.

- 3.4 All workmanship and materials to be to the satisfaction of the Owner's representative.

Part 4: PROOF OF PERFORMANCE

- 4.1 N/A

Part 5: Deliverables

- 5.1 N/A

Spec item #: HD-12	SPECIFICATION	TCMSB Field # N/A
Bow Thruster		

Part 1: SCOPE

- 1.1 The intent of this specification is to drain the oil from the bow thruster gearbox and reservoir and refill with filtered owner supplied gear oil as well as to renew the tunnel anodes and renew wasted areas of tunnel insert seams.

Part 2: REFERENCES

Standards

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Fleet Safety Manual (DFO 5737)

Part 3: TECHNICAL DESCRIPTION

ULSTEIN Tunnel Thruster Model 900TT

Ulstein Drawing # D8101810 Rev A 900 TT Fig 5.1

Propeller shaft seals are separately oil lubricated

System Oil Capacity approx 350 litres of MOBIL Mobilgear 600 XP 68

- 3.1 Except where specifically noted all parts shall be Owner-supplied. Lockouts requested will completed by the ship's Electrical Officer.
- 3.2 The Contractor shall neatly crop off the bow thruster tube protective grids port side along the existing scar lines. Sharp edges on the hull so created shall be lightly ground smooth for personnel and rigging safety. Protective grid shall be reinstalled after gear box oil change completed. All disturbed paint shall be reapplied as per Spec HD-05 Hull Cleaning and Coating.
- 3.3 The Contractor shall have two 205 litre empty drums ready and shall remove the two drain plugs dwg ref 4032 from the gearbox and direct all the approx 375 used litres of gear oil through a coarse strainer/funnel and direct the draining oil into the empty drums or empty pails as Contractor sees fit. The final 2 litres (ie dregs) shall be collected into a clear pail/bucket and covered. The pail shall be labeled eg. ANN HARVEY B/T Gbx Oil Drain, Date, Name etc. The pail shall be handed to the Chief Engineer within 12 hours of collection. Any debris captured in the coarse strainer shall also be collected in a clean plastic bag or rag, labeled and passed to the Chief Engineer. Contractor shall advise Chief Engineer promptly if the liquid drained contained any free water or emulsification.
- 3.4 After thoroughly cleaning the area of the bow thruster header tank top plate; dismantling the header tank top plate and breather assembly and flushing the gearbox with the initial 10 litres of new Owner-supplied gear oil added to the system through the header/expansion tank using the owners portable filtration cart. Contractor shall reinstall bow thruster gearbox drain plugs in good order.

Spec item #: HD-12	SPECIFICATION	TCMSB Field # N/A
Bow Thruster		

3.5 Contractor shall then refill the system through the header/expansion tank using the owners portable filtration cart. The Contractor shall temporarily dismount the top cover of the header tank to perform this. The Contractor shall not permit the level in the expansion tank to reach the height of the vent/expansion hose inlet, i.e. the pumping will be ‘stop and go’ to avoid trapping air in the gearbox.

3.6 Upon completion of refilling the Bow thruster gear oil system and inspection of the header tank internals by the Chief Engineer the Contractor shall re-secure the header tank cover and breather assembly maintaining meticulous cleanliness standards.

3.7 The Contractor shall crop the straps of the wasted zinc anodes in the tunnel and replace the wasted anodes with new. Contractor shall include the cost of renewing quantity 6 of M24 zinc anodes and further quote the unit cost per anode installation for 1379 adjustment.

3.8 The Contractor shall include in his bid for this spec item the cost of gouging and renewing 12 linear feet, 48 bead feet, of tunnel insert seam welding. Contractor shall further quote the unit cost per additional linear foot of insert seam gouging and renewal for 1379 adjustment. Contractor to supply to the technical authority for review, an approved welding procedure for mild steel to stainless steel. The specific composition of this ferrous corrosion/abrasion resistant alloy is believed to be 316SS. Contractor to adhere to aspects of the welding procedure when completing this repair.

3.9 After final welding has cooled it shall be Nondestructive tested with LPI to ensure defect free. Any repair to be at Contractors expense and repair retested.

Part 4: PROOF OF PERFORMANCE

4.1 – N/A

Part 5: Deliverables

5.1 Acceptance will occur when:

- a. All above work is completed to the satisfaction of the Chief Engineer,
- b. Any and all Safety Management System forms provided to Chief Engineer.

Spec item #: HD-13	SPECIFICATION	TCMSB Field # N/A
Rudder and Rudder Trunk Anodes		

Part 1: Scope

1.1 The intent of this specification is to replace all wasted anodes that are fitted to the rudder and in the rudder trunk.

Part 2: Reference

N/A

Part 3: Technical Description

3.1 The contractor shall replace all wasted anodes that are fitted to the rudder and in the rudder trunk. Quote on supplying and fitting quantity 20 of M24 anodes. A separate bonding cable shall be attached to the rudder prior to any welding on the rudder.

3.2 The contractor shall ensure that old anode straps are removed and ground down. The hull steel so exposed shall be primed and painted.

3.3 Quote shall include unit price for additional anodes.

Part 4: Proof of Performance

N/A

Part 5: Deliverables

N/A

Spec item #: HD-14	SPECIFICATION	TCMSB Field # N/A
Seatrials		

Part 1: Scope

1.1 The intent of this specification shall be to carry out seatrials as a functional test of the ship's propulsion and other systems.

Part 2: References

N/A

Part 3: Technical Description

3.1 On completion of all specification items, sea trials will be carried out as a functional test of the ship's propulsion and other systems.

3.2 Sea trials will last a minimum of eight hours.

3.3 Trials will contain ahead and astern movements at various power levels.

3.4 Trials will be carried out to the satisfaction of the Inspection Authority and Technical Authority.

3.5 The Contractor is to have sufficient supervisory staff on board, during these trials to witness the operation of machinery which he has worked on during this refit.

Part 4: Proof of Performance

N/A

Part 5: Deliverables

N/A

Spec item #: E-01	SPECIFICATION	TCMSB Field # 3H029
Bow Windlass Survey		

Part 1: Scope

The intent of this specification is to perform the following work. Contractor is to note that this work shall be performed in conjunction with the Forepeak Tank work and that the port Anchor and Cable shall not be re-stowed until all the Chain Locker steel work including the pressure testing of the Forepeak Tank and re-installation of the port chain locker false floor over the newly recoated disturbed steel work is completed to the satisfaction of the Owner's representative and attending TCMS Inspector.

- 1.1 The Contractor shall survey the ship's bow anchor windlass for TCMS
- 1.2 The band brake material is to be renewed.
- 1.3 The brake drums wearing surface are to be re-faced to bright metal in-situ.
- 1.4 The brake band bushings and pivot pins are to be renewed and the used ones labeled with original position and handed to Owner.

Part 2: Reference

Guidance Drawings/Nameplate data

- 2.1 Windlass is Pacific Winches horizontal shaft, double wildcat hydraulically driven anchor windlass as Reference Drawing No 900-400-134. Chain size 40 mm U3 stud link chain.
- 2.2 General Brake Assembly Drawing Reference No 900-400-342
- 2.3 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

- 2.4 The Contractor shall supply all materials, equipment and parts and labour required to perform the specified work unless otherwise stated. This includes the specifications and MSDS of all chemicals and coatings used.

Spec item #: E-01	SPECIFICATION	TCMSB Field # 3H029
Bow Windlass Survey		

Part 3: Technical Description

Dismantling and Cleaning

- 3.1 The Contractor shall dismantle and service the windlass for TCMS survey and brake linings and brake band bushings renewal. Ships Crew will assist with operating the windlass to pay out and range the anchor and chains to the Bitter Ends for cleaning and painting as Spec. Item # H-?? The Bitter Ends securing pins are accessible in the Foc'sle forward compartment.
- 3.2 The Windlass and Stbd Forward Mooring Winch Breakers shall be locked out and Lock Out Permit completed.
- 3.3 The windlass gearbox shall be drained and the gear oil (approx 17 litres) shall be disposed of ashore.
- 3.4 The windlass gearbox top cover shall be dismantled and laid aside.
- 3.5 Both Brake assemblies shall be tagged for original location and dismantled and laid aside.
- 3.6 Both clutch operating handle assemblies are to be dismantled; the clutch dogs are to remain on the shafts.
- 3.7 Each of the 4 main bearing caps are to be marked/tagged for original location/orientation then dismantled and laid aside.
- 3.8 The bearings are to be opened for inspection.
- 3.9 All the above mentioned from 3.3 to 3.8 inclusive are to be manually cleaned.
- 3.10 All the grease passages for this equipment are to be proven clear.
- 3.11 The Contractor shall arrange for the attendance of a TCMS Machinery Inspector when the above work is completed and the Windlass is ready for inspection. The Chief Engineer shall be advised when the TCMS Inspector is expected onsite.

Renewals

- 3.12 Contractor shall renew the brake bands with new contractor-supplied brake material and screws. Friction linings: 4 lengths each 6" wide by ½ inch thick by approx 44 inches long. Contractor shall provide quantity of 150 countersunk brass ¼" UNC bolts (minimum length 1") and brass nuts to suit. Surplus fasteners to be handed to the Owner.

Reassembly

- 3.13 Contractor shall re-install all above removals in good order.
- 3.14 Contractor shall fill the gearbox to the operating level with 17 litres of Owner supplied Enduratex EP-150 gear oil.

Spec item #: E-01	SPECIFICATION	TCMSB Field # 3H029
Bow Windlass Inspection		

Part 4: Proof of Performance

- 4.1 Contractor shall contact TC and Chief Engineer for inspection of Bow Windlass components
- 4.2 Subsequent to the successful pressure testing of the Forepeak Tank after re-installation of the chain locker plate and false floor and re-stowing of the cleaned and re-painted anchor cables in the Chain Locker the ship's crew will operate the anchor windlass to prove its operation to the satisfaction of the Chief Engineer and attending TCMS Machinery Inspector

Part 5: Deliverables

N/A

Spec item #: E-02	SPECIFICATION	TCMSB Field # N/A
Starboard Forward Mooring Winch Band Brake Refurbishment		

Part 1: Scope

The intent of this specification is to renew the Stbd Forward Mooring Winch Brake linings, renew the linkage bushings and re-align the linkages, and supply a spare set of mooring winch brake linings to the vessel for onboard spares.

Part 2: Reference

Guidance Drawings/Nameplate data

- 2.1 Mooring Winch is Pacific Winches horizontal shaft, hydraulically driven Mooring Winch as Reference Drawing No 900-400-283C.
- 2.2 General Brake Assembly Drawing Reference No 900-400-342
- 2.3 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - Canadian Coast Guard Fleet Safety Manual (DFO 5737)

Owner Furnished Equipment

- 2.4 The Contractor shall supply all materials, equipment and parts and labour required to perform the specified work unless otherwise stated.

Part 3: Technical Description

Dismantling and Cleaning

- 3.1 The Contractor shall dismount and lay aside the brake guard and dis-assemble the brake assembly for brake linings and brake band bushings renewal.
- 3.2 The Windlass and Stbd Forward Mooring Winch Breakers (common hydraulic tank) shall be locked out and Lock Out Permit completed.

Renewals

- 3.3 The band brake material is to be renewed. The steel brake bands shall be cleaned of corrosion (wire brushed) and their exterior surfaces primed prior to installation of the new linings. Contractor is to supply 2 sets of the brake linings; the first set is to be installed and the second set is to be fully identified as to composition, thickness, width and length and handed to the Chief Engineer.

The replacement linings shall be 5" wide, 1/2" thick; the upper linings are 48" long and the lower linings are 36" long.

Contractor shall provide quantity of 100 countersunk brass 1/4" UNC slot-head bolts (minimum length 1") and brass nuts to suit. Surplus fasteners to be handed to the Owner.

Spec item #: E-02	SPECIFICATION	TCMSB Field # N/A
Starboard Forward Mooring Winch Band Brake Refurbishment		

- 3.4 Contractor shall drill and countersink the new linings for the new bolts such that the new friction linings have minimum 1/8" wear down to the heads of the new bolts.
- 3.5 The brake drum wearing surface is to be cleaned of corrosion in-situ.
- 3.6 The brake linkages bushings (total quantity 10) and thrust washers (qty 2) are to be renewed. The used bushings are to be handed to the Chief Engineer
- 3.7 The anchor and pivot pins are to be cleaned, inspected, measured and grease passages proven clear. Any defective pins requiring renewal shall be renewed by 1379 action.
- 3.8 The bottom band alignment/adjustment screws are to be cleaned and proven free.

Reassembly

- 3.9 Contractor shall re-install/re-assemble the re-lined brake band and linkages in good order complete with lower band adjustment bolts adjustment to suit the new thickness of brake lining.

Part 4: Proof of Performance

- 4.1 When there is no impediment to the operation of the Stbd Forward Mooring Winch the Contractor with Ship's crew assistance shall test and season the new brake linings as per the manufacturer's instructions "allow the brake to sit for at least 6-8 hours with maximum handwheel load applied" then "Before using the brake under load run the winch against a partially applied brake for at least 10 MINUTES" (Pacific Winches Hydraulic Deck Machinery section 3 "Brake Lining Replacement steps 13 & 14)

Part 5: Deliverables

- 5.1 Contractor shall provide to the Owner's Representative 3 fair copies of the measured dimensions of the pins as 3.7

Spec item #: E-03	SPECIFICATION	TCMSB Field # 3KK180-01
No 1 Boiler Survey (EO-150 port)		

Part 1: Scope

- 1.1 The intent of this item shall be to open up the port boiler for cleaning, inspection and testing and to obtain a credit from the Transport Canada Marine Safety Inspection Board.

Part 2: References

Port Boiler – Located Engine Room Flat

Clayton Steam Generator

Model EO-150, Serial # 21954

Working Pressure – 100 PSI

Test Pressure - 125 PSI

Safety Valve – 1 1/2", 125 PSI

Part 3: Technical Description

- 3.1 The contractor shall include an allowance of \$10,000.00 for the services of a qualified Clayton service provider for overhaul of the boiler. The allowance will be adjusted by 1379 action for payment upon proof of invoice.
- 3.2 The contractor shall with the Senior Engineer lock out the boiler as required. The Contractor shall use their own locks/tags and the lock-outs shall be entered in the Ship's Lock-out/Tag-Out Register.
- 3.3 The contractor shall remove or disconnect all wiring, piping, sensors, brackets, pressure gauges, and other associated hardware and appliances to carry out the specified work. All items shall be reassembled and reconnected in good order upon completion of all testing, cleaning, and inspections.
- 3.4 Mountings on the boiler shall be tagged prior to removal for identification purposes and installed back in their respective original locations upon completion of all work.
- 3.5 The contractor shall remove the below mentioned valves and install the Coast Guard supplied replacements where specified. All other mentioned valves shall be overhauled for inspection.

Spec item #: E-03	SPECIFICATION	TCMSB Field # 3KK180-01
No. 1 Boiler Survey (EO-150 port)		

<u>Item</u>	<u>Location and Size</u>
Main Stop Valve	3 inch port - overhaul
Safety Relief Valve	1 ½ inch port - to be certified (see Spec Item H-05)
Separator Drain Valve	¾ inch angle globe - replace
Burner Control Valve	¼ inch – replace
Feed Water Pump Inlet Valve	2 inch gate - replace
Feed Water Check Valve	2 inch angle strainer - replace
Feed Water Pump Relief Valve ½" angle	- replace
Coil Feed Valve	1 inch globe - replace
Coil Drain Valve	1 inch globe - replace
Steam Trap Discharge Valve	1 inch globe - replace
Soot Blowing Valve	1 ¼ inch port – angle – replace
Back Press Regulating Valve	3 inch port - overhaul

3.6 The contractor shall remove the following valve for overhaul by a qualified shop.

Main Stop Valve	3 inch port
-----------------	-------------

The valve shall be disassembled and thoroughly clean all parts for inspection. The metal seat shall be lapped and if the valve is not repairable or considered not cost effective to repair, shall be replaced with new valves, owner supply. Valve gland shall be repacked with new packing and all disturbed gaskets shall be replaced with new gaskets supplied by Contractor. All material shall be suitable for use with steam and rated for a minimum of 150 psi operating pressure.

3.7 Contractor shall remove the burner. They are secured via wing nuts. The fuel inlet and return lines will need to be let go.

3.8 The contractor shall thoroughly clean by wire brushing and fresh water flushing the external surfaces of the boiler coil. The internals of the boiler coil shall be thoroughly cleaned with an approved chemical for removing scale. Upon completion of chemical cleaning, the coil internals are then to be thoroughly washed out and neutralized with a suitable alkaline agent followed by a flushing. All cleaning chemicals and fluids used for cleaning and descaling shall be contained and disposed of ashore by the contractor in a manner in keeping with local environmental recommendations. Contractor shall ensure catchall under boilers is plugged to contain all contamination from cleaning.

Spec item #: E-03	SPECIFICATION	TCMSB Field # 3KK180-01
No. 1 Boiler Survey (EO-150 port)		

Current MSDS sheets are to be provided to the Chief Engineer before the chemicals are used. The Contractor shall quote on the removal of 500 gallons of water and residue from the internal and external cleaning of the boiler coil.

3.9 Following the cleaning procedures, the boiler coil and the associated steam separator shall be hydrostatically tested at 1.5 times the working pressure. The contractor shall provide all the equipment including blank flanges, valves, gaskets, fittings, pressure gauges, pumps, etc. necessary to perform the hydrostatic test. Provide proof of gauge and pressure relief valve calibration to the C/E before the test.

3.10 Testing shall be witnessed by the Marine Safety Inspector and shall be to a pressure and duration to the Inspector's satisfaction. Contractor shall arrange for TCMSB and shall notify Chief Engineer prior to TCMSB attendance.

3.11 The combustion chamber shall be thoroughly cleaned. The refractory cement shall be inspected for cracks. Contractor shall quote \$ 5,000.00 for repairs to the refractory cement. Final cost shall be adjusted up or down by 1379 action upon proof of invoice. Owners shall supply plastic refractory cement.

3.12 The contractor shall remove the combustion air duct and damper assembly from each boiler. Air duct and damper components shall be completely disassembled. All parts shall be cleaned and laid out for inspection by Chief Engineer. Upon completion of inspection, the damper unit and ducting shall be reassembled as per the manufacturer's specifications section 8.12 of the manufacturer's instruction manual which is located onboard the vessel and will be provided to the successful bidder.

3.13 The contractor shall remove the safety valve and send ashore as per Spec item H-05.

3.14 Following the completion of the specified work, the boiler shall be suitably drained. All blanks, plugs, gaskets, etc. necessary for testing shall be removed. All piping, fittings, valves, brackets, burner etc. and all items disturbed to perform the cleaning and inspections shall be reconnected in good order

Spec item #: E-03	SPECIFICATION	TCMSB Field # 3KK180-01
No. 1 Boiler Survey (EO-150 port)		

All new gaskets shall be supplied and installed by the contractor in place of gaskets and seals that were disturbed to perform this work. All alarms and controls shall be reconnected and proven operational. This shall be done with the assistance of the Electrical Officer.

3.15 All materials, equipment, chemicals, cleaners, etc. shall be supplied by the contractor to perform the cleaning and testing of both boilers. Current MSDS sheets shall be provided to the Chief Engineer for any and all chemicals used before the chemicals are brought aboard the vessel.

Part 4: Proof of Performance

4.1 After completion of the above mentioned work, correct boiler operation and safety testing shall be demonstrated for the Chief Engineer and the attending Marine Safety Inspector.

Part 5: Deliverables

5.1 Contractor shall provide 3 typewritten service reports of the work carried out.

Spec item #: E-04	SPECIFICATION	TCMSB Field #
Distiller Removal and RO Desalinator Installation		

Part 1: Scope

1.1 The intent of this item shall be threefold:

- a. Removal of existing Alfa Laval Nirex Fresh Water Distiller with accessories and associated piping.
- b. Thorough surface preparation, priming and coating of the tank top plating in the associated areas.
- c. Install new Owner Supplied Matrix SS3600 Reverse Osmosis Desalinator. This will involve modifying the Distiller mounting seat, fabricating a mounting stand as per forward RO Desalinator and supplying, fabricating and installing new 2@ nominal diameter 70/30 CuproNickel pipe and fittings from both the existing Distiller sea suction Supply Isolation Valves. This replacement shall include supply of new 2" bronze duplex suction strainers above the tanktop level.

Part 2: References

Ship's Drawings: 72-38 sh1 detail 23 "Auxiliary Seats in Generator Room"
 72-553 sh. 1 detail 14 "Connections on Sea Bay"
 72-501 Sh. 1 "Machinery Arrangement Plans"
 72-755 "Central Cooling"
 MATRIX O & M Manual Installation Instructions

Standards

2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- Canadian Coast Fleet Safety Manual (DFO 5737)
- TP127EE Marine Electrical Standards to latest revision

Part 3: Technical Description

3.1 Contractor shall ensure that all his lifting and rigging equipment is certified for minimum 1800 KGs

3.2 Contractor shall check with Chief Engineer that lockout/tagouts are in place.

Spec item #: E-04	SPECIFICATION	TCMSB Field #
Distiller Removal and RO Desalinator Installation		

Removals

- 3.3 Contractor shall disconnect, tag, secure aside and protect from damage the power supply cable to the Distiller for re-use with the new RO Desalinator.
- 3.4 Contractors shall disconnect (wiring and piping), dismount and transport ashore the Distiller Pumpsets (including the remotely mounted Ejector Pumpset)
- 3.5 Contractor shall dismount and transport ashore the distiller housing door.
- 3.6 Contractor shall dismount and transport ashore the piping connected to the distiller housing:
 - a) Steam supply at the unlagged flange between the boilers and all pipe sections in-between.
 - b) Condensate return pipe at distiller flange back approx 1.5 Meters to flange joining unit heater condensate line
 - c) Cooling Water to and from distiller at housing connections back to the nearside of the central cooling isolation valves tagged ‘#1’ & ‘#4’.

Note that the system on the other side of these isolation valves is charged with more than 3,000 liters of treated coolant.

- d) Seawater feed/ejector connections to be disconnected at the distiller housing and removed all the way back to the distiller sea chest sea suction isolating valve discharge pipe including the modified ‘y’ angled inlet all the way back to the distiller Sea Bay suction isolation valve **Note: These sea connections are being serviced by the Contractor as part of the ‘Sea Connections’ specification**
- e) Brine overboard to the inlet flange to the reducing tee inlet to the Overboard Discharge Valve **Note: The overboard discharge valve is being serviced by the Contractor as part of the ‘Storm Valves’ specification**
- f) Product water discharge pipe (fresh water pumpset having already been removed) to the inlet side of the ball valve discharge to the Fresh Water Tanks.

Tank Top Cleaning and Coating

- 3.7 When the Distiller is removed in its entirety the Contractor is to location mark and lift and stack aside the deck plates between the forward RO and the existing frame.
- 3.8 The tank top areas so exposed including the areas of the sea water suction piping and the area between the stbd sea strainer and the forward RO installation shall be cleaned of debris, degreased, wire-brushed and coated with two coats of Interbond 998. One stripe coat to all welds and edges and one overall coat at 14mils DFT as per the Coating Manufacturer’s Instructions. Contractor is to be aware that the access to the tank top plating is made difficult by piping runs.

Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinator Installation		

- 3.9 Approximate total area of tank top plating to be treated at this time is 16 square meters. Total area as agreed to by Ship's Project Engineer to be adjusted by 1379 action.
- 3.10 Contractor shall provide temporary safe access walkways and barricades as required to perform the above work safely and efficiently.

Installations

- 3.11 Contractor shall modify the existing distiller seat to suit a new elevating platform for the new Matrix Reverse Osmosis Desalination System as per the existing forward RO Installation. New platform to be of welded steel square tubing; 2 feet wide by 4 feet long by 30" high with a longitudinal channel at each end for mounting the feet of the new RO. The 1/4" thick channels are to be 4" wide by 1.5" deep. The contractor shall supply a 1/8" thick plate welded to the bottom of the new stand and a 3" deep catch tray of stainless steel below the top of the stand. The catch tray shall have a threaded drain nipple with pipe plug of 1/2" NPT or greater.
- 3.12 Contractor shall supply, fabricate and install new 2" nominal 30/70 CuproNickel piping and fittings from the discharge side of the existing 3" distiller sea suction from the sea bay and the Distiller Sea Chest. The reducing connection flanged to the valves shall have galvanic isolating washers fitted to the fasteners between the steel valves and the CuproNickel Flanges. The Contractor may tee the two alternate sea suction in a more efficient manner than existing now that the requirement to tie the suction before the former ejector pump has been removed. The Contractor shall supply and install a bronze duplex sea strainer to the joined sea suction piping at a convenient height and location above the deck plate level. The Contractor will supply and install a suitable support frame for the new sea water corrosion resistant duplex strainer
- 3.13 Contractor shall supply and install sufficient bracketing and chafing sleeves to protect all the new pipe runs against vibration, chafing and deflection.
- 3.14 The Contractor shall transport the new Matrix Reverse Osmosis Desalination System to the engineroom tank top stbd and mount it on the new Contractor fabricated and installed stand as per the existing forward unit.

Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinators Installation		

- 3.15 The contractor will supply and attach to the new RO stand a suitable conduit for the power supply cable to the new RO Control Panel as per the forward RO installation. The existing electrical cables from the removed Distiller installation shall be run through this conduit to the new RO Control Panel.
- 3.16 The new sea water supply piping shall be led to the new RO installation through the owner supplied filtration mounted to the new stand by the Contractor as per the forward RO Installation.
- 3.17 The product discharge piping shall be tied in to the existing product inlet ball valve of 3.6 f) using Contractor supplied stainless steel tubing.
- 3.18 The overboard discharge line shall be tied into the existing overboard discharge valve by a contractor fabricated and supplied schedule 80 reducing pipe c/w 1.5" Sched 80 pipe nipple or flange for discharge from RO brine line, a ¾" sched 80 pipe nipple for product rejection c/w stainless steel ball valve and non-return valve. The new reducing pipe section shall also be fitted with a ¾" schedule 80 pipe nipple and valve on the bottom for testing purposes.
- 3.19 All workmanship and materials shall be to the satisfaction of the Contractor's QA Department and the Owner's Representative

3.20 Interferences

- 3.20.1 **There are multiple pipe runs below the deckplates which will constrict the routing of the new 2" nominal diameter 30/70 CuproNickel piping and fittings.**
- 3.20.2 The new equipment cannot be tested until the vessel has been refloated and sufficient time has passed for the sea water feed supply to be deemed clear of coating volatiles.
- 3.20.3 The re-installation of D/G 3 cylinder heads, turbo-charger, intercooler will be proceeding concurrently with periods of this work
- 3.20.4 The removal and installation of replacement Air Compressors may be occurring concurrently with this work.

Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinator Installation		

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1 The newly installed RO Desalinator plant shall be thoroughly inspected for correct and secure installation and connections prior to being energized and set for functional testing.

4.2 Testing

- 4.2.1 The newly installed RO Desalinator is to be functionally tested during the latter part of sea trials when the sea chests/bay can be presumed clear of harbour and coating debris. All parameters as per Manufacturer's commissioning instructions shall be recorded.

Part 5: Deliverables

- 5.1 The Contractor shall provide 3 fair copy of the functional test parameters as per 4.2 above. These test sheets shall be compared to the manufacturer's standards and any deviation shall be corrected.
- 5.2 Contractor shall provide Certificates of Conformity for piping materials and fitting installed as part of this specification; in particular for the duplex sea strainer assembly.

Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinator Installation		



Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinator Installation		



Spec item #: E-04	SPECIFICATION	TCMSB Field # N/A
Distiller Removal and RO Desalinator Installation		



Spec item #: L-01	SPECIFICATION	TCMSB Field #
Fan and Motor Overhaul		

Part 1: Scope

- 1.1 The intent of this item shall be to perform complete overhaul on both Fan/Motor assemblies.

Part 2: Reference

Guidance Drawings/Nameplate data

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- Canadian Coast Guard Fleet Safety Manual (DFO 5737)
 - Transport Canada Ship's Electrical Standards TP127E.

Part 2: REFERENCES

Port and Stbd HAVC Supply Blower Motors
ETATECH
7.5 H.P. , 575V, 3 Phase, 60Hz
FLA 8 Amps, S.F. 1.0, Cont Duty, RPM 1740
Model : 6545235 Type NBHW1
Series : ML3818-1 Frame : 213T
DE Bearing 6207-ZZ OE Bearing 6206-ZZ

Location: HVAC Room – Upper Deck Stbd Side

Part 3: TECHNICAL DESCRIPTION

- 3.1 The contractor and Owner's Electrical Officer shall; prior to start of work witness and record starting and running currents on all three phases on both motors. Megger and resistance readings of each winding in every motor shall be taken and recorded by the Contractor before removal and after subsequent installation to prove the integrity of the motor windings. Direction of rotation shall be clearly marked on motors prior to removal and rotation confirmed upon reassembly. A copy of all readings shall be delivered to the Chief Engineer.
- 3.2 These records will be signed and dated and a clean and legible copy of same shall be passed to the Chief Engineer. The Contractor and Electrical Officer shall subsequently isolate the power supply at the MCC and both shall apply their lockouts to the breakers. Contractor shall then disconnect and dismount the fan/motor assembly units complete with mounting tubes.
- 3.3 Each fan/motor unit shall be removed to the Contractor's workshop for disassembly, cleaning, inspection, bearing renewal and dynamic balancing. The new bearings shall be sealed both sides and SKF or equivalent.
- 3.4 The fan tubes shall be grit blasted to remove all paint, rust, and dirt and then coated with primer and enamel finish.

Spec item #: L-01	SPECIFICATION	TCMSB Field #
Fan and Motor Overhaul		

- 3.5 The contractor shall supply and install replacement intake screens and tube transitions canvas flex pieces, dimensions as original.
- 3.6 Contractor shall allow \$3,000.00 for the materials costs of bearings, flex transitions, labels etc to be adjusted up or down by 1379 on proof of invoice.
- 3.7 Upon re-installation of the refurbished motor/fan units they shall be reconnected, de-isolated and correct direction of rotation shall be confirmed. Electrical Officer shall be Owner's Representative for witnessing the recording of starting and running currents for each motor for each phase.
- 3.8 All work shall be to the satisfaction of the Owner's Representative and in accordance with current Electrical and Marine Standards.

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

- 4.1 Upon completion of installation of the motors are to be ran up and tested.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

- 5.1 Contractor shall supply the Chief Engineer with 2 typewritten overhaul reports

Spec item #: L-02	SPECIFICATION	TCMSB Field #
Bow Thruster Breaker Renewal		

Part 1: Scope

1.1 The intent of this spec is to replace the existing Federal Pioneer Bow Thruster Breaker with a new Owner supplied Merlin Gerin Breaker.

Part 2: Reference

Guidance Drawings/Nameplate data

- 2.1 The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- Canadian Coast Guard Fleet Safety Manual (DFO 5737)
 - Transport Canada Ship's Electrical Standards TP127E.

Part 2: REFERENCES

FSR Stephen Dalley

Schneider Electric

Services & Projects Business

Canada

Senior Field Technician Marine

Phone: +1-902-450-0368 Fax: +1-859-334-9910 Mobile: +1-902-877-0995

Email: stephen.dalley@schneider-electric.com

Site: www.schneider-electric.com

Address: 110 Chain Lake Drive, Unit 3G, Halifax, NS, Canada
B3S 1A9

Part 3: TECHNICAL DESCRIPTION

3.1 Contractor shall have an allowance of \$25,000 for the services of the Field Service Representative (FSR) to be adjusted up or down via 1379 action upon proof of invoice for the removal the existing breaker and the installation of the new Merlin Gerin breaker including testing.

3.2 Contractor shall only be responsible for the transporting the old breaker from the Transformer Compartment off the vessel and transporting the new breaker from off the vessel to the Transformer compartment. The FSR **shall be solely responsible** for all other items in this specification under the allowance provided.

3.3 LOW VOLTAGE BREAKER RETROFIT in Main Switchboard

3.4 FSR shall shut down and isolate the Main Switchboard, main and control power circuits, for LV breaker retrofits. If necessary / possible – Isolate the Distribution Section bus. Install temporary jumper cables between the Main Switchboard Tie breaker cables and the distribution section.

Spec item #: L-02	SPECIFICATION	TCMSB Field #
Bow Thruster Breaker Renewal		

- 3.5 FSR shall remove existing Federal Pioneer Bow Thruster and cradle.
- 3.6 FSR shall relocate control wiring to a terminal block at the rear of each section of switchboard. The control blocks, mounted on DIN rail, will be supplied by Eaton.
- 3.7 FSR shall install new the Masterpact breaker and cradle for the Bow Thruster. These are to be supplied by Coast Guard.
- 3.8 FSR shall supply and install custom bussing to go between the new breakers and cradle and the existing bus bars in the switchboard.
- 3.9 FSR shall supply and install insulated barriers / bus bracing as required for the new breaker installation.
- 3.10 FSR shall supply / install control wiring as required for the new breaker installation.
- 3.11 FSR shall replace the existing door with new manufactured ones in order to accept the new breaker profile. If necessary supply new breaker mounting pans.
- 3.12 FSR shall set and test the breaker overload protection relay to similar settings from existing breaker, perform contact resistance and megger, electrical and mechanical functions etc. Submit detailed test report to the Chief Engineer / Electrical Officer.
- 3.13 FSR shall test the breaker to ensure they operate as designed for close / open, indications, interlocks etc to the satisfaction of the Chief Engineer / Electrical Officer.
- 3.14 FSR shall modify electrical drawings showing the changes that have been made.
- 3.15 FSR shall be responsible for supply the following parts required for the breaker retrofits:
- 600 / 120 control transformers rated 150 VA
 - Fuse blocks and fuses for control transformers, 24 VDC power supplies, control relays
 - 120 VAC control relays (required for breaker status)
 - 120 VAC adjustable time delay module for breaker U/V coils
 - 24 VDC power supply modules for Micrologic relays
 - Cradle position switches for breakers interlock defeat circuits
 - New switchgear doors for each breaker

Spec item #: L-02	SPECIFICATION	TCMSB Field #
Bow Thruster Breaker Renewal		

Part 4: PROOF OF PERFORMANCE

Inspection, Testing & Certification

4.1 Upon completion of installation of new breakers, FSR to notify Chief Engineer prior to testing new breakers.

4.2 The newly installed breakers to be tested to manufacturer's recommendations in consultation with ship's Electrical Officer and 2 typewritten reports are to be provided to Chief Engineer.

Part 5: Deliverables

Reports, Drawings, Manuals, Spares & Training

5.1 FSR to provide 2 copies of breaker installation and electrical drawings.