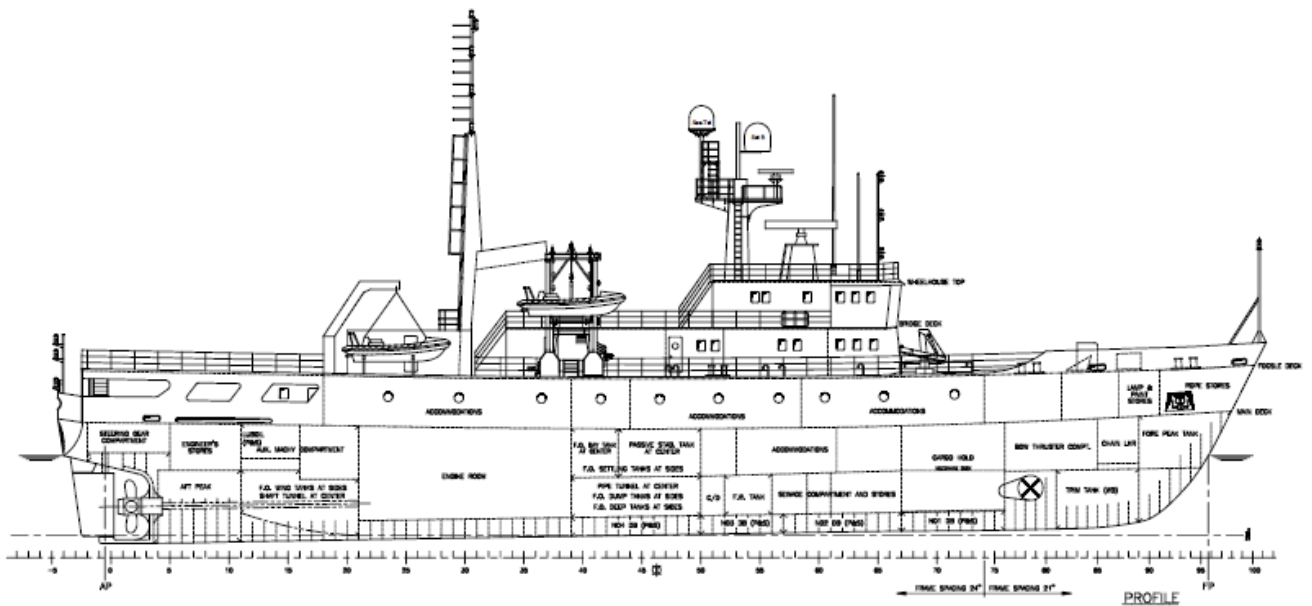


CCGS Cygnus

Annual Refit and Drydocking

2018/2019



September 10th, 2018 – November 1st, 2018

F6855-180961

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PREAMBLE

1. INTENT

The intent of this specification shall describe the necessary work involved in carrying out the ship's Annual Refit and Drydocking from September 10th, 2018 – November 1st, 2018. All work specified herein and all repairs, inspections and renewals shall be carried out to the satisfaction of the Owner's Representative and, where applicable, the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor. 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 Transport Canada (TC) Inspector and/or ABS Class Surveyor. The recorded test results, calibrations, measurements and readings from the entire refit specification shall be provided in 1 typewritten bound report on 8.5" X 11" paper. The bound report shall be tabbed as per table of contents in the refit specification. The contractor shall also provide 3 electronic copies of all recorded test results, calibrations, measurements and readings from the entire refit spec. The bound report and electronic 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 craneage and line handling.

6. MATERIALS AND SUBSTITUTIONS

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

7. REMOVALS

Any items or 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 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 is 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

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

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

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

15.4 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 Matchless Red Oxide Alkyd Primer 713. 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, public washrooms, cafeteria, dining room, lab spaces and any other area identified by the Owners Representative at time of refit.

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 CG Senior Vessel Maintenance Manager (SVMM) for all work described in this specification at time of bid closing. The Contractor 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 Chief Engineer, SVMM, PWGSC and Class Inspector.

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

IMO Number	7927831
Length	63 Metres
Breadth	14.6 Metres
Draft	3.8 Metres
Gross Tonnage	1210.5 grt
Net Tonnage	302 nrt
Year Built	1982
Place Built	Marystown, NL

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Spec Item #: HD-01	SPECIFICATION	F6855-180961
Production Chart		

HD-01 Production Chart

Part 1 - Intent

- 1.1** The intent of this specification shall be to give the owner's representatives an accurate timeline on production and completion dates for Coast Guard Operational Services.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The successful Contractor shall supply the Chief Engineer with three (3) bound hard copies of a detailed bar chart showing the planned work schedule for the ship's refit. This bar chart shall show each specification item, the planned and actual start date, the duration and the completion date. An electronic version shall be forwarded to the Senior Vessel Maintenance Manager (SVMM) – Geoffrey.Stewart@dfo-mpo.gc.ca. The Contractor shall also forward an electronic copy of the Production Chart to the Contracting Authority.
- 3.1.2** A critical path of work shall be identified, which shows the critical tasks that may delay the completion of the refit and if they shall not be completed within the estimated time frame. The critical path may exist due to labor constraints or tasks which cannot be completed concurrently with other tasks.

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Production Chart		

3.1.3 If work arises that affects the critical path, it shall be immediately brought to the attention of the Chief Engineer, SVMM and PWGSC. Every effort shall be made to prevent the vessel from delay in completing the refit in the time frame provided. Regular QA procedures shall apply.

3.1.4 The bar chart shall be updated weekly and for each production meeting to reflect all changes to the actual production of the refit and changes to the anticipated completion dates of each individual item. The Contractor shall include on the updates to the production chart any work arising from PWGSC 1379 action that indicates the additional work shall impact the completion schedule for the vessel.

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, PWGSC, TC Inspector and if required the ABS Class Inspector.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 The successful Contractor shall supply the Chief Engineer with three (3) bound hard copies of a detailed bar chart showing the planned work schedule for the ship's refit. This bar chart shall show each specification item, the planned and actual start date, the duration and the completion date. An electronic version shall be forwarded to the Senior Vessel Maintenance Manager (SVMM) – Geoffrey.Stewart@dfo-mpo.gc.ca. The Contractor shall also forward an electronic copy of the Production Chart to the Contracting Authority.

5.1.2 Three copies of the original and three copies of each weekly update shall be given to the Chief Engineer one day prior to each weekly Production Meeting. The SVMM shall also be forwarded an electronic copy of the weekly update prior to the Production Meeting.

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Spec Item #: HD-02	SPECIFICATION	F6855-180961
Services		

HD-02 Services

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to supply the listed services to the vessel for the entire refit period.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The following services shall be supplied and connected upon arrival at the contractor's facilities. The services shall be maintained throughout the contract period and removed from the vessel on completion of the work period. The contractor is to be responsible for any additional connections and disconnection required when the ship is moved between the dry-dock and alongside a berth at contractor's premises
- 3.1.2** The Contractor is to quote a global price, daily rates and /or unit rates for all services supplied to the vessel during the dry-dock period.
- 3.1.3** Garbage Removal: One garbage container of 6m³ (215 ft³) minimum capacity shall be provided for the ship's use. The contractor is to remove garbage from the container on a daily basis. Cost of crange and disposal to be included in quotation.

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Services		

The garbage container is to be placed in a suitable location agreed upon by the contractor and the Owner's Representative.

- 3.1.4** Fire Main: Water shall be supplied to the vessel's fire main system at a continuous pressure of 4.13 bar (60psi) 24 hours a day. The hose shall be connected to the ship's international shore connection. A leak off connection shall be installed to prevent freezing.
- 3.1.5** Water Supply: Fresh Potable water shall be continuously (24 hours per day) supplied to the vessel's fresh water systems at 3.44 bar (50psi). The connections for domestic services, fridge cooling system and filling of tanks shall be maintained throughout entire docking period and while tied up at the shipyard wharf. A pressure reducing station with isolation valve and pressure gauge shall be fitted before the shore connection on board the ship. Contractor shall quote on supplying 10m³ of water per day and shall be monitored by contractor installed meter on hydrant. Total amount used shall be adjusted up or down via PWGSC 1379 action upon completion of docking.
- 3.1.6** Gangways: The contractor shall supply and erect two separate and independent gangways, one forward and one aft, with safety nets and hand rails to the satisfaction of the Commanding Officer. One gangway shall be erected from each side of the vessel. One gangway is to be considered as an alternate escape route in case of emergency. Access to both gangways is to be constantly maintained in a safe and secure manner and clear of all obstacles. Both Gangways are to be illuminated for use at night.
- 3.1.7** Telephones: Three telephone lines shall be provided for the vessel. One for the C/O's cabin, one for the wheelhouse and one for Chief Engineer's cabin. The contractor will be responsible for connection and disconnection when required.
- 3.1.8** Overboard Discharge: The contractor shall supply labour and materials to connect, for the duration of the dry-docking, the following drainage hoses on the shell in order to protect the hull from leaks while painting:
- 3.1.8.1** Sewage (forward)
- 3.1.8.2** Refrigeration (forward)
- 3.1.9** Electrical Power: The contractor shall supply manpower and material to connect one electrical cable to the ship's electrical system. Power required is 600VAC, 3 phase, 300 amp and shall be supplied for the entire refit period. Any changes to the shipyard cable arrangement to accommodate vessel shore power plug

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Services		

arrangements shall be included in the bid. Any connection/disconnection required for known work to be included in the bid. Actual power consumption to be prorated up or down as per power used, as indicated by vessel's meter. The meter shall be read and recorded by the Chief Engineer and contractor at the beginning and end of the refit period. A kWh unit price to be quoted (separately) for adjustment purposes. The contractor shall quote on 150000 kWh for the refit period. Unit price for connect/disconnect of power to be quoted separately.

- 3.1.10** Cleaning: The contractor is to ensure all spaces, compartments and areas of the ship where work was done are left in an "as clean as found condition" The cost of clean up is to be included in each specification item.
- 3.1.11** Crane: The contractor shall provide a quote on 15 hours of use for the services of a crane, an operator, and a rigger to load/unload stores. The contractor shall quote an hourly rate for crane services.
- 3.1.12** Berthing: During the contract period, while not on dock, the vessel is to be secured alongside the contractor's wharf to the satisfaction of the Commanding Officer.
- 3.1.13** The berth shall have adequate depth of water at all conditions of tide, for which the Commanding Officer shall be the sole judge.
- 3.1.14** The contractors shall include in the quote all costs for initial tying up, any movements of the vessel during the refit, including letting go of lines from contractors wharf of departure after completion of contract.
- 3.1.15** Maneuvering of the vessel into and out of the contractor's docking facilities shall be the responsibility of the contractor. Costs for tugs and pilots required for any movements of the vessel during the contract period are to be included in the bid price quoted on, but shown separately.
- 3.1.16** One gangway is required while alongside contractor's jetty. It is to be rigged as directed by vessel's Commanding Officer, complete with safety net. This gangway is to be safe, well-lit and structurally sufficient to support passage of contractor's workers and ships' crew.
- 3.1.17** Oily Bilge Water: The contractor shall quote on removing from the vessel approximately 10 cubic metres of 80/20 % water/oil mixture. The quotation is to include craneage, pumping, trucking and disposal of waste mixture. The contractor is to provide documents identifying the licensed firms subcontracted for pumping and disposal of waste oil. The contractor shall quote on additional cost per cubic meter (1 m³).

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Services		

3.1.18 Parking: The contractor is requested to provide 3 parking spaces for ship's personnel for the duration of the contract.

3.1.19 The contractor shall supply one local Cable Television connection to the ship's internal system for the entire refit period. Cable shall be connected as directed by the Chief Engineer. The cost of connections/disconnection and service charges shall be included in the contractors quotation.

3.1.20 Dock and Sea Trials:

3.1.20.1 On completion of all specification items, dock trials and sea trials will be carried out as a functional test of the ships propulsion system and maneuvering systems.

3.1.20.2 Dock trials will last a minimum of one (1) hour.

3.1.20.3 Sea trials will last a minimum of four (4) hours.

3.1.20.4 Trials will include ahead and astern movements at various power levels.

3.1.20.5 Trials will be carried out to the satisfaction of the Chief Engineer, PWGSC Inspector and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

3.1.20.6 The contractor is to have sufficient supervisory staff on board during these trials to witness the operation of machinery and systems that were worked on during the refit.

3.1.21 Contractor shall provide a cost for taking 150 UT shots and provide a unit cost per UT shot above 150. This cost is to include taking the UT Shot, prepping the steel for the UT Shot, priming disturbed steel upon completion of shot and any materials used/required.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

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Services		

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, PWGSC Inspector, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-03	SPECIFICATION	F6855-180961
Dry - Docking		

HD-03 Dry-Docking

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to dry dock the vessel in its facility.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** 30-04413 Docking Plan

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** Docking shall be undertaken during the first day of the contract period. If necessary, Contractor is to prepare the dock in advance of the ship's arrival and the official start of the contract.
- 3.1.2** If the ship will not be docked on the first day of the contract period, the contractor is to state this in his bid package, and include in the project schedule.
- 3.1.3** The vessel is not to be docked with any other ship for any part of the contract period in such a way that will interfere with its scheduled refloating.
- 3.1.4** A Guidance Docking Plan is available on board the vessel and will be provided to the successful contractor. Contractor will be responsible to ensure drawing is returned to the vessel upon completion of work.

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Dry - Docking		

- 3.1.5** Contractor is to perform full set of crankshaft deflections for both Main Engines as outlined in item E-01.
- 3.1.6** Contractor to prepare blocks and necessary shoring to maintain true alignment of the vessel's hull and machinery throughout the dry-docking period. Contractor to dock and undock vessel and allow sufficient lay days to complete both the work described in this specification as well as a margin of time to cover work arising. Contractor to include unit cost/lay day for adjustment.
- 3.1.7** The vessel is to be docked so that all docking plugs, transducers, anodes and sea inlet grids are clear and accessible. A minimum clearance of 1.22 meters (4') is to be available below the keel. If any hull fittings are covered, the Contractor is responsible for all labour and materials required for making alternative arrangements to drain tanks or move blocks to gain access to areas of specified work.
- 3.1.8** During docking of the vessel, radio contact is to be maintained between the vessel's Commanding Officer and the Contractor's Docking Officer. Contractors are to include, but show separately, the price of any tug and/or pilot services required.
- 3.1.9** Within two hours of docking, the underwater hull is to be cleaned by high-pressure fresh water washing 420 bar (~6000psi) minimum to remove all marine growth and allow preliminary inspection. The hull above the water line is also to be water blasted clean at this time. Total Area is approx 1800 square meters.
- 3.1.10** The following information is to be recorded in a Ship Condition Report that is to be prepared by the Contractor with a typeface copy provided to the Chief Engineer:
- 3.1.10.1** Prior to docking, all tanks on vessel to be sounded and contents recorded. A copy of the Tank Condition Report is to be signed by the Commanding Officer, Chief Engineer and Contractor's Docking Officer.
- 3.1.10.2** After docking, all tanks emptied to be listed, and copies held by Contractor and Chief Engineer.
- 3.1.10.3** At undocking, all tanks to be refilled to obtain same draft and trim as at docking, and condition agreed by Contractor and Chief Engineer or his representative.
- 3.1.11** Contractor is responsible to remove or relocate any items (spare tail shafts, propellers, etc.) stored on deck, prior to docking or undocking, that will aid in

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Dry - Docking		

obtaining the required draft and trim for settling on the docking blocks. All items are to be secured in original locations after vessel has been undocked.

3.1.12 Frame spacing is to be marked on the hull as to aid in the initial hull survey by the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor. Immediately after hydro-blasting, but prior to any grit blasting for the underwater hull coating, the Contractor is to mark the frame spacing at 5 frame intervals from the stern post (Fr"0"); markings are to be in a contrasting colour, approx. 6" in height, and are to be at the turn of the bilge, port and stbd.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver one (1) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (3) electronic copy of all reports to SVMM.

5.2 Spares

5.2.1 N/A

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5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-04	SPECIFICATION	F6855-180961
Cleaning of Seabays		

HD-04 Cleaning of Seabays

Part 1 - Scope

- 1.1** The intent of this specification shall be to open up the sea bays for cleaning and inspection.
- 1.2** This work shall be done in conjunction with
 - 1.2.1** HD-06 C2000 Anti Fouling System
 - 1.2.2** HD-05 Zinc Anodes

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** 30-01045 Sea Inlets
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** The contractor shall remove and later replace two manhole covers to gain access to the vessel's sea bay. Sea bay is to be ventilated and a safe for manned entry certificate obtained. Upon completion of the work, the contractor shall reinstall the manhole covers complete with contractor's supplied neoprene cover gaskets.
 - 3.1.2** The contractor shall remove and later install fourteen grid plates to gain access to the area of work. The actual areas of work are the port and starboard low sea box, starboard high sea box and aft seabay. Any disturbed steel work in the area is to be

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Cleaning of Seabays		

coated as per the paint scheme in the area. The condition of the bolts is to be noted. Any replacement will be through PWGSC 1379 action.

- 3.1.3** All grids are to be reamed out and all holes cleaned of blockages before re-installation.
- 3.1.4** All anodes in the sea bay are to be inspected for wastage. Contractor to bid on supply and replacement of twenty-four M-24 sea bay anodes. Unit cost/anode to be included for adjustment purposes.
- 3.1.5** Debris, marine growth and retained seawater are to be removed by the contractor. It is recommended that the Contractor attend to this specification item as soon as possible after the vessel is docked to minimize the difficulty in removing this growth. Internal surfaces of the sea bay are to be scraped clean and pressure washed with fresh water. Internals to be examined for wastage. Chief Engineer shall carry out inspection when seabays are clean.
- 3.1.6** The contractor is to clean all associated suction cooling lines of all sea growth and mussels. The ship's staff will have these lines isolated from their respective pieces of machinery to facilitate the contractor in the breaking of flanges and the removal of these suction piping lines for cleaning. These lines are to be cleaned to the satisfaction of the Chief Engineer. Once cleaned, these suction piping lines are to be reinstalled using new contractor supplied gaskets.

There is a total of twelve (12) pipes in the forward seabay and a total of three (3) pipes in the aft seabay to be cleaned.

3.2 Location

- 3.2.1** Sea bays are located at Frame spaces 37 – 39 port and starboard forward and frame space 19 -20 aft.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

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Cleaning of Seabays		

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver one (1) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (3) electronic copy of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-05	SPECIFICATION	
Zinc Anodes		

HD-05 Zinc Anodes

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to replace the sacrificial anodes on the exterior hull, rudder, rudder trunk, sea chests, etc.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The sacrificial anodes on the hull, rudder, rudder trunk, sea chests, etc. are to be examined for wastage. Missing or wasted anodes are to be replaced with new anodes; all old straps are to be removed from the hull and ground flush. Contractor to bid on supplying and renewing (62) sixty-two 22 pound anodes. Unit cost/anode to be included for adjustment purposes.

- 3.1.2** Any disturbed steel work is to be coated as per the paint scheme in the area.

3.2 Location

3.2 N/A

3.3 Interferences

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Zinc Anodes		

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

Part 5 - Deliverables

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver one (1) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (3) electronic copy of all reports to SVMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

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Spec Item #: HD-06	SPECIFICATION	F6855-180961
C2000 Anti Fouling		

HD-06 C2000 Anti Fouling

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to replace all marine growth (MG) and trap corrosion anodes (TC)
- 1.2** This work shall be carried out in Conjunction with:
 - 1.2.1** HD-04 Cleaning of Seabays

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The Contractor shall secure FSR services to supervise the work. The Cathelco contact address is;

Martin Lepage, P.Eng. Regional Sales Manager
 Jastram Technologies
 188 Bunting Rd., Unit 7
 St. Catherine's, ON
 Tel: 418-263-6196

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C2000 Anti Fouling		

All Work to be completed to manufacturer instructions. Manuals are available from the vessel.

3.1.2 The contractor shall include in his quote an allowance of \$8000.00 in bid for the services of the FSR and shall include 100 person hours to assist the FSR to carry out the work.

3.1.3 The contractor shall replace all marine growth (MG) and trap corrosion anodes (TC) As per the manufacturer's instructions and location drawing. Contractor shall use all new gaskets and fittings.

Location	Type
Main Seabay- Port Low Sea Suction	MG (Copper) 82.5 dia x 458 long
Main Seabay- Port Low Sea Suction	TG (Aluminum) 82.5 dia x 458 long
Main Seabay- Stbd Low Sea Suction	MG (Copper) 82.5 dia x 458 long
Main Seabay- Stbd Low Sea Suction	TG (Aluminum) 82.5 dia x 458 long
Main Seabay- Stbd High Sea Suction	MG (Copper) 82.5 dia x 610 long
Main Seabay- Stbd High Sea Suction	TG (Aluminum) 82.5 dia x 610 long
Aft Sea Chest- Port	MG (Copper) 82.5 dia x 610 long
Aft Sea Chest- Port	TG (Aluminum) 82.5 dia x 610 long
Aft Sea Chest- Stbd	MG (Copper) 82.5 dia x 610 long
Aft Sea Chest- Stbd	TG (Aluminum) 82.5 dia x 610 long

3.1.4 Anodes are to be electrically and mechanically disconnected and removed from the sea bays, electrical leads shall be tagged as required. Old anodes are to be turned over to the vessel for disposal.

3.1.5 Anodes are to be installed only after all sea bay work is completed (i.e. cleaning and replacing of sacrificial anodes). After installation the system is to be checked for grounds and any found are to be repaired by the contractor.

3.1.6 The inside of the anode safety caps is to be filled with nonconductive grease before closing.

3.2 Location

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C2000 Anti Fouling		

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

4.2.1 At undocking the vessel, system to be proven fully operational with no grounds. System will be set up as per manual and tested alongside wharf and during sea trials.

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver one (1) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (3) electronic copy of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-07	SPECIFICATION	F6855-180961
Hull Inspection and Survey		

HD-07 Hull Inspection and Survey

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to carry out a hull inspection and non-destructive testing on the hull and structure of the vessel
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** HD-10 Hull Painting
 - 1.2.2** HD-11 Tank Inspections

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** After docking and hull cleaning the contractor along with the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor shall carry out a visual inspection of the underwater hull of the vessel. This item is to be carried out prior to the hull painting.
 - 3.1.2** The contractor shall obtain the services of an ABS certified company to carry out an ultrasonic thickness survey for the hull and structure of the vessel. Individual taking the readings shall be level 2 certified. This survey shall include shots taken on

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the outside hull, the decks of the vessel and framing in side vessel tanks, and some fuel tanks, as per Spec Item HD-11.

3.1.3 The contractor shall be responsible for providing all equipment including staging or lift equipment to carry out the hull inspection and the ultrasonic inspection.

3.1.4 The shots shall be taken in the following areas:

3.1.4.1 The wind and water strake of plating on the vessel

3.1.4.2 Two bands around the hull of the vessel from the Foscle deck, under the vessel to the foc'sle deck on the other side. One approximately 1/3 the vessel length and the other approximately 2/3 the length

3.1.4.3 The shell plating in the Fore peak and after peak area

3.1.4.4 Framing and stiffeners inside the for peak and after peak and the fuel tanks as per Spec Item HD-11.

3.1.4.5 Other area as determined by the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.

3.1.5 The contractor shall quote on taking 1000 shots. The contractor shall quote unit price for providing additional shots that may be requested. This price shall include the taking of the shot, prep work of the steel for shot and applying 1 coat of primer after shot is taken.

3.1.6 In areas where poor readings are found additional shots are to be taken in the area to confirm the extent of the wastage.

3.1.7 Contractor is to inform the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor at least two days prior to the shots being taken so that their attendance can be planned.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

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Hull Inspection and Survey		

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver one (1) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (3) electronic copy of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-08	SPECIFICATION	F6855-180961
Butts and Seams		

HD-08 Butts and Seams

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to remove and replace any wasted butts and seams identified during the hull inspection.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** HD-10 Hull Painting
 - 1.2.2** HD-07 Hull Inspection and Survey

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** Subsequent to an examination of the external hull by the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor, designated areas of wasted butts and seams on shell plating to be ground and air arced to good metal and built up to original level by welding.
 - 3.1.2** Contractor to quote on five hundred (500) linear feet of arcing and two thousand (2000) bead feet of weld. Quote unit cost per bead foot using 3/16" low hydrogen

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Butts and Seams		

rods (for adjustment purposes). Contractor to assume welding will be at water line and include cost of staging in total bid.

3.1.3 Contractor shall quote for 6 non-destructive tests (x-Rays) to be carried out on welds.

3.1.4 Any failed welds as a result of the Radiograph shall be gouged out and re welded at the expense of the contractor. The contractor shall also have the welds retested at their expense.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 The welding shall be tested by way of radiographic inspection in areas identified by the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 The contractor shall provide 1 typewritten report and 3 electronic reports indicating the results of the radiographic inspection.

5.2 Spares

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5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-09	SPECIFICATION	F6855-180961
Arms Locker Door Replacement		

NOTE FROM BIDDERS CONFERENCE: Door currently on order but not yet arrived.

HD-09 Arms Locker Door Replacement

Part 1: SCOPE:

- 1.1** The contractor shall replace the arms locker door with a new owner supplied door.
- 1.2** This spec item is dependent on delivery of the new door prior to Oct 5th, 2018. The door is currently ordered. If door does not arrived prior to Oct 5th, 2018 this spec item will be cancelled.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

2.3.1 Canada Shipping Act 2001

2.4 Owner Furnished Equipment

2.4.1 Owner will supply a new door for the arms locker

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

3.1.1 Contractor shall remove the arms locker by cutting the welds using a grinder at four anchoring points.

3.1.2 Contractor shall move the arms locker using a contractor supplied crane to contractor workshop.

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Arms Locker Door Replacement		

- 3.1.3** Contractor is to cut out existing door and prepare the steel to weld in new owner supplied door of same dimensions and materials.
- 3.1.4** Contractor shall weld in new door frame using approved welding methods, ensuring no warping will occur to the frame or the arms locker.
- 3.1.5** Contractor shall install two new owner supplied deadbolt locks.
- 3.1.6** Contractor shall mount door and have it checked by Chief Engineer and Commanding Officer
- 3.1.7** Contractor shall move arms locker back to ship's deck using contractor supplied crane.
- 3.1.8** Contractor shall weld the locker back to the deck mounts using approved welding methods.
- 3.1.9** Contractor shall bid on eight feet of welding to be adjusted up or down by PWGSC 1379 action, for welding the arms locker to the deck.
- 3.1.10** Contractor shall hose test door using ships water supply to determine watertight seal. Door must be sealed to the approval of the Chief Engineer and Commanding Officer prior to acceptance.
- 3.1.11** Any disturbed paint around and on the door frame and deck mounts is to be feathered back and painted with one coat of matchless white primer and two coats of Matchless #700 white paint.

3.2 Location

- 3.2.1** Bridge deck

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

- 4.1.1** Work is to be inspected by Chief Engineer and Commanding Officer

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Arms Locker Door Replacement		

4.2 Testing

4.2.1 Doors are to be tested using a water hose sprayed onto door surface and around seal to prove weather tight to the satisfaction of the Chief engineer and Commanding Officer.

4.3 Certification

4.3.1 Certificates are supplied by Owner by way of the Door supplier.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: HD-10	SPECIFICATION	F6855-180961
Hull Painting		

NOTE FROM BIDDERS CONFERENCE: Going back through past files to 2000, the hull coating has remained the same as below in the Technical Description 3.1.12.

HD-10 Hull Painting

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to prepare the exterior hull of the vessel both above and below the water line for painting and to apply the specified coating.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** HD-07 Hull Inspection
 - 1.2.2** HD-08 Butts and Seams

Part 2 – References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** Underwater hull from the waterline to the keel is to be cleaned for inspection by the Chief Engineer, SVMM and Transport Canada (TC) Inspector and/or ABS Class Surveyor. Painting is to be carried out only after any tank repairs and hull inspection is complete. Contractor is to arrange for Transport Canada (TC) Inspector and/or ABS Class survey of the external hull prior to painting.

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Hull Painting		

3.1.2 Total area of hull is approximately 1800 square meters.

3.1.3 All hull mounted equipment such as anodes, reference electrodes, echo sounders, speed log, etc. are to be suitably protected against damage during the cleaning of the hull and application of the new coatings. The

Contractor will be responsible for repair/replacement of any damaged items to the satisfaction of the Chief Engineer. On completion of cleaning and coating, Contractor is responsible for the removal of any such protective coverings.

3.1.4 The Contractor shall take measures to ensure that no damage, unnecessary cleaning or repairs, accrue from the sand or grit blasting and/or the application of the coating. Sand or grit used for the blast cleaning shall not be permitted into any part of the vessel. The Contractor is to ensure that each and every opening into the vessel where sand and grit may gain ingress and cause damage shall be suitably protected. All deck equipment including davit wires and blocks are to be completely wrapped to prevent any entry of grit. Contractor is to supply all coverings.

3.1.5 The Contractor is to ensure all navigation equipment (radar, etc.) are suitably protected from any ingress or contamination from the sand or grit utilized in the blasting process.

3.1.6 Measures shall also be taken to ensure that application of coatings does not take place on surfaces or equipment other than those areas specified, and that the coating shall not block any inlets or discharges in the shell.

3.1.7 The Contractor shall plug deck scuppers and discharges, or take any necessary measures to prevent water or other liquids from contaminating the areas of plating being coated or prepared for coating.

3.1.8 The Contractor shall remove from the vessel all traces of sand and/or grit used for blast cleaning. The Contractor shall be responsible and liable for ensuring that the hull is clear and clean, prior to, during and immediately after the application of the coating.

3.1.9 All staging, craneage, screens, heaters, and other environmental control equipment, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by the Contractor.

3.1.10 Water Blasting:

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Hull Painting		

Immediately following the docking, the entire hull area is to be high pressure washed (no less than 6000-PSI hydro blast). Blasting to include the hull, rudder, Bow Thruster outlet pipe, Seabays, and overboard outlets.

All loose scale and marine growth is to be removed by the water blasting. See dry-Docking (HD-03)

3.1.11 Surface Preparation Underwater Hull:

All underwater hull area to be abrasive blasted to bare metal (SSPC-SP10-631, near white blast) to a profile of 2 mils. Edges of sandblasted area to be feathered back 6" to provide for good overlap and adhesion of new paint. Area to be dealt with to be 900 square meters for bidding purposes.

3.1.12 Painting Underwater Hull:

The underwater hull is to be painted to the following schedule (product information sheets are attached):

First Coat: Amercoat 235 at 6-8 mils DFT black, to be applied, according to manufacturer's directions, to the sandblasted areas (900 square meters). NOTE: Overspray of Amercoat epoxy underwater coatings onto the area above the waterline must be avoided, as they are not compatible with conventional marine paints.

Second Coat: Amercoat 235 at 6-8 mils DFT red, to be applied, according to manufacturer's directions, to the entire underwater hull.

Third Coat: ABC No.4 Black at 4 mils DFT, to be applied, according to manufacturer's directions, to the entire underwater hull area (900 square meters). NOTE: Anti-fouling coat must be applied while the second coat is thumbnail soft.

Fourth Coat: ABC No.4 at 4 mils DFT, AF red, to be applied, according to manufacturer's directions, to the entire underwater hull area (900 square meters).

3.1.13 Surface Preparation Above Waterline Hull:

All above waterline hull areas showing damage and/or disturbed paint to be abrasive blasted to bare metal (SSPC-SP10-631, near white blast) to a profile of 2 mils. Edges of sandblasted area to be feathered back 6" to provide for good overlap and adhesion of new paint. Area to be dealt with to be 400 square meters for bidding purposes. Actual area to be agreed to in writing by Contractor's Representative and Chief Engineer before any blasting starts. Remaining area of 500 square meters is to be given a hard sweep blast to a dull finish with a profile of 1 – 2

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mils. (SSPC SP7). Contractor to quote a rate per square meter for both abrasive blasting and sand sweeping for adjustment purposes.

The above water hull is to be painted to the following schedule (product information sheets attached in appendix):

3.1.14 Painting Above Waterline Hull:

One coat of Amercoat 235 at 6-8 mils DFT red to bare hull area, to be applied (Contractor supplied). When the primer coat is dry, the Contractor is to apply two (2) coats of Amercoat 5450 Coast Guard Red Hull 509-102 enamel (Contractor Supply) to this area. Total area involved is approximately 400 square meters. Contractor to include a per square meter rate in the data sheets for adjustment purposes.

3.1.15 The contractor shall be responsible for coating of all DFO/CCG identification markings on the vessel exterior hull. The color scheme and location for the Coast Guard stripe, lettering, draught marks, loadline marks, etc. will be dictated by the Chief Officer/Commanding Officer or a delegate. All coatings to have two (2) coats of the Amercoat 5450 colours as per vessel's original scheme. Total area involved is approximately 200 square meters. Contractor to include a per square meter rate in the data sheets for adjustment purposes. Stencils will be supplied by Vessel.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.1.2 The contractor shall be advised that an Independent coating inspector shall be present during coats application and shall provide advice to the Chief Engineer.

4.2 Testing

4.2.1 N/A

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4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Tank Inspection		

HD-11 Tank Inspection

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to open up the listed tanks for cleaning and inspection.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** HD-07 Hull Inspection and Survey

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The intent of this item shall be to open up tanks listed below for cleaning, inspection and testing in conjunction with the 5 year survey.
- 3.1.2** The ship's crew will pump/transfer the tanks contents down to the suction levels (with the exception of miscellaneous tanks). The contractor shall remove the manhole covers from the tanks.
- 3.1.3** 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 Gas Free. Each tank is to be safe for personnel to enter and safe for hot work. Certificates shall be

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forwarded 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. This is the responsibility of the contractor.

- 3.1.4** Once the tank is safe for entry, the contractor shall thoroughly clean the internal surfaces of the tanks from debris, rust, and scale. All material and liquids remaining in the tank resulting from the cleaning shall be removed to the contractor's premises. Rusty areas shall be wire brushed cleaned.
- 3.1.5** Following the cleaning of the tanks, the tanks shall be inspected by the Chief Engineer and a Transport Canada (TC) Inspector and/or ABS Class Surveyor.
- 3.1.6** The contractor shall quote a price on hydrostatically testing the water tanks and pneumatically testing fuel tanks. The quote shall include, if required, the installation and removal of blanks for suctions, sounding pipes, overflow pipes and vent head removals. All testing is to be done as per the requirements of the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.
- 3.1.7** Upon completion of all work and testing of tanks, the contractor shall clean tanks of all fluids and debris and wiped dry.
- 3.1.8** The contractor shall clean the sealing surfaces around the manhole and cover and install the cover using new ¼ inch thick neoprene gaskets. Contractor to bid on renewal of six manhole studs. A per stud cost is to be supplied in the bid for adjustment purposes.
- 3.1.9** All work is to be to the satisfaction of Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.
- 3.1.10** Special Notes for Fuel Tanks
 - 3.1.10.1** With the tanks pumped down to the suction levels of the pumps, residual fuel will be present in tanks. The contractor shall quote the cost of removing 1500 litres residual fuel for disposal ashore. The quote shall also include the cost per litre for disposal above and below quoted value so that adjustments can be made. The total value will be adjusted by 1379 action.
 - 3.1.10.2** The contractor shall quote on removal and storage cost, per cubic meter, of fuel that may be required to be pumped off of the vessel to facilitate drydocking and tank inspection. Fuel can be removed using vessel fuel oil transfer pumps. The contractor shall be notified of fuel storage requirements one week prior to drydock period.

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3.1.11 Special Notes for Water Ballast Tanks

- 3.1.11.1** With the tanks pumped down to the suction levels of the pumps, residual water will be present in tanks. Once the tanks are pumped as low as possible, the docking plugs shall be removed from all 5 tanks.
- 3.1.11.2** The location of the docking plugs is shown on the docking plan. A Ship's Officer is to be present when the docking plugs are removed and reinstalled. All docking plugs removed shall be tagged immediately after removal, stored in a suitable container and given to the Chief Officer.
- 3.1.11.3** Any docking plugs removed will require to be temporarily filled with wood plugs during operations such as sandblasting, painting, etc. which could cause contamination of tanks to occur.
- 3.1.11.4** After tanks have been drained, and at the direction of the Chief Engineer, all docking plugs are to be installed using new sealing thread and white lead. Tap to be run over threads in hole. Docking plug threads to be cleaned on a lathe if required. Contractor to quote on thread cleaning docking plugs in lathe. (Including one docking plug for the sea well if required).
- 3.1.11.5** The contractor shall be responsible for the removal of any water not drained from the removal of the docking plugs.

3.1.12 Special Notes for Miscellaneous Tanks

- 3.1.12.1** The removal any liquids in the engine room tanks are covered with HD-02 Services.

3.2 Location

3.2.1 Fuel Tanks

Tank	Frames	Other Specs.
Flume Tank	39-50	
Flume Dump Tank Port	39-50	

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Flume Dump Tank Stbd	39-50	
F/O Wing Tank Port	11-21	
F/O Wing Tank Stbd	11-21	

3.2.2 Ballast Tanks

Tank	Frames	Other Specs.
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3.2.3 Miscellaneous Tanks

Tank	Frames	Other Specs.
Bilge Retention Tank	22-29	
Pipe Tunnel	39-50	

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

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5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Anchors, Chains and Chain Locker		

NOTE FROM BIDDERS CONFERENCE:

3.1.3 – Remove abrasive blast and replace with high pressure wash.

HD-12 Anchors, Chains and Chain Locker

Part 1: SCOPE

- 1.1** The intent of this specification shall be to remove both anchors and all chain from the CCGS Cygnus and prepare both Port and Starboard chain lockers for inspection and coating.

Part 2: REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** CCGS Cygnus Tank Plan

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001 – Hull Inspection Regulations

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall remove the Port and Starboard anchors and anchor chains from the vessel and lower from the ship to the wharf by means of the ship's windlass with the assistance of the ship's crew for use of ship's machinery. Final disconnect and lowering of bitter end shall be completed with use of Contractor supplied crane.

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- 3.1.2** The Contractor shall disconnect the chain from the ship's structure at the "bitter end" in each chain locker. A total of two (2) anchors are fitted, each weighing 1148 kg, and 15 shots (412.5 m) of stud link anchor chain of 30 mm diameter. Contractor to note which anchor was fitted with the longer chain and shall reinstall same.
- 3.1.3** The Contractor shall remove all scale and rust from both anchors and chains, using high pressure wash. Upon completion of blasting, the anchors and chain are to be inspected by TCMS and the Technical Authority. The chain lockers are considered to be confined spaces on the CCGS Cygnus. Prior to entry, the Contractor shall ensure that the space has been thoroughly ventilated and has been certified safe for entry.
- 3.1.4** Any defects found in the anchors or chain shall be immediately brought to the attention of the Technical Authority. Contractor shall measure every 5th link at the throat to check amount of wastage/wear. Original diameter of chain is 30mm. A typewritten copy of the measurements shall be given to the Chief Engineer and an electronic copy shall be forwarded to the SVMM. Report to indicate what links where measured, measurements and any observations noted.
- 3.1.5** The Contractor shall paint the anchors and chains with a minimum of two (2) coats of "Interprime Red". Each coat is to be 3.5 mils to achieve a DFT of 3.0 mil. Each anchor is to have two (2) coats of "Interlac Black CL". Each coat is to be 3.5 mils to achieve a DFT of 3.0 mil.
- 3.1.6** The Contractor shall paint the Joining Shackles red. The appropriate number of links corresponding the number of shots shall be painted on either side of the joining shackle shall be painted white. Items to be painted shall receive two (2) coats of appropriate colour at 3.5 mils to achieve 3.0 mils DFT. Numbering of shots shall begin at the anchor.
- 3.1.7** The Contractor shall remove the false bottoms in both the Port and Stbd chain lockers. All debris, mud, and rust shall be removed and the chain lockers inspected by the Technical Authority.
- 3.1.8** The Contractor shall prepare the surface of each chain locker, including the false bottoms, with a wire brush and apply one (1) coat of Interprime Red to achieve a 3.5 mil DFT. The surface area of the chain locker is 56 m².
- 3.1.9** The Contractor shall ensure that all bilge suction lines are proven clear and that the bilge pumping system is proven operational.

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3.1.10 The Contractor shall reinstall the false bottoms in each chain locker and connect the bitter end of each new chain to the ship's structure with new Owner supplied end shackles.

Use of ship's equipment to stow the anchors and chains will be performed by ship's crew only. Prior to lifting the anchors and chains aboard, the Contractor shall notify the Technical Authority.

3.2 Location

3.2.1 Chain Locker Fr. 85 – 89 (C)

3.2.2 Bow

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 All work shall be subject to witness by the Chief Engineer or delegate.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a typewritten report in both electronic and hardcopy formats outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item.

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5.2 Spares

5.2.1 Any components which have been Owner supplied and not used shall be returned to the Technical Authority or delegate upon completion of this specification item.

5.2.2 Any components which may have been damaged when carrying out this specification item shall be returned to the Technical Authority and a replacement supplied by the Contractor.

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Rudder Removal and Survey		

HD-13 Rudder Removal and Survey

Part 1: SCOPE

- 1.1** The intent of this specification is to remove and subsequently reinstall the ships rudder to permit access to the propeller and tailshaft.
- 1.2** This item shall be performed in conjunction with the following:
 - 1.2.1** HD-10 Hull Painting
 - 1.2.2** HD-14 Propeller and Mechanism

Part 2: REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Rudder and Rudderstock Dwg. 30-1040

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.2.2** 7.B.2 – Fall Protection
- 2.2.3** 7.B.4 – Hotwork
- 2.2.4** 7.B.5 – Lockout and Tagout

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001 – Hull Inspection Regulations

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall supply all equipment, staging, chain falls, craneage, slings and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required

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in the performance of this specification shall be welded into place by CWB-certified welders certified to welding Std. W47.1, Div. 1 and 2.

- 3.1.2** Prior to any hot work taking place, the Contractor shall ensure that the area of work and any adjacent space is certified as gas free and suitable for hot work as per the preamble.
- 3.1.3** Prior to erecting staging in way of the rudder, the Contractor shall ensure that the steering gear has been locked out and tagged out as per the preamble.
- 3.1.4** The Contractor shall be responsible to arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor when completing this specification item.
- 3.1.5** Before any removals of the rudder take place, the Contractor shall have the rudder arranged at zero helm in the steering gear compartment. The rudder position will then be verified on the exterior of the ship by means of sighting and measurements to determine position. These measurements shall be witnessed by the Chief Engineer or Technical Authority as well as the Transport Canada (TC) Inspector and/or ABS Class Surveyor and shall be included in the final report for this specification item.
- 3.1.6** Any Contractor attached lifting points which have been welded to the ship are to be removed prior the undocking of the ship and any disturbed coatings are to be repaired with the appropriate hull coating.

3.2 Removals

- 3.2.1** The Contractor shall remove the securing arrangement from the six palm bolts. Prior to removal, the Contractor shall permanently mark each bolt as to its original location. The Contractor shall include in the bid, the unit cost of removal, and fabrication of a palm bolt in the event one is damaged during removal. Actual adjustments shall be made through 1379 action.
- 3.2.2** Prior to lifting, the Contractor shall determine if there has been any water ingress into the internals of the rudder. This shall include the removals of the vent and drain plugs and a subsequent pressure test of the rudder with air at a pressure not to exceed 2.5 psi. Pressure testing of the rudder to be witnessed by the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor and survey credit obtained.
- 3.2.3** Should the rudder fail the pressure testing, the Contractor shall locate the problem area on the rudder and provide a repair option to the Owner. Once all repairs have been completed, the Contractor shall coat the internals of the rudder with an anti-

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corrosion coating by means of float coating. Actual cost of repair and coating to be adjusted by 1379 action upon presentation of invoices.

- 3.2.4** The Contractor shall disconnect the rudderstock from its carrier and the rudderhead gland and the rudder carrier disassembled. The Contractor shall supply an eye bolt to be fitted in the rudderhead and securely support the rudderstock. Prior to disconnecting the rudderstock, the Contractor shall remove all rudder angle indicators to secure storage. All grounding straps are to be disconnected and will be reconnected upon completion of the specification item.
- 3.2.5** Once the rudderstock has been completely supported, the palm bolts may be removed. The rudder shall then be turned to clear the ice horn and raised until the pintle is clear of its gudgeon and the rudder can be lifted clear of the ship and landed.
- 3.2.6** The rudder pintle, complete with locking pin, shall be removed along with the upper and lower fairing plates. The pintle and gudgeon clearances are to be measured and indicated on a computer generated sketch and will be included with the report for this specification item. The Contractor shall also check the alignment of the rudder and stern frame, gudgeon to be checked for proper centering.
- 3.2.7** The Contractor shall disconnect the rudderstock from the tiller arm and slowly lower it out of the rudder trunk and onto the floor of the dock. A complete inspection for wear and corrosion shall be carried out. The rudder and rudderstock bushings are to be visually inspected and measured for wear using a micrometer. These measurements are to be recorded on a computer generated sketch and included with the report for this specification item.
- 3.2.8** The Contractor shall provide an allowance of \$5000 to permit for the build-up and machining of the rudderstock in way of the rudder gland and rudderstock guide. Adjustment of this allowance shall be by 1379 action upon presentation of invoices.

3.3 Installation

- 3.3.1** The Contractor shall reinstall the rudderstock in the ship and reattach the rudder. The rudderstock shall be reconnected to the tiller arm, ensuring correct alignment as per original installation.
- 3.3.2** The Contractor shall repack the rudder gland with new, Contractor supplied packing. This packing shall be John Crane style 1335 packing or equivalent. The

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Contractor shall allow for eight (8) rings of 3/4" (19 mm) packing to fit a 7.875" (200 mm) diameter shaft.

3.3.3 The Contractor shall ensure that the pintle and all palm bolts are installed in their original locations.

3.3.4 The Contractor shall reinstall the upper and lower fairing plates and shall secure the palm bolts by means of a welded locking bar.

3.3.5 Once completely installed, the rudder shall be test swung easily and then rapidly from side to side to ensure freedom of movement and complete range of travel for multiple cycles. Alignment of the rudderstock and rudder are to be verified at zero helm once installation and testing has been completed as per initial findings in 3.1.5. This testing shall be witnessed by the Transport Canada (TC) Inspector and/or ABS Class Surveyor, Chief Engineer and / or the Technical Authority.

3.4 Location

3.4.1 Stern

3.4.2 Steering Gear Compartment

3.5 Interferences

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

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 All work shall be subject to witness by the Chief Engineer or delegate and the TCMS surveyor.

4.2 Testing

4.2.1 The Contractor shall test the operation of the rudder from hard over to hard over for one and two steering pump operation, the time of each which will be recorded. The same test will be performed after the rudder has been reinstalled and the result compared. Any discrepancies in the results will be corrected at the Contractor's expense.

4.2.2 All testing to be witnessed by the Chief Engineer or delegate.

4.3 Certification

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4.3.1 N/A

Part 5: DELIVERABLES

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a typewritten report in both electronic and hardcopy formats outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 All manuals which have been borrowed from the ship for the performance of this specification item will be returned to the Chief Engineer prior to the acceptance of this item.

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Propeller and Mechanism		

HD-14 Propeller and Mechanism

Part 1: SCOPE

- 1.1** The intent of this specification shall be to remove and open up for overhaul and 5 year survey by TCMS Inspector and/or ABS Surveyor the oil distribution box, forward and aft shaft bearings, tailshaft, stern bearing and propeller hub and mechanism.
- 1.2** This item shall be performed in conjunction with the following:
 - 1.2.1** HD-13 Rudder Removal and Survey
 - 1.2.2** H-10 Aft Shaft Bearing Install

Part 2: REFERENCES

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** Wartsila GA of Tailshaft Dwg. DAAK106663
 - 2.1.2** Shafting Dwg. 220/01 (from CCGS Cape Roger)
 - 2.1.3** Wartsila GA of 380 mm PSE Type Seal Dwg. H78580-01
 - 2.1.4** Docking Plan Dwg. 30-04413
- 2.2 Standards**
 - 2.2.1** Fleet Safety and Security Manual (DFO/5737)
 - 2.2.2** ISO 1302:2002 – Surface Texture
- 2.3 Regulations**
 - 2.3.1** Canada Shipping Act 2001 – Marine Machinery Regulations
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The Contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3: TECHNICAL DESCRIPTION

- 3.1 General**

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- 3.1.1** The Contractor shall arrange for a Wartsila Propulsion representative (FSR) to oversee the removal and installation of the tailshaft as well as the disassembly, overhaul, and reinstallation of the propeller and hub assembly. The Contractor shall include an allowance of \$25,000.00 for the services of the FSR for this specification item. Any necessary adjustments will be through 1379 action upon presentation of invoices. This cost is to include cost per day, accommodations, meals and transportation.

Contact info for the FSR is as follows:

Ron Van der Linden

Wartsila Canada Incorporated

164 Akerley Blvd

Dartmouth, NS B3B 1Z5

Tel: (902)468-1264

- 3.1.2** The Contractor shall arrange for a LamaLo Technologies representative (FSR) to oversee the alignment of the shaft line. The Contractor shall include an allowance of \$20,000.00 for the services of the FSR for this specification item. Any necessary adjustments will be through 1379 action upon presentation of invoices. This cost is to include cost per day, accommodations, meals and transportation. Contact info for the FSR is as follows:

Bruce Cowper

LamaLo Technologies Inc.

1935 12th Street SW

Calgary, AB T2T 3N3

Tel: (403)244-3378

- 3.1.3** The Contractor shall be responsible to arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor when completing this specification item.

- 3.1.4** The Contractor shall supply all equipment, staging, chain falls, craneage, slings and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this

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specification shall be welded into place by CWB certified welders certified to welding Std. W47.1, Div. 1 and 2.

3.1.5 Prior to any hot work taking place, the Contractor shall ensure that the area of work and any adjacent space is certified as gas free and suitable for hot work as per the preamble.

3.1.6 Any Contractor attached lifting points which have been welded to the ship are to be removed prior the undocking of the ship and any disturbed coatings are to be repaired with the appropriate hull coating.

3.1.7 Prior to disassembly, the Contractor shall take alignment measurements on the FAG Shaft Coupling as well as the aft and intermediate shaft bearings located in the shaft tunnel. These measurements shall be witnessed by the Chief Engineer or Technical Authority and a typewritten copy of the readings shall be supplied to the same.

3.1.8 Prior to any work commencing the contractor shall perform the following:

3.1.8.1 Measure and record tailshaft run out axially and radially, before and after docking of the vessel, prior to dismantling and subsequent reinstallation of all specification components.

3.1.8.2 Measure the tailshaft wear-down in presence of TCMS and/or ABS Surveyor and Chief Eng.

3.1.8.3 Verify centering mark on propeller blades to centering mark on propeller hub.

3.1.8.4 Proof mark location on SKF Coupling.

3.1.8.5 Measure and record thrust clearance at thrust block prior to dismantling and subsequent reinstallation of all specification components.

3.2 Removals

3.2.1 The Contractor shall coordinate the removal / installation of the tailshaft with the other related specification items as outlined in Section 1.2 of this specification item.

3.2.2 The Contractor shall dismount the rudder from the ship prior to engaging in tailshaft and propeller / hub removal activities.

3.2.3 The Contractor shall remove the rope guard to permit stern bearing measurements prior to removal of the tailshaft.

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- 3.2.4** The Contractor shall open the stern gland assembly, remove all existing packing, and clean the shaft in way of the stuffing box to limit damage to the sterntube bearings.
- 3.2.5** The Contractor shall disassemble the shaft brake and remove to the Engineer's workshop in a Contractor supplied crate with all components.
- 3.2.6** The Contractor shall open up the shaft bearings in the shaft tunnel and remove the bearing shells for safe storage in the Engineer's Workshop. The bearing shells shall be marked as to original orientation and location prior to disassembly. Measurements of the bearings and shaft in way of the running surfaces shall be taken and recorded.
- 3.2.7** The Contractor shall drain the CPP hydraulic system prior to disassembly. The oil shall be disposed of in accordance with all provincial regulations and shall be held in a container suitable to handle approximately 400 litres of oil. The entire system shall be flushed with new oil until all signs of dirt and water are removed. Sump tank to be opened and cleaned, low level alarm to be proven operational and cover to be reinstalled with new contractor supplied gasket after inspection by Chief Engineer. All filters, owner supplied, on the system shall be changed and strainers cleaned. The drive gear for the shaft torsional meter shall be disconnected at this time and given to the Chief Engineer for storage.
- 3.2.8** SKF Sleeve coupling shall be proof marked and shaft surfaces in way of the coupling thoroughly cleaned prior to coupling being removed. Coupling shall be thoroughly cleaned after removal and prior to installation. Owner will supply high injection pump that is required for removal of the coupling. Hydraulic pressure required to remove the coupling shall be recorded. NOTE: While separating the sections of shafting extreme care shall be taken as not to place undue stress on the central oil supply line. The pitch must also be adjusted to full astern before dismantling the SKF coupling.
- 3.2.9** The Contractor shall withdraw the tailshaft outwards as a unit complete with propeller hub assembly and blades. Provisions shall be made to collect any oil which remains in the control circuit without permitting any oil to drain into the bilges of the ship. Should any oil spill into the bilges, the Contractor shall be responsible for any subsequent cleaning. The tailshaft shall be withdrawn far enough to permit access to the internal piping for the purpose of disconnecting.

For purpose of reference, the tailshaft with hub assembly is 26'6" (8.1 m) in length and has a mass of 23,000 lbs (10,430 kg).

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3.2.10 Upon removal of the tailshaft, the Contractor shall conduct a laser alignment of the shaft line from the gearbox output shaft through the sterntube prior to any steel removals or renewals. This shall establish the baseline datum for the present alignment.

3.3 Propeller and Hub Overhaul

- 3.3.1** The tailshaft and propeller / hub assembly shall be removed to the Contractor's workshop. All lifting is to be completed with certified rope or nylon slings. The use of wire rope on the shaft or hub assembly is not permitted.
- 3.3.2** The Contractor, under the guidance of the Wartsila Propulsion FSR, shall disassemble the propeller and remove the hub assembly from the shaft for inspection, overhaul, and installation on existing tailshaft.
- 3.3.3** The Contractor shall have the lock strips ground off and remove all drain and vent plugs. Special attention is to be paid to any oil leakage, water contamination, or particulate matter.
- 3.3.4** The hub shall be opened and all blades removed. Blades shall be marked as to their orientation and location prior to removal from the hub. Provision shall be made to collect any oil leaking from the hub during disassembly and at all times, the Contractor shall be diligent in protecting the hub from any contamination. All grease and oil shall be removed from the hub and all parts cleaned with a manufacturer approved solvent.
- 3.3.5** The Contractor shall utilize their own hydraulic wrench and socket to remove and replace the bolts for the dismounting and remounting of the propeller blades to the hub.
- 3.3.6** The hub is to be completely disassembled with all piston rod and cylinder seals being replaced using Owner supplied spares. The Contractor shall have all blades polished and tested for cracks using dye penetrant.
- 3.3.7** Upon complete assembly, the Contractor shall fit the reassembled hub and propeller to the existing tailshaft. The fitment of the hub shall be witnessed by Transport Canada (TC) Inspector and/or ABS Class Surveyor, the Wartsila FSR, and the Chief Engineer or delegate for acceptance. OEM specification for fitment shall be provided by the Wartsila FSR.
- 3.3.8** The Contractor shall obtain survey credit for the overhaul of the propeller and hub assembly from Transport Canada (TC) Inspector and/or ABS Class Surveyor.

3.4 Installation

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- 3.4.1** The tailshaft shall have diameter measurements taken in way of the sterntube bearing locations, forward and aft, with readings taken vertically and horizontally for a total of six (6) sets of readings. These readings shall be included in the final report for this specification item.
- 3.4.2** Clearance measurements are to be taken on the propulsion shafting in way of the forward and aft shaft bearings. Shaft surface finishes in way of the bearings shall be checked to ensure a surface texture finish of N4 or better as per ISO 1302:2002. The Contractor shall include in the bid, a total of 32 hours for the purpose of polishing with an hourly rate thereafter for the purpose of adjustments.
- Adjustments will be made through 1379 action upon the presentation of invoices.
- 3.4.3** Fwd shaft bearing housing shall be cleaned of all oil and debris prior to reassembly and the cooling boxes are to be thoroughly cleaned and pressure tested for witness by the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor. The Contractor shall reassemble the bearing using new Contractor supplied OEM seals. The bearing shall be flushed with new Owner supplied oil prior to filling for sea trials.
- 3.4.4** The Contractor shall reinstall the shaft as per the manufacturer's recommended instruction and under the guidance of the Wartsila Propulsion FSR. All internal oil distribution piping shall be reconnected using new Owner supplied o-rings. The FAG coupling shall be reinstalled as per the manufacturer's recommended instruction only after all internal piping has been connected. Upon completion of all work and inspections the SKF coupling is to be reattached up to the original marks and final hydraulic pressure recorded. All threaded holes in the coupling shall be cleaned and sealed.
- 3.4.5** The Contractor will assist the Wartsila Alignment FSR in the performance of the alignment tasks by providing two (2) personnel to the FSR. The Contractor shall be responsible to supply the FSR with the necessary dial gauges, and non-specific measurement tools that would not normally be FSR supplied such as strain gauges or laser alignment tools.
- 3.4.7** A total of two days (2) is anticipated for the completion of the alignment. The Contractor shall include a cost per day for the provision of the two (2) labourers beyond the two (2) days. Any necessary adjustments will be through 1379 action.
- 3.4.8** Rotation of the shaft will be performed by the Contractor supplied labourers once direction how to do so by the ship's personnel.

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3.4.9 The Contractor shall refill the hydraulic system for the CCP system with new Contractor supplied Petro Canada AW-68 hydraulic oil (approximately 400 litres). The oil shall be pumped into the system via a filter cart fitted with filters rated at 3 microns absolute. Once the system has been refilled and bled of all air, the pitch angle shall be checked against the gauges and indicator located at the oil distribution box. Adjustments will be made as necessary until both readings are in agreement.

3.4.10 Once all pitch controls have been verified as correct, the rope guard may be welded in place and the rudder reinstalled. Lifting eye bolts are to be removed at this point and returned to the Chief Engineer or delegate. Once the ship has been refloated for a minimum of 24 hours, the final coupling of the shafting may be completed and final alignment carried out under the guidance of the Wartsila Alignment FSR.

3.4.11 Final chocking of the shaft line bearings will be the responsibility of the Contractor once the alignment has been completed and is deemed within the alignment limits as outlined by the FSR. Alignment and run-out will be rechecked once the chocking material has completely cured.

3.4.12 Prior to launching and installation of the rope guard, a set of wear-down measurements will be taken. These measurements will be witnessed by the Chief Engineer or Technical Authority and will be included in the final report upon the completion of this specification item. The Contractor shall also obtain Transport Canada (TC) and/or ABS Class Surveyor credit for the alignment and wear-down.

3.5 Location

3.5.1 Shaft Tunnel Fr. 11 – 21

3.6 Interferences

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

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 All work shall be subject to witness by the Chief Engineer or delegate, Wartsila FSR's, and the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

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4.2.1 Functional testing of the CPP system shall be done prior to the refloating of the vessel as well as once the vessel has been refloated after docking. This is required in order to obtain TCMS survey credit.

4.2.2 The Contractor shall be responsible to arrange the Transport Canada (TC) Inspector and/or ABS Class Surveyor when items are ready for inspection.

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a type written report of the Contractors work as well as the report produced by the Wartsila Propulsion FSR in both electronic and hardcopy formats outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 All drawings and certificates associated with the new tailshaft shall be delivered to the Chief Engineer or Technical Authority prior to the acceptance of this item

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Spec Item #: H-01	SPECIFICATION	F6855-180961
Fire Detection System Annual Inspection		

H-01 Fire Detection System Annual Inspection

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to arrange for a certified company to perform an annual inspection and certification of the fire detection system.
- 1.2** This work shall be carried out in conjunction with the following spec items:
 - 1.2.1** H-02 Ships Portable Fire Extinguishers
 - 1.2.2** H-03 Fixed Fire Fighting System
 - 1.2.3** H-04 Galley Fire Extinguishing System

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** Notifier NFS2-640
- 2.2 Standards**
 - 2.2.1** Fleet Safety and Security Manual (DFO 5737)
- 2.3 Regulations**
 - 2.3.1** Canada Shipping Act 2001
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** The system is a Notifier NFS2-640 Fire Alarm System.
 - 3.1.2** The contractor shall contact Transport Canada (TC) Inspector and/or ABS Class Surveyor before work begins and will arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor to be present for the inspection if required.

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3.1.3 The contractor shall present a certificate of inspection to the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor for credit.

3.2 Location

3.2.1 The control panel for the fire detection system is located in the wheelhouse.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copies of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

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Fire Detection System Annual Inspection		

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-02	SPECIFICATION	F6855-180961
Portable Fire Extinguishers		

H-02 Portable Fire Extinguishers

Part 1 – Scope

- 1.1** The intent of this specification shall be for the contractor to secure the services of a certified company to perform an annual inspection and certification of the vessels portable fire extinguishers.
- 1.2** This work shall be carried out in conjunction with the following spec items:
 - 1.2.1** H-01 Fire Detection System
 - 1.2.2** H-03 Fixed Fire Fighting System
 - 1.2.3** H-04 Galley Fire Extinguishing System

Part 2 – References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** Table of Extinguishers listed in Part 3: Technical Description.
- 2.2 Standards**
 - 2.2.1** Fleet Safety and Security Manual (DFO 5737)
- 2.3 Regulations**
 - 2.3.1** Canada Shipping Act 2001
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** The contractor shall secure the services of a certified company to perform the annual inspection, servicing and certification of the ship's portable fire extinguishers.
 - 3.1.2** The sub-contractor shall inspect and certify all extinguishers and components to the requirements of NFPA 12.

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- 3.1.3** The contractor shall remove the ships fire extinguishers from the vessel and transport them to the sub-contractors facility for servicing and testing.
- 3.1.4** The contractor shall ensure only one third of the total extinguishers are removed from vessel at any one time. The number and location of the removed extinguishers shall be approved by the Chief Officer.
- 3.1.5** The contractor shall fit each extinguisher with a tag indicating the inspection date.
- 3.1.6** The contractor shall provide a unit cost to replace each of the below types/sizes of extinguishers Any repairs and/or refilling of any fire extinguishers will be addressed with PWGSC 1379 action and shall be approved by Coast Guard Owner's Rep prior to work commencing.
- 3.1.6.1** 5lb DC/ABC **3.1.6.2** 2.5lb DC/ABC
- 3.1.6.3** 20lb DC/ABC **3.1.6.4** 10lb DC/ABC
- 3.1.6.5** 8lb DC/ABC **3.1.6.6** 10lb CO2
- 3.1.6.7** 15lb CO2 **3.1.6.8** 5lb CO2
- 3.1.6.9** 20lb CO2
- 3.1.6.10** 2.5 gal Pressurized Water & Wet Chemical Class K
- 3.1.7** The contractor shall return all extinguishers to the vessel and reinstall them in their original positions to the satisfaction of the Chief Officer.
- 3.1.8** Tank Description and Locations

#	Type	Location	Next 6 Year Maint	Next Hydro Test	Serial No.	Checked (√)
1	5 Lbs DC/ABC	Bridge Port	11/15	2021	628631	
1A	2.5 Lbs DC/ABC	Deck Office	11/12	2018	YH-48712	
2	5 Lbs DC/ABC	Bridge Stbd	12/11	2011	105837	
3	15 Lbs CO2	Bridge Aft	4/12	4/11	087463	

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4	5 Lbs DC/ABC	Bridge Alleyway	12/11	12/11	105852	
5	5 Lbs DC/ABC	Bottom, Bridge Stairs	4/11	04/11	105853	
6	10 Lbs CO2	Foc'sle Alleyway	11/14	2020	492433	
7	5 Lbs DC/ABC	Foc'sle Alleyway, Aft	1/12	4/12	35597	
8	5 Lbs DC/ABC	Main Deck Fwd.	11/15	2021	628636	
9	5 Lbs DC/ABC	Officer's Mess	12/11	5/11	105842	
#	Type	Location	Next 6 Year Maint	Next Hydro Test	Serial No.	Checked (√)
10	2.5 gal Pressurized Water & Wet Chemical Class K	Galley	6/15	6/14 Every 5 years	000266	
11	5 Lbs DC/ABC	Main Deck by Cook	3/13	3/12	YS-687882	
12	5 Lbs DC/ABC	Main Deck by 2 nd Cook	11/15	11/21	628627	
13	5 Lbs DC/ABC	Crews Mess	12/11	11/11	105861	
14	5 Lbs DC/ABC	Main Deck Aft Stairway	12/10	12/11	105851	
15	5 Lbs DC/ABC	Main Deck Stbd Aft	12/11	12/17	378531	
16	5 Lbs DC/ABC	Main Deck Port side	12/11	12/11	105838	
16A	20 Lbs DC/BC	MCR	6/15	6/21	877825	

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17	5 Lbs DC/ABC	Bosun's Workshop	12/11	12/11	105835	
17A	10 Lbs CO2	MCR		4/13	151981	
18	5 Lbs DC/ABC	E/Rm Lower steps	11/15	11/21	628634	
19	20 Lbs DC/BC	ER. Port side	11/15	11/21	729748	
20	20 Lbs DC/BC	ER. By ME Stbd	2/13	01/12	086054	
21	5 Lbs DC/ABC	E/R center	11/15	11/21	628676	
22	5 Lbs DC/ABC	ER. Port Gen.	12/11	12/17	636138	
23	5 Lbs DC/ABC	E/Rm, Aft Bulkhead Stbd	11/15	11/21	628657	
24	5 Lbs DC/ABC	Aux. ER. Stbd Fwd Bulkhead	2/13	1/13	085836	
25	5 Lbs DC/ABC	Aux. ER. Aft center	12/12	1/13	085845	

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#	Type	Location	Next 6 Year Maint	Next Hydro Test	Serial No.	Checked (√)
26	10 Lbs CO2	E/Rm. Workshop	11/14	7/13	537928	
27	5 Lbs DC/ABC	E/Rm. Workshop	11/15	11/21	628670	
28	5 Lbs DC/ABC	Steering Flat	11/15	11/21	628658	
S15	20 Lbs CO2	Emergency Gen. Rm.	N/A	6/13	AA-33219	
30	5 Lbs DC/ABC	Laundry Room	12/11	12/11	103752	
31	5 Lbs DC/ABC	Davit Hydraulic Control Rm.	11/15	11/21	628655	
32	5 Lbs DC/ABC	Lower Deck by Office	10/14	10/15	ZP-326358	
33	5 Lbs DC/ABC	Central Stores	12/11	12/11	105834	
34	5 Lbs DC/ABC	Battery Rm.	12/11	12/11	105839	
35	5 Lbs DC/ABC	Sewage Compartment	11/15	11/21	628652	
36	5 Lbs DC/ABC	SAR Locker		12/11	105840	
37	20 Lbs DC/BC	Bow Thruster	11/15	11/21	381978	
38	10 Lbs DC/ABC	Fore Peak	11/15	11/21	131048	
S1	5 Lbs DC/ABC	ER Aft bulkhead Port	11/15	11/21	628669	
S2	5 Lbs DC/ABC	ER Stbd Gen	11/15	11/21	628665	
S3	20 lbs DC/BC	SAR Locker	4/12	4/18	YG-419910	

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S4	5 Lbs DC/ABC	SAR Locker	12/10	12/16	731811	
S5	10 lbs DC/ABC	SAR Locker	12/10	12/10	008344	
S6	10 lbs DC/ABC	Officers Washroom	11/15	11/21	131015	
#	Type	Location	Next 6 Year Maint	Next Hydro Test	Serial No.	Checked (√)
S7	5 Lbs CO2	SAR Locker	N/A	5/12	15283	
S8	10 Lbs DC/ABC	SAR Locker	12/12	12/18	K905449	
S9	10 lbs CO2	Central Stores			128225	
S10	8 Lbs DC/ABC	FRC CG258	9/16	9/12	T-983475	
S11	8lbs DC/ABC	FRC CG234	9/16	9/12		
S12	5 Lbs DC/ABC	SAR Locker	N/A	5/11	XP-582712	
S13	10 lbs DC/ABC	SAR Locker	11/13	5/11	ZJ-960639	
LB1	10 Lbs DC/ABC	Life Boat	10/14	10/20	2V-711011	
LB2	10 Lbs DC/ABC	Life Boat	10/14	10/20	ZV-711076	
FRC 590	2.5lb DC/ABC	FRC/590	05/2008	05/2014	01904	
Hot Work H5	20 Lbs CO2	E/R Workshop	N/A	12/12	1044C	
Water Jel Fire Blanket's		Galley	05/2009			
		E/R Workshop	11/2009			

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Note #1: CO2 Bottles are to be hydro tested every 5 years. DC Bottles are to have a 6 year maintenance check and are hydro tested every 12 years.

Note#2: The serial numbers for the CO2 bottles are the ones stamped on the cylinder itself

3.2 Location

3.2.1 As per table in 3.1.8

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM

Part 5 – Deliverables

5.1 Drawings/Reports

5.1.1 The contractor shall provide a report including a list of the extinguishers and shall indicate the condition of the extinguisher before inspection, parts and agent used and shall provide a certificate of compliance to the satisfaction of the Chief Officer that indicates that the extinguishers comply with the requirements of NFPA 12.

5.2 Spares

5.2.1 N/A

5.3 Training

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5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-03	SPECIFICATION	F6855-180961
Fixed Fire Fighting System		

NOTE FROM BIDDERS CONFERENCE: It is confirmed that only one bottle is required to be hydrotested.

H-03 Fixed Fire Fighting System

Part 1 – Scope

- 1.1** The intent of this specification shall be for the contractor to arrange for a certified company to perform an annual inspection and certification of the fire detection system.
- 1.2** This work shall be carried out in conjunction with the following spec items:
 - 1.2.1** H-02 Portable Fire Extinguishers
 - 1.2.2** H-01 Fire Detection System
 - 1.2.3** H-04 Galley Fire Extinguishing System

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO 5737)

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The vessel has a combination FM200 and CO₂ as listed below.
- 3.1.2** The following Kidde CO₂ systems shall be inspected:

Space	# of Bottles	Size

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Emergency Generator Compartment	1	100 lb
Engine Room	13	100 lb
Auxiliary Machinery Compartment	2	100 lb
Cargo Hold	2	100 lb
Bow Thruster Compartment	2	75 lb
Gun Locker	1	20 lb

3.1.3 The following “H” series FM 200 Systems shall be inspected:

Space	# of Bottles	Size
Lamp Room	1	40 lbs
Paint Locker	1	40 lbs

3.1.4 The contractor shall contact Transport Canada (TC) Inspector and/or ABS Class Surveyor before work begins and shall arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor to be present for the inspection if required.

3.1.5 Contractor shall arrange for the following bottle to be hydrostatically tested. This item shall be addressed within the first 5 days of drydocking to avoid delays in shipping and receiving the bottle back.

3.1.5.1 Gun Locker – Last hydro test 2007

3.1.6 The contractor shall present a certificate of inspection to the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor for credit.

3.2 Location

3.2.1 The locations are listed in the above charts.

3.3 Interferences

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

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Fixed Fire Fighting System		

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and Transport Canada (TC) Inspector and/or ABS Class Surveyor Inspector.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copies of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM

Part 5 – Deliverables

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 1 electronic copy of all reports/certs to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

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Spec Item #: H-04	SPECIFICATION	F6855-180961
Galley Fire Extinguishing Systems		

H-04 Galley Fire Extinguishing Systems

Part 1 – Scope

- 1.1** The intent of this specification shall be for the contractor to arrange for a certified company to perform an annual inspection and certification of the fire detection system.
- 1.2** This work shall be carried out in conjunction with the following spec items:
 - 1.2.1** H-03 Fixed Fire Fighting System
 - 1.2.2** H-01 Fire Detection System Annual Inspection
 - 1.2.3** H-02 Portable Fire Extinguishers

Part 2 – References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** Kidde – Model WHDR4005
- 2.2 Standards**
 - 2.2.1** Fleet Safety and Security Manual (DFO 5737)
- 2.3 Regulations**
 - 2.3.1** Canada Shipping Act 2001
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.2 General**
 - 3.1.1** The contractor shall arrange to have a certified company to perform an annual inspection on the galley wet chemical fire system. The galley system is manufactured by Kidde, model WHDR4005.

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3.1.2 The contractor shall contact Transport Canada (TC) Inspector and/or ABS Class Surveyor before work begins and will arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor to be present for the inspection if required.

3.1.3 The contractor shall present a certificate of inspection to the Commanding Officer and Transport Canada (TC) Inspector and/or ABS Class Surveyor for credit.

3.1.4 The vessel shall be given two days' notice prior to work on the galley system to minimize galley disruptions.

3.2 Location

3.2.1 The fixed system is located in the Galley on the vessels main deck.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and Transport Canada (TC) Inspector and/or ABS Class Surveyor Inspector.

4.2 Testing

4.2.1 Testing shall be carried out to satisfy Transport Canada (TC) Inspector and/or ABS Class Surveyor and NFPA requirements.

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM

Part 5 – Deliverables

5.1 Drawings/Reports

5.1.1 The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 1 electronic copy of all reports/certs to SVMM.

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Galley Fire Extinguishing Systems		

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-05	SPECIFICATION	F6855-180961
Ventilation Trunk Cleaning		

H-05 Ventilation Trunk Cleaning

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to clean the vessels supply and exhaust systems of dirt, dust and debris.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

Reference Drawing	Trunking	Approx. m ²
30-07245	Bridge Deck Supply	9.2
30-07243	Main Deck Fwd/Aft Supply	72.8
30-07243	Main Deck Fwd/Aft Exhaust	11.7
30-07244	Foc'sle Deck Supply	22.1
30-07244	Foc'sle Deck Exhaust	35.0
30-07242	Lower Deck Supply	8.5
30-07242	Lower Deck Exhaust	5.3
30-07243	Galley Exhaust Fan	46.9
30-03208	Engine Room Supply	133.3
30-03262	Engine Room Exhaust	36.0
30-03208	Aux. Comp. Supply	17.2
30-03208	Aux. Comp. Exhaust	7.3
30-0743	MCR Exhaust	3.5
-----	Dryer Vent	1.0

2.1.1

2.2 Standards

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Ventilation Trunk Cleaning		

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

3.1.1 All trunking shall be thoroughly cleaned. The blower housing shall be opened up to gain access to the fan impellers. Those impellers shall be thoroughly cleaned.

3.1.2 The contractor is responsible for the removal of all deck heads and all other paneling in order to access this work area. The contractor shall reinstall all of the same paneling in its original condition in order to successfully complete this work.

3.1.3 The contractor shall thoroughly degrease, steam out and drain accumulated fat and grease deposits in the existing vent trunking from the galley vent canopy.

3.1.4 The contractor shall take precautions when carrying out work that all spaces are protected from debris and cleaning chemicals.

3.1.5 The contractor shall be responsible for all materials.

3.1.6 Upon completion of work all debris and cleaning chemicals shall be removed from the ship.

3.1.7 All work shall be carried out to the satisfaction of the Chief Engineer. The contractor shall complete this work without any disruption to galley routine and hours.

3.2 Location

3.2.1 As referenced in 2.1.1

3.3 Interferences

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

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Ventilation Trunk Cleaning		

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and/or SVMM.

4.2 Testing

4.2.1 Testing shall be completed as per OEM service center.

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 1 electronic copy of all reports/certs to VMM.

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-06	SPECIFICATION	F6855-180961
Port Lifeboat and Davit Inspection		

NOTE FROM BIDDERS CONFERENCE: Replace reference of Schatt Harding with Palfinger Marine in sections 1.1, 3.1.1 and 3.1.2

H-06 Port Lifeboat and Davit Inspection

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to supply the services of a Palfinger Marine Representative to carry out annual inspection on the vessel's Lifeboat and Davit.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** H-07 Port and Stbd Miranda Davit Inspections

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The owner shall supply parts required to perform the specified work.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** The contractor shall supply the services of a Palfinger Marine representative to carry out an annual inspection on the Lifeboat and Davit.
 - 3.1.2** Contact information for the FSR:
 - Sean Kasper Operations Manager Palfinger Marine
 - +1 604 530 0814

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Spec Item #: H-06	SPECIFICATION	F6855-180961
Port Lifeboat and Davit Inspection		

sean.kasper@palfingermarine.com

3.1.3 The contractor shall include in his quote an allowance of \$10,000.00 for the services of the FSR. This allowance encompasses FSR services for H-07. Price shall be adjusted up or down by PWGSC 1379 action based on FSR Invoice.

3.2 Location

3.2.1 The lifeboat davit is located on the port side on the boat deck.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and/or SVMM.

4.2 Testing

4.2.1 Testing shall be completed as per OEM service center.

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM.

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

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Port Lifeboat and Davit Inspection		

5.4 Manuals

5.4.1 N/A

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Spec Item #:H-07	SPECIFICATION	F6855-180961
Port and Stbd Miranda Davit		

NOTE FROM BIDDERS CONFERENCE: Replace Schatt Harding with Palfinger Marine in sections 1.1, 3.1.1 and 3.1.2.

H-07 Port and Stbd Miranda Davit

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to supply the services of a Palfinger Marine Representative to carry out annual inspection on the vessel's Port and Stbd Miranda Davits.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** H-06 Port Lifeboat and Davit Inspection

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The owner shall supply parts required to perform the specified work.

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** The contractor shall supply the services of a Palfinger Marine representative to carry out an annual inspection on the port and stbd Miranda Davit.
 - 3.1.2** Contact information for the FSR:
 - Sean Kasper - Operations Manager Palfinger Marine
 - +1 604 530 0814

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Port and Stbd Miranda Davit		

sean.kasper@palfingermarine.com

3.1.3 Allowance for this spec item is included in Spec Item H-06.

3.2 Location

3.2.1 The Miranda Davits are located on the port and stbd side of the boat deck.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and/or SVMM.

4.2 Testing

4.2.1 Testing shall be completed as per FSR recommendations.

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM.

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall arrange for the Schat Harding FSR to provide 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

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Port and Stbd Miranda Davit		

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-08	SPECIFICATION	F6855-180961
Fresh Water Tanks		

H-08 Fresh Water Tanks Cleaning, Touch Ups and Steel Work

Part 1 - Scope

- 1.1** The intent of this specification shall be to open both Port & Starboard Fresh Water Tanks for cleaning & inspection.

<u>Tank</u>	<u>Frame</u>	<u>Capacity (Long Tons)</u>
Port Tank	52-56	22.1
Stbd Tank	52-56	22.1

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Dwg. CYG-E-046 (97037-61A) Tank Plan

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737) Section 7.A12
- 2.2.2** Guidelines for Canadian Drinking Water Quality
- 2.2.3** NSF 61 Standards

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001
- 2.3.2** Fleet Safety Bulletin 2015-01

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

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Fresh Water Tanks		

- 3.1.1** The ships crew shall pump both tanks down to the suction levels. When the tanks are empty they are to be locked out in accordance with the Fleet Safety and Security Manual.
- 3.1.2** The manhole covers from both tanks shall then be removed by the contractor.
- 3.1.3** On opening the tanks they are to be mechanically ventilated for 24 hrs. The contractor shall issue safe for entry certificate issued by a Marine Chemist is to be posted at the tank and the gangway. It is the Contractors responsibility to obtain and maintain these certificates.
- 3.1.4** Residual water remaining shall be sucked out by the contractor. Contractor shall quote on removing 1000 litres from each tank to be adjusted up or down by PWGSC 1379 action.
- 3.1.5** The contractor shall be responsible for the removal of any / all dirt / debris and residual water in the tanks at the initial draining as well as the chlorinated water used to sanitize the tanks.
- 3.1.6** These tanks are used for the ships own drinking water, so proper protection shall be worn by the workers inside at all times to reduce the contamination and dirt accumulation from performing the work. The contractor shall be responsible for cleaning any foot prints and black marks introduced by the workers.
- 3.1.7** The tanks shall be cleaned removing all rust discoloration. Generally high pressure water wash and hand wiping should suffice. If any chemical cleaners are needed the cleaning method used shall be approved by Health Canada for its intended use. Proof of such approval shall be furnished to the Chief Officer.
- 3.1.8** Precautions shall be made to protect remote level tank sensors prior to any high pressure washing.

PORT TANK

- 3.1.9** Contractor shall arrange for 10 shots per tank to be taken around sounding pipe penetration.
- 3.1.10** Contractor shall crop and remove approx. 1 square meter of tank top tank around sounding pipe and cut sounding pipe approx. 12" from tank top.
- 3.1.11** Contractor shall remove approximately 1 square meter of decking material in alleyway surrounding sounding pipe. Contractor shall continue to remove decking material until dry solid decking is found. Contractor shall provide a quote per additional square meter if required.

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Fresh Water Tanks		

- 3.1.12** Contractor shall provide a unit cost per m² for supplying, cropping and inserting 3/8" plate in tank.
- 3.1.13** Contractor shall reinstall new sounding pipe and removed tank top section as per original. Contractor shall arrange for mag particle testing on all new welds.
- 3.1.14** All steel decks(new and existing) and bottom section of bulkheads are to be coated under the supervision of NACE 2 inspector, with 2 coats of Amercoat 83HS (or equivalent) epoxy primer following paint manufacturer application procedures, and time required between coats. Thickness and temperature readings shall be recorded.
- 3.2.9** The contractor shall supply and install approx.1 m² area of Transport Canada IMO approved Insul-Dex system installed by Certified Marine Dexotex installer at a thickness specified by the manufacturer. Thickness and temp readings shall be taken at time of install
- 3.2.10** After Insul-Dex has cured it is to be covered by a VLW IMO bond coat installed by certified dexotex marine installer. Thickness and temp readings shall be taken at time of install. VLW IMO underlayment shall be installed by certified dexotex marine installer on top of the VLW IMO bond coat.
- 3.2.10** The contractor shall install a Dexotex Seamless Epoxy deck system (color to be determined) in accordance with manufacturers' specifications
- 3.1.9** Contractor to quote on touching up and recoating 20m² of internal tank surface. Cost per m² to be included for adjustment purposes. When touching up any surfaces, the damaged coating is to be feathered back around the edges. All coating work to be in accordance with the manufacturer's recommended procedures.
- 3.1.10** Any rust and/or bare areas shall be dealt with as per direction of the Chief Engineer. If any coating touch ups are deemed necessary the area shall be coated with one coat to 3-5 mils DFT of Royal Coatings EasyPrime or equivalent to all prepared steel. One top coat of Royal Coatings Easy Flex or equivalent shall be applied to all primed areas to a thickness of 8-12 DFT. An independent (CG Supplied) NACE Level 2 Coating inspector shall be used to oversee the coating process. All new equipment (brushes, sprayers, hoses, etc) shall be used in the coating application. *Contractor shall bid on coating 20m² and shall be adjusted according with a 1379.*
- 3.1.11** Upon completion of the final wipe cleaning of the tanks to the satisfaction of the Chief Engineer and Chief Officer, the manhole covers shall be re-installed using new contractor supplied neoprene gaskets. Any studs broken shall be renewed. Anti-seize compound shall be used on the stud threads.

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Fresh Water Tanks		

3.1.12 The Contractor shall fill both the Port & Stbd Fresh Water Tanks with fresh water and then Super – Chlorinate the tanks as per Fleet Safety Manual (contractor supplied bleach level of 50 mg/L of free chlorine). The fresh water distribution system valves shall be opened to ensure the chlorine reaches into the entire associated pipe work. This water / chlorine shall be allowed to sit in the system for a minimum of 4 hours.

3.1.13 The Chlorinated water shall be removed and disposed of by the contractor in accordance with Provincial and Federal Regulations. (It can be neutralized with hydrogen peroxide, according to the procedures identified in the fleet safety manual). After removing the super-chlorinated water from the tanks, they shall be flushed with 2 full volumes of fresh potable water until a free chlorine level of less than 0.5 mg/L is obtained.

3.1.14 The contractor shall quote on sending a water sample from the completed tanks to an accredited laboratory for testing. The testing shall be in accordance to the Fleet Safety Manual Standards and meet the 28 parameters for testing. The original certificate shall be given to the Chief Engineer.

3.1.15 If any coating touch-ups were needed a secondary test 28 parameter test shall be completed after a minimum of 3 days since VOC's sometimes leach out overtime.

3.2 Location

3.2.1 Frames 52-56.

3.3 Interferences

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

Part 4 – Technical Description

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 The contractor shall send a water sample from the completed tanks to an accredited laboratory for testing. The testing shall be in accordance to the Fleet Safety Manual Standards and meet the 28 parameters for testing and drinking water standards as set out by Health Canada. The certificate shall be given to the Chief Engineer.

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Fresh Water Tanks		

4.3 Certification

4.3.1 The Certificate shall be delivered to the vessels Chief Engineer prior to opening the fresh water tanks for shipboard use.

Part 5 - Deliverables

5.1 Drawings / Reports

5.1.1 The Contractor shall provide three copies of a detailed report in electronic format to the Chief Engineer indicating the condition of the fresh water tanks, the work performed and the water reports from the Laboratory.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-09	SPECIFICATION	F6855-180961
Searchlight Replacement		

H-09 Searchlight Replacement

Part 1: SCOPE:

- 1.1** The intent of this specification shall be to remove the Port and Stbd Carlisle & Finch searchlights and replace with new, owner supplied, Colorlight searchlights.
- 1.2** Spec also includes installation of new, owner supplied, step down transformers.
- 1.3** Installation of 22" led monitor and PiPc module on bridge for the searchlight mounted cameras.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Colorlight Installation manual CL38
- 2.1.2** Colorlight Manual CL38
- 2.1.3** Colorlight Elbox CL20-25-35 DIMs
- 2.1.4** Colorlight OP3G operator panel
- 2.1.5** Color PiPc module owner's manual
- 2.1.6** CMP-01Mount Pole Installation manual
- 2.1.7** Transfab Transformer Spec Sheet

2.2 Standards

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

2.3 Regulations

- 2.3.1** The testing of this equipment must be witnessed by the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class.

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2.3.2 The testing shall be in accordance to Transport Canada (TC) Inspector and/or ABS Class regulations.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

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

3.1.2 Prior to work commencing, both searchlights shall be locked out; breakers EP5 and EP8 located on the 460v distribution in the emergency generator compartment.

3.1.3 Deckhead panels shall be removed in the wheelhouse, foscle deck alleyway, officers' washroom and Emergency Generator Space to access cable trays, all shall be reinstalled after work is complete.

3.1.4 Port and Stbd searchlights shall be disconnected electrically and removed from their mounts. Wires to be pulled back through the kick pipes in the wheelhouse deckhead. All existing cabling to be removed in its entirety to the associated joystick control panels in the wheelhouse and power control panels in the wheelhouse. Contractor shall crop 6 kickpipes for existing port and 6 kickpipes for existing stbd searchlights. Contractor shall install one new multi-cable transit on port side and one new on stbd side for new searchlight wires. Transits must be installed to Transport Canada (TC) Inspector and/or ABS Class standards.

3.1.5 Electric connection boxes shall be removed from search light support bases, on wheelhouse top, and disposed of.

3.1.6 Contractor shall fabricate two stub sections to extend the height of the searchlight mounts. Stub sections to consist of ½" steel plate for top and bottom bases, dimensions to be taken from current mount base and base of new search light. Post to consist of a section of 8" schedule 80 pipe, welded to top and bottom bases. Overhaul height of stub sections to be 12". Stub sections to be drilled and

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bolted to current support base and search light base. The new Searchlights shall be lifted onto their bases and secured using the supplied anti-vibrations dampers.

- 3.1.7** The old power control panels for the searchlights are located in the Wheelhouse located on Port and Stbd Bridge Wings. The existing power control panels are to be disconnected from its wiring and removed from the space. The wiring for the searchlights and the controllers to be removed in their entirety. Contractor to bid on removing 10 wire runs (5 wires/ per searchlight) approx. length of 20 ft each. The two power feed cables from 460v distribution panel, approx. 100 ft each shall be removed as well. All holes in paneling to be covered with sheet metal of similar style/color as existing paneling.
- 3.1.8** Contractor shall bolt 2 sections of 2" x 3' x 3/8" flat bar to existing mounts and install a NEMA 4X steel box in place of the power control panels. In each box the contractor will mount 1(one) 440/220V single phase transformer and a 10A circuit breaker. Breakers to be connected on the secondary (output) side of the transformers. All components shall be owner supplied.
- 3.1.9** Contractor shall run 2(two) new 440v feed cables from breakers in emergency generator compartment, to the transformers in electrical enclosures on the Wheel House Bridge Wings Port and Stbd, approx 100 ft each. Contractor shall also run 2(two) 220v feed cables from breakers in new electrical enclosures, to new power supply units, (E-Boxes), on the bridge, approx 20ft each. All new wire to be run, contractor supplied, properly secured in cable trays and the use of proper bulkhead penetrations where required.
- 3.1.10** Contractor to ensure that all disturbed transits are restored to ensure water and fire tight integrity.
- 3.1.11** Two new E-Boxes shall be installed on the bulkhead near the search light transformer enclosures, Chief Engineer shall confirm exact location.
- 3.1.12** Two new cables shall be installed from each searchlight to the power supply units (E-Box). These cables will be factory supply and consist of one 9.1mm cross section and one 10.9mm cross section. The light will come prewired between the searchlight and the E-Box. For the installation of the cables, ONLY the connection from the E-Box is to be removed. The connection to the searchlight is factory sealed to prevent water ingress. Cables shall be run through the kick pipes, along the cable trays in the bridge deckhead, down the interior of the aft wheelhouse bulkhead and out through the bulkhead to the E-Boxes. Cable length is specific from the factory and must not be cut or altered. Any extra cabling to be coiled and secured in the wheelhouse deckhead.

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Searchlight Replacement		

- 3.1.13** The existing controllers are located in the port and stbd Wheel House wing consoles. The old controllers shall be disconnected from the wiring and removed. New controllers to be installed on the main console. Port side to be located just forward of the Nav light panel, stbd side to be located just forward of the whistle control panel. Chief Engineer to confirm exact location.
- 3.1.14** Two new cables shall be installed from each of the new controllers to the E-Boxes. Contractor to run the cables up between bridge windows, across cable tray in deck head, down aft wheelhouse bulkhead and out through to the E-Boxes, approx 40ft port controller and 40ft stbd controller. One cable will be a minimum 14/3 marine cable to be connected to the 24Vdc of the E-Box (terminals 15 & 16). The other cable will be a Cat5e cable that complies with standard TIA/EIA-568-B. The Cat5E cable will be terminated with standard T568A connectors as outlined on page 26 of the installation manual. The Cat5E cable will plug into the E-Box next to the main power input terminals. This Cat5E input is not shown on the installation drawing.
- 3.1.15** Contractor shall install a new owner supplier 22" monitor and Color PiPc module in the wheelhouse. Monitor to be mounted above the current CCTV monitor, stbd side of wheelhouse, and mounted from the deckhead with owner supplier mount. PiPc module shall be mounted underneath the console. Both units to be plugged into owner supplied power bar, also to be mounted underneath console.
- 3.1.16** Video cables from both searchlight cameras shall be run down through kick pipes, across the wheelhouse deckhead wire ways, down behind the window pillars and into the PiPc module. Additional video cable to be run from PiPc module to monitor. All wiring to be properly labeled and secured.
- 3.1.17** The type, style and size of all cabling shall be as specified in the manufacturer's documentation. All cables shall be connected to the appropriate equipment and power sources as specified in the manufacturer's documentation.
- 3.1.18** All cables shall be tagged with circuit identification at all points of connection and on both sides of bulkheads, decks and barriers. The tags will be metal, compatible with the cable sheath and shall have a circuit designation embossed thereon. Both ends of the tag shall be secured to the cable with metal tape or metal ty-raps. All cables shall be properly secured along their length with ty-wraps.
- 3.1.19** All new and disturbed steel shall be coated with two coats of contractor supplied primer.

3.2 Location

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Searchlight Replacement		

- 3.2.1** Searchlights are located forward on wheelhouse top, port and stbd.
- 3.2.2** Power supply units are located in the wheel house on port and stbd bridge wings.
- 3.2.3** Searchlight controls are located in port and stbd bridge wing consoles in the wheelhouse.
- 3.2.4** Control panels will be moved to new locations, as stated above in the specification.
- 3.2.5** Transformers will be mounted in the Wheel House in the location of the old port and stbd searchlight power supply units.

3.3 Interferences

- 3.3.1** Contractor is responsible for all interference items that may require attention during the install of the searchlights.
- 3.3.2** Contractor is responsible for any and all scaffolding, craneage or man lifts.

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

- 4.2.1** All new cabling shall be tested/inspected, as per manufactures recommendations, to ensure there has been no damage during installation.
- 4.2.2** All aspects of the searchlights' operations shall be proven operational in the presence of the Chief Engineer, Commanding Officer and Chief Officer. Searchlights to be run up for a minimum of 1(one) hour.
- 4.2.3** Cameras to be run up and video feed to be proven operation on the monitors, ensuring both feeds can be viewed on the one screen.

4.3 Certification

- 4.3.1** N/A

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Searchlight Replacement		

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-10	SPECIFICATION	F6855-180961
Aft Shaft Bearing Install		

H-10 Aft Shaft Bearing Install

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to install a new aft shaft pedestal bearing.
- 1.2** This work shall be carried out in Conjunction with the following:
 - 1.2.1** HD-13 Rudder Removal and Survey.
 - 1.2.2** HD-14 Propeller and Mechanism.

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** Podeidon – Aft Intermediate Shaft Bearing
- 2.2 Standards**
 - 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.3 Regulations**
 - 2.3.1** Canada Shipping Act 2001
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.
 - 2.4.2** Shaft Bearing supplied by owner

Part 3 – Technical Description

- 3.1 General**
 - 3.1.1** Contractor shall drain oil from existing aft bearing and dispose of oil according to regulation.
 - 3.1.2** Contractor shall remove and dispose of old bearing and cooling water lines.
 - 3.1.3** Shaft surfaces to be protected during removal.

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Aft Shaft Bearing Install		

3.1.4 The new bearing requires a modification to the structural arrangement for supporting the shaft in order for the new bearing to fit. A Scope of work has been drawn up by Poseidon Marine what was submitted and approved by Transport Canada. Using this scope of work the mounting plate is to be lowered to the height required to fit the new bearing.

3.1.5 Contractor to install new bearing casing and re-weld adjusting bolt brackets.

3.1.6 Contractor shall use owner supplied Vibracon mounts in place of Chock Fast.

3.1.7 Mounts are to be installed as per manufacturers instructions.

3.1.8 Any disturbed paint is to be cleaned and repainted.

3.1.9 Contractor shall ensure proper alignment between shaft and bearings.

3.1.10 Contractor to attach cooling using new contractor supplied flexible lines and stainless fittings. Contractor is to reinstall temperature probes in bearing casings.

3.1.11 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

3.2 Location

3.2.1 Shaft tunnel below Auxiliary machinery space

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

4.2.1 During sea trials the bearing shall be tested by taking temperature readings every 15 minutes for the duration of the trials to ensure there is no overheating on the bearing.

4.3 Certification

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Aft Shaft Bearing Install		

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-11	SPECIFICATION	F6855-180961
Watertight Door Install		

NOTE FROM BIDDERS CONFERENCE:

As per ASTM F1196-00 standards for sliding watertight doors. Sliding watertight door assemblies that incorporate a non-metallic gasket between the door and frame shall be hose tested after installation. Water at a hose pressure of 50psi shall be supplied through a smooth bore nozzle with an orifice opening of 5/8" inch, attached to a 1 1/2" inch hose. The nozzle shall be held at a distance of no greater than 5ft from the door. The stream shall be directed at all points of the door/frame interface. No leakage shall occur.

H-11 Watertight Door Install

Part 1 - Scope

- 1.1 The intent of this specification shall be for the contractor to remove 2 existing watertight doors and frames and install new Government Supplied

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 Podeidon –

2.2 Standards

- 2.2.1 Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

- 2.3.1 Canada Shipping Act 2001

2.4 Owner Furnished Equipment

- 2.4.1 The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.
- 2.4.2 2 new GSM Watertight Doors

Part 3 – Technical Description

3.1 General

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Watertight Door Install		

- 3.1.1** Contractor shall disconnect and drain all hydraulic connections required to drain the oil from the 2 aft watertight doors.
- 3.1.2** Contractor shall follow included Poseidon Marine drawing for the cut out and reinstall of new GSM Watertight doors.
- 3.1.3** Upon completion of install contractor shall hook up all hydraulic connections previously disconnected and top up system with GSM hydraulic oil.
- 3.1.4** Upon completion of all hookups, contractor shall operate door to ensure correct operation.
- 3.1.5** Final approval shall be obtained upon completion of a function test of both doors in viewing of Transport Canada (TC) Inspector and/or ABS Class Surveyor.

3.2 Location

- 3.2.1** Fwd and Aft of Aft Machinery Space

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

- 4.2.1** Contrator shall operate both doors from all remote and local stations and ensure the door closes the required distance and within the required time required by Transport Canada (TC) Inspector and/or ABS Class Surveyor
- 4.2.2** Once doors are closed, contractor shall hose test the door from both sides using ships water supply. Hose test shall be performed to the satisfaction of the Chief Engineer, Commanding Officer, Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.3 Certification

- 4.3.1** N/A

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Watertight Door Install		

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-12	SPECIFICATION	F6855-180961
Liferaft Annual Inspection and Servicing		

H-12 Liferaft Annual Inspection and Servicing

Part 1 - Scope

- 1.1** The Contractor shall remove and transport the ships liferafts and hydrostatic releases to and from an authorized service center for servicing.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

PART 3 - TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The Contractors quote shall include the removal of the vessels two (2) 25 man DBC inflatable liferafts and releases from the ship and transport them to the OEM service center for annual inspection. Upon return of the rafts they are to be replaced onboard the vessel in their respective locations and secured as directed by Chief Officer
- 3.1.2** An allowance of \$900 per liferaft shall be quoted for replacement of survival equipment for a total allowance of \$1800 for this specification item; this cost shall be adjusted by PWGSC 1379 action on proof of invoice.

3.2 Location

- 3.2.1** 1 X 25 Man DBC Liferaft – Bridge Deck Port

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Liferaft Annual Inspection and Servicing		

3.2.2 1 X 25 Man DBC Liferaft – Bridge Deck Stbd

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and/or SVMM.

4.2 Testing

4.2.1 Testing shall be completed as per OEM service center.

4.3 Certification

4.3.1 Contractor shall deliver 2 hard copies of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 1 electronic copy of all reports/certs to VMM.

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-13	SPECIFICATION	F6855-180961
Aft Aux Machinery Space Deck Penetration Repairs		

BIDDERS CONFERENCE NOTE: Hatches have arrived and will be delivered with vessel.

H-13 Aft Aux Machinery Space Deck Penetration Repairs

Part 1 - Scope

- 1.1** The Contractor shall use provided MSI drawing to close off any openings in Aft Aux Machinery Deck.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** MSI Drawing – Cygnus Aux Machinery Space Deck. New W/T Penetrations Key Plan

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

PART 3 - TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The contractor shall make the repairs noted in the included drawing and install 2 new GSM hatches on fwd and aft shaft tunnel access ladders as per MSI drawing.
- 3.1.2** Any new penetrations found during repairs shall be addressed by PWGSC 1379 action.

3.2 Location

- 3.2.1** Aft Machinery Space

3.3 Interferences

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Aft Aux Machinery Space Deck Penetration Repairs		

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** Contractor shall deliver 1 hard copies of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM.

Part 5 - Deliverables

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

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Spec Item #: H-14	SPECIFICATION	F6855-180961
Female Washroom Deck Refurbishment		

H-14 Female Washroom Deck Refurbishment

Part 1: SCOPE:

- 1.1 Replace the deck material in the Female Washroom with a Seamless Deck Epoxy System and measure deck plate thickness and repair if necessary.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 N/A

2.2 Standards

- 2.2.1 Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.2 Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.3 ISM hot work, Confined Space entry, and fall protection procedures are to be strictly enforced.
- 2.2.4 All welding shall be as per specification preamble.
- 2.2.5 CG Lockout Procedure.

2.3 Regulations

- 2.3.1 All deck covering materials shall be non-combustible, approved by TCMS for its intended usage, and shall comply with the requirements of hull construction Regulations – Part X “Fire protection for cargo ships of 500 Tons Gross Tonnage or more” Method 1C.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

Existing Configuration:

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Female Washroom Deck Refurbishment		

- 3.1.1** The washroom is equipped with two toilets and two shower stalls and a sink vanity. The total deck area is 82 square feet.

3.2 Deck

- 3.2.1** The contractor shall arrange the services of a professional flooring company to complete the flooring renewals including labour, supply of materials and all equipment, tools and consumables as outlined in work below.

The professional flooring company laying the underlayment shall also be responsible for the preparation of the deck as the surface profile is critical to the manufacturer's guidelines for the underlayment application.

The professional flooring company and all their installers must be trained and certified for Dexotex(or equivalent) Installation to ensure efficient timelines.

- 3.2.2** The two toilet stalls, toilets and vanity are to be removed, stored and reinstalled when the deck is completed.
- 3.2.3** The whole of the steel deck in the areas listed in Section 3.2 are to be prepped to SP11 by flooring contractor with NACE 2 certified inspector on staff to perform salt and temp readings on steel deck.
- 3.2.4** The contractor shall have an ultrasonic NDT technician take 12 ultrasonic shots on the exposed steel to establish the amount of deck plating if any to be replaced. The Chief Engineer in consultation with the NDT technician will decide the best locations for the ultrasonic shots. Before testing, the Contractor shall at each identified test location grind the surface coating to bare metal while ensuring that any dishing of the metal is prevented. Contractor shall prepare and supply a report on the findings and amount of plating to be replaced to Chief Engineer immediately after the testing is complete. This Survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any to be replaced.
- 3.2.5** Before any more remedial work on this item is commenced; Chief engineer shall invite Transport Canada (TC) Inspector and/or ABS Class Surveyor to inspect the deck to ascertain if additional testing/repairs are required and so that proper notes for future vessel hull surveys can be made. Contractor shall also quote on unit cost per additional ultrasonic shot and shall be adjusted up or down by PWGSC 1379 action.

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Female Washroom Deck Refurbishment		

- 3.2.6** The Contractor shall crop out, dispose of and replace any deteriorated deck plating as determined by TCMS. The new plating must also have the proper mill certification; copy of same shall be given to Chief Engineer and TCMS inspectors.
- 3.2.7** The Contractor shall bid on replacing 5 Square feet of 3/8 inch deck plating in the Wash room. Contractor shall also quote on unit price per square foot of deck plate replacement. Deck Plating required shall be adjusted up or down by PWGSC 1379 action. The contractor shall also bid on the replacement of one deck scupper if required to be adjusted using PWGSC 1379 if not needed.
- 3.2.8** All steel decks(new and existing) and bottom section of bulkheads are to be coated under the supervision of NACE 2 inspector, with 2 coats of Amercoat 83HS (or equivalent) epoxy primer following paint manufacturer application procedures, and time required between coats. Thickness and temperature readings shall be recorded.
- 3.2.9** The contractor shall supply and install approx. 82 ft2 area of Transport Canada IMO approved Insul-Dex system installed by Certified Marine Dexotex installer at a thickness specified by the manufacturer. Thickness and temp readings shall be taken at time of install
- 3.2.10** After Insul-Dex has cured it is to be covered by a VLW IMO bond coat installed by certified dexotex marine installer. Thickness and temp readings shall be taken at time of install. VLW IMO underlayment shall be installed by certified dexotex marine installer on top of the VLW IMO bond coat.
- 3.2.10** The contractor shall install a Dexotex Seamless Epoxy deck system (color to be determined) in accordance with manufacturers' specifications.

3.3 Sink and Mirror

- 3.3.1** The Contractor shall disconnect and remove existing sink and vanity, these items to be stored for re-use. The contractor shall bid on replacing water pipe deck penetrations if required, to be adjusted using PWGSC 1379 if not needed.
- 3.3.2** When deck work is completed, all piping and drain connection shall re-oriented to fit and re-connected.
- 3.3.3** The Contractor shall re-install Vanity sink.

3.4 Toilets

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Female Washroom Deck Refurbishment		

3.4.1 The two toilets shall be removed and re-installed when deck work is completed. The deck shall be cleaned to bare metal. This shall be done prior to taking ultrasonic shots. New toilet securing studs shall be stainless steel. The toilet shall be installed on new contractor supplied Teflon pad; some minor rework of ABS pipe in the toilet area may be required.

3.5 Location

3.5.1 Main Deck forward

3.6 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 All welding shall be as per specification preamble.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 The Contractor shall prepare and supply a report on the ultrasonic shots. This survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any, to be replaced.

5.1.2 All reports from the work specified shall be given to the Chief Engineer.

5.2 Spares

5.2.1 N/A

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5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-15	SPECIFICATION	F6855-180961
Tow Winch Install		

H-15 Tow Winch Install

Part 1: SCOPE:

- 1.1** Contractor shall lift GSM Tow Winch onto vessel and install as per include MSI drawing.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.2** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.3** ISM hot work, Confined Space entry, and fall protection procedures are to be strictly enforced.
- 2.2.4** All welding shall be as per specification preamble.
- 2.2.5** CG Lockout Procedure.

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** Contractor shall install new owner supplied tow winch on the aft main deck using supplied MSI installation drawing.
- 3.1.2** Contractor shall install new owner supplied deck penetration in aft deck and connect to the hydraulic drain line on winch and to tie into existing drain line for aft deck capstan.

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Tow Winch Install		

3.1.3 Contractor shall install and connect new GSM power beyond sleeve onto existing capstan control valve. Contractor shall supply and install new hydraulic hose from tow winch to existing capstan control valve.

3.1.4 Contractor shall fabricate and install guard to cover hydraulic hose on aft deck. Tabs shall be welded to deck to allow for cover to be bolted in place for easy removal and painting. Guards shall be steel construction and primed and painted as per spec.

3.1.2 Contractor shall coat all disturbed decking as per coating system described in H-23.

3.2 Location

3.2.1 Main Deck Aft

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 All welding shall be as per specification preamble.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 All reports from the work specified shall be given to the Chief Engineer.

5.2 Spares

5.2.1 N/A

5.3 Training

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Tow Winch Install		

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-16	SPECIFICATION	F6855-180961
Crab Pot Hauler & Davit Install		

H-16 Crab Pot Hauler & Davit Install

Part 1: SCOPE:

- 1.1 Contractor shall install base for crab pot hauler davit on stbd foc'sle deck as per drawings from MSI.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 MSI Drawing

2.2 Standards

- 2.2.1 Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.2 Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.3 ISM hot work, Confined Space entry, and fall protection procedures are to be strictly enforced.
- 2.2.4 All welding shall be as per specification preamble.
- 2.2.5 CG Lockout Procedure.

2.3 Regulations

- 2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1 Contractor shall install new owner supplied crab pot davit and hauler on foc'sle deck using supplied MSI installation drawing.

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Crab Pot Hauler & Davit Install		

3.1.2 Contractor shall install 4 GSM deck penetrations, 2 near current hydraulic controls and 2 near davit base. Contractor shall connect new valve bank to deck penetrations using contractor supplied hydraulic hose.

3.1.3 Contractor shall paint all disturbed deck area using GSM supplied primer and paint.

3.2 Location

3.2.1 Foc'sle Deck

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 All welding shall be as per specification preamble.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 All reports from the work specified shall be given to the Chief Engineer.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

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Crab Pot Hauler & Davit Install		

5.4.1 N/A

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Spec Item #: H-17	SPECIFICATION	F6855-180961
Bilge Valve Manifold Replacement		

H-17 Bilge Valve Manifold Replacement

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to remove existing Valve Manifolds as listed below and replace with new GSM Manifolds.
- 1.2** This spec item is dependent on delivery of the bilge manifolds prior to Oct 5th, 2018. These manifolds are currently out for tender with a separate PWGSC contract. If manifolds have not arrived prior to Oct 5th, 2018 this spec item will be cancelled.
- 1.3** Manifolds required for replacement are:
 - 1.2.1** Bilge Pump Suction Manifold
 - 1.2.2** Bilge Manifold Fwd Engine Room
 - 1.2.3** To Bilge Main
 - 1.2.4** To Bilge Main
 - 1.2.5** General Service and Fire Pump

Part 2 - References

- 2.1 Guidance Drawings/Nameplate Data**
 - 2.1.1** N/A
- 2.2 Standards**
 - 2.2.1** N/A
- 2.3 Regulations**
 - 2.3.1** N/A
- 2.4 Owner Furnished Equipment**
 - 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3 – Technical Description

- 3.1 General**

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Bilge Valve Manifold Replacement		

3.1.1 Contractor shall remove existing manifolds and install new GSM manifolds.

3.1.2 Contractor shall supply all necessary bolts, nuts, washers, gasket material and other material required for this job.

3.1.3 Upon completion of job, manifolds shall be put in operation and tested for leaks.

3.1.4 Any additional pipework required to fit the manifolds shall be covered under PWGSC 1379 action.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 Manifolds shall be function tested to the satisfaction of the Chief Engineer and the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor

4.3 Certification

4.3.1 N/A

Part 5 - Deliverables

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

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5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-18	SPECIFICATION	F6855-180961
Main Engine Lube Oil Duplex Filter Replacement		

BIDDERS CONFERENCE NOTES:

3.1.9 - The relocation of the filter housings will facilitate modification and fabrication of the 4" diameter schedule 80 supply and discharge pipework of both housings.

H-18 Main Engine Lube Oil Duplex Filter Replacement

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to remove the existing Port and Stbd Main Engine Lube Oil filter housings (4 in total) and relocate and replace with new, owner supplied, lube oil filter housings of new design (2 in total).
- 1.2 Specification also includes modification or replacement of existing pipework as required to facilitate new filter housing installation.
- 1.3 Fabrication of mounting frames and bases will also be required for the new mounting locations.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

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

2.3 Regulations

2.3.1 The testing of this equipment must be witnessed by the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

2.3.2 The testing shall be in accordance to Transport Canada (TC) Inspector and/or ABS Class Surveyor regulations.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

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Main Engine Lube Oil Duplex Filter Replacement		

3.1 General

- 3.1.1** Contractor to ensure prior to any work commencing that both the Contractor Basic Safety Familiarization and Pre Job Safety Assessment are completed and signed off.
- 3.1.2** Prior to work commencing, both lube oil filter housing isolation valve's (suction and discharge) shall be locked out; also both main engine pre-lube and circulating pump breakers located in MCR on MCC #1 and MCC #3 to be tripped off and locked out.
- 3.1.3** Existing lube oil filter housings (2 housings port and 2 housings stbd) to be disconnected from the suction and discharge manifolds at the flanges.
- 3.1.4** Entire filter housings (4 in total) to be disconnected from the base mounts and removed from vessel by contractor. Note that these housings are of dimensions approx. 20" x 12" x 20" and of steel construction weighing approx. 100 lb each. Contractor shall provide equipment required to remove the filter housings from their mounted locations and to be disposed of ashore.
- 3.1.5** New filter housings (supplied by owner) to be relocated and mounted in location identified by Chief Engineer. Stbd housing to be relocated on Generator deck (stbd side fwd of S/S Gen.) approx. 3 feet above existing location. Port filter housing to be mounted on lower deck of Engine Room (Port side forward) near fuel transfer pump station approx. 12 ft from current location. Please note that the new filter housings are of one piece construction whereas the current system has two housings per side.
- 3.1.6** Contractor shall fabricate mounting frames to facilitate mounting and securing new filter housings. Note that the Port side filter location currently has mounting frames in place that will require small modifications to suit housing installation. Stbd filter housing location is flat plate and will require framing to be installed to facilitate mounting of filter housing. Framing to be completed with 2 pieces of 3" x 3" angle iron approx. 3 ft in length to match mounting flanges on the filter assembly. Angle iron to be welded to Gen. deck plating in a stitch welding pattern.
- 3.1.7** Please note that it is imperative that all pipework and assembly pieces are kept as clean as possible to prevent any foreign material from entering the lube oil system of the main engines. All new pipework to be pickled to remove slag and foreign material prior to installing. Any pipes welded after installation shall be pickled in place. Foreign materials will be detrimental to the main engine lube oil systems. All exposed pipework to be blanked and covered to prevent ingress of foreign material.

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Main Engine Lube Oil Duplex Filter Replacement		

- 3.1.8** Suitable containment measures must be taken when disconnecting pipework to prevent excess lube oil from spilling into engine room bilges. All spaces to be left in an as found condition when work is completed.
- 3.1.9** The relocation of the filter housings will facilitate modification and fabrication of the 4" diameter **schedule 80** supply and discharge pipework of both housings. The Port housing will require an additional 12 ft of inlet piping (flange to flange) and 10 ft of discharge piping (flange to flange). The stbd housing requires approx. 10 ft of discharge piping (flange to flange) and 9 ft of inlet piping (gruvlock coupling to flange). All fabricated pipework to be pressure tested and proven clean prior to installation onboard. The piping routes to be determined by Chief Engineer once the filter housings have been mounted in place.
- 3.1.10** Stbd filter housing will require two stbd side generator deck penetrations to allow passage of the 4" diameter inlet and discharge pipes through the deck plating. Deck penetrations to be equipped with collars.
- 3.1.11** All new pipework to be installed with new Contractor supplied Oil compatible gaskets and new grade 8 mounting hardware. The gruvlock coupling to have a new sealing ring supplied and installed by Contractor. All new pipework to have a minimum of 2 coats of Contractor supplied primer prior to installation.
- 3.1.12** When assembly and installation is completed, Owner supplied filters to be installed into housings and systems returned to operating condition. Both lube oil system's to be operated and leak tested by ship's crew with Contractor present. Once confirmed as leak free the filters will be removed and inspected for debris or foreign materials.
- 3.1.13** System testing to be witnessed and signed off as completed by Chief Engineer.

3.2 Location

- 3.2.1** Current filter housings (2 per side) are located below port and stbd generator decks on engine room lower deck.
- 3.2.2** Stbd filter housing to be re-located to Stbd generator deck in Engine Room, just forward of Stbd S/S generator.
- 3.2.3** Port filter housing to be relocated to Engine Room lower deck, port side fwd near fuel transfer system.

3.3 Interferences

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3.3.1 Contractor is responsible for all interference items that may require attention during the install of the filter housings.

3.3.2 Contractor is responsible for any and all lifting and crange as required.

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of Transport Canada (TC) Inspector and/or ABS Class Surveyor and the Chief Engineer.

4.2 Testing

4.2.1 Once completed both systems to be returned to normal operation and function tested by Ship's Crew. Both systems to be visually inspected for leakage with Contractor representative present.

4.2.2 Chief Engineer to witness function testing of system.

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-20	SPECIFICATION	F6855-180961
P&S Wheelhouse Deck and Bulkhead UT Shots		

NOTE FROM BIDDERS CONFERENCE: Contractor shall take 12 UT Shots on each side of the bridge and shall remove 2 bulkhead panels and interference items to allow for shots to be taken. All panels and items removed shall be reinstalled upon completion of work.

This work shall be completed in conjunction with Spec Item H-09 Searchlight Install.

H-20 P&S Wheelhouse Deck and Bulkhead UT Shots

Part 1: SCOPE:

- 1.1** The intent of this specification shall be for the contractor to carry out an ultrasonic inspection of an area of steel deck and bulkhead on the Port and Stbd Wheelhouse Wings.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The contractor shall remove all paneling and items on the bridge required to gain access to the work area. This will include bulkhead panels, deck head panels and any other items required. The contractor shall also remove the insulation in way of the ship side exterior hull for inspection.

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P&S Wheelhouse Deck and Bulkhead UT Shots		

3.1.2 The contractor shall obtain the services of a certified company to carry out an ultrasonic thickness survey for the deck of the wheelhouse wings. Individual taking the readings shall be level 2 certified.

3.1.3 The contractor shall apply 2 coats of contractor supplied primer (Amercoat 5105) to all new and disturbed steel on the inside of the vessel.

3.1.4 The contractor shall supply and install new insulation on the ship side bulkhead.

3.1.5 The contractor shall reinstall previously removed panels in their original location.

3.2 Location

3.2.1 Port and Stbd Bridge Wings

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES:

5.1 Drawings/Report

5.1.1 The contractor shall provide a report showing the locations and the results of the ultrasonic thickness shots taken on the deck.

5.2 Spares

5.2.1 N/A

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P&S Wheelhouse Deck and Bulkhead UT Shots		

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-21	SPECIFICATION	F6855-180961
Main Engine Lube Oil and Jacket Water Cooler Inspection		

H-21 Main Engine Lube Oil and Jacket Water Cooler Inspection

Part 1: SCOPE

- 1.1** The intent of this specification shall be for the contractor to perform cleaning and pressure testing of lube oil coolers fitted to the port and starboard main engine cooling circuits.
- 1.2** The contractor shall also pressure test only the main engine jacket water coolers. Ships crew will be responsible for disassembly, cleaning and reassembly.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Engine Type: Polar Nohab F212V
- 2.1.2** Cooler Type: Serck Heat Exchanger Type AA40 Dwg. 44367-3051

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The owner shall assist the contractor in identifying the isolation valves for each of the lube oil coolers to prevent excess loss of oil and to limit system contamination. Each valve that is closed by the Contractor shall be marked as such.
- 3.1.2** The Contractor shall be responsible to remove both end covers, when cover from bolted end of tube nest is removed the tube nest retainer is to be installed to keep tube nest in place, and using a tube brush shall run through each individual tube in the nest to clear any appreciable build-up / deposits.

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Main Engine Lube Oil and Jacket Water Cooler Inspection		

3.1.3 The Contractor shall carry out a pressure test of 1.5 X the maximum working pressure. Maximum working pressure for the coolers is 4 Bar. Therefore, the cooler shall be pressure tested to 6 Bar.

3.1.4 The Contractor shall be responsible for arranging the Transport Canada (TC) Inspector and/or ABS Class Surveyor to witness both the internals and the pressure tests of both the port and starboard main engine lube oil and jacket water coolers

3.1.5 The Contractor shall reassemble all disturbed pipe work with new, Contractor supplied, gaskets. All valves that had been closed prior to disassembly will be reopened unless directed otherwise by the Chief Engineer.

3.1.6 The Contractor shall be responsible for the repair of any leaks caused by the removal of piping once the system is returned to operation.

3.2 Location

3.2.1 Engine Room, Port and Starboard

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.1.2 The Contractor shall ensure that Transport Canada (TC) Inspector and/or ABS Class credit is obtained for these items prior to acceptance.

4.2 Testing

4.2.1 Pressure tests shall be held for a minimum of one (1) hour.

4.2.2 Final pressure tests are to be witnessed by Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.3 Certification

4.3.1 N/A

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Main Engine Lube Oil and Jacket Water Cooler Inspection		

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-22	SPECIFICATION	F6855-180961
General Service Pump Survey		

H-22 General Service Pump Survey

Part 1: SCOPE:

- 1.1** The intent of this specification shall be for the contractor to carry inspection of the General Service Pump for Transport Canada (TC) and/or ABS Class credit.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Pump: Hamworthy Type: D125VID2 Serial Number: 48596-10

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

- 2.4.1** The Contractor shall supply all materials and equipment required to perform the specified work unless otherwise stated.
- 2.4.2** Parts requiring replacement shall be owner supplied.

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The Contractor shall isolate the pump both electrically and hydraulically and use proper lockout / tagout procedures as identified per the Fleet Safety and Security Manual.
- 3.1.2** The Contractor shall disassemble the pump and clean the internals prior to taking measurements. All parts are to be examined for wear, corrosion, cracks, distortion or any other damage and be renewed as necessary. Reference must be made to the wear tolerances given in section 1 of the technical data in Maintenance manual. All components shall be marked with locating marks prior to disassembly to ensure proper reassembly.

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General Service Pump Survey		

3.1.3 Removal of the pump and transportation to the Contractor's facility, if required, shall be the responsibility of the contractor.

3.1.4 Measurements to be taken are outlined in section 4.1 of this specification.

3.1.5 After inspection, the pump shall be reassembled to original configuration using new, owner supplied, gaskets and seals.

3.2 Location

3.2.1 Engine Room, Forward

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 The following measurements are to be taken:

- a) shaft and housing diameter
- b) impeller diameter
- c) internal housing (wear ring) diameter
- d) impeller thickness

4.1.2 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor

4.1.3 The contractor shall ensure that Transport Canada (TC) Inspector and/or ABS Class credit is obtained for this item prior to acceptance.

4.2 Testing

4.2.1 Pump shall be run in sea to sea condition for a period of one (1) hour.

4.3 Certification

4.3.1 N/A

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General Service Pump Survey		

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copy of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver 3 electronic copies of all reports to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-24	SPECIFICATION	F6855-180961
Engineers Washroom Deck Refurbishment		

H-24 Engineers Washroom Deck Refurbishment

Part 1: SCOPE:

- 1.1** Contractor shall replace the deck material in the Engineers Washroom with a Seamless Deck Epoxy System. Measure deck plate thickness and repair if necessary.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.2** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.3** ISM hot work, Confined Space entry, and fall protection procedures are to be strictly enforced.
- 2.2.4** All welding shall be as per specification preamble.
- 2.2.5** CG Lockout Procedure.

2.3 Regulations

- 2.3.1** All deck covering materials shall be non-combustible, approved by TCMS for its intended usage, and shall comply with the requirements of hull construction Regulations – Part X “Fire protection for cargo ships of 500 Tons Gross Tonnage or more” Method 1C.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

Existing Configuration:

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Engineers Washroom Deck Refurbishment		

- 3.1.1** The washroom is equipped with two toilets and two shower stalls and two sink vanities. The total deck area is approximately 100 square feet. This area includes the two shower stalls.

3.2 Deck

- 3.2.1** The contractor shall arrange the services of a professional flooring company to complete the flooring renewals including labour, supply of materials and all equipment, tools and consumables as outlined in work below.

The professional flooring company laying the underlayment shall also be responsible for the preparation of the deck as the surface profile is critical to the manufacturer's guidelines for the underlayment application.

The professional flooring company and all their installers must be trained and certified for Dexotex(or equivalent) Installation to ensure efficient timelines.

- 3.2.2** The two toilet stalls, toilets and vanity are to be removed, stored and reinstalled when the deck is completed.
- 3.2.3** The whole of the steel deck in the areas listed in Section 3.1.1 are to be prepped to SP11 by flooring contractor with NACE 2 certified inspector on staff to perform salt and temp readings on steel deck.
- 3.2.4** The contractor shall have an ultrasonic NDT technician take 12 ultrasonic shots on the exposed steel to establish the amount of deck plating if any to be replaced. The Chief Engineer in consultation with the NDT technician will decide the best locations for the ultrasonic shots. Before testing, the Contractor shall at each identified test location grind the surface coating to bare metal while ensuring that any dishing of the metal is prevented. Contractor shall prepare and supply a report on the findings and amount of plating to be replaced to Chief Engineer immediately after the testing is complete. This Survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any to be replaced.
- 3.2.5** Before any more remedial work on this item is commenced; Chief engineer shall invite Transport Canada (TC) Inspector and/or ABS Class Surveyor to inspect the deck to ascertain if additional testing/repairs are required and so that proper notes for future vessel hull surveys can be made. Contractor shall also quote on unit cost per additional ultrasonic shot and shall be adjusted up or down by PWGSC 1379 action.

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Engineers Washroom Deck Refurbishment		

- 3.2.6** The Contractor shall crop out, dispose of and replace any deteriorated deck plating as determined by TCMS. The new plating must also have the proper mill certification; copy of same shall be given to Chief Engineer and TCMS inspectors.
- 3.2.7** The Contractor shall bid on replacing 5 Square feet of 3/8 inch deck plating in the Wash room. Contractor shall also quote on unit price per square foot of deck plate replacement. Deck Plating required shall be adjusted up or down by PWGSC 1379 action. The contractor shall also bid on the replacement of one deck scupper if required to be adjusted using PWGSC 1379 if not needed.
- 3.2.8** All steel decks(new and existing) and bottom section of bulkheads are to be coated under the supervision of NACE 2 inspector, with 2 coats of Amercoat 83HS (or equivalent) epoxy primer following paint manufacturer application procedures, and time required between coats. Thickness and temperature readings shall be recorded.
- 3.2.9** The contractor shall supply and install approx. 82 ft2 area of Transport Canada IMO approved Insul-Dex system installed by Certified Marine Dexotex installer at a thickness specified by the manufacturer. Thickness and temp readings shall be taken at time of install
- 3.2.10** After Insul-Dex has cured it is to be covered by a VLW IMO bond coat installed by certified dexotex marine installer. Thickness and temp readings shall be taken at time of install. VLW IMO underlayment shall be installed by certified dexotex marine installer on top of the VLW IMO bond coat.
- 3.2.10** The contractor shall install a Dexotex Seamless Epoxy deck system (color to be determined) in accordance with manufacturers' specifications.

3.3 Shower Stalls

- 3.3.1** The shower stall deck will be incorporated in the new Seamless Floor as per directions in Section 3.2. The contractor shall bid on the replacement of two shower drain scuppers, to be adjusted using PWGSC 1379 if not required.

3.4 Sinks and Mirrors

- 3.4.1** The Contractor shall disconnect and remove existing sinks and vanity, these items to be stored for re-use. The contractor shall bid on replacing water pipe deck penetrations if required, to be adjusted using PWGSC 1379 if not required.
- 3.4.2** When deck work is completed, all piping and drain connection shall be re-oriented to fit and re-connected.

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3.4.3 The Contractor shall re-install Vanity sinks.

3.5 Toilets

3.5.1 The two toilets shall be removed and re-installed when deck work is completed. The deck shall be cleaned and prepped as per Section 3.2. This shall be done prior to taking ultrasonic shots. New toilet securing studs shall be stainless steel. The toilet shall be installed on new contractor supplied Teflon pad; some minor rework of ABS pipe in the toilet area may be required.

3.6 Location

3.6.1 Main Deck Aft

3.7 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 All welding shall be as per specification preamble.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 The Contractor shall prepare and supply a report on the ultrasonic shots. This survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any, to be replaced.

5.1.2 All reports from the work specified shall be given to the Chief Engineer.

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Engineers Washroom Deck Refurbishment		

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-25	SPECIFICATION	F6855-180961
Capt and Chief Eng Washroom Deck Refurbishment		

H-25 Capt and Chief Eng Washroom Deck Refurbishment

Part 1: SCOPE:

- 1.1** Replace the deck material in the captains and chief engineers Washroom with a Seamless Deck Epoxy System. Measure deck plate thickness and repair if necessary.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.2** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.3** ISM hot work, Confined Space entry, and fall protection procedures are to be strictly enforced.
- 2.2.4** All welding shall be as per specification preamble.
- 2.2.5** CG Lockout Procedure.

2.3 Regulations

- 2.3.1** All deck covering materials shall be non-combustible, approved by TCMS for its intended usage, and shall comply with the requirements of hull construction Regulations – Part X “Fire protection for cargo ships of 500 Tons Gross Tonnage or more” Method 1C.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

3.1 General

Existing Configuration:

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- 3.1.1** The washrooms are each equipped with one toilet, one shower stall and a one sink vanity. The total deck area in captains washroom is approximately 32 square feet and the chief engineer's washroom is approximately 30 square feet. Shower stalls not included.

3.2 Deck

- 3.2.1** The contractor shall arrange the services of a professional flooring company to complete the flooring renewals including labour, supply of materials and all equipment, tools and consumables as outlined in work below.

The professional flooring company laying the underlayment shall also be responsible for the preparation of the deck as the surface profile is critical to the manufacturer's guidelines for the underlayment application.

The professional flooring company and all their installers must be trained and certified for Dexotex (or equivalent) Installation to ensure efficient timelines.

- 3.2.2** Contractor shall include the raised combing around the perimeter of the washroom in removals
- 3.2.3** The whole of the steel deck in the areas listed in Section 3.2 are to be prepped to SP11 by flooring contractor with NACE 2 certified inspector on staff to perform salt and temp readings on steel deck.
- 3.2.4** The contractor shall have an ultrasonic NDT technician take 10 ultrasonic shots on the exposed steel to establish the amount of deck plating if any to be replaced. The Chief Engineer in consultation with the NDT technician will decide the best locations for the ultrasonic shots. Before testing, the Contractor shall at each identified test location grind the surface coating to bare metal while ensuring that any dishing of the metal is prevented. Contractor shall prepare and supply a report on the findings and amount of plating to be replaced to Chief Engineer immediately after the testing is complete. This Survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any to be replaced.
- 3.2.5** Before any more remedial work on this item is commenced; Chief engineer shall invite Transport Canada (TC) Inspector and/or ABS Class Surveyor to inspect the deck to ascertain if additional testing/repairs are required and so that proper notes for future vessel hull surveys can be made. Contractor shall also quote on unit cost per additional ultrasonic shot and shall be adjusted up or down by PWGSC 1379 action.

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- 3.2.6 The Contractor shall crop out, dispose of and replace any deteriorated deck plating as determined by TCMS. The new plating must also have the proper mill certification; copy of same shall be given to Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.
- 3.2.7 The Contractor shall bid on replacing 2 Square feet of 3/8 inch deck plating in the Wash room. Contractor shall also quote on unit price per square foot of deck plate replacement. Deck Plating required shall be adjusted up or down by PWGSC 1379 action. The contractor shall also bid on the replacement of two deck scuppers if required to be adjusted using PWGSC 1379 if not needed.
- 3.2.8 All steel decks (new and existing) and bottom section of bulkheads are to be coated under the supervision of NACE 2 inspector, with 2 coats of Amercoat 83HS (or equivalent) epoxy primer following paint manufacturer application procedures, and time required between coats. Thickness and temperature readings shall be recorded.
- 3.2.9 The contractor shall supply and install approx. 82 ft2 area of Transport Canada IMO approved Insul-Dex system installed by Certified Marine Dexotex installer at a thickness specified by the manufacturer. Thickness and temp readings shall be taken at time of install
- 3.2.10 After Insul-Dex has cured it is to be covered by a VLW IMO bond coat installed by certified dexotex marine installer. Thickness and temp readings shall be taken at time of install. VLW IMO underlayment shall be installed by certified dexotex marine installer on top of the VLW IMO bond coat.
- 3.2.10 The contractor shall install a Dexotex Seamless Epoxy deck system (color to be determined) in accordance with manufacturers' specifications.

3.3 Sinks and Mirrors

- 3.3.1 The Contractor shall disconnect and remove existing sinks and vanities, these items to be stored for re-use. The contractor shall bid on replacing water pipe deck penetrations if required, to be adjusted using PWGSC 1379 if not needed.
- 3.3.2 When deck work is completed, all piping and drain connection shall be re-oriented to fit and re-connected.
- 3.3.3 The Contractor shall re-install Vanity sinks.

3.4 Toilets

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3.4.1 The two toilets shall be removed and re-installed when deck work is completed. The deck shall be cleaned to bare metal. This shall be done prior to taking ultrasonic shots. New toilet securing studs shall be stainless steel. The toilet shall be installed on new Contractor supplied Teflon pad; some minor rework of ABS pipe in the toilet area may be required. Toilet in captains bathroom is to be replaced with new owner supplied toilet.

3.5 Location

3.5.1 Foscle deck

3.6 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 All welding shall be as per specification preamble.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 The Contractor shall prepare and supply a report on the ultrasonic shots. This survey report shall include the metal thickness measurements; and diagram(s) of the deck showing the test points and plating, if any, to be replaced.

5.1.2 All reports from the work specified shall be given to the Chief Engineer.

5.2 Spares

5.2.1 N/A

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5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: H-26	SPECIFICATION	F6855-180961
Port Clutch Element Replacement		

H-26 Port Clutch Element Replacement

Part 1: SCOPE:

- 1.1** The intent of this specification shall be for the contractor to supply the services of a FSR to supervise the replacement of the Port Clutch Elements and testing of the vessels main engine port. The contractor shall provide labour under the direction of the FSR.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

2.1.1 Pneumaflex

Type & Size: KAE260 SHD/1299-1300

Hardness Degree of Rubber Elements "SHD"

Input Speed 750 rpm

Order No. 14/321 017-1

Weight: approx. 880 kg

2.1.2 Lohmann and Stolterfoht Installation-Operation-Maintenance-Including Parts and

Drawings Manual

Installation Drawing No. 3/1637/5020/0

2.2 Standards

2.2.1 Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

2.3.1 Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:

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Port Clutch Element Replacement		

3.1 General

- 3.1.1** The contractor shall supply the services of a Factory Service Representative (FSR) to carry out overhaul, testing and survey of the vessels main engine port clutch.
- 3.1.2** Bosch Rexroth is Representative for Pneumaflex. Contact information is as follows:
- 3.1.3** Scott Whalen – General Manager - North Point Technical Services
(cell) - 1709-749-1747 (Office) 1-709-722-7282
SWhalen@NorthPointTS.com
- 3.1.4** The Contractor shall include in their bid an allowance of \$6000.00 for the services of the FSR. The actual cost shall be adjusted by 1379.
- 3.1.5** Ships' crew will isolate and lockout electrical control and air supply to both port and stbd clutches.
- 3.1.6** Contractor shall remove the guard housings that cover port clutch, any piping, wiring, etc. deemed necessary to facilitate the removal of the clutch assembly.
- 3.1.7** Prior to commencing the work in this specification, the contractor shall record the axial and radial run out with the each clutch disengaged and engaged. Contractor shall compare readings with the manufactures tolerances to see if current readings are still within spec. Contractor shall check condition of all pickups and measure and record distances between pickups and pins.
- 3.1.8** Prior to clutch being uncoupled the contractor shall measure and record the thickness of the friction pad linings on the input and output sides of the clutch. Contractor shall measure and record the torsional angle of twist on the Pneumaflex elements. Contractor shall ensure all faces and flanges are properly marked for subsequent reassembly and correct orientation. Contractor to reference to the service manual on the proper procedure to carry out all tasks. Any items found outside manufactures recommended values are to be replaced.
- 3.1.9** All fitted bolts and bolt holes shall be marked to ensure they are reinstalled in their original locations
- 3.1.10** Contractor shall remove port clutch from engines and gearbox and lay out for inspection. All components shall be cleaned and inspected for wear and damage. All measurements and clearances, shall be taken and recorded in accordance with manufacturers specifications.

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- 3.1.11** All magnetic pins on the input and output sides of the clutch shall be inspected and replaced if damaged.
- 3.1.12** Contractor shall rebuild the clutch with all new seals, o-rings, gaskets and clutch linings, if required.
- 3.1.13** Owner to supply all required replacement parts.
- 3.1.14** Upon completion of reassembly of clutch pack, contractor to perform air pressure test of 100 psi on the clutch assembly to prove all seals properly aligned and tight and operating properly, Chief Engineer to witness.
- 3.1.15** Contractor shall re-install clutch using new nylock nuts for the fitted bolts; care is to be taken to ensure the fitted bolts are installed in original bolt holes. After installation radial and axial alignment of the clutch to be measured and recorded with both the clutch disengaged and engaged. Contractor shall measure and record the torsional angle of twist on the Pneumaflex elements. Contractor to adjust working pressure and check engagement time and adjust as required as per manufactures specifications. Contractor to ensure line-up bolts are removed upon completion of fastening of forward flange to crankshaft flange.
- 3.1.16** Contractor shall reinstall the guard housings that cover port clutch, any piping, wiring, etc. that was prior removed.
- 3.1.17** Upon completion of work, Contractor to test operation of clutch with engine running, ship alongside dock. Slippage to be adjusted if required. Contractor to monitor temperature of clutch assembly for a period of one hour, with use of infrared hand held temperature gun.
- 3.1.18** Upon completion of dock trials, vessel to carry out 2 hours of sea trials with the contractor in attendance. During sea trials the clutch will be subjected to various load conditions. Contractor to monitor clutch assembly temperature throughout the sea trials.

3.2 Location

- 3.2.1** Engine room.

3.3 Interferences

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

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Port Clutch Element Replacement		

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

4.2.1 Testing to be completed as per item 3.1.16 of this specification.

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 The contractor shall arrange for the North Point FSR to supply three typewritten reports in both electronic or hardcopy formats detailing all measurements taken, detailed list of work completed and list and quantity of parts used to the Chief Engineer at the completion of the work.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-01	SPECIFICATION	F6855-180961
Main Engine Crankshaft Deflections		

E-01 Main Engine Crankshaft Deflections

PART 1 - SCOPE:

- 1.1** The intent of this specification shall be for the contractor to carry out a complete set of crankshaft deflections/thrust clearances on both the port and starboard main engines prior and after drydocking.

PART 2 - REFERENCES:

- 2.1** Guidance Drawings/Nameplate Data
- 2.1.1** Procedure available from Wartsila service manual on vessel.
- 2.2** **Standards**
- 2.2.1** N/A
- 2.3** **Regulations**
- 2.3.1** N/A
- 2.4** **Owner Furnished Equipment**
- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

PART 3 - TECHNICAL DESCRIPTION:

- 3.1** **General**
- 3.1.1** The contractor shall carry out a complete set of crankshaft deflections/thrust clearances on both the port and starboard main engines prior to and after drydocking.
- 3.1.2** The contractor shall be responsible for removal and reinstallation of crankcase doors and associated equipment to allow access to perform the deflections. Sufficient cool down time after main engine shutdown shall be allowed for prior to commencement of the deflections.

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Main Engine Crankshaft Deflections		

3.1.3 These deflections shall be taken when the vessel is at the same draft, trim, and loaded condition as is required to enter the drydock. The main engine temperature is to be at the normal temperature (40 degrees Celsius) required for starting.

3.1.4 The procedure for taking main engine crankshaft deflections is to be as per the manufacturer's service manual. This service manual is available from the Chief Engineer. The table to be used is also in the engine manufacturers' service manual.

3.1.5 Readings after drydocking shall be taken after 24 hours has passed since the vessel is afloat in the water where no keel blocks are touching the hull. The readings must be taken at the same temperature as the initial readings.

3.1.6 All crankshaft deflections shall be carried out in the presence of the Chief Engineer or his delegate.

3.1.7 Two copies of the readings shall be given to the Chief Engineer at the time of completion.

3.1.8 Any discrepancy discovered in the crankshaft deflections is to be addressed by the contractor.

3.2 Location

3.2.1 Engine Room

3.3 Interferences

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

PART 4 - PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

PART 5 - DELIVERABLES:

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Main Engine Crankshaft Deflections		

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copies of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manual

5.4.1 N/A

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Spec Item #: E-02	SPECIFICATION	F6855-180961
Bow Thruster Oil Change		

E-02 Bow Thruster Oil Change

Part 1: SCOPE:

- 1.1** The intent of this specification shall be for the Contractor to do an oil change on the Bow Thruster.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Pump: Hamworthy Type: D125VID2 Serial Number: 48596-10

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

- 2.4.1** The contractor shall supply all materials and equipment required to perform the specified work unless otherwise stated.
- 2.4.2** Parts requiring replacement shall be owner supplied.

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** The Contractor shall supply and install staging that will allow the external propeller hub to be visually inspected for damage, any oil leaks around the seals, etc.
- 3.1.2** The Contractor shall ensure that the Bow Thruster is electrically isolated before starting any work on this system.
- 3.1.3** The Contractor is to drain the oil from the Bow Thruster System as per the Lips service manual. The first four (4) liters of oil to be drained in a clear container for visual inspection by Chief Engineer or his delegate for water content. An oil sample shall be taken by Chief Engineer while the first 4 liters are draining.

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Bow Thruster Oil Change		

- 3.1.4** The Chief Engineer or his delegate shall be present when the hub is to be drained in order to verify that there is any water present.
- 3.1.5** The magnetic plug must be cleaned and checked.
- 3.1.6** The Contractor shall fill the Bow Thruster system as per the Lips service manual to the required level. The oil shall be then drained again to flush the system. The contractor is then to refill with oil. The oil shall be contractor supplied Petro-Canada Hydrex AW-68. There is approximately 45 liters in the whole system.
- 3.1.7** The Contractor shall be responsible for disposing of the used oil.
- 3.1.8** The Bow Thruster system shall be checked for leaks to the satisfaction of the Chief Engineer.

3.2 Location

- 3.2.1** Bow Thruster Compartment

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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Bow Thruster Oil Change		

5.1.1 Contractor shall deliver 1 hard copies of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-03	SPECIFICATION	F6855-180961
Annual Meggar Test and Thermal Scan		

E-03 Annual Meggar Test and Thermal Scan

Part 1 - Scope

- 1.1** The intent of this specification shall be for the contractor to arrange to have a certified company perform an annual test of the Ship's Electrical System Insulation.

Part 2 - References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO 5737)
- 2.2.2** The Contractor shall adhere to the Ships ISM Hotwork, Confined Space Entry, Fall Protection and Lockout Procedures.

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001
- 2.3.2** This vessel is regulated by Transport Canada and all work performed must be approved and inspected by Transport Canada Marine Safety Inspector.

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The contractor shall arrange to have a certified company perform an annual test of the Ship's Electrical System Insulation. A list of the required circuits will be supplied upon request.
- 3.1.2** The contractor shall contact Transport Canada (TC) Inspector and/or ABS Class Surveyor before work begins and will arrange for Transport Canada (TC) Inspector and/or ABS Class Surveyor to be present for the inspection if required.

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Annual Meggar Test and Thermal Scan		

3.1.3 The Contractor shall arrange to have a certified Technician perform a Thermal scan of all Essential and Non-essential circuits on the Main Switchboard and the Emergency Switchboard.

3.1.4 The contractor shall present a certificate of inspection and Meggar and Thermal Scan readings of all listed circuits to the Chief Engineer and Transport Canada (TC) Inspector and/or ABS Class Surveyor for credit.

3.2 Location

3.2.1 N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer and the attending Transport Canada (TC) Inspector and/or ABS Class Surveyor.

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 Contractor shall deliver 2 hard copies of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 1 electronic copy of all reports/certs to SVMM

Part 5 – Deliverables

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 1 hard copies of Service Certificates and original Service Certificates to Chief Engineer. Contractor shall deliver 3 electronic copies of all reports/certs to SVMM.

5.2 Spares

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5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-04	SPECIFICATION	F6855-180961
Wire Transit Repairs		

NOTE FROM BIDDERS CONFERENCE: This item will be going ahead and the Spar Marine transit report is included in the Reference Materials. From the report, UTI means Unable To Inspect due to interference items.

E-04 Wire Transit Repairs

Part 1: SCOPE:

- 1.1** The intent of this specification is to overhaul the multi-transits and single transits labelled 74, 75, 76, 77, 78, 79, 80, 81, 82 and 83 in the Spar Marine transit report reference E. These transits shall meet the Transport Canada Marine regulations once overhauled.

Part 2: REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Spar Marine report on transit for the Cygnus

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.2.2** TP127 – Ship’s Electrical Standard
- 2.2.3** IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

- 2.4.1** All transit blocks and materials required shall be the responsibility of contractor unless otherwise noted.

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1** All electrical circuits associated with the transit being worked on to be isolated before any work is to proceed.

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Wire Transit Repairs		

3.1.2 The contractor shall overhaul the single cable transits and multi- cable transits as listed below;

Transit #	Location	Comments
74	Aft Stbd Engine Rm	Pull back all wires and remove existing frame. Weld in new GSM Supplied Transit Frame. Reinstall all wires/ cables and repack.
75	Deckhead Over Port Eng	Repack with MCT Brattburg
76	Deckhead Over Stbd Eng	Repack with MCT Brattburg
77	Deckhead Over Stbd Eng Aft	Repack with MCT Brattburg
78	AMR Deckhead Port	Repack with MCT Brattburg
79	AMR Deckhad Mid	Repack with MCT Brattburg
80	AMR Deckhead Mid	Repack with MCT Brattburg
81	AMR Deckhead Stbd	Repack with MCT Brattburg
82	AMR Deckhead Stbd	Repack with MCT Brattburg
83	AMR Port Aft	Repack with Roxtec

3.1.3 The contractor shall install new transit blocks and or repair the transit to meet transport Canada regulations and standards.

3.1.4 All cables passing through the transits shall be tagged with circuit identification on both sides of transits. The tags will be metal, compatible with the cable sheath and shall have a circuit designation embossed thereon. Both ends of the tag shall be secured to the cable with metal tape or metal ty-raps.

3.1.5 The contractor is responsible for pulling and replacing all wire, required to be pulled, for these repairs.

3.2 Location

3.2.1 See the Spar Marine transit report.

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Wire Transit Repairs		

3.3 Interferences

3.3.1 Any interference items that need to be removed are the responsibility of the contractor. Contractor is responsible for the temporary removal, storage and refitting to vessel of all equipment previously identified. No Equipment/wiring or interference items to be removed without prior approval from Chief Engineer.

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.1.2 All cabling, blocking and installations to be to the acceptance of attending TCMS inspector and Chief Engineer

4.2 Testing

4.2.1 All circuitry that was disturbed shall be proven to be in good and safe working order.

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-05	SPECIFICATION	F6855-180961
Radar/ECDIS Upgrade		

E-05 Radar/ECDIS Upgrade

Part 1 SCOPE:

- 1.1** The intent of this specification is for the removal of the existing Bridge Master E Dual Radar System and upgrade to the new **owner supplied** Furuno FAR-3000 Series Dual Radar System and Furuno FMD-3000 Series Electronic Chart Display and Information System (ECDIS).
- 1.2** Contractor must supply all materials, and parts required to perform the specified work unless otherwise stated.

Part 2 REFERENCES:

2.1 Guidance Drawings

Drawing Number	Description	Electronic Number
68804101	CCGS Cygnus Bridge Master E Radar System Wiring System	
MM688-046-AL	CCGS Cygnus Antenna Layout Diagram	
68803601	CCGS Cygnus ECS & RADAR Video Distribution Diagram	
68803201	CCGS Cygnus STBD Aldebaran II ECS Diagram	
68803202	CCGS Cygnus Monitor Captain Cabin	
68803203	CCGS Cygnus PORT Aldebaran II ECS Diagram	
	CCGS Cygnus Radar Replacement and Pedestal Modification Outline Scope of Work Document	
18-041-100	CCGS Cygnus Pedestal Mount Modifications	
68805701	CCGS Cygnus FURUNO RADAR/ECDIS Type 2 Wiring Diagram	
68805801	CCGS Cygnus	

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	Base for PC	
69905901	CCGS Cygnus Transformer Plate	
68806001	CCGS Cygnus RADAR/ECDIS Console Adapter Plate	
	FURUNO FAR-3000 CHART RADAR Installation Manual	
	FURUNO FMD-3000 ECDIS Installation Manual	
	Retrofit installation manual of X and S-Band radar waveguide for shipyard workers	
03-182-330G-5	Furuno X-Band Antenna Unit RSB-130 Outline Drawing	
03-183-330G-4	Furuno S-Band Antenna Unit RSB-131 Outline Drawing	

2.2 Standards

- 2.2.1 Fleet Safety and Security Manual (DFO/5737)
- 2.2.2 TP127E – Ships Electrical Standards
- 2.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installations on Ships
- 2.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)
- 2.2.5 General Information for the Rules and Regulations for the Classification of Ships.

2.1 Regulations

- 2.1.1 Canada Shipping Act, 2001
- 2.1.2 Ship Station (Radio) Regulations 1999
- 2.1.3 Ship Station (Radio) Technical Regulations 1999

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Part 3: TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The contractor must supply all equipment, enclosures, ventilation, staging, chain falls, carnage, crane, slings, and shackles necessary to perform the work. All lifting equipment must be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, or a safe working load for the expected duties. Any brackets, mounts, or any other welded attachments required in the performance of this specification must be welded into place by certified welders.
- 3.1.2** Prior to any hotwork taking place, the contractor must ensure that the area of work and all equipment, wiring, transits, etc. have been sufficiently protected from any sparks or metal filings.
- 3.1.3** Contractor must be responsible to ensure that all areas have been cleaned and free of any debris resulting from the performance of this specification item.
- 3.1.4** Contractor must be responsible for the temporary removal and reinstallation of any deck heads, bulkheads, paneling, insulation, and any items that is deemed to be interfering to the running of any cables and mounting of any equipment.
- 3.1.5** All cabling must follow existing cable trays throughout the vessel where fitted. Once installed, all cabling must be secured as per TP127. Contractor must re-use existing cable penetrations and repack with LRS approved products. Any cable penetrations that are deemed not reusable by the contractor will be replaced and installed with new glands of an approved type and dealt with by a 1379.
- 3.1.6** All cabling, once installed, must be marked with a stamped stainless steel metal tag for all outside cabling and an appropriate label type for all inside cabling. The labels are to be securely affixed to the cable at each end and through any deck, deck heads, and/or gland penetrations with the designation for each cable as provided in this specification.
- 3.1.7** Contractor must provide a unit cost for the supply and install of a new LRS approved transit complete with appropriate transit blocks. If any new transits are required they will be dealt with by a 1379.
- 3.1.8** Contractor must provide a unit cost for the supply and installation of ten (10) meters (m) of ALL cable listed within this specification.
- 3.1.9** The contractor must dispose of all cables that have been identified for removal below and in the reference drawings attached.

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- 3.1.10** Contractor must be responsible to repack all glands and transits that will be reused as per this specification and the method must meet or exceed TCMS requirements.
- 3.1.11** Prior to the commencement of any electrical work, the contractor must ensure that all electrical supplies feeding the systems have been isolated at the source following an established lockout/tagout procedure.
- 3.1.12** Electrical isolations for AC power are as follows.
- 3.1.12.1 EL2-3 – Port ECS
 - 3.1.12.2 EL2-4 – Starboard ECS
 - 3.1.12.3 EL2-8 – Radar X-Band
 - 3.1.12.4 EL2-12 – Radar S-Band
 - 3.1.12.5 EL2-14 – S-Band Turning Unit
 - 3.1.12.6 EL4-5 – Outlet under S-Band Transceiver
 - 3.1.12.7 EL4-9 – Outlet under Port Radar Console
- 3.1.13** Nav. Aids Panels EL2 and EL4 are located on the Nav. Bridge on the forward side of the Nav. Console.
- 3.1.14** Upon final installation, testing must be carried out as per Section 4.2 of this specification item.
- 3.1.15** All electronic components removed from the vessel resulting from the performance of this specification must be safely stored and returned to the owner as these components must be used to service similar systems on CCG vessels.
- 3.1.16** Contractor must work in conjunction with a Coast Guard Electronic Technician to oversee the installation of the new systems to ensure compliance with applicable Coast Guard standards. Terminations of all equipment must be completed by CCG technicians except power terminations within feed panels.
- 3.1.17** Contractor must disconnect and remove all of the existing equipment and cabling associated within systems as detailed in reference drawings and equipment accompanied in the tables below. It would be recommended to start the cable removal from the equipment side to eliminate any discrepancies with applicable drawings. Reference pictures below.
- 3.1.18** Contractor must reference **CCGS Cygnus Radar Replacement and Pedestal Modification Outline Scope of Work** for the removal of the X-Band and S-Band Turning Units.
- 3.1.19 Equipment Removal**

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Equipment	Location
X-BAND (Display B) Console and all associated equipment and cabling. <ul style="list-style-type: none"> • Processor and Display • Outlet (EL4-9) • Serial Interface Unit • Video Splitter • Isolation Switch 	Nav. Bridge Port Side of Nav. Console
X-Band 25 KW Transceiver	Nav. Bridge behind GMDSS Console next to Racks on bulkhead
X-BAND Turning Unit	Main Mast Radar Platform
X-BAND Safety Switch	Next to ladder on Main Mast
S-BAND (Display A) Console and all associated equipment and cabling. <ul style="list-style-type: none"> • Processor and Display • Serial Interface Unit • Isolation Switch 	Nav. Bridge Starboard Side forward next to Starboard Wing Console
S-Band 30 KW Transceiver	Nav. Bridge behind GMDSS Console next to Racks on bulkhead
Scanner Control Unit	Nav. Bridge behind GMDSS Console next to Racks on bulkhead
S-Band Turning Unit	Wheelhouse Top forward of Main Mast on pedestal
S-Band Safety Switch	Located on starboard side of S-Band pedestal
Interswitch	Nav. Bridge behind GMDSS Console next to Racks on bulkhead under S-Band Transceiver
ECS Console (ECPINS) and all associated equipment and cabling <ul style="list-style-type: none"> • Monitor/Keyboard/Mouse • UPS • Two (2) PC's • Video Splitter 	Nav. Bridge next to X-Band (Display B) Console

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Picture: X-Band Console Display B



Picture: Radar Transceivers, Interswitch, and Scanner Control Unit



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Picture: S-Band Console Display A



Picture: ECS (ECPINS) Console



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1.1.1 Cable Removals

Cable Number Type Label	From	To	Total Length (m)
WAVEGUIDE (Rigid)	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band Turning Unit Main Mast 1 st Platform	10
207 RDR-SB- PMTRIG	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band Turning Unit Main Mast 1 st Platform	10
206 RDR-SB- BEARING	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band Turning Unit Main Mast 1 st Platform	10
209 RDR-SB- TUENABLE	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band Turning Unit Main Mast 1 st Platform	10
208 RDR-SB- MOTOR	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band Safety Switch Base of Main Mast	5
208 RDR-SB- MOTOR	X-Band Safety Switch Base of Main Mast	X-Band Turning Unit Main Mast 1 st Platform	5
B225 RDR-TB-VID	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	2
B226 RDR-TB-ISW	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	2
204 RDR-TB-AC	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	5
B213 RDR-DB- ISW1	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	5
B214 RDR-DB- ISW2	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	5

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B211 RDR-DB-VID	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	5
B212 RDR-DB- TRIG	X-Band Transceiver Nav. Bridge bulkhead behind GMDSS Console	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	5
205 RDR-DB-AC	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	2
B196 (GYR 14) RDR-DB- GYRO	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Main Deck Gyro Room Alleyway between Chief Engineer and Commanding Officers Cabin	5
B199 RDR-DB- DGPS	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Nav. Bridge Under Chart Nav. Console Center	5
Data Cable ARPA	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Nav. Bridge Under Chart Nav. Console Center	5
B197 RDR-DB- LOG	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Nav. Bridge Under Chart Nav. Console Center	5
Video Cable	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Main Deck Commanding Officers Cabin	5
Video Cable	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Nav. Bridge Port Wing Console	5
Video Cable	X-Band (Display B) Console Nav. Bridge Port Side of Chart Table	Nav. Bridge Starboard Wing Console	10
WAVEGUIDE (Helix, AVA5-50)	S-Band Transceiver located on bulkhead behind GMDSS Console	S-Band Turning Unit Wheelhouse Top	5
166 RDR-SA- MOTOR	Scanner Control Unit Nav. Bridge on bulkhead behind GMDSS Console under S-Band Transceiver	S-Band safety Switch Wheelhouse Top on pedestal starboard side under S-Band Turning Unit	10
166 RDR-SA- MOTOR	S-Band safety Switch Wheelhouse Top on pedestal starboard side under S-Band Turning Unit	S-Band Turning Unit Wheelhouse Top	2

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168 RSDR-SA-BEARING	S-Band Transceiver located on bulkhead behind GMDSS Console	S-Band Turning Unit Wheelhouse Top	10
169 RSDR-SA-PMTRIG	S-Band Transceiver located on bulkhead behind GMDSS Console	S-Band Turning Unit Wheelhouse Top	10
180 RDR-SCU-TUENABLE	Scanner Control Unit Nav. Bridge on bulkhead behind GMDSS Console under S-Band Transceiver	S-Band Transceiver located on bulkhead behind GMDSS Console	2
184 RDR-TA-AC	S-Band (Display A) Console Nav. Bridge forward starboard side	S-Band Transceiver located on bulkhead behind GMDSS Console	15
A225 RDR-TA-VID	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
A226 RDR-TA-ISW	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
A213 RDR-DA-ISW1	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
A214 RDR-DA-ISW2	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
A211 RDR-DA-VID	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
A212 RDR-DA-TRIG	Interswitch Nav. Bridge bulkhead behind GMDSS Console under S-Band Transceiver	S-Band (Display A) Console Nav. Bridge forward starboard side	15
205 RDR-DA-AC	S-Band (Display A) Console Nav. Bridge forward starboard side	S-Band (Display A) Console Nav. Bridge forward starboard side	2
A198 (GYR 15) RDR-DA-	S-Band (Display A) Console Nav. Bridge forward starboard side	Main Deck Gyro Room Alleyway between Chief	10

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GYRO		Engineer and Commanding Officers Cabin	
A197 RDR-DA-LOG	S-Band (Display A) Console Nav. Bridge forward starboard side	Nav. Bridge Under Chart Nav. Console Center	10
A199 RDR-DA-GPS	S-Band (Display A) Console Nav. Bridge forward starboard side	Nav. Bridge Under Chart Nav. Console Center	10
ARPA (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
GYRO (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
DGPS (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
WIND (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
AIS (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
DEPTH (x2)	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Under Chart Nav. Console Center	5
VIDEO Cable	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Main Deck Commanding Officers Cabin	5
OSL-VID-R OSL-VID-G OSL-VID-B	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Starboard Wing Console Nav. Bridge	10
PORT-RED PORT-GRN	Starboard/Port ECS System ECPINS Console located on	Port Wing Console Nav. Bridge	10

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PORT-BLUE	the port side of Nav. Chart Console		
OSL-8	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Starboard Wing Console Nav. Bridge	10
OSL-7	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Port Wing Console Nav. Bridge	10
RMP-R RMP-G RMP-B	Starboard Wing Console Nav. Bridge	Port Wing Console Nav. Bridge	15
OSL-9	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Phone System Cabinet Nav. Bridge Aft next to Deck Office	10
OSL-3	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	S-Band (Display A) Console Forward Starboard Side Nav. Bridge	10
OSL-10	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	X-Band (Display B) Console Nav. Bridge next to ECPINS Console	5
GYR-11	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Main Deck Gyro Room Alleyway between Chief Engineer and Commanding Officers Cabin	5
OSL-1	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Wheelhouse Top Forward Port	20
OSL-4	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Bulkhead behind GMDSS Console	10
OSL-5	Starboard/Port ECS System ECPINS Console located on the port side of Nav. Chart Console	Nav. Bridge Bulkhead behind GMDSS Console	10
OSL-6	Starboard/Port ECS System	Nav. Bridge	10

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	ECPINS Console located on the port side of Nav. Chart Console	Bulkhead behind GMDSS Console	
EL2-4	Nav. Bridge Nav. Chart Console	Nav. Bridge Panel EL2 Forward side of Nav. Chart Console	5
EL2-8	Nav. Bridge X-Band (Display B) Console Port side of Nav. Chart Console	Nav. Bridge Panel EL2 Forward side of Nav. Chart Console	5
EL2-12	Nav. Bridge S-Band (Display A) Console Starboard side forward of Nav. Bridge next to Center Console	Nav. Bridge Panel EL2 Forward side of Nav. Chart Console	10
EL2-14	Nav. Bridge Bulkhead behind GMDSS Console (Radar Closet) Scanner Control Unit	Nav. Bridge Panel EL2 Forward side of Nav. Chart Console	10
EL4-5	Nav. Bridge Bulkhead behind GMDSS Console (Radar Closet) Outlet under S-Band Transceiver	Nav. Bridge Panel EL4 Forward side of Nav. Chart Console	10
EL4-9	Nav. Bridge X-Band (Display B) Console Outlet Port side of Nav. Chart Console	Nav. Bridge Panel EL4 Forward side of Nav. Chart Console	5

1.1.2 Contractor must place any unused or un-removed cables into junction boxes and ensure they are isolated. Contractor must supply and install all junction boxes needed complete with glands.

1.1.3 Contractor must install the **new owner** supplied Furuno FAR 3000 and FMD 3000 Series Radar and ECDIS System, as detailed in reference drawings and as per manufacturer's installation instructions. Equipment list is shown below. Locations to be finalized prior to installing and mounting by Technical Representative on board.

1.1.4 Contractor must supply all mounting hardware, unless supplied with equipment, and hardware must all be of 316 Grade Stainless Steel.

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1.1.5 Contractor must reference CCGS Cygnus Radar Replacement and Pedestal Modification Outline Scope of Work for the modifications of the X-Band and S-Band pedestals.

1.1.6 Equipment List

Equipment	Mounting Location
X-Band Console (Display A)	Nav. Bridge Port Side of Nav. Chart Console where old X-Band Console located.
S-Band Console (Display B)	Nav. Bridge forward starboard side where old S-Band Console was located.
ECDIS Console (Display C)	Nav. Bridge port side of Nav. Chart Console where old ECPINS console was located and in between X-Band Console and Nav. Console
Isolation Transformers (x3)	Nav. Bridge bulkhead behind GMDSS Console on new plate
Power Supply Unit (PSU-014) X-Band (Display A)	Nav. Bridge under GMDSS Console
Power Supply Unit (PSU-014) S-Band (Display B)	Nav. Bridge under GMDSS Console inside cabinet
X-Band Transceiver RTR-108 25 KW	Nav. Bridge behind GMDSS Console on existing bulkhead plate
S-Band Transceiver RTR-109 30 KW	Nav. Bridge behind GMDSS Console on existing bulkhead plate
Isolation Switches (x3)	Nav. Bridge behind GMDSS Console on existing bulkhead plate each one behind Isolation Transformer
X-Band Turning Unit RSB-130N	Main Mast 1 st Radar Platform on modified pedestal
S-Band Turning Unit RSB-131N	Wheelhouse Top existing modified pedestal
RCU-026 (x2)	Flush mount in Port and Starboard Wing Consoles

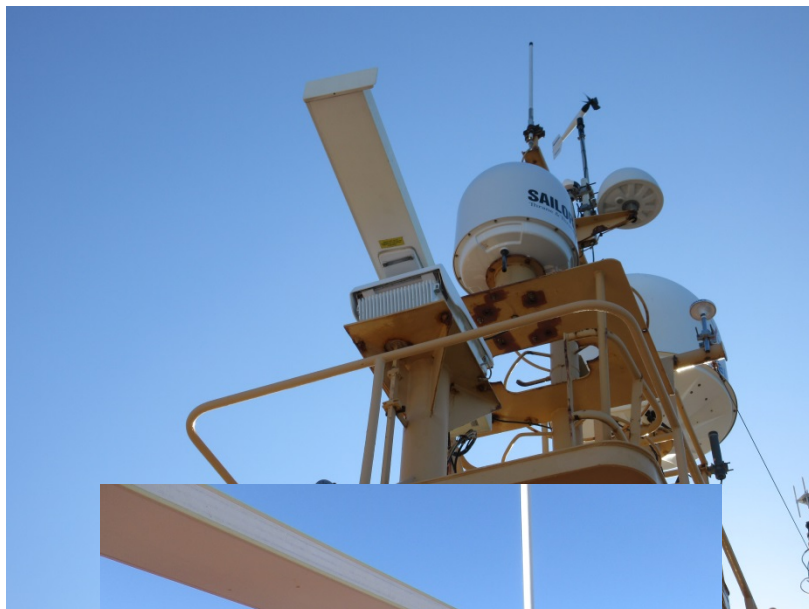
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Picture: Location of Transceiver, Transformers, and Switches



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Picture: X-Band Turning Unit Location



Picture: S-Band Location



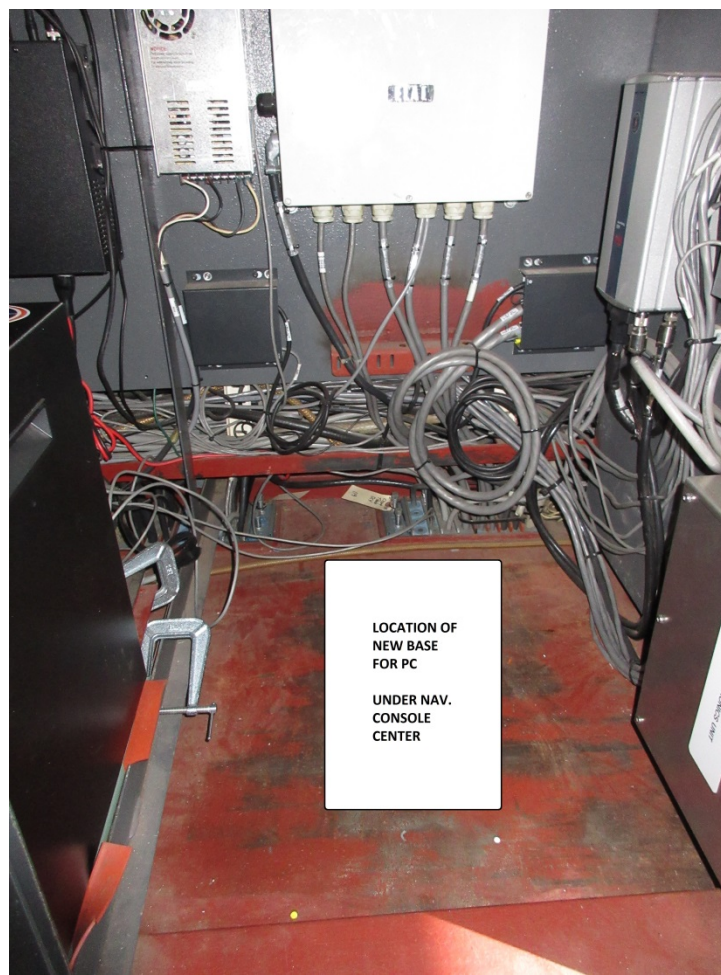
Turning Unit

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1.1.7 Contractor must supply the material, fabricate, and install a new plate/shelf for the three (3) Isolation Transformers. Refer to Drawing # 68805901 and referencing picture above for locations.

1.1.8 Contractor must supply the material, fabricate, and install a new base under the Nav. Console. Refer to Drawing # 68805801 and referencing picture below for location.

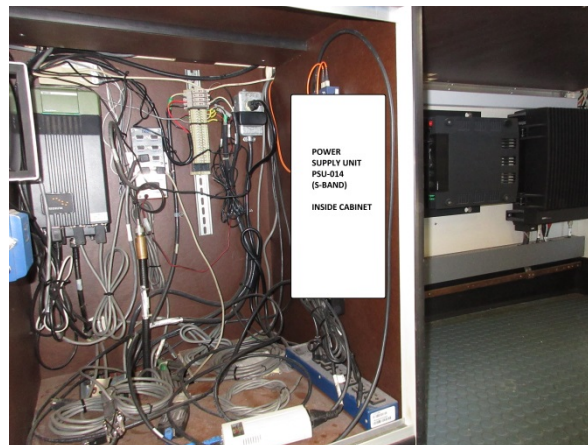
Picture: PC Base under Nav. Console



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1.1.9 Contractor must mount two (2) new power supply units (PSU-014) under the GMDSS Console. One inside the Cabinet and the other outside. Reference picture below.

Pictures: Power Supply Units (PSU-014) Locations



1.1.10 Contractor must supply the material, fabricate, and install new deck plate on existing ECPINS and X-BAND deck mounts on Port Side of Nav. Chart Console. Plate must be primed and painted to match existing with two coats of each. Plate size to be determined once old consoles are removed but an approximate size is 56" x 26" and 5/16" thick. Material must be of same composite. Plate must have cutouts to resemble the opening in the base adapter plates and consoles. Reference Drawing # 68806001.

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1.1.11 Contractor must supply the material, fabricate, and install new base adapter plates for three (3) new consoles. Refer to Drawing # 68806001. The adapter bases will be mounted between the new consoles and new deck plates to ensure the height resembles the existing consoles. The adapter bases will be bolted to the new base plates. The adapter base will be of welded steel construction, a minimum of 3/16" thickness, and it will be primed and painted to match the new consoles. All dimensions are to be confirmed at the time of fabrication and installation.

1.1.12 Contractor must install new X-Band (Display A) and ECDIS (Display C) consoles on new base adapter plates in location of old consoles. Consoles will be mounted side by side. Reference picture below.

Picture: X-Band (Display A) and ECDIS (Display C) Layout



1.1.13 Contractor must supply the material, fabricate, and install a new deck base plate to the existing deck mounts for the S-Band (Display B) where the old Console was located

Side forward wing determined Approximate and 5/16" cutout to base plate and

on Nav. Bridge Starboard in between the center and consoles. Plate size will be once old console is removed. size will be 27 1/2" x 24" thick. Plate must have resemble opening in adapter console.

Picture: S-Band (Display



B) Layout

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1.1.14 Contractor must install new S-Band (Display B) console on new base adapter plate.

1.1.15 Contractor must install RCU-026 Trackball Control units flush mounted in Port and Starboard consoles, one per console. Reference pictures below.

Picture: Location of RCU-026 in Port Wing Console



**Picture:
RCU-026 in
Wing Console**



**Location of
Starboard**

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1.1.16 Contractor must reference document **CCGS Cygnus Radar Replacement and Pedestal Modification from Poseidon Marine Consultants Ltd** for the modifications of the existing radar pedestals.

1.1.17 Contractor must mount the new radar turning units, X-Band RSB-130N and S-Band RSB-131N, on new modified pedestals. Contractor must reference Furuno CHART RADAR Installation Manual Section 1-1 for proper hoisting, bow alignment, and mounted instructions.

1.1.18 Contractor must install all cabling as supplied by **owner** except AC power feeds as outlined in **Cable List** below.

1.1.19 All cable terminations will be conducted by CCG Technicians with the exception of AC power in panels.

1.1.20 Cable List

Cable Label	Cable Type	From	To	Signal	Length (m)
RDR-A-WG	WAVE-GUIDE	X-Band Transceiver RTR-108 Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	X-Band Turning Unit Main Mast 1 st Platform	RF	10
RDR-A-2	TTYCYSL A-10	X-Band Transceiver RTR-108 Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	X-Band Turning Unit Main Mast 1 st Platform	Power/Data	10
RDR-A-1	Factory Cable	X-Band Transceiver RTR-108 Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	Power Supply Unit (PSU-014) X-Band Nav. Bridge under GMDSS Console	Power/Data	5
EL2-8	Marine AC 14/3	Panel EL2 Nav. Bridge forward side on Nav. Chart Console	X-Band Isolation Switch Nav. Bridge bulkhead behind	AC Power	10

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		Breaker # 8	GMDSS Console (Radar Closet)		
EL2-8-A	Marine AC 14/3	X-Band Isolation Switch Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	Wheelhouse Top base of Main Mast X-Band Safety Switch	AC Power	10
EL2-8-B	Marine AC 14/3	Wheelhouse Top base of Main Mast X-Band Safety Switch	Power Supply Unit (PSU-014) X-Band Nav. Bridge under GMDSS Console	AC Power	10
EL-2-8-D	Marine AC 14/3	X-Band Isolation Transformer Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	AC Power	10
RDR-A-3	Belden 1300SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Power Supply Unit (PSU-014) X-Band Nav. Bridge under GMDSS Console	LAN	10
RDR-A-4	Belden 8777SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Power Supply Unit (PSU-014) X-Band Nav. Bridge under GMDSS Console	LAN	10
RDR-A-5	Belden 1300SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5
RDR-A-6	Belden 1300SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5

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RDR-A-12	Belden 1300SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5
RDR-A-13	Factory Cable	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	RCU-026 Nav. Bridge Port Wing Console	Data	10
RDR-A-14		X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Port Wing Console		10
RDR-A-15	Belden 8777SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Port Wing Console	Data	10
RDR-A-16		X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Main Deck Commanding Officers Cabin in area of workstation	Video	10
RDR-A-AIS	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-A-HDT	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Main Deck Gyro Room (Closet) Alleyway between Commanding Officer and Chief Engineers Cabins	Data	10

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RDR-A-GPS1	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-A-GPS2	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-A-LOG	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-A-IMIC3	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Rack next to bulkhead behind GMDSS Console	Data	10
RDR-A-DEPTH	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-A-WIND	Belden 8723SB	X-Band (Display A) Console Nav. Bridge Port Side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-B-WG	WAVE-GUIDE	S-Band Transceiver Unit RTR-109 Nav. Bridge bulkhead behind GMDSS Console	S-Band Turning Unit RSB-131N Wheelhouse Top Center pedestal	RF	10

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		(Radar Closet)			
RDR-B-2	TTYCYSL A-10	S-Band Transceiver Unit RTR-109 Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	S-Band Turning Unit RSB-131N Wheelhouse Top Center pedestal	Power/Data	10
RDR-B-1	Factory Cable	S-Band Transceiver RTR-109 Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	Power Supply Unit (PSU-014) S-Band Nav. Bridge under GMDSS Console in cabinet	Power/Data	5
EL2-12	Marine AC 14/3	Panel EL2 Nav. Bridge forward side on Nav. Chart Console Breaker # 12	S-Band Isolation Switch Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	AC Power	10
EL2-12-A	Marine AC 14/3	S-Band Isolation Switch Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	S-Band Safety Switch Wheelhouse Top inside S-band radar pedestal	AC Power	10
EL2-12-B	Marine AC 14/3	S-Band Safety Switch Wheelhouse Top inside S-band radar pedestal	Power Supply Unit (PSU-014) S-Band Nav. Bridge under GMDSS Console in cabinet	AC Power	10
EL2-12-D	Marine AC 14/3	S-Band Isolation Transformer Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	AC Power	15
RDR-B-3	Belden 1300SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Power Supply Unit (PSU-014) S-Band Nav. Bridge under GMDSS Console in cabinet	LAN	5

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RDR-B-4	Belden 8777SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Power Supply Unit (PSU-014) S-Band Nav. Bridge under GMDSS Console in cabinet	Data	5
RDR-B-5	Belden 1300SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5
RDR-B-6	Belden 1300SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5
RDR-B-12	Belden 1300SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	ECDIS (Display C) Console Nav. Bridge Port Side of Nav. Chart Console	LAN	5
RDR-B-13	Factory Cable	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	RCU-026 Nav. Bridge Port Wing Console	Data	10
RDR-B-14		S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Starboard Wing Console	Video	10
RDR-B-15	Belden 8777SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Starboard Wing Console	Data	10
RDR-B-AIS	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-B-HDT	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward	Main Deck Gyro Room (Closet)	Data	10

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		starboard side next to center console	Alleyway between Commanding Officer and Chief Engineers Cabins		
RDR-B-GPS1	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-B-GPS2	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-B-LOG	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Nav. Chart Console Center	Data	10
RDR-B-IMIC3	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Rack next to bulkhead behind GMDSS Console	Data	10
RDR-B-DEPTH	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge ES5100 Sounder Display located on bulkhead across from Nav. Chart Console	Data	15
RDR-B-WIND	Belden 8723SB	S-Band Console (Display B) Nav. Bridge forward starboard side next to center console	Nav. Bridge Nav. Chart Console Center	Data	10
EL4-9	Marine AC 14/3	Panel EL4 Nav. Bridge forward side on Nav. Chart Console Breaker # 9	ECDIS Isolation Switch Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	AC Power	10
EL4-9-B	Marine AC	ECDIS	ECDIS Console	AC	10

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	14/3	Isolation Transformer Nav. Bridge bulkhead behind GMDSS Console (Radar Closet)	(Display C) Nav. Bridge Port side of Nav. Chart Console	Power	
ECD-C-3		ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Main Deck Commanding Officers Cabin in area of workstation	Video	10
ECD-C-AIS	Belden 8723SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
ECD-C-HDT	Belden 8723SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
ECD-C-GPS1	Belden 8723SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
ECD-C-GPS2	Belden 8723SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
ECD-C-LOG	Belden 8723SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
GPS1-C-7	Belden 1300SB	ECDIS Console (Display C) Nav. Bridge Port side of Nav. Chart Console	Nav. Bridge Nav. Chart Console Center	Data	10
GPS2-C-8	Belden 1300SB	ECDIS Console (Display C)	Nav. Bridge Nav. Chart Console	Data	10

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		Nav. Bridge Port side of Nav. Chart Console	Center		

1.1.21 Contractor must be responsible for all AC power terminations in associated panels.

1.2 Location

1.2.1 Navigating Bridge Deck

1.2.2 Wheelhouse Top

1.2.3 Main Deck

1.2.4 Main Mast

1.3 Interferences

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

Part: 2 PROOF OF PERFORMANCE:

2.1 Inspection

2.1.1 All work must be subject to witness by the Chief Engineer of delegate and the attending surveyor if applicable.

2.2 Testing

2.2.1 The commissioning of the new GMDSS system must be done under direction of an approved FSR and in accordance with the manufacturers approved procedures. This will be arranged by CCG personal.

2.2.2 Contractor is responsible to ensure all relocated equipment is in proper working order witnessed and at the satisfactory of the Chief Engineer.

2.2.3 All cables are to be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.

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2.2.4 All cable testing must be verified by a Coast Guard Technician.

2.2.5 Contractor responsible to ensure new AC/DC circuits be proven operational.

2.3 Certification

N/A

Part: 3 DELIVERABLES:

3.1 Drawings/Reports

3.1.1 Contractor must provide the Technical Authority with a report of the contractors work in both electronic and hardcopy formats outlining the details of the inspections and any alterations/repairs prior to the acceptance of this item.

3.2 Spares

N/A

3.3 Training

N/A

3.4 Manuals

N/A

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BNWAS Installation		

E-06 BNWAS Installation

Part 1: Intent

- 1.1** The intent of this specification is for the installation of a new owner supplied Bridge Navigation Watch Alarm System (BNWAS).
- 1.2** Contractor must supply all materials, and parts required to perform the specified work unless otherwise stated.

Part 2: References

2.1 Guidance Drawings and Documents

Drawing Number	Description	Electronic Number
Preliminary	CCGS Cygnus Bridge Navigation Watch Alarm System (BNWAS)	
97037-24	CCGS Cygnus General Arrangement	

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.2.2** TP127E – Ships Electrical Standards
- 2.2.3** IEEE 45:2002 – Recommended Practice for Electrical Installations on Ships
- 2.2.4** Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)
- 2.2.5** General Information for the Rules and Regulations for the Classification of Ships. CWB, Welding Procedures

2.3 Regulations

- 2.3.1** Canada Shipping Act, 2001

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2.4 Owner Furnished Equipment

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

Part: 3 TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The contractor must supply all equipment, enclosures, ventilation, staging, chain falls, carnage, crane, slings, and shackles necessary to perform the work. All lifting equipment must be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, or a safe working load for the expected duties.
- 3.1.2** All cabling, once installed, must be marked with a stamped stainless steel metal tag for all outside cabling and an appropriate label type for all inside cabling. The labels are to be securely affixed to the cable at each end and through any deck, deck heads, and/or gland penetrations with the designation for each cable as provided in this specification.
- 3.1.3** Contractor responsible for the temporary removal and reinstallation of any deck heads, bulkheads, paneling, insulation, and any items that is deemed to be interfering to the running of any cables and mounting of any equipment.
- 3.1.4** All cabling must follow existing cable trays throughout the vessel where fitted. Once installed, all cabling must be secured as per TP127.
- 3.1.5** Contractor must supply and install any transit blocks that are required in any deck penetrations throughout the vessel for any of the new cables.
- 3.1.6** The contractor must be responsible to ensure that all areas have been cleaned and free of any debris resulting from the performance of this specification item.
- 3.1.7** Prior to the commencement of any electrical work, the contractor must ensure that all electrical supplies feeding the systems have been isolated at the source following an established lockout/tag out procedure. Contractor must ensure that Chief Engineer or Senior Electrical Officer is notified of any lockout/tag out completed.
- 3.1.8** Electrical Isolations for AC power are as follows:

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3.1.8.1 Panel EL4 Breaker # 4 (EL4-4) Nav. Bridge Nav. Console

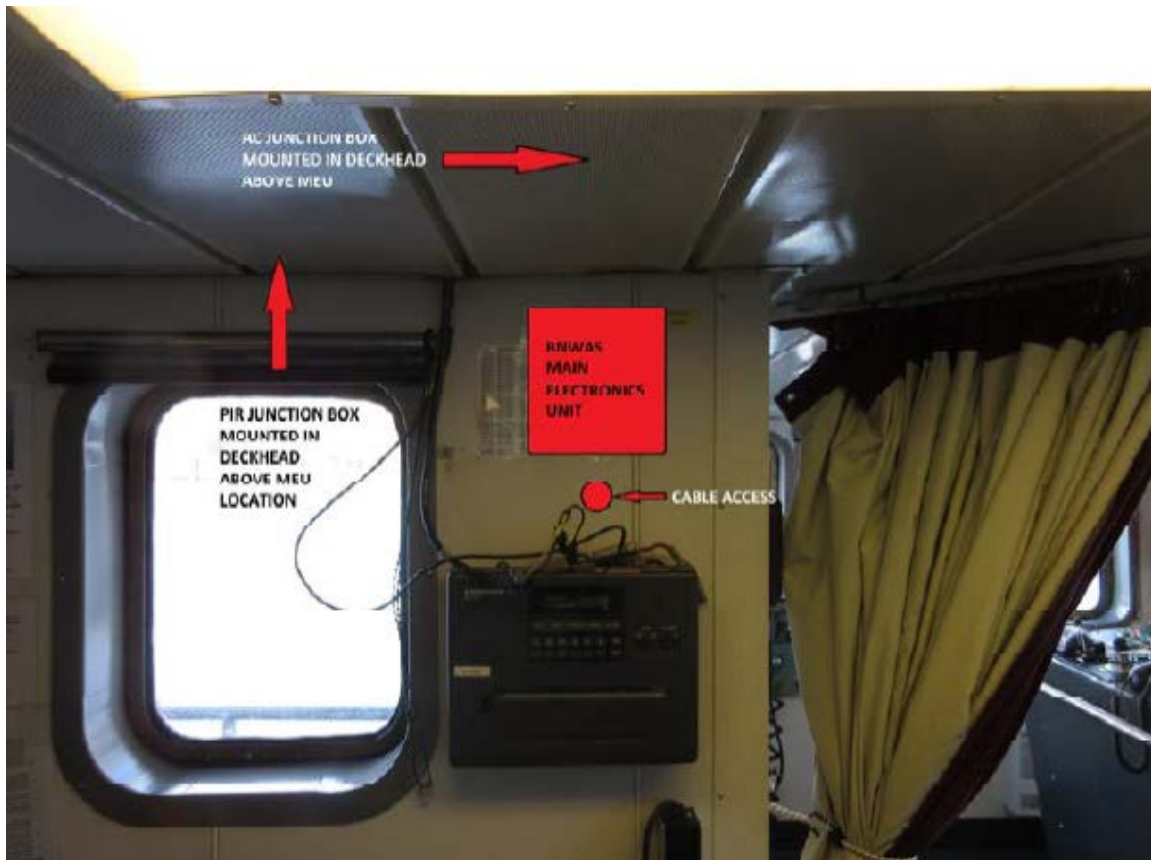
- 3.1.9** Upon final installation, testing must be carried out as per Section 4.2 of this specification item.
- 3.1.10** The contractor must work in conjunction with a Coast Guard Electronic Technician to oversee the installation of the new system to ensure compliance with applicable Coast Guard standards. Terminations of all equipment must be completed by CCG technicians with the exception of those for electrical supply which must be the contractor's responsibility as well as any grounding requirements.
- 3.1.11** Contractor must supply and install a suitable junction box (PIR JB) for marine environment complete with at least six cable glands and can accommodate at least 20 terminal blocks.
- 3.1.12** Contractor must fabricate and install brackets for all equipment.
- 3.1.13** Contractor must supply and install new junction box in deck head above Main Electronics Unit for AC Power.
- 3.1.14** Contractor must install the following **owner** supplied equipment listed in **Equipment List** below and with reference to the preliminary **CCGS Cygnus Bridge Navigation Watch Alarm System Block Diagram**.

3.1.15 Equipment List

Equipment	Location
Main Electronics Unit (MEU)	Nav. Bridge Port Side Bulkhead
Monitor and Alert Panel (MAP)	Nav. Bridge Forward Center Console Port Side
Remote Alert Panel (RAP)	Nav. Bridge Port Wing Console
Remote Alert Panel (RAP)	Nav. Bridge Starboard Wing Console
Motion Sensor (PIR)	Nav. Bridge Port Wing Deck head
Motion Sensor (PIR)	Nav. Bridge Starboard Wing Deck head
Motion Sensor (PIR)	Nav. Bridge Forward Center Deck head
Watch Alert Panel (WAP)	Focsle Deck across from Commanding Officer Cabin
Watch Alert Panel (WAP)	Main Deck Officers Mess
Watch Alert Panel (WAP)	Main Deck Crew's Mess
PIR Junction Box	Nav. Bridge Forward Center Deck head above Motion Sensor
AC Junction Box	Nav. Bridge Port Side above MEU

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Main Electronics Unit (MEU) Location, AC Junction Box, and PIR Junction Box



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Monitor and Alert Panel (MAP) Location



Port Wing Remote Alert Panel (RAP) Location

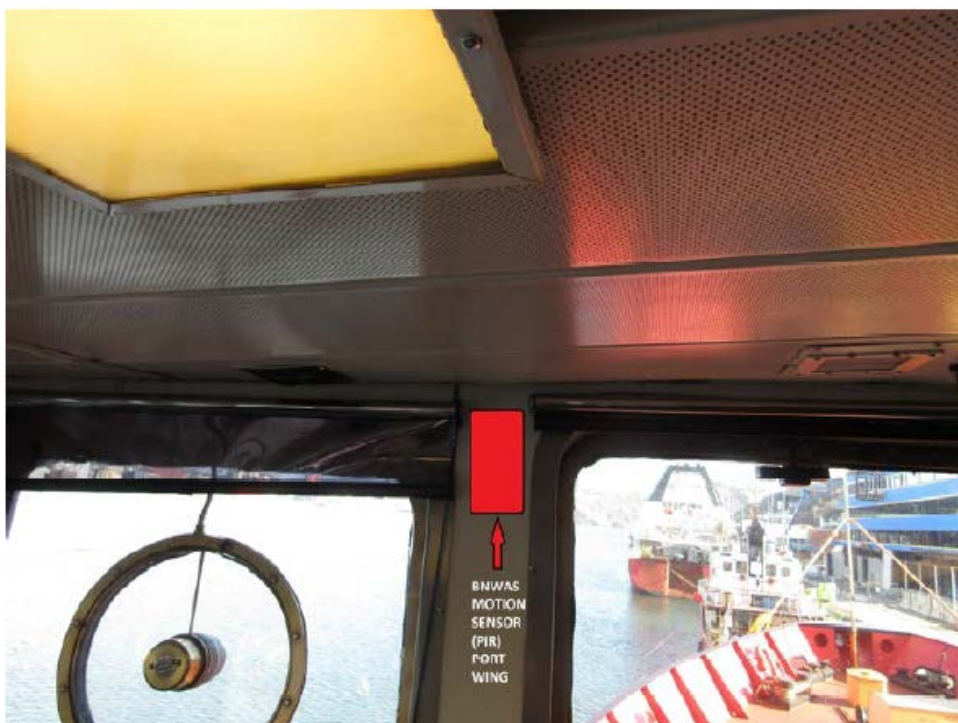


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Stbd Wing Remote Alert Panel (RAP) Location



Motion Sensor Port Wing (PIR) Location



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Motion Sensor Stbd Wing (PIR) Location



Motion Sensor Forward Center (PIR) Location and PIR Junction Box



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2nd Stage Watch Alert Panel (WAP) Location



3rd Stage Watch Alert Panel (WAP) Location Crew's Lounge



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3rd Stage Watch Alert Panel (WAP) Location Crew's Mess



- 3.1.16** Contractor must use stainless steel hardware for mounting equipment, plates, and panels listed within this specification.
- 3.1.17** Contractor must install owner supplied cables and supply and install Marine AC cable listed in the **Cable List** below. All cables must be Shipboard Approved Marine Cable. Refer to **CCGS Cygnus Bridge Navigation Watch Alarm System Block Diagram Preliminary**.

3.1.17 Cable List

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Cable Label	Cable Type	From	To	Length (m)
BNWAS-1A	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	Monitor and Alert Panel (MAP) Nav. Bridge Forward Center Console	10
BNWAS-1B	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	Monitor and Alert Panel (MAP) Nav. Bridge Forward Center Console	10
BNWAS-2	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	Remote Alert Panel (RAP) Nav. Bridge Port Wing Console	15
BNWAS-3	Belden 8777SB	Remote Alert Panel (RAP) Nav. Bridge Port Wing Console	Remote Alert Panel (RAP) Nav. Bridge Starboard Wing Console	15
BNWAS-4	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	PIR Junction Box Nav. Bridge Deck Head above MEU	2
BNWAS-5	Belden 8777SB	PIR Junction Box Nav. Bridge Deck Head above MEU	Motion Sensor (PIR) Nav. Bridge Port Wing Deck head	10
BNWAS-6	Belden 8777SB	PIR Junction Box Nav. Bridge Deck Head above MEU	Motion Sensor (PIR) Nav. Bridge Forward Center Deck head	10
BNWAS-7	Belden 8777SB	PIR Junction Box Nav. Bridge Deck Head above MEU	Motion Sensor (PIR) Nav. Bridge Stbd Wing Deck head	10
BNWAS-8	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	Watch Alert Panel (WAP) Bridge Deck Focsle Deck Alleyway bulkhead across from Commanding Officer	20

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BNWAS Installation		

			Cabin	
BNWAS-9	Belden 8777SB	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	Watch Alert Panel (WAP) Main Deck Lounge bulkhead	25
BNWAS-10	Belden 8777SB	Watch Alert Panel (WAP) Main Deck Lounge bulkhead	Watch Alert Panel (WAP) Main Deck Mess bulkhead	20
BNWAS-11	Belden 8777SB	Nav. Bridge X-Band Radar Console Port Side of Nav. Console	PIR Junction Box Nav. Bridge Deck Head above MEU	10
BNWAS-12	Belden 8777SB	Nav. Bridge ECDIS Console Port Side of Nav. Console	PIR Junction Box Nav. Bridge Deck Head above MEU	10
BNWAS-13	Belden 8777SB	Nav. Bridge S-Band Radar Console Starboard Side forward	PIR Junction Box Nav. Bridge Deck Head above MEU	20
EL4-4	Marine AC 14/3	Main Electronics Unit (MEU) Nav. Bridge Port Side Bulkhead	AC Junction Box above MEU in Deck head	2
EL4-4	Marine AC 14/3	Panel EL4 Breaker # 4 Nav. Bridge Nav. Console	AC Junction Box above MEU in Deck head	15

3.2 Location

3.2.1 Bridge Deck

3.2.2 Focsle Deck

3.3 Interferences

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

Part: 4 PROOF OF PERFORMANCE:

4.1 Inspection

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BNWAS Installation		

- 4.1.1** All work must be subject to witness by the Chief Engineer of delegate and the attending surveyor.

4.2 Testing

- 4.2.1** All cables are to be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.
- 4.2.2** All cable testing must be verified by a Coast Guard Technician.
- 4.2.3** New AC/DC circuits must be proven operational.
- 4.2.4** Electronic equipment which has been removed for the performance of this specification item must be returned to operational condition as it will be used as spares for similar equipment used in CCG fleet.

4.3 Certification

- 4.3.1** All original Class approval certificates for all system components must be submitted to the owner prior to acceptance of this item.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1** The contractor must provide the Chief Engineer with a typewritten report of the contractors work in both electronic and hardcopy formats outlining the details of the inspections and any alterations / repairs to the acceptance of this item.

5.2 Spares

- 5.2.1** All owner supplied cable which has not been used must be returned to the owner prior to the acceptance of the item.

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

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Spec Item #: E-07	SPECIFICATION	F6855-180961
Power System Study		

E-07 Power System Study

Part 1 – Scope

- 1.1** The intent of this specification shall be for the contractor to arrange for Avalon Controls Ltd to perform a Power System Study on the Generator Electrical System onboard.

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

2.1.1 N/A

2.2 Standards

2.2.1 Fleet Safety and Security Manual (DFO 5737)

2.3 Regulations

2.3.1 Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

3.1.1 The contractor shall arrange for Avalon Controls Ltd. to perform a Power System Study on the vessel:

3.1.1.1 Tim Hancock, P.Eng.

Project Engineer

Avalon Controls Ltd.

12 Panther Pl, Mt Pearl NL A1N 5B1

Office: 709-364-5111

Cell: 709-682-8272

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Power System Study		

3.1.2 This study shall include a full investigation and account for protective features of the vessel Load Management System and secondary protective devices. This study should not be limited to overcurrent protection, but should include for dynamic power system computational simulations and should consider the effects of frequency and voltage protection.

3.1.3 This study shall also address those issues outlined in Section 4 of the provided CCGS Cygnus Fire and General Service Pump report.

3.1.4 Contractor shall bid an allowance of \$25,000 to perform this work. This shall be adjusted as required based on Final Invoice by PWGSC 1379 action.

3.2 Location

3.2.1 Engine Room

3.2.2 Control Room

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and Transport Canada (TC) Inspector and/or ABS Class Surveyor Inspector.

4.2 Testing

4.2.1 Testing shall be carried out to satisfy Transport Canada (TC) Inspector and/or ABS Class Surveyor and NFPA requirements.

4.3 Certification

4.3.1 Contractor shall deliver 1 hard copy of service certificates and original service certificate to Chief Engineer. Contractor shall deliver 3 electronic copy of all reports/certs to SVMM

Part 5 – Deliverables

5.1 Drawings/Reports

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Power System Study		

5.1.1 The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 1 electronic copy of all reports/certs to SVMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-08	SPECIFICATION	F6855-180961
Seatel Antennae Replacement		

E-08 Seatel Antennae Replacement

Part: 1 SCOPE:

- 1.1** The intent of this specification is to remove the Telesat Radome Antenna from vessels main mast and install new owner supplied Antenna Radome in its place.
- 1.2** Contractor must supply all materials, and parts required to perform the specified work unless otherwise stated.

Part: 2 REFERENCES:

2.1 Guidance Drawings/Documents

2.1.1 Description	Electronic Number
Sea Tel 4009MK3-36 Installation Manual	
VSCS Block and Level Diagram Rev B.	68803401

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.2.2** TP127E – Ships Electrical Standards
- 2.2.3** IEEE 45:2002 – Recommended Practice for Electrical Installations on Ships
- 2.2.4** Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)
- 2.2.5** General Information for the Rules and Regulations for the Classification of Ships.

2.3 Regulations

- 2.3.1** Canada Shipping Act, 2001

2.4 Owner Furnished Equipment

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

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2.4.2 Cobham Seatel Antenna Radome

Part: 3 TECHNICAL DESCRIPTION

3.1 General

3.1.1 The Contractor must supply all equipment, enclosures, ventilation, staging, chain falls, craneage, slings and shackles necessary to perform the work. All lifting equipment must be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties.

3.1.2 Prior to the commencement of any electrical work, the contractor must ensure that all electrical supplies feeding the systems have been isolated at the source following an established lockout/tagout procedure, and as per ISM fleet safety manual. Electrical Isolation is as follows:

- Heater Plate via EL6-10
- Antenna Electronics via EL6-10 or by unplugging the AC cable from the Uninterruptable Power Supply.

3.1.3 Contractor must disconnect and remove two Antenna RF Cables (LMR600) and two AC Cables from the existing antenna radome. These cables must be reinstalled for the new Antenna Radome. "Pay attention to what cable goes where"

3.1.4 Contractor must remove the Telesat Seatel Radome from the vessels main mast following manufacturers recommended procedures.

3.1.5 Contractor must install the new Cobham Seatel Antenna Radome on the vessels main mast following the manufacturer's procedures on pages 18 - 22 of installation manual. Special attention is to be paid to the torque value for bolt sizes on page 19.

3.1.6 Contractor must re-install the four cables that were removed from the old antenna and reconnect the AC and RF Cables. Contractor must take note of the four cables as they have to be reconnected to the same places as they were removed.

- AC Feed for Antenna Electronics (via new connector provided with antenna) from UPS LAN Room equipment rack.
- AC Feed for Antenna Heater Plate (EL6-10)
- LMR600 RF Cable (TX)

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- LMR600 RF Cable (RX)

3.1.7 Contractor must ground the Radome following the manufacturer's procedures in section 3.4 of Installation Manual. Use #6 green ground wire for the ground.

3.2 Location

3.2.1 Wheelhouse Top

3.3 Interferences

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

Part: 4 PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work must be subject to witness by the Chief Engineer of delegate and the attending TCMS surveyor.

4.2 Testing

4.2.1 All cables are to be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.

4.2.2 All cable testing must be verified by a Coast Guard Technician.

4.2.3 New AC/DC circuits must be proven operational.

4.2.4 Electronic equipment which has been removed for the performance of this specification item must be returned to operational condition.

4.3 Certification

4.3.1 N/A

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

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5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

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Spec Item #: E-09	SPECIFICATION	F6855-180961
Jastram Steering Controls Modification		

E-09 Jastram Steering Controls Modification

Part 1 SCOPE:

- 1.1** The intent of this specification is to install the following owner supplied components for Steering Control System Upgrade (Two Wheelhouse Junctions Boxes, and a Unit Change-Over Panel).
- 1.2** Additional Cabling (contractor supply/install) also required of this specification item as detailed in the Technical Description.
- 1.3** Contractor must supply all materials, and parts required to perform the specified work unless otherwise stated.

Part 2 REFERENCES:

2.1 Guidance Drawings

Drawing Number	Description	Electronic Number
D-751855	Steering Control Cabling Diagram	
B-721516	Unit Change-Over Panel Overall Dimensions	
C-721221	Wheelhouse Junction Box Overall Dimensions	

2.2 Standards

- 2.2.1** Fleet Safety and Security Manual (DFO/5737)
- 2.2.2** TP127E – Ships Electrical Standards
- 2.2.3** IEEE 45:2002 – Recommended Practice for Electrical Installations on Ships
- 2.2.4** Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)
- 2.2.5** General Information for the Rules and Regulations for the Classification of Ships.

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2.3 Regulations

2.3.1 Canada Shipping Act, 2001

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION

3.1 General

3.1.1 The Contractor must supply all equipment, enclosures, ventilation, staging, chain falls, craneage, slings and shackles necessary to perform the work. All lifting equipment must be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification must be welded into place by CWB-certified welders certified to welding Std. W47.1, Div. 1 and 2.

3.1.2 Prior to any hotwork taking place, the Contractor must ensure that the area of work and all equipment, wiring, transits, etc. have been sufficiently protected from any sparks or metal filings. The Contractor must also ensure that the area of work, the system, and the adjacent space is certified as gas free and suitable for hotwork as per the Fleet Safety and Security Manual.

3.1.3 The Contractor shall be responsible to ensure that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

3.1.4 Contractor must follow existing cable trays throughout the vessel where fitted. Once installed, all cabling must be secured as per TP127.

3.1.5 The contractor must dispose of all cables that have been identified for removal indicated below.

3.1.6 The contractor must be responsible to ensure that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

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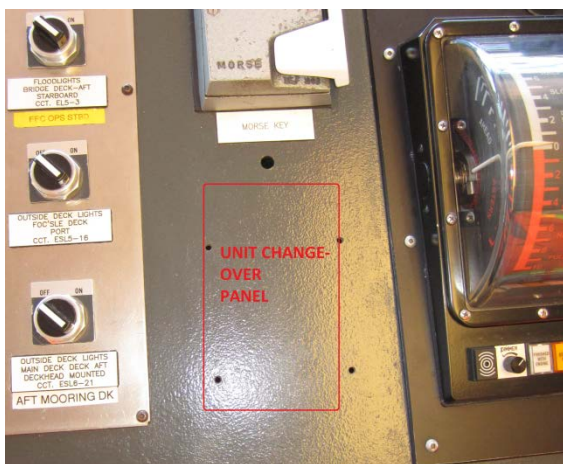
- 3.1.7** Prior to the commencement of any electrical work, the contractor must ensure that all electrical supplies feeding the systems have been isolated at the source following an established lockout/tagout procedure, and as per ISM fleet safety manual.
- 3.1.8** Upon final installation, testing must be carried out as per Section 4.2 of this specification item.
- 3.1.9** Contractor must install the following equipment;
- Two Wheelhouse Junction Boxes (Port Side of Bridge Forward Console, location shown in picture below)
 - Unit Change-Over Panel (Port Side of Bridge Forward Console, location shown in picture below).
- 3.1.10** Contractor must modify the bridge forward console by means of cutting the back part of the console so the two wheelhouse junction boxes can be recessed in the console. There is roughly a 6" void space to accommodate this.
- 3.1.11** Contractor must also supply and install a finished access panel at the rear of the modified console to enclose the two wheelhouse junction boxes.
- 3.1.12** Contractor must supply and install 12 cable glands in the gland plates (6 for each wheelhouse junction box)

WHEEL-HOUSE JUNCTION BOXES

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UNIT CHANGE-OVER PANEL



3.1.13 All equipment dimensions are found in JQ131081 Upgrade Package documentation.

3.1.14 Contractor must relocate cables as per Table 1 below

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Table 1

Cable Label	Digital Steering Controller Unit #2	Unit #2 Wheelhouse Junction Box Terminals	Reference
6P	Terminals 20, 32 and DC Power +, -	Terminals 10, 11, 12, 13, Shield 14	Sheet 5 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	Digital Steering Controller Unit #1	Unit #1 Wheelhouse Junction Box Terminals	
6S	Terminals 20, 32 and DC Power +, -	10, 11, 12, 13, 14	Sheet 5 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	MCP #2	Unit #2 Wheelhouse Junction Box Terminals	
9PA3	SCP1 TB12 Terminals 1, 2, 12 SCP1 TB11 Terminals 2, 10	20, 21, 22, 23, 24	Sheet 7 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	MCP #1	Unit #1 Wheelhouse Junction Box Terminals	
PSA3	SCP1 TB12 Terminals 1, 2, 12 SCP1 TB11 Terminals 2, 10	20, 21, 22, 23, 24	Sheet 9 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)

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3.1.15 Contractor must pull cables 6P, 6S, 9PA3, and 9SA3 back into Commanding Officers cabin and junction each cable separately as these cables will not be long enough to reach the wheelhouse junction boxes and run new cable from these junction boxes to wheelhouse junction boxes.

3.1.16 Contractor must install/label cable as per Table 2 below.

Table 2

Cable Label/Type	Unit #2 DSC Terminals	WHJB #2 Terminals	Reference
53P 14/4 Shielded	2, 20, 1, 32	15, 16, 17, 18, (19-Shield)	Sheet 21 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	Unit #1 DSC Terminals	WHJB #1 Terminals	
53S 14/4 Shielded	2, 20, 1, 32	15, 16, 17, 18, (19-Shield)	Sheet 5 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	Unit #2 MCP Terminals	WHJB #2 Terminals	
54P 14/4 Shielded	SCP1 TB12 (1, 2, 4, 12) SCP1 TB11 (2, 10) SCP2 TB12 (2) JTA, JTB	1, 4, 6, 5, 2, 3, 9, 7, 8	Sheet 22 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)

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	Unit #1 MCP Terminals	WHJB #1 Terminals	
54S 14/4 Shielded	SCP1 TB12 (1, 2, 4, 12) SCP1 TB11 (2, 10) SCP2 TB12 (2) JTA, JTB	1, 4, 6, 5, 2, 3, 9, 7, 8	Sheet 22 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	Unit Change-Over Panel Terminals	WHJB #2 Terminals	
55P 18/8 Shielded	9, 10, 11, 12, 13, 14, 15, Spare	32, 26, 31, 27, 30, 29, 28, Spare	Sheet 23 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	Unit Change-Over Panel Terminals	WHJB #1 Terminals	
55S 18/8 Shielded	1, 2, 3, 4, 5, 6, 7, Spare	32, 26, 31, 27, 30, 29, 28, Spare	Sheet 23 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)
	WHJB #2 Terminals	WHJB #1 Terminals	
56 18/8 Shielded	33, 34, 35, 36, 37, 38, 39, 40	34, 33, 36, 35, 39, 40, 37, 38	Sheet 23 of 24 of the Steering System Installation & Service Manual (Upgrade Manual)

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3.1.17 Contractor must gland and prepare all cables so CCG Technicians can terminate as per applicable drawings.

3.1.18 Contractor must be responsible for unpacking/repacking all cable transits/glands.

3.1.19 Contractor must ground all equipment as per the wiring diagrams.

3.2 Location

3.2.1 Navigating Bridge Deck

3.2.2 Forecastle Deck

3.3 Interferences

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

Part 4 PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work must be subject to witness by the Chief Engineer of delegate and the attending TCMS surveyor.

4.2 Testing

4.2.1 All cables are to be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.

4.2.2 All cable testing must be verified by a Coast Guard Technician.

4.2.3 New AC/DC circuits must be proven operational.

4.2.4 Electronic equipment which has been removed for the performance of this specification item must be returned to operational condition.

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4.3 Certification

4.3.1 N/A

Part 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 All owner supplied cable which has not been used must be returned to the owner prior to the acceptance of the item.

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A