

# **CANADIAN COAST GUARD ATLANTIC REGION**

**CCGS C MCLAREN MMV**



## **DRY DOCKING AND REFIT SPECIFICATION**

**SPECIFICATION NO.: 18-C184-017-1  
REVISION 3**

**REQUISITION NUMBER: F5561-181076**

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## **TABLE OF CONTENTS**

GENERAL NOTES .....	5
1 - SERVICES.....	11
2 – PRODUCTION CHART & SUBCONTRACTORS ALLOWANCES .....	17
HD-01 BERTHING AND MOORING .....	19
HD-02 DRYDOCKING .....	22
HD-03 HULL INSPECTION /BUTTS AND SEAMS .....	25
HD-04 ANODES .....	30
HD-05 STORM VALVES & SEA CONNECTIONS INSPECTION .....	34
HD-06 HULL CLEANING AND PAINTING .....	39
HD-07 SEA CHESTS AND STRAINERS .....	47
HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION.....	52
HD-09 SPUR ROPE CUTTER INSTALLATION .....	59
HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION .....	62
HD-11 TANK INSPECTIONS .....	71
HD-12 BOW THRUSTER GEAR OIL AND SEAL CHANGE.....	76
H-01 LIFERAFTS ANNUAL INSPECTION .....	79
H-02 FIXED FIRE FIGHTING SYSTEMS.....	82
H-03 FIRE DETECTION SYSTEM INSPECTION .....	85
H-04 PORTABLE FIRE EXTINGUISHERS .....	88
H-05 ANNUAL DUCT CLEANING.....	92
H-06 ANNUAL LIFEBOAT DAVIT INSPECTION.....	96
H-07 ALLIED CRANE ANNUAL INSPECTION.....	101
H-08 FRESH WATER TANK CLEANING AND INSPECTION.....	104
H-09 INTENTIONALLY LEFT BLANK .....	111
H-10 4500 HOUR PROPULSION ENGINE OVERHAUL.....	112
T-1 AIS ANTENNA RELOCATION.....	118
T-2 INSTALLATION OF SAILOR GMDSS 6000 SYSTEM .....	126
L-01 ANNUAL MEGGAR READINGS .....	157
APPENDIX A .....	160
APPENDIX B .....	190
APPENDIX C .....	194
APPENDIX D.....	205

## GENERAL NOTES

**ON-SITE PROJECT OFFICER:** All the specified work, as well as all work arisings, shall be completed to the satisfaction of the **Coast Guard Technical Authority (CGTA/TA)** who, unless otherwise advised, shall be the **Chief Engineer** of the ship, or their designated representative. Upon completion of each item of the specification, the CGTA shall be notified so that he/she may inspect the work prior to the complete closing up of any work. Failure to give notification does not absolve Contractor of the responsibility of providing CGTA the opportunity to inspect any item. Inspection of any item by the CGTA does not substitute for any required inspection by Transport Canada Marine Safety and Security (TCMSS), classification societies or alternate authority identified by the CGTA.

**SAFETY:** Vessel shall be under Contractor's Safety Management program while under their Care & Custody. Potential Contractor's shall include with their bids the name of their Safety Manager or Supervisor who will ensure that these requirements for workplace safety are met. When under Canadian Coast Guard (CCG) Care & Custody the ISM Safety annex shall apply.

**SUB-CONTRACTORS:** All conditions, stipulations etc. listed in the General Notes apply to any Sub-Contractors employed by the Main Contractor to carry out work on any Specification item.

**SCHEDULE:** At the Pre-Refit Meeting, the successful Contractor shall provide a Production Bar Chart or Schedule showing commencement and completion dates for each item in this specification. This document shall highlight any critical dates and be capable of showing the effects of late completion date of the work package. Contractor shall provide updated Production Schedules to the CGTA, Senior Vessel Maintenance Manager and Public Service and Procurement Canada () whenever the schedule is revised.

**SAFE WORK CERTIFICATES:**

Contractor must obtain Marine Chemist Certificates in accordance with TCMSS TP 3177E before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments, Contractor and subcontractor personnel issuing these certificates shall be fully trained, qualified and certified in accordance with Canada Labour Code (CLC) requirements and all relevant provincial legislation. Certificates shall clearly state the type of work permitted and shall be renewed as required by the regulations. Contractor and his sub-Contractors are advised that any work carried out in confined spaces as defined by the CLC and relevant provincial legislation shall fully comply with all provisions therein.

**CONFINED SPACE:**

For all work requiring entering or working in confined spaces; Contractor shall note that Canadian Coast Guard ships are presently working under the ISM CODE and that each ship has a FLEET SAFETY MANUAL onboard. This manual is also available in soft copy and can be distributed upon request. As a minimum, Contractor shall comply with the WORK REQUIREMENTS as outlined in the FLEET SAFETY MANUAL during the contracted work period. In accordance with the CCG Fleet Safety and Security manual, all work involving the entering of confined spaces shall make use of a qualified rescue team. This team shall be used at all times when tanks or confined spaces are to be entered. The costs associated with all

## GENERAL NOTES

known work requiring the services of a confined space rescue team shall be the responsibility of Contractor.

7. **WELDING:** All welding work shall be performed in accordance with all of the requirements of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

### 7.1 **CONTRACTOR REQUIREMENTS**

#### **Steel Structures**

All welding contractors shall be certified by the Canadian Welding Bureau (CWB) to CSA Standard W47.1 Division 1 or 2 for new construction and work packages other than new construction.

#### **Aluminum Structures**

All welding contractors shall be certified by the CWB to CSA Standard W47.2 Division 1 or 2 for new construction and work packages other than new construction.

#### **Welding Procedures**

All welding procedure specifications and/or welding procedure data sheets shall be reviewed and approved by the CWB prior to use.

#### **Welding Personnel**

All welding personnel shall be approved by the CWB prior to their commencing any welding work.

#### **Performance and Qualification Testing**

All performance and procedure qualification testing shall be fully witnessed and documented by the CWB.

### **Limitations Prior to Commencing Welding Work**

All Contractors shall submit their welding personnel qualification records and approved welding procedures to the Delegated Representative prior to commencing any welding work.

All welding procedures, including welding procedure specifications and welding procedure data sheets, shall include an indication of acceptance by Contractor (by signature, seal or other appropriate means) and a stamp of acceptance by the CWB.

### **Governing Standards for Welding**

For structural steels > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.1 and W59, except as modified by the Canadian Coast Guard Welding CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

For structural aluminum > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.2 and W59.2, except as modified by the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

## GENERAL NOTES

### **INSPECTION OF WELDS**

The methods of inspection, extent, acceptance criterion and inspection personnel qualifications shall be in accordance with all of the requirements of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014.

**HOTWORK VENTILATION AND CONTAINMENT:** During all known work and work arisings, that involve hotwork, Contractor shall ensure that all dust, debris, gas and smoke generated by the work is evacuated from the vessel by the most direct method.

Each item that involves hotwork shall have a defined zone which shall be kept sealed off from the rest of the vessel during the complete work period that involves the generation of welding gases, smoke, and grinding dust etc. These zones shall be indicated in the items contained within the known work package. All extra work arisings that involve hotwork shall have a zone determined using the same logic. The zone shall be limited to the space(s) where the hotwork is being done, boundary areas where fire watches are required, and the access routes between the zone and the exterior of the vessel for workers, welding and cutting equipment and ventilation ductwork.

In areas where accommodations and or workplaces cannot be completely isolated from personal access a double sealed door (air lock) arrangement shall be erected to minimize ingress of the contaminants into occupied areas. A ventilation extraction point shall be located as near as practical to the inside door on the worksite side to reduce the egress into the air lock and subsequently the accommodations and/or workspaces.

All doorways within the affected area that are not being worked or require access for fire watch activities shall be sealed off to prevent all containments from getting in. Passageway branches that connect to the zone shall be sealed off. Contractor shall completely clean all surfaces and fabrics within a compartment that are not suitably protected.

**ENCLOSURES AND HEATING:** Contractor shall provide all enclosures and heating required to carry out all the scheduled work, taking into account the nature of the work, the time of year the refit is, and the weather conditions for that time of year in Contractor's geographic area. Examples of where heating and enclosures could be required include but are not limited to painting, Potable Water coating, and tank cleaning.

**SERVICE CONDITIONS:** Unless specified otherwise, all components, materials and installations supplied by or carried out by Contractor shall be adequate to meet the following service conditions:

In areas that are exposed to the elements:  
outside air temperature of minus (-) 40° C to plus (+) 35° C;  
wind velocity of 50 knots;  
water temperature of minus (-) 2° C to plus (+) 30° C;

All new components, materials and installations within the ship shall be adequate to withstand the specified shock loading accelerations.

## GENERAL NOTES

**HOTWORK & FIRE WATCHES:** Contractor shall abide by their Safety Management Program when performing Hot-work. Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers are **not** shall be used except in an emergency. Should Contractor have to use ship's extinguishers in an emergency they shall be recharged and re-certified by a local facility, of CCG's choice, at Contractor's cost.

**RELOCATIONS:** Any piping, manholes, parts and/or equipment requiring temporary relocation to carry out specified work, or to gain access, shall be refitted upon completion with new jointing, anti-seize compound, clamps and brackets as applicable (Contractor supply). All equipment and systems, so disturbed, shall be tested to prove correct function and fluid integrity upon completion. Defects shall be corrected at Contractor's cost. **NOTE:** It is Contractor's responsibility to identify equipment and systems that shall be tested to verify correct function, prior to being disturbed for required work.

**LIGHTING:** Temporary lighting and/or temporary ventilation required by Contractor to carry out any item of this specification shall be supplied, installed and maintained in safe working condition by Contractor and removed on completion of the related work. Naked light bulbs or tubes shall not be used as temporary lighting inside the vessel. All lights used in the vessel shall be supplied with approved guards.

**CLEANUP:** Contractor to ensure that all spaces, compartments, and areas where work has been carried out, or Shipyard staff has used for transit routes, are left in **"as clean a condition as found"** when the vessel commenced refit. All rags, debris, and associated garbage generated by the shipyard staff while on board shall be removed to the garbage container(s) each day. The costs associated with the removal of dirt, debris, and garbage shall be included in the quote.

**INSPECTION:** Contractor shall be responsible for calling in the services of TCMSS, RO (Recognized Organization), and HC Inspectors when and as required for survey and inspection items. All TCMSS and RO surveyors called in by Contractor shall sign-off the CGTA's Inspection Log Book for all items surveyed.

**CORRESPONDENCE & REPORTS:** Unless otherwise agreed upon, all type written correspondence, reports, certificates and drawings presented to the CGTA shall be in English. All reports shall be computer generated and provided in **English**. Additional copies may be submitted in French.

All reports shall be completed in a timely manner and provided to the CGTA immediately following their completion, and shall continue as required throughout each specification item.

Upon delivery of the vessel, a compilation of all reports, drawings and correspondence shall be provided on a CD or DVD to CGTA

**PAINTING:** Unless specified otherwise, replacement and/or disturbed steelwork shall be given a minimum of two (2) coats of Intershield 300 bronze Epoxy; each coat shall be of contrasting colour. **Lead-based paints shall not be used.** Prior to painting, all new and disturbed

## GENERAL NOTES

steelwork shall be power tool cleaned as a minimum standard of surface preparation. Contractor shall notify the CGTA after the first coat of paint is fully cured so that it may be inspected prior to the application of the second coat. Failure to do so shall result in another coat being applied at Contractor's expense.

**MATERIALS & TOOLS:** All materials, unless otherwise specified, shall be supplied by Contractor. Contractor to supply all necessary tools and equipment to perform the specified work. Also referred to as Contractor Furnished Material (CFM ). Special, ship-specific tools, as required, will be issued by and returned to CGTA. Contractor shall be responsible for removing the tools from their stored location aboard the vessel, and returning them and securing them in place when finished. Otherwise, ship's tools and equipment will not be available for Contractor's use. Contractor must provide power and air for any tools required, the ship's supply must not be used.

**MEASUREMENTS:** All dimensional measurements shall be taken and recorded in inches. Unless otherwise specified, the dimensions shall be taken and reported in thousandths of an inch (0.000 inch). All measuring devices shall be described on the submitted reporting sheets. All reported dimensions shall be either typed or printed in a neat legible manner, and shall include the name of the person who took the readings.

**CO-OPERATION:** During the period that the ship is in refit, members of the ship's complement, Coast Guard technical staff, and service specialists may be carrying out repairs to, maintenance of, or modifications of various ships' equipment not covered in this specification. Contractor shall not deny access to the vessel to these persons. Every effort will be taken to ensure that this Coast Guard controlled work will not interfere or conflict with that being carried out by Contractor.

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

**ACCESS:** The following areas are out of bounds to Contractor's personnel except to perform work as required by the specifications: all cabins, offices, workshops, Wheelhouse, Control Room, public washrooms, Officers' and Crew's Messes and Lounges. Contractor shall ensure that no workers bring meals onboard the ship

**INSPECTION & GUIDANCE:** During this contract, Ship's Crew and Regional Staff will be onboard conducting inspections and providing guidance to Contractor personnel.

**ASBESTOS:** There are no locations having asbestos containing materials (ACM).

## GENERAL NOTES

### **PROTECTION OF EQUIPMENT**

Contractor must take measures to ensure that all surfaces and items of material or equipment installed on the vessel, finished surfaces, final color coats and other finished work must be protected against damage, soiling, and/or contamination.

All electrical and electronic equipment and components must be protected during the execution of the specified work against damage by direct or indirect physical contact or by the effects of adverse temperatures or other environmental conditions. Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance by Canada must be returned to "As Delivered" condition by Contractor at no expense to Canada. All openings in machinery and/or systems prior to connections being made must be kept covered by inserts or covers at all times.

Contractor must obtain and follow instructions from its sub-Contractors for any special protection required for sub-Contractor furnished equipment during the specified work. Such instructions must be made available to the CGTA and TCMSS. Contractor must ensure that the ship's machinery, equipment and systems are protected from all hazards, including but not limited to damage from ongoing work, corrosion, sandblasting (directly or indirectly), paint over, hot work, adverse temperature or other environmental conditions and contaminants.

## 1 - SERVICES

**GENERAL:** The following services shall be supplied, fitted and/or connected upon arrival at Contractor's facility, maintained throughout the docking / contract period, and removed from the vessel on completion of the work. Contractor shall be responsible for any additional connections required when ship is moved between dock/slipway and alongside berth at Contractor's premises.

**UNMANNED REFIT:** During the majority of the contract period, the CCGS McLaren will be unmanned. As a result, the ship shall be placed in the care and custody of Contractor as described in this specification. However, access to the vessel shall not be denied to CCG, Public Service Procurement Canada (PSPC) personnel by the Contractor. Every effort will be taken to ensure that vessel access by these personnel shall not interfere or conflict with the Contractor's work.

**CCG / PSPC Offices:** For the period of the Contract, the Contractor must provide furnished office accommodations for authorized representatives of Canada including the provision of high speed wireless internet service.

The above office furnishings and accommodations are to be made available for three (3) representatives of Canada only and may not be occupied at all times during the period of the Contract. During periods of non-occupancy the Contractor may make other uses of the office accommodations as required.

**CARE AND CUSTODY:** During the contract period, the ship shall be placed in the custody of Contractor who shall be responsible for all safety and security matters pertaining to the vessel. As the ship will not be de-stored, Contractor shall provide whatever security arrangements are required to safeguard CCG and DFO equipment and material that remain onboard during the contract period.

**SECURITY WATCHES:** During the contract period, Contractor shall provide and maintain a continuous, 24 hour-per-day, 7 day-per-week security watch consisting of at least one (1) mobile security patroller. The patrollers are to provide mobile safety and security checks throughout the vessel. The patrols shall be adequate to ensure integrity against personal injury, fire and flood in accordance with Part II of the Canada Labour Code, as well as to ensure that the ship remains free from damage and/or theft resulting from unauthorized entry or activity.

## 1 - SERVICES

**TURNOVER:** The turnover of the ship to and from Contractor shall be carried out on a compartment-by-compartment basis with a Contractor's Representative, and Captain (or Representative) in attendance.

As part of the initial turnover, digital photographs will be taken by the CGTA with Contractor Representative in attendance consisting of a minimum of four photographs per space. CD copies of the photographs will be distributed to Contractor, CCG Representative and the PSPC and shall be accepted as representative of the condition of the vessel at turnover.

On completion of the photographic survey and compartment inspections, CGTA shall provide Contractor's Representative with keys as required for access to all areas of the ship's interior spaces. Turnover to the Contractor shall be finalized by completion of an "Assumption of Custody Certificate" to be supplied by PSPC.

When custody is returned to CCG, a "Resumption of Custody Certificate" shall be completed after completion of a second compartment inspection survey and return of all keys to CGTA.

Contractor shall be responsible for the safe transfer of the ship between its pre/post-docking berth and its docking blocks. During docking and undocking of the ship, radio contact shall be maintained between the vessel's Commanding Officer and the Contractor's Docking Officer, if the vessel is crewed at these times. If the ship is unmanned at the docking and undocking, the safe movement of the ship shall be the sole responsibility of the Contractor.

**DOCKING:** Contractor shall be responsible to coordinate a safe transfer of the ship between its pre/post-docking berth and its docking blocks. During docking and undocking of the ship, radio contact shall be maintained between the vessel's Commanding Officer and Contractor's Docking Officer.

**PRICES:** Contractor shall quote a global price and daily or unit cost rates for all services supplied to the vessel during the refit period.

**GANGWAYS:** Contractor shall supply and install two (2) gangways complete with safety net, while the ship is on the dock or slipway or at berth. Gangways, complete with safety nets, one of the two gangways shall be installed in such a manner that they provide separate routes for escape in the event of fire. CGTA shall advise of specific locations.

Safety nets shall be in compliance with the Canada Labour Code. Gangways shall be safe, well-lit and structurally suitable for the passage of shipyard personnel and the ship's crew. Contractor shall maintain gangways in a safe condition throughout the duration of the refit while the ship is out of the water.

## 1 - SERVICES

Initial installation and later removal of gangways shall be included in quote, as well as maintenance and upkeep while vessel is in Contractor's yard. Any movement of gangway(s) required by Contractor shall be at his cost.

**ELECTRIC POWER:** Contractor shall connect and quote on supplying electrical power at 600 Volt Alternating Current, 3 Phase, 4 wire with floating neutral, 60 Hz at 200 Ampere rating upon ship's arrival at Contractor's facilities.

Contractor shall bid on the supply of 3000 kWh per day for refit period. The actual consumption shall be pro-rated up or down as per power used as indicated by vessel's kWh meter. The power meter shall be read and recorded by CGTA and Contractor's Representative together at the start and end of contracted period. The kWh unit price shall be quoted for PSPC 1379 adjustment purposes. Cost of connection and disconnection shall be included in the quote.

If no kW consumption meter is available, a daily consumption (amps) shall be negotiated and power requirement determined by the following formula:

$$\text{KWH} = I \times E \times P.F. \times 1.73 \times 24/1000.$$

A ground cable shall be attached to the ship's hull. Contractor shall ensure compliance as per the Transport Canada Marine Safety Bulletin – “Grounding Safety in Dry dock”.

Note: Problems have been experienced in the past with the loss of one phase with Contractor supplied shore power, due to a fuse blowing. Contractor shall ensure the electrical service provided has protection system fitted such that loss of a single phase at Contractor's end of the cable results in immediate opening of the remaining phases.

**FIRE MAIN:** Contractor shall connect a one and a half (1 ½ ) inch diameter fresh water line to the ship's fire main, with an isolation valve placed onboard. **Fire main shall be charged and maintained at 100 psig.**

**POTABLE & SANITARY WATER:** Contractor shall supply Two (2) Portable toilets, they shall be placed forward of the wheelhouse for duration of contract and emptied weekly. Potable fresh and sanitary water at 415 kPa (60 PSI) constant pressure shall be connected to ship's systems, complete with pressure regulator and shut-off valves. Approximately 20 cubic meters shall be supplied for duration of the contract. Contractor shall supply and connected a water meter to the ship's inlet line. Contractor shall quote a unit rate per cubic meter for PSPC 1379 adjustments, and include all connection / disconnection costs in bid price. Contractor shall make arrangements to prevent the potable water supply piping/hoses are protected against freezing. Contractor shall provide to CGTA at the

## 1 - SERVICES

Pre-Refit Meeting a certificate of potable water quality before water service is connected to the vessel.

This potable water supply shall be connected to a one and a half (1 ½) inch camlock on the Foredeck.

### **HULL DISCHARGE CONNECTIONS:**

Connections shall be made to the following and directed to suitable drains:

- Drain connection to the Port main engine exhaust for refrigeration drain.

These connections shall be maintained for the duration of the vessel's docking period. Arrangements shall be made to prevent the freeze up of these drains. Contractor s shall include the cost of all connections and disconnections in their quotations.

**GARBAGE:** A garbage container, 6 m3 (215 Ft.3) minimum capacity, strictly for ship's use shall be placed in a convenient location as close as possible to the ship's gangway. Contractor shall provide this service for the duration of the refit. The bin shall be empty on a regular basis to negate the problems of odors.

**CRANAGE:** Contractor shall bid on supplying general services of a dockside crane, driver and rigger for twenty (20) hours during the dry-docking period as and when required by the CGTA, plus an hourly rate for PSPC 1379 adjustment purposes.

**WASTE OIL:** Contractor shall bid on removal and disposal of 5,000 liters of waste oil / water mixture from the vessel during the refit period, and quote a unit rate per litre for PSPC 1379 adjustment purposes. Removal and disposal shall be performed by an identified licensed waste oil disposal company in full compliance with regulatory requirements.

Copies of all dirty water and oily water removal invoices with quantities shall be given to the CGTA. Copies of invoices detailing disposal of the liquids shall be given to the CGTA.

**CLEANING:** Contractor shall ensure that all spaces, compartments and areas of the ship where work has been carried out, or Shipyard staff has used for transit routes, are "as clean as found" when work is completed. The cost of clean-up work shall be included in the quote for each specification item.

## 1 - SERVICES

**PARKING:** Sufficient parking for DFO/CCG and PSPC representatives shall be provided conveniently close to the berthed or docked vessel. Contractor shall provide five (5) clearly designated for “DFO/CCG and PSPC use only” parking spaces for the duration of the docking period.

**ALLEYWAY AND BULKHEAD PROTECTION:** Alleyways and area that shall be used by Contractor’s personnel on a regular basis for access to required work areas shall be suitably protected from damage, soil, etc. All affected alleyways shall have deck surfaces covered by 6mm Masonite extending to the full extremities of the areas dealt with. All seams, butts, and edges of the applied Masonite shall be taped to discourage ingress of soil beneath, as well as to stop any migration of the applied sections. Contractor shall quote on supplying and installing 150 square meters of 6 mm Masonite rough one side and installed rough side up. Upon completion of refit, Contractor shall lift all Masonite. The area shall be swept and mopped on completion of the refit and any tape residue shall be removed. Contractor to quote separately a price per square foot for cost of supply, installation and removal of any additional Masonite as may be required.

All internal bulkhead panels in the above-noted areas shall be suitably protected with application of 3mm inch Masonite panels (or heavy construction paper) extending to a minimum 1.5 m height above the deck level and all corners shall be covered and taped. Again, all butts, seams and edges shall be taped. Contractor shall quote on supplying and installing 100 square meters of 3 mm Masonite (or heavy construction paper). Upon completion of refit Contractor shall remove all Masonite/paper and dispose. The areas shall be wiped clean on completion of the refit and any tape residue shall be removed. Contractor to quote separately a price per square foot for cost of supply, installation and removal of any Masonite/paper that may be required. Total cost shall be adjusted up or down by PSPC 1379 action.

**SCAFFOLDING:** Contractor shall supply the necessary manpower and equipment to erect, as necessary, scaffolding and staging to facilitate the inspection of the ship’s hull as necessary by a surveyor from the RO (Recognized Organization) and ship’s personnel. This will include scaffolding and equipment to access propellers, rudder, thruster and renewal of anodes. The scaffolding shall be removed when the work is complete, at Contractor’s expense.

**GASOLINE TANKS:** Contractor must remove the port and starboard gasoline tanks from the vessel and store the tanks so that they are protected from the weather for the duration of the dry-docking. All gasoline must be removed and disposed of according to provincial and federal regulations. After all dry-dock work is complete the contractor

must reinstall the gasoline tanks. Cranage required to do the work is covered under the Cranage section in Services.

## 2 – PRODUCTION CHART & SUBCONTRACTORS ALLOWANCES

### 1: SCOPE:

The intent of this specification shall be to provide a means for tracking the overall progress of the refit.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall supply three copies of a detailed gantt chart showing the planned work schedule for the ship's refit. All copies shall be in colour as per the originals.
2. This bar chart shall show, for each specification item, the start date, the manpower loading, the duration and the completion date. The chart shall also highlight any critical paths.
3. The production chart shall be updated weekly and for each production meeting to reflect the actual production on the refit and changes to the anticipated completion dates of each individual item.
4. The production chart shall clearly indicate the arrival/departure dates of any Subcontractors/Field Service Representatives.
5. The production chart shall include the status and production on each PSPC 1379 arising.
6. Three copies of the production chart shall be given to the Chief Engineer the day prior to each Production Meeting. A copy shall be emailed to the Senior Vessel Maintenance Manager (SVMM), Jeff Mercier (jeffrey.mercier@dfo-mpo.gc.ca) the day prior as well.
7. A copy of the original bar chart shall be provided via email to the PSPC contracting Officer and SVMM before the close of business on the day of the ships arrival at the Contractors premises.
8. The update shall be emailed to, PSPC Contracting Officer and SVMM the day prior to the weekly scheduled Progress Meeting

#### 2.2 Location

1. N/A

#### 2.3 Interferences

1. N/A

### **3: REFERENCES:**

#### 3.1 Guidance Drawings/Nameplate Data

1. N/A

#### 3.2 Standards and Regulations

1. N/A

#### 3.3 Production Chart & Subcontractors Allowances

1. N/A

#### 3.4 Owner Furnished Equipment

1. N/A

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

#### 4.1 Inspection

1. N/A

#### 4.2 Testing

1. N/A

#### 4.3 Certification

1. N/A

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings, and Manuals

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

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

# HD-01 BERTHING AND MOORING

## 1: SCOPE:

The intent of this specification item is for the Contractor to provide berthing services. During the contract period at the Contractors facilities, while not in dock, the vessel must be berthed at the contractor's wharf at a safe and secure berth with adequate water at extreme low tide to ensure that the vessel will not touch bottom.

## 2: TECHNICAL DESCRIPTION:

### 2.1 General

1. The vessel will be delivered to the Contractor's facility under its own power.
2. Contractor is to include in their overall bid, all costs for initial tying up, any movement of the vessel during refit, and letting go of lines from Contractor's wharf on departure after completion of contract. Contractor is responsible for supplying all necessary lines for securing the vessel at their facility.
3. Maneuvering of the vessel into and of contractors docking facilities is the responsibility of Contractor. Costs for tugs and pilots required for any movements of the vessel during the contract period must be included in the bid price, shown as a separate cost.
4. One gangway must be supplied at the Contractors jetty. This gangway must be set up and rigged from the wharf onto the aft main deck, complete with safety net. Gangway must be well lit and structurally sufficient to support passage of the Contractor's workmen and the ship's crew.  
The supplied gangway must be in accordance with the with the provisions stipulated in the tackle regulations as well as the safe working practices regulation made pursuant to the Canada Shipping Act and the Marine Occupational Safety and Health Regulations, Part 2 on Temporary Structures made pursuant to the Canada Labour Code, Part 2.

#### 5. Vessel Particulars:

Length Overall = 42.8m  
Breadth Overall = 7.0 m  
Draft = 2.8 m

### 2.2 Location

1. N/A

### 2.3 Interferences

1. N/A

## 3: REFERENCES:

## HD-01 BERTHING AND MOORING

### 3.1 Guidance Drawings/Nameplate Data

1. N/A

### 3.2 Standards and Regulations

1. N/A

### 3.3 Subcontractors Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. N/A

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

### 4.1 Inspection

1. N/A

### 4.2 Testing

1. N/A

### 4.3 Certification

1. N/A

## **5: DELIVERABLES:**

### 5.1 Reports, Drawings, and Manuals

1. N/A

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

## HD-02 DRYDOCKING

### 1: SCOPE:

Contractor shall quote on docking and undocking the ship, allowing sufficient service days to carry out the specified work, with a reasonable time allowance for arising new work. A vessel docking plan (Dwg # AF6099-10000-14\_AF Dry-Docking Plan-1\_2 (Rev AF1) and AF6099-10000-14\_AF Dry-Docking Plan-2\_2 (Rev AF1)) onboard the vessel shall be made available to Contractor.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Dry docking shall be under the direct supervision of a Certified Docking Master. Prior to docking the vessel, Contractor shall present to Canadian Coast Guard their plan to effect a safe docking. This will include, but not be limited to, an explanation of block loading, dock preparation, tide wind- tug issues, manpower arrangements and communications. Contractor shall provide reasonable notice to CCG prior to undocking the vessel and make similar presentations regarding safe undocking and for the vessel's on dock period. Vessel's crew will be present for docking and undocking.
2. Contractor shall supply the services of divers to confirm that the vessel is setting evenly on the bilge and keel blocks.
3. Contractor shall quote a unit daily service day cost on dock. This cost shall form part of the overall quote. This quote shall include any tug and/or pilotage service cost.
4. Docking shall be undertaken during the first two days of refit. If necessary, Contractor shall prepare the dock in advance of the ship's arrival and the official start date of the contract period. If premium time is required for evening shifts or weekend work to meet this objective, Contractor shall identify this and include all costs in the quotation.
5. Ship's personnel will be responsible for all line handling onboard the vessel only during the docking and undocking operations. Contractor shall supply personnel on the dock walls and ashore for all line handling.
6. Contractor shall ensure that docking blocks are clear of transducer faces and sea bay access covers.
7. The Contractor shall make sure enough room between the block, the speed log and the echo sounder.

## HD-02 DRYDOCKING

8. Two gangways shall be supplied and set up by Contractor while the vessel is drydocked. These gangways shall be set up and rigged from the wharf onto the buoy deck, complete with safety net. Gangways shall be safe, well-lit and structurally sufficient to support passage of Contractor's workmen and ship's crew.
9. During undocking Contractor shall ensure that sufficient personnel are in attendance throughout the ship's spaces to monitor for leakage around the numerous sea connections, stern tubes, sea chests, and any other areas in communication with the underwater area of the vessel that were disturbed during dry docking, and to correct any deficiencies that may arise.
10. Contractor shall quote a unit cost on the removal of keel blocks as well as a unit cost on the insertion of keel blocks. This quote shall be included in the overall bid.

### 2.2 Location

1. N/A

### 2.3 Interferences

1. N/A

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate Data

1. Vessel Docking Plan;  
AF6099-10000-14\_AF Dry-Docking Plan-1\_2 (Rev AF1)  
AF6099-10000-14\_AF Dry-Docking Plan-2\_2 (Rev AF1)

### 3.2 Standards and Regulations

1. N/A

### 3.3 Subcontractors Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. N/A

## HD-02 DRYDOCKING

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

#### 4.1 Inspection

1. N/A

#### 4.2 Testing

1. N/A

#### 4.3 Certification

1. N/A

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings, and Manuals

1. N/A

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

## HD-03 HULL INSPECTION /BUTTS AND SEAMS

### 1: SCOPE:

The intent of this specification item is for Contractor to repair welded joints in hull plating as identified in a hull survey by the RO Surveyor and CGTA. To be completed in conjunction with specification item HD-05 Hull Cleaning and Painting.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor must arrange for the RO Class inspection of the underwater hull area shell plating and paint system condition. Inspection to be scheduled upon completion of hull cleaning and within 48 hours of docking. Contractor to note that this inspection also includes the bow thruster tunnel. The RO Surveyor's hull inspection will determine those areas that require weld renewal. Joints selected for repair will be marked and must be cleaned to sound metal by air arc gouging and / or grinding. Joint welds are then to be built up to the original level by the RO approved welding techniques with approved materials. All work must be to the approval of the RO and the CGTA. Prior to commencing repair Contractor shall inform the CGTA and provide a copy of their welding procedure.
2. The underwater hull survey inspection shall be carried out in accordance with the Classification Society's survey requirements for a vessel of this type.
3. For bidding purposes, Contractor must include in their overall bid price the cost of 50 feet of air arc gouging and 150 feet of bead weld. Contractor must include cost per foot for each of air arc gouging and bead welding for adjusting purposes.
4. Butts and seams falling in way of any fuel tanks will require the fuel tank to be pumped down by the vessel's crew. Contractor must gas free and certified safe for hot work after they remove and dispose of any remaining fuel in accordance with all Federal, Provincial and Municipal regulations. Disposal certificates must be provided to the CGTA.
5. Butts and seams falling in way of ballast/void tanks with coated internals will require interior paint work to be touched up in way of heat damaged. The foregoing gas freeing and paint work will be handled through PSPC 1379 action.
6. Contractor must supply all scaffolding, materials, equipment, and personnel to arc gouge and re-weld the existing deteriorating welds as identified by the RO Surveyor on both sides of the vessel. Contractor to quote on the services of a person lift and operator for 8 hours for survey and inspection purposes. Contractor to quote hourly rate for this work.
7. Upon completion of all work, NDT (UT or Mag particle or equivalent) must be carried out by a qualified technician in areas chosen by the attending RO Surveyor. Contractor must schedule the attendance of a certified NDT Technician along with the RO Surveyor. The RO Surveyor will direct the NDT technician as to areas that require inspections.

## HD-03 HULL INSPECTION /BUTTS AND SEAMS

8. In addition to the above work, Contractor must provide a cost on the following in their bid;
  - Unit cost per additional foot of arc gouging.
  - Unit cost per additional foot of welding.
  - Unit cost per additional NDT (UT or Mag particle or equivalent)
  - Unit cost for gas free certified
9. Contractor must schedule the RO Surveyor to inspect and credit repairs, prior to coatings application. All new and disturbed steel must be prepared and coated in conjunction with HD-06 Hull Cleaning and Painting. Contractor must carry out all RO specified repairs.
10. Contractor must ensure a survey credit is obtained from the RO for the inspection and certification of the shell plating. Contractor shall present this survey credit to the PSPC and the CGTA prior to the flooding of the dock to re-float the vessel. Contractor shall notify the PSPC and the CGTA so that these authorities may witness the shell plating inspection by the RO Surveyor.

### 2.2. Location

1. All work shall be conducted on the vessel's outer hull; if hot work is required, tank access will be required to access the interior surfaces of the hull plating.

### 2.3. Interferences

1. No known interferences. Contractor shall take note of the interference items during the vessel viewing and include the costs associated with dealing with these items, including removals, reinstallations and painting of disturbed metal parts.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate Data

## HD-03 HULL INSPECTION /BUTTS AND SEAMS

<b>Drawing Number</b>	<b>Description</b>	<b>Electronic #</b>
AF6099-10000-14	Docking Plan 1-2 and 2-2	
AF6099-10000-01_AF	Midship and Other Sections Plan	
AF6099-10000-03_AF	Shell Expansion	
AF6099-10000-04_AF	Watertight Bulkheads Plans	
AF6099-63100-01_AF	Paint Schedule	
AF6099-89940-01_AF	General Arrangement Plan 1-2	
AF6099-89940-01_AF	General Arrangement Plan 2-2	
AF6099-89940-02_AF	Tank Arrangement & Capacity Plan	
AF6099-89940-03_AF	Lines Plan	
AF6099-89940-08_AF	Draft Marks and Load Line Marks Plan	

### 3.2 Standards and Regulations

1. At a minimum the following Coast Guard Standards and or Technical Bulletins shall be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CGTA.
  - a. Canadian Coast Fleet Safety Manual (DFO 5737)
  - b. Coast Guard ISM Lock Out/Tag Out Procedures
  - c. Canada Shipping Act, 2001 (2001, c. 26) Hull Inspection Regulations (C.R.C., c.1432)
  - d. ABS, Rules & Regulations for the Classification of HSC (High Speed Craft)
2. All hotwork shall be done in accordance with CCG Welding Specification CT-043-EQ-EG-001E (EKME#3049715v3A)
3. CG Fleet Circular FC 08-2007

### 3.3 Production Chart & Subcontractors Allowances

1. N/A

### 3.4 Owner Furnished Equipment

## HD-03 HULL INSPECTION /BUTTS AND SEAMS

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

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

#### 4.1 Inspection

1. The Contractor shall afford the CGTA the opportunity to witness the RO's inspection of the underwater hull prior to and following all prescribed repairs.
2. All work to be completed to the satisfaction of the RO Surveyor and the CGTA.

#### 4.2 Testing

1. Contractor shall include the cost of 10 non-destructive tests on the new welds; these tests shall be as directed by the attending RO Surveyor. Contractor must supply a report to the CGTA on the NDT readings along with a detailed drawing showing each measurement location.
2. Contractor shall perform and record Wet Film Thickness readings during each application of underwater surface area coating as required by the FSR. The readings and their locations shall be contained in the final report.

#### 4.3 Certification

1. Contractor is responsible for arranging the RO Surveyor for all required inspections in order to obtain credit towards the vessel's continuous hull and machinery survey.
2. Prior to the close of contract, certification or other documentation shall be submitted to the CGTA attesting to the quality of new materials and components such as shell plating, structural members and welding rods.

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings, and Manuals

1. A computer generated report shall be provided in digital format to the CGTA. At a minimum this report must include all reading taken, NDT readings, drawings, certificates, results/recommendations, etc. identified in this specification item.

## HD-03 HULL INSPECTION /BUTTS AND SEAMS

2. Following the RO underwater hull inspection and prior to carrying out any identified repairs, Contractor shall submit in PDF format a copy of drawing AF6099-10000-03\_AF Shell Expansion outlining in red all proposed plate repairs.

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

## HD-04 ANODES

### 1: SCOPE:

The intent of this specification item is for Contractor to replace all wasted and/or defective hull anodes and corrosion protection on the underwater hull of the vessel.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

##### Anodes

1. All sacrificial hull anodes shall be visually inspected in the presence of the CGTA or delegate for defects and findings, recorded on a general hull plan. Recommendations for replacement shall be made accordingly.
2. Contractor shall remove all wasted and/or damaged anodes from the vessel and grind smooth all previous anode welded connections. Contractor shall fit new anodes in the same locations as the removed anodes. This shall be done after the hull coating has been applied. All weld areas shall be touched up with the hull coating after the anodes have been fitted.
3. All anodes / other protection shall be removed after completion of the coating application. Any anodes that are covered with coating shall be renewed at Contractor's expense.

#### 1. Hull Anodes

1. The Contractor must replace all sacrificial hull anodes MM28AB (20 in total).
2. Replacement hull anodes, type MM 28AB, will be Contractor supplied

#### 2. Sea chests/seabay/fire pump suction

1. The Contractor must replace three anodes, one in each of the three sea chests.
2. The Contractor must replace one anode in single Fire Pump suction sea chest.
3. Replacement anodes, type MM 26A, will be Contractor supplied.

#### 3. Bow thruster tunnel

1. The Contractor must replace all four Bow Thruster Tunnel anodes, two on each side of the propeller.
2. Replacement anodes, type MM 26A, will be Contractor supplied.

## HD-04 ANODES

### 4. Bow thruster anodes

1. The Contractor must replace the two cone shaped anodes, one on each side of the propeller.

Replacement anodes (Type TRAC 24) will be provided by Canada.

The Contractor must install the cone shaped anodes in accordance with Manual No.: 29351 24 TRAC ASSY.



4. A unit price per anode replacement shall be included in the pricing data sheet.
5. All anodes shall be protected from the coating material being applied in the sea chest areas during the work execution of paint process. All anode protection shall be removed after completion of the coating application. Any anodes that are covered with coating shall be renewed at Contractor's expense.
6. A unit price per anode replacement is to be included in the pricing data sheet.

### 2.2 Location

#### 1. Hull Area

### 2.3 Interferences

## HD-04 ANODES

1. N/A

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate data

Manual:

NO.	Description
1	Hydraulic Thruster (PKK 24 TRAC (24) 75 kw) Installation and Operation
2	24 TRAC ASSY drawing # 29351

Drawings:

Drawing Number	Drawing Title	Electronic File Name
AF6099-O63300-01-AF	Scheme of Cathodic Protection	

#### 3.2 Standard and Regulations

1. Canada Shipping Act, 2001 (2001, c. 26) Hull Inspection Regulations (C.R.C., c.1432)
2. ABS, Rules & Regulations for the Classification of HSC (High Speed Craft)

#### 3.3 Owner Furnished Equipment

1. N/A

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. Contractor shall afford the CGTA an opportunity to witness the RO inspection of the anodes prior to, and following all prescribed renewing.

#### 4.2 Testing

1. Contractor shall notify CGTA upon completion of this work item to afford them the opportunity to verify the work has been completed as detailed in this Section. Verification of this work shall be performed before the ship undocking.

#### 4.3 Certification

## HD-04 ANODES

1. Prior to the close of contract, certification or other documentation shall be submitted to the TA attesting to the quality of new materials and components.

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings and Manuals

1. Prior to the close of contract, a comprehensive report covering all work and replacements shall be submitted to PSPC and CGTA.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

# HD-05 STORM VALVES & SEA CONNECTIONS INSPECTION

## 1: SCOPE:

The intent of this specification item is for Contractor to remove, disassemble, clean and layout for the RO's inspection all storm valves and sea connections. The Contractor must start this specification item as soon as possible to ensure any failed valves will have enough time to be replaced before the end of the docking period.

## 2: TECHNICAL DESCRIPTION

### 2.1 General

1. Contractor shall ensure all applicable safety precautions including equipment lock outs and tag outs are implemented prior to the start of work.
2. Contractor shall ensure, prior to the start of disassembly, that all precautions are taken to ensure that the reassembly and reinstallation of all system and equipment components shall be as per original and in accordance with manufacturer's specifications.
3. Contractor shall visually inspect all removed valves, record findings and report all deficiencies as they are identified to the CGTA and make recommendations for their repair or replacement. Contractor shall give the CGTA a copy of their hand written record indicating the findings and recommended repairs.
4. Contractor shall remove, disassemble, clean and layout for the RO inspection all sea connections listed below.
5. Prior to reassembly and installation, Contractor shall arrange for a viewing by the attending RO Surveyor and CGTA, to inspect all valves as listed below.
6. Following inspection, all original valves shall have their seats and discs ground in. Final lapping shall be done to ensure the valve disc makes full contact with the valve seat around their entire circumference. All valves shall be reassembled using new Contractor Furnished Materials (CFM) packing and gaskets.
7. Contractor shall include in their bid 20 hours of machining time for repair of any storm valves or sea connections.
8. Where a valve is beyond serviceable, contractor supplied replacement valves must be installed. The replacement valves must be RO approved, the same material, class of service and style as the condemned valve.
9. All valves that are deemed to beyond serviceable will be considered unscheduled work and will be replaced by way of PSPC 1379.
10. All threaded fasteners and valve spindle itself are to be coated with anti-sieze compound during reassembly.

## HD-05 STORM VALVES & SEA CONNECTIONS INSPECTION

11. All flange gaskets disturbed as a result of the valve servicing process shall be renewed using new CFM gasket material.

### 2.2 Location

	ID	Description	Location
	V256001	Main Isolation Port	MMR Port Fwd
	V256002	Main Isolation Stbd	MMR Stbd Fwd
	V256003	Fwd Sea Chest Isolation	Bow Thruster Rm
	V256007	Port Sea Chest Re-circulation	MMR Ctr Fwd
	V256008	Stbd Sea Chest Re-circulation	MMR Stbd Fwd
	V256010	Port Sea Chest Vent	MMR Ctr Fwd
	V256011	Stbd Sea Chest Vent	MMR Stbd Fwd
	V256012	Fwd Sea Chest Vent	Bow Thruster Rm Port
	V256013	Port Sea Strainer Outlet	MMR Fwd
	V256014	Stbd Sea Strainer Outlet	MMR Fwd
	V256018	PS Main Engine Supply	MMR Fwd
	V256022	SB Main Engine Supply	MMR Fwd
	V256042	Fwd Sea Strainer Outlet	Bow Thruster Rm
	V256090	Cooling Water Supply Header Vent	MMR Fwd
	V256136	SW for Fridge	MMR Fwd
	V555017	Emergency FM Supply	Bow Thruster Room
	V520055	Bilge Eductor Supply	Bow Thruster Room
	V256020	SW to GS Pump	MMR Stbd Fwd
	V520015	FM Supply	

### Storm Valves

	ID	Description	Location
	V526023	Fuel Oil Spill LCR O/B Discharge	Laundry Rm
	V526029	HVAC/DK LCR O/B Discharge	Bow Thruster Rm Port
	V526031	Wet Gear Rm O/B Discharge	MMR Port Aft

### Overboard Valves

	ID	Description	Location
	V593091	Sewage Plant O/B Discharge	MMR Port Aft
	V256032	Port O/B Discharge	MMR Port Fwd
	V256035	Stbd O/B Discharge	MMR Stbd Fwd

	V256065	ACU O/B Discharge	Bow Thruster Rm Port Aft
	V256114	Stbd ME Gear Box O/B Discharge	MMR Stbd
	V256115	Port ME Gear Box O/B Discharge	MMR Port
	V256131	Cyclone Filter O/B Discharge	MMR Stbd Aft
	V520018	Bilge O/B	AMR Port Fwd
	V520019	Bilge O/B	MMR Port Aft
	V520056	Bilge Eductor O/B	Bow Thruster Rm Stbd
	V593071	O/B Discharge (Check Valve)	MMR Aft
	V256043	PS Main Engine Exhaust	Steering Gear
	V256045	PS Diesel Generator Exhaust	Steering Gear
	V256047	SB Diesel Generator Exhaust	Steering Gear
	V256049	SB Main Engine Exhaust	Steering Gear
	V530001	RO Overboard	Bow Thruster Room
	V555009	Fire Main Drain	

#### Blow Down Air Valves

	ID	Description	Location
	V551061	Blow down Air Side Sea Chest (S)	MMR Stbd Fwd
	V551062	Blow down Air Bottom Sea Chest (P)	MMR Fwd
	V551070	Blow down Air RO Unit	Bow Thruster Room Stbd
	V551074	Blow down Air FWD Sea Chest	Bow Thruster Room Aft
	V551075	Blow down Air Bilge O/B valve	Bow Thruster Room Stbd
	V551076	Blow down Air HVAC ACU O/B	Bow Thruster Room Port
	V551089	Blow down Air Fire Water O/B	Bow Thruster Room Stbd
	V551126	Blow down Air Gear Box Port O/B	MMR Port
	V551127	Blow down Air Gear Box Stbd O/B	MMR Stbd
	V551128	Blow down Air Cyclone Filter O/B	MMR Stbd Aft
	V551073	Blow Down Side Discharge AMR Bilge Pump	AMR Port
	V551071	Blow Down Side Discharge MMR Bilge Pump	MMR Port Aft
	V551068	Blow Down Sewage Discharge	MMR Port Aft
	V551063	Blow Down ME Discharge O/B PS	MMR Port Fwd
	V551064	Blow Down ME Discharge O/B SB	MMR Stbd Fwd

#### Misc Valves

	ID	Description	Location
	V520115	Emergency Bilge Valve	MMR Fwd

## HD-05 STORM VALVES & SEA CONNECTIONS INSPECTION

### 2.3 Interferences

1. Contractor shall take note of the interference items during the vessel viewing and include the costs associated with dealing with these items, including removals, reinstallations and painting of disturbed metal parts.

Refer to General Notes: section 12 and 17

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate data

Drawings:

Drawing Number	Description	Electronic #
AF6099-25600-01	As Build Cooling Water System	
AF6099-52000-01	Bilge Drainage & Dewatering System	
AF6099-52600-01	Scuppers and Drains	
AF6099-55100-01	Compressed Air System	
AF6099-59300-02	Black Grey Water & Sanitary System	

#### 3.2 Standard and Regulations

1. Canada Shipping Act 2001, Hull Inspection Regulations (C.R.C., c. 1432)
2. ABS, Rules & Regulations for the Classification of HSC

#### 3.3 Allowances

1. N/A

#### 3.4 Owner Furnished Equipment

1. N/A

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. Following all valves servicing and prior to installation, Contractor shall provide the attending RO Surveyor and CGTA an opportunity to inspect all valves as listed above.

## HD-05 STORM VALVES & SEA CONNECTIONS INSPECTION

### 4.2 Testing

1. Following the completion of all valve work, Contractor shall test all valves as listed above for sealing integrity at their respective maximum system operating pressures. All leaks shall be repaired at the Contractor's expense prior to the closing of contract.
2. The Contractor shall arrange the attending RO Surveyor, the TA the opportunity to witness the successful testing of all valves as listed above.

### 4.3 Certification

1. Prior to the close of contract, certification or other documentation shall be submitted to the CGTA attesting to the quality of new materials and components such as packing, gaskets and valves.

## 5: DELIVERABLES:

### 5.1 Reports, Drawings and Manuals

1. Prior to the close of contract, a comprehensive report covering all work and replacements shall be submitted to the CGTA.

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

# HD-06 HULL CLEANING AND PAINTING

## 1: SCOPE:

The intent of this specification item is for Contractor to clean the ship's hull, properly prepare the surfaces, and recoat the vessel's hull. This work shall be carried out in conjunction with all other dry-docking items

## 2: TECHNICAL DESCRIPTION:

### 2.1 General

1. The existing hull coating must be repaired and/or renewed utilizing Contractor Supplied Coatings as specified below.
2. Contractor must use an International Paints (IP) NACE inspector to oversee all coating processes for all critical points within this specification. IP NACE inspector contact information:

**Michael Kemp**

Technical Sales Representative  
Marine Coatings

T (902) 468-1401  
F (902) 468-1403  
M (902) 497-8363  
E [michael.kemp@akzonobel.com](mailto:michael.kemp@akzonobel.com)

**International Paint (a division of Akzo Nobel Coating Ltd. Canada)**

Suite 2, 250 Brownlow Avenue  
Dartmouth, Nova Scotia  
Canada  
B3B 1W9

3. Contractor must prepare the underwater hull and apply the coating system in strict accordance with the manufacturer's instructions. In conjunction with any other functional quality assurance procedure as may be specified by the manufacturer, the following points must be carried out:

- Provide a list of batch numbers with correspondent dates of manufacture.
- Record the quantity and type of any solvent added.
- Measure and record the ambient conditions.
- Record details of spray tips and pressures used.
- WFT gauge readings to be taken on a regular basis during application.
- Using a calibrated DFT gauge, fifteen (15) measurements per 9.3 m<sup>2</sup> are to be taken and recorded. Upon agreement of consistency with the CGTA, fifteen (15) measurements per 93m<sup>2</sup> are then to be taken and recorded over the entire underwater hull area. All recorded information must be typewritten and two hard copies and one electronic copy in PDF format to be given to the CGTA.

## HD-06 HULL CLEANING AND PAINTING

4. Once the vessel has been dry-docked, the entire hull must be hydro-blasted (minimum 5000 psi) to remove any accumulated growth salt deposition and loose paint, within 24 hours of docking. This must include all underwater appendages such as rudders, speed log and echo sounder cowlings, sea chests and associated gratings (gratings to be removed to allow cleaning of the sea chests), bow thruster tubes, etc. The sea inlet grids for the bow thruster, sea chests, sea bays and underwater overboard discharge valves are to be hydro-blasted remove any accumulated growth.
5. Upon completion of high pressure wash, the hull must be inspected for paint damage by the CGTA and the Contractor. All underwater hull areas must be inspected for damage, including all plating and appendages from the keel a level line visible at approximately the 2.8m draft marks. This inspection is to be completed within 48 hours of docking. During the vessel underwater hull inspection up to the deep load line all areas with poor coating adhesion or lack of coating shall be recorded on a copy of the shell expansion plan by Contractor and verified by the CGTA. These areas shall be recoated as per Paint Manufacturer specification.
6. Any local requirements for protective structures (ie. Shelter around the vessel while sandblast and coating application) will be the responsibility of the Contractor and must be included in the bid price. All existing coatings removed from the vessel must be contained and disposed of in accordance with applicable territorial and federal environmental regulations.
7. Painting must be carried out only after any tank repairs are completed, hull anodes are installed, hull identity markings (excludes vinyl decals) and hull inspections are complete.
8. Intact exposed epoxy hull coating must be sweep blasted to a surface profile of 3 mils to allow adhesion of the required finished coat. In hull areas where only small amounts or sections of existing epoxy coating exist, removal of coating to bare steel must be accomplished. All bare areas of hull steel and areas where existing coating is damaged, loose, blistered, missing or otherwise compromised, must be blasted to near white standard, SSPC-SP-10. Edges of intact paint shall be feathered back to a minimum of 10 mm, and blown clean with compressed air. The surface profile shall have a minimum roughness of 3 mils (75 microns).
9. Contractor must take measures to ensure that no damage, unnecessary cleaning or repairs accrue from the sand or grit blasting and/or the application of coatings. Grit used for blast cleaning shall not be permitted to enter into any part of the vessel or its equipment. Where such ingress may occur, the equipment and vessel must be suitably protected, while sandblasting or when painting is in progress. Any cleaning required due to failure to comply will be at Contractor's expense.
10. All underwater hull surfaces shall be degreased by solvent cleaning to SSPC-SP-1 standard prior to application of coatings.
11. Upon completion of the specified surface preparations, the affected areas shall be surveyed by the International Paints FSR and CGTA. The surface areas of bared steel and intact coatings shall be agreed upon, recorded by the Contractor and signed-off by all parties with copies of the document for each.

## HD-06 HULL CLEANING AND PAINTING

12. Application of underwater hull coatings are to be as follows:

**First coat:** Contractor to quote on applying one (1) coat of "INTERSHIELD 300", abrasion resistant epoxy, bronze, at 5 mils D.F.T. to bared steel areas.

**Second coat:** Contractor to quote on applying one (1) coat of "INTERGARD 263" epoxy tie coat, light gray, at 4 mils D.F.T. to areas that were coated with INTERSHIELD 300 and areas of exposed epoxy that were swept blasted.

**Third coat:** Contractor to quote on applying one (1) coat of "INTERSPEED 640" TIN-FREE ANTIFOULING, RED, at 4 mils D.F.T. to areas that were coated with INTERGARD 263.

**Forth coat:** Contractor to quote on applying one (1) coat of "INTERSPEED 640" TIN-FREE ANTIFOULING, RED, at 4 mils D.F.T. to the entire underwater hull area as described in this Specification Item.

13. New coatings must be stored, prepared and applied in full compliance with manufacturer's requirements, to provide a finished coat of no less than 17 mils D.F.T. overall. Any requirement for variance from manufacturer's instructions must be approved by the CGTA prior to proceeding.

14. New coatings shall be applied with atmospheric and steel conditions acceptable to paint manufacturer and CGTA. Application conditions shall be recorded by Contractor and/or paint manufacturer's representative for inclusion in the final Report to be submitted to CGTA.

15. Where ambient air temperatures may become a problem, Contractor shall take steps to ensure that the painting and curing of the underwater hull coating system will be completed before the completion date of the contract. If required Contractor is responsible for providing shelter(s) and heating required to meet the coating manufacturer's specifications and include this cost in the overall bid price.

16. Coatings application to hull steel affected by "flash" rust is not acceptable and must be corrected at the Contractor's expense.

17. Contractor must "cut-in" a straight line of paint at the top of the underwater hull coatings and prevent overspray of these coatings onto the above water hull area.

18. All hull plate openings including overboard discharges, suctions, grids, etc. must be plugged to prevent the ingress of sand during sandblasting operations. In addition, deck mounted/fitted equipment, including but not limited to those listed below are to be protected during any and all sandblasting and coatings operations. Contractor will be responsible for repair/replacement of any damaged items to the satisfaction of the CGTA. Where suitably fitted closure arrangements are not available for use, protection must be made by complete coverage with heavy gauge

## HD-06 HULL CLEANING AND PAINTING

poly-wrap and/or canvass suitably secured against environmental elements. All applied coverings must be removed upon completion of blasting.

19. Areas of obvious concern include but are not limited to:

- All fan intakes and discharges.
- All natural ventilation intakes and/or discharges.
- All machinery exhaust pipe ends.
- Aft deck crane.
- Anchor windlass.
- Lifeboat cables and blocks.

20. All hull-mounted equipment such as anodes, echo sounders, speed log, transducers, ship side valves, propellers, bow thruster, rudder bearings and its cover, etc. shall be suitably protected against damage during cleaning of the hull, grit blasting and application of the coatings. Contractor is responsible for repair / renewal of any such damaged items.

21. Contractor must ensure that application of coatings does not take place to surfaces or equipment other than those areas specified, and that any inlets or discharges in the shell must not be blocked by the coating.

22. Total hull area is approximately 330 square meters. Contractor to quote on blasting approximately 10 square meters to bare steel and coated as specified previously, the remainder of the hull being swept blasted if the epoxy coating is exposed. Contractor must provide a unit cost per square meter for sandblasting to bare steel, unit cost for sweep-blasting per square meter and a unit cost per square meter for coating application as previously specified. Actual area dealt with must be agreed upon by the CGTA and Contractor and will be adjusted through PSPC 1379 action.

23. Contractor to plug all deck scuppers and discharges, or take whatever means required to prevent water and other liquids from contaminating hull areas being coated or prepared for coating application. Contractor shall be responsible for removing these plugs upon completion of underwater hull work.

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

25. All above water line surfaces, accommodation area, scuttles, port holes, windows, deck machinery, susceptible to damage from surface preparation and coating application overspray shall be protected accordingly.

26. Contractor is responsible for the cleanup of all blasting grit, debris and overspray from the vessel's interior and exterior decks.

## HD-06 HULL CLEANING AND PAINTING

### Draft Markings

1. Contractor shall renew the following draft markings on the vessel by grit blasting clean each draft mark to the bare steel, re-punch the outline of the draft mark if required and applying the Interspeed 640 for under parts. **Draft marks that have interspeed 640 coating applied shall have two coats of CFM Trilux 11 white applied.** The renewal of these marks shall be done after the final painting and curing of the underwater hull coating.
2. Forward: Both Port and Starboard side draft markings including the 2.4M and 1.6M meter markings for a total of 10 markings shall be renewed.
3. Aft: Both Port and Starboard side draft markings including the 2.0M and 2.8M meter markings for a total of 10 markings shall be renewed.
4. When renewing the draft markings Contractor shall ensure that the draft markings are the correct height and obliqueness to the hull, representing the true draft of the marking and vessel and are acceptable to the attending RO Surveyor.
5. Contractor shall renew the Port and Starboard Plimsoll markings at mid-ship including all load lines and mid-ship markings via the same procedure as outlined above for the draft marks.

### Above Waterline Areas

Contractor and CGTA to identify and agree upon the total square area for all disturbed / bare/corroded areas for the above water line repairs prior to start of work. Contractor must repair these areas as per the coating scheme, supplied by AkzoNobel Coatings Ltd, in APPENDIX C. Contractor must prepare each area identified above to an SSPSC-SP6, feather the edges to the adjoining coating (do not use the surface preparation indicated in the APPENDIX C, only the coating scheme). Contractor must bid on repairing 25 square meters of above water line area and include the cost in their overall bid. Contractor to provide a unit cost per square meter for adjustment purposes, the actual area repaired will be adjusted through PSPC 1379 action.

1. Contractor must apply the coating material before visible oxidation occurs. If oxidation does occur, the entire oxidized surface must be re-blasted to the standard specified above.
2. All staging, cranes, screens, lighting and any other support services, equipment, paint and materials necessary to carry out these specifications must be CFM, installed, and removed upon completion of all work.
3. Suitable storage facilities must be provided close to the work site by Contractor for the material and equipment, to ensure they will be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application.

## HD-06 HULL CLEANING AND PAINTING

4. Contractor must remove all protective materials from the machinery, equipment and hull openings on completion of the coating work. All grit, dirt, debris, rust, scale, etc. must be removed from all decks and areas of accumulation and disposed of ashore by Contractor
5. All work must be completed to the satisfaction of the CGTA.

### 1.2 Location

1. Vessel 's exterior hull, decking and superstructure

### 1.3 Interferences

1. Contractor is responsible for protecting surrounding area and equipment while carrying out this work
2. Contractor is responsible for the identification of any interference items, their temporary removal with approval from the CGTA and storage and refitting to the vessel.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate data

1. Drawing # AF6099-10000-03\_AF Shell Expansion
  2. Drawing # AF6099-63100-01\_AF Paint schedule
  3. Drawing # AF6099-89940-08\_AF Draft Marks And Load Line Marks Plan Draft Marks
4. APPENDIX C- Onboard coating scheme

### 3.2 Standards and Regulations

1. Contractor is responsible and liable for ensuring that the hull is clear and clean prior to, during, and immediately after the coating application.
2. Suitable storage facilities shall be provided close to the work site for the material and equipment, to ensure they will be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application

### 3.3 Allowances

1. N/A

## HD-06 HULL CLEANING AND PAINTING

### 3.4 Owner Furnished Equipment

1. All staging, cramage, screens, lighting and any other support services, equipment, paint and materials necessary to carry out these specifications shall be Contractor supplied. Unless otherwise specified, all labour, materials, and equipment required to complete all tasks required in this specification shall be Contractor supplied
2. Contractor must supply all coatings, paints, equipment, and hardware necessary for the cleaning and painting of the underwater and above water areas of the hull.

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

#### 4.1 Inspection

1. Contractor shall follow the inspection regime outlined in General Notes, and provide documentation to support all inspections and tests performed.
2. The CGTA and RO Surveyor must inspect the entire hull for defects and deficiencies.
3. National Association of Corrosion Engineers (NACE) Surveyor to oversee the application of the coating and perform inspections.

#### 4.2 Testing

1. Contractor and/or NACE inspector must take sixty (60) wet film thickness measurements; thirty (30) per side, in areas where hull has been cleaned to bare steel. The measurements shall be witnessed by the CGTA and recorded with locations referenced to the attached shell expansion drawing. Unwitnessed measurements shall not be accepted.

#### 4.3 Certification

1. Contractor shall provide certification for all hull coatings applied

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings and Manuals

1. Contractor shall maintain a Quality Assurance reporting program, which shall at minimum include the following points:
  - a. Which areas were blasted and indicate the blast media type and air pressure
  - b. Which areas were coated, with what product, and the volume of coating used.

## HD-06 HULL CLEANING AND PAINTING

- c. Provide a list of batch numbers with corresponding dates of manufacture.
  - d. Record the quantity and type of any solvent added.
  - e. Measure and record all ambient conditions (Temperature, Humidity, Barometric pressure).
  - f. Hull temperature
  - g. Record all details of spray tips and pressures.
  - h. All WFT and DFT readings taken as prescribed in section 4.2 of this specification.
2. All information noted above shall be recorded in a typewritten (English) report and two (2) copies and one electronic copy shall be given to the CGTA.

### 5.2 Spares

- 1. N/A

### 5.3 Training

- 1. N/A

## HD-07 SEA CHESTS AND STRAINERS

### 1: SCOPE:

The intent of this specification item is to open sea chests and sea boxes for cleaning and inspection.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall open up the three (3) sea chests for cleaning and inspection. In addition, the two (2) main inlet sea strainers shall be opened as well. This work shall be carried out in conjunction with HD-06 Hull Cleaning and Painting and HD-01 Dry Docking.
2. Sea chest grates shall be removed so that internal inspection of the Sea Chests can take place.
3. Contractor shall follow the coating manufacturer's recommendations and procedures when applying the coatings outlined below. Contractor shall allow sufficient curing times as outlined by the manufacturer during the application of all coatings. Contractor shall take random thickness readings (mils) between coats with the CGTA in attendance.
4. Contractor shall note that access to the sea chests is only available via removable shell grids (one per chest). Contractor shall note the location of shell grids when planning blocking arrangements for dry docking. Contractor shall identify (mark) each grid being removed for their original location.
5. Contractor shall use hydro-blasting at 5,000 psi minimum and mechanical means (power brushing) for the cleaning the areas identified in this specification item. All debris shall be removed and disposed of ashore by Contractor. Copies of invoices detailing disposal of the debris shall be given to the CGTA.
6. The exact measured area of the sea chests is unknown at this time since it is included in the underwater hull area calculation, but it was estimated to be approximately 10 square meters.
7. For bidding purposes, Contractor shall bid on this area being 100% bare. Contractor shall quote on power tooling this area and prepping it for coating application as per the requirements outlined in HD-06 Hull Cleaning and Painting, Underwater Hull Painting section. The cost shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PSPC 1379 action. This area is considered part of the underwater hull area and as such coating applications are covered under HD-06 Underwater Hull Cleaning and Painting.
8. Contractor shall remove all screens from each sea strainer for cleaning and inspection. Zinc Anodes shall be inspected for wastage and renewed as directed by the CGTA.

## HD-07 SEA CHESTS AND STRAINERS

9. Contractor shall high pressure wash the grids and inlet areas and grid holes shall be mechanically reamed to their original diameter.
10. Contractor must clean all marine growth from all seabays (both forward and aft seabays), inlet piping and main seabay headers.
11. All grids must be prepared and coated as per HD-06 Hull Cleaning and Painting, coating shall be applied to both sides. First Coat shall be allowed to dry prior to grid being turned to apply coating to the opposite side. Grating holes shall not be obstructed by coating applications upon completion of this specification item.
12. The grid securing tabs on the hull shall be inspected. Any broken tabs shall be welded back into position. Contractor shall assume that 3 tabs shall require welding repairs and include a cost in their overall bid, actual work carried out shall be adjusted up or down (credit), through PSPC 1379 action. Contractor must provide a unit price to repair one tab, for adjustment purposes.



Example of a Grid tab (broken off)

### 2.2 Location

#### Sea Chests

Tank Name	Location	Manhole Location
Fwd Sea Chest	Fr 31.5 - 32	Access from Exterior
Stbd Sea Chest	Fr 16.5 - 17	Access from Exterior
Center Sea Chest	Fr 16 - 17	Access from Exterior

## HD-07 SEA CHESTS AND STRAINERS

### 2.3 Interferences

1. N/A

### **3: REFERENCES:**

#### 3.1 Guidance Drawings/Nameplate data

1. N/A

#### 3.2 Standards and Regulations

1. N/A

#### 3.3 Allowances

1. N/A

#### 3.4 Owner Furnished Equipment

1. N/A

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

#### 4.1 Inspection

1. N/A

#### 4.2 Testing

1. N/A

#### 4.3 Certification

1. N/A

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings and Manuals

1. N/A

#### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

## HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION

### 1: SCOPE:

The Contractor must prepare both rudders, their associated rudder stocks and rudder bearings for a RO survey.

### 2: TECHNICAL DESCRIPTION

1. The Contractor must disconnect and remove the rudders from the vessel. Where electrical circuits and position switches are removed or disconnected, the connections must be clearly marked and recorded and all disconnected wiring must be marked and the connections recorded. Where linkages are fitted, their fitted distance must be marked and recorded prior to disconnection such that these distances can be re-established upon re-assembly.

3. The Contractor must ensure, prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all system and equipment components are as per original and in accordance with manufacturer's specifications.

4. The Contractor must report by email all deficiencies as they are identified, to the TA and make recommendations for their prompt remedial action. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

5. The Contractor must disconnect and remove the two rudders and rudder stock assemblies. These must be laid out for a RO survey.

6. The Contractor must visually inspect the rudders and must note any defects. On each rudder the Contractor must remove the docking plug and perform a pressure test of not more than 3 psi for 1 hour.

7. This test must be witnessed by attending RO surveyor and the TA. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

8. The Contractor must visually inspect the rudder stocks for any defects; the diameters must be measured and recorded. Recommendations for repairs must be made accordingly. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

9. The Contractor must inspect the rudder stock key and keyway for any defects using NDT LP Level II testing in full compliance with CAN/ONGC-48.9712. All findings must be recorded and

## HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION

delivered to the TA as soon as practical. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

10. The Contractor must visually inspect the top rudder bearings and bearing fasteners of both rudders for any defects and the findings must be recorded and submitted to the RO surveyor and the TA. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

11. The Contractor must visually inspect the rudder carrier bearings for both rudder stocks for any defects and the findings must be recorded and submitted to the RO surveyor and the TA. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

12. Following the inspection the Contractor must reassemble both rudders, rudder stocks and carrier bearings as per original and in accordance with manufacturer's specifications. The Contractor must re-install the rudders and reconnect all equipment and items removed during the removal of the rudders.

13. Before installation of the rudders, the Contractor must replace the Nylon protection plates on the rudders. The Contractor must remove the existing plates and install new Thordon plates, as described in drawing TG-28380 (Thordon SXL Steering Wear Pads assembly), taking care to correctly adjust the holding screws. The Contractor must machine the rudder bearing hold ring to allow the Thordon plate to be 2mm higher than the ring on final installation. The Thordon SXL plate will be supplied as Government Supplied Material (GSM); the Contractor must supply all other installation material.

14. The Contractor must exercise care to ensure that all values recorded prior to disassembly are achieved during re-assembly and that all electrical connections are re-established as recorded.

15. The Contractor must ensure that the tiller achieves a proper fit and that the tiller nut is tightened up in the presence of the TA.

16. The Contractor must prepare a test and trials plan for the full functional test of the steering gear and rudders. This functional test must be carried out before the undocking of the vessel so that the full movement of the rudders can be observed.

## HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION

### Rudder Skeg Inspections

The Contractor must ensure that all applicable environmental and safety precautions are taken to collect all residual liquid or other filling mixture inside in the skegs before the docking pugs are removed.

The Contractor must remove the docking plugs from the PORT and STBD skegs, drain all residual liquid or other filling mixture and must perform a pressure test of not more than 3 psi for 1 hour which is to be witnessed by the attending RO surveyor and the TA.

The Contractor must float coat both skegs with water based corrosion preventative and then drain it before installing the docking plugs.

### 2.2 Location

Steering compartment

### 2.3 Interferences

Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate data

AF6099-56100-02	Steering System Schematic of the Hydraulic System
AF6099-56100-03	Steering Gear Room Arrangement Plan
AF6099-10000-11	Rudders Construction Plan Sheet 1 of 2
AF6099-10000-11	Rudders Construction Plan Sheet 2 of 2
TG-28380	Thordon SXL Steering wear pads assembly

### 3.2 Standards and Regulations

1. Canada Shipping Act, 2001: Marine Machinery Regulations (SOR/90-264)
2. ABS, Rules & Regulations for the Classification of HSC
3. CAN/ONGC-48.9712

## HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. Thordan SXL plate

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

### 4.1 Inspection

The Contractor must afford the attending RO surveyor and the TA the opportunity to inspect all disassembled components following disassembly and cleaning.

### 4.2 Testing

1. The Contractor must perform a functional test on the rudder system, verifying that the rudders move hard over to hard over and perform as per the specifications of the installation manual. This test must be carried out before the vessel is undocked.
2. The Contractor must conduct a dock trial where both the rudders systems are tested for correct operation in both directions and to ensure that proper rudder angle indications are received on all system gauges.
3. The Contractor must prepare a test and inspection plan for the sea trials of the steering gear system. Sea trials for the steering gear system must include hard over to hard over maneuvers of both rudders in the full follow-up mode and the non-follow-up mode. These trials must be conducted at various speeds of the vessel from zero speed to full ahead and astern conditions.
4. The Contractor must correct any defects, at no cost to Canada, that are a result of any work carried out by the Contractor on this specification Section.
5. Following initial testing and subsequent repairs, the Contractor shall afford the attending RO Surveyor, the IA and TA the opportunity to witness a comprehensive operational test under full load of all disturbed equipment and systems.

### 4.3 Certification

1. N/A

## HD-08 RUDDER, RUDDER BEARING AND SKEG INSPECTION

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings and Manuals

The Contractor must prepare and submit to the TA prior to the close of the contract and in accordance with Section 2.11 a comprehensive report of all inspections including all findings, recommendations, test results and recorded measurements.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

## HD-09 SPUR ROPE CUTTER INSTALLATION

### 1: SCOPE:

The intent of this specification is for the Contractor to install the GSM "SPURS" line and net cutter system to both port and starboard propeller shafts as per the installation guide provided in APPENDIX D

### 2: TECHNICAL DESCRIPTION

#### 2.1 General

1. Contractor must enlist the services of the Spurs FSR to oversee the installation of the Spurs line cutters as per the Spurs installation guide.

2. All SPURS equipment required for the installation is GSM including the service charges for the FSR

3. See attached email from FSR at the end of this specification which briefly states what the FSR requires from the yard.

4. For the purposes of bidding, contractor must:

Supply 1 machinist for 24 hours and include hourly rate

Supply 1 mechanical helper for 12 hours and include hourly rate

Supply 1 welder for 4 days for 12 hours/day and include hourly rate

Supply 1 fitter for 3 days for 12 hours/day and include hourly rate

Complete 2, 360 degree production welds, one on each propeller shaft

5. Contractor must schedule the FSR and work near the end of the refit, after all propeller/bearing/shaft work is completed.

#### 2.2 Location

1. Port and starboard propeller shafts (stern)

#### 2.3 Interference

1. N/A

### 3: REFERENCES:

#### 3.1 Guidance drawings/Name plate data

1. Spurs installation guide (APPENDIX D)

## HD-09 SPUR ROPE CUTTER INSTALLATION

### 3.2 Standards:

1. Canadian Coast Fleet Safety Manual (DFO 5737)
2. Coast Guard ISM Lock Out/Tag Out Procedures
3. Canada Shipping Act 2001 - Machinery Inspection Regulations

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. The Spurs installation equipment will be GSM
2. The Spurs FSR has been contracted by the Government of Canada

## 4: PROOF OF PREFORMANCE:

### 4.1 Inspection

1. N/A

### 4.2 Testing

1. N/A

### 4.3 Certification

1. N/A

## PART 5: DELIVERABLES:

### 5.1 Drawings / Reports

1. N/A

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

### 5.4 Manuals

1. N/A

**Re: Installation of rope cutters for G.Peddie/ FW: Amd003 Contract F7044-160218/001/ML**

**Chris Jones** <chris@spursmarine.com>

 You forwarded this message on 2018-01-25 10:37 AM.

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Sent: Wed 2018-01-03 12:20 PM

To: Mercier, Jeffrey

Cc: Bryony Fisher; Pablo; Wyse, David E

 Message  Spurs Hero Class Vessel Installation Guide.pdf (1 MB)

Hi Jeff,

Thanks for your email. Our Spurs installation is typically done towards the end of the dry dock after all propeller bearing shaft work is completed. The shafts need to be in and coupled up to install the rope guards. I have done 5 of these vessels so far, the shortest installation took 2 days and the longest installation took 4 days on site. It all depends on the shipyard's capabilities and if they are actually ready for me.

Attached you will find our Hero class installation guide. You can thumb through it to see the general process. A couple of small upgrades/changes have been made to the stationary assembly to address the noise issues experienced by the first few vessels.

Please let the yard know I will need a machinist/mechanical helper to assist with the installation of the rotary components on the propeller hub on the first day. We will be doing some stainless tack welding on the propeller side as well. After that, we'll work to prep and install the rope guards for which I'll need a welder and fitter. The rope guards are now 360 degree, fully welded to the stern tube so the yard will need to plan for a long production weld.

If you have any questions please feel free to ask. My cell phone # is 813-732-6253. Hopefully the weather will be a bit better than what I just went through with the Kaoble in Les Mecins haha.

If you could advise what the closest best airport and hotel to fly into and stay at it would help a lot!

Best regards,

**Chris**

# HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

## **1: SCOPE:**

The intent of this specification is to:

- Open Port and Starboard shaft seals for RO survey
- Check and record wear down readings for Port and Starboard Stern tube bearings, intermediate bearings and aft spectacle frame bearings.
- Remove Port and Starboard shafts for RO inspection

This specification item must be done in conjunction with HD -07

## **2: TECHNICAL DESCRIPTION:**

### 2.1 General

#### **Propeller shaft seals**

1. The Contractor must ensure that all applicable safety precautions including equipment lock outs and tag outs are implemented prior to the start of work.
2. The Contractor must ensure that, prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all system and equipment will be as per original and in accordance with manufacturer's specification.
3. The Contractor must release the inboard side of the PORT and STBD shaft seals. The Contractor must protect the sealing surfaces of the shaft seals as described in the Simplan Seal Manual.
4. The Contractor must engage the services of a FSR from Simplex Americas LLC to dismantle the shaft seals, measure and record the required measurements and reassemble the shafts seals after the RO survey. Contractor shall include an allowance of \$30,000 to cover expenses of an Simplex Americas FSR. The FSR shall be reimbursed for any necessary parts, services, authorized travel and living expenses reasonably and properly incurred in the performance of the work. Contractor shall provide the fee schedule from Simplex Americas for the services of the FSR. This info shall be included in the PSPC data pricing sheet. Final costs for the FSR as well as parts and materials shall be adjusted up/down upon proof of invoices through PSPC 1379 action.
5. The Simplex FSR must re-install the PORT and STBD shaft seals after the necessary work in this specification has been completed. The FSR must record measurements and must tension the shaft seals in accordance with the Simplan Manual. The Contractor must include all costs related to the Simplex FSR in the bid proposal.

# HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

## **Propeller Shaft Clearances**

1. The Contractor must measure and record the clearance reading between shaft and FWD Stern Tube Bearings while the shaft seal is dismantled. Bearing clearance readings must be taken at four places for both the PORT and STBD shafts as follows:

- Top (12 o'clock position);
- Bottom ( 6 o'clock);
- Port (9 o'clock position);
- Stbd (3 o'clock position).

2. The Contractor must open the Aft Stern Tube Bearing covers from PORT and STBD sides. Bearing Clearance readings must be measured and recorded in four places for both the PORT and STBD shafts as follows:

- Top (12 o'clock position);
- Bottom ( 6 o'clock);
- Port (9 o'clock position);
- Stbd (3 o'clock position).

3. The Contractor must reinstall the Aft Stern Tube Bearing covers on the PORT and STBD shaft lines after the readings have been measured and recorded. The Contractor must lock the screws in their original position using the original screw lock style.

4. The Contractor must remove the Rope Guards with Net Cutters from PORT and STBD sides of the AFT Bracket Bearing. Bearing clearance readings must be measured and recorded at four places for both the PORT and STBD shafts as follows:

- Top (12 o'clock position);
- Bottom ( 6 o'clock);
- Port (9 o'clock position);
- Stbd (3 o'clock position).

## **Propeller shaft removals and Inspection**

1. The Contractor must engage the services of a Rolls Royce FSR to provide oversight of all work being performed on the shafting systems. Final system performances must be verified by the FSR and must be signed-off attesting that the systems have been serviced in accordance with Rolls Royce requirements. The FSR must have a good working knowledge of the specific shafting systems installed on the CCGS C McLaren. Contractor shall include an allowance of \$30,000 to cover expenses of a Rolls Royce FSR. The FSR shall be

## HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

reimbursed for any necessary parts, services, authorized travel and living expenses reasonably and properly incurred in the performance of the work. Contractor shall provide the fee schedule from Rolls Royce for the services of the FSR. This info shall be included in the PSPC data pricing sheet. Final costs for the FSR as well as parts and materials shall be adjusted up/down upon proof of invoices through PSPC 1379 action.

2. The Contractor must remove the propeller rope guards from the aft stern tube bosses on both sides. This includes the removal of the rope cutters.

3. The Contractor must label and mark the shaft grounding system fitted to the shafts. This system must be disconnected and removed from the shaft line. This includes the removal of the bushes and brush holders as space will be required for the removal of the shaft seal.

4. The Contractor must label and mark the shaft speed measuring system fitted to the shafts. The system must be disconnected and removed from the shaft line. This includes the proximity sensors for the speed signal. The Contractor must measure and record the distance between the proximity sensors to the electrical pic-ups and provide to the TA.

5. The Contractor must clean the shafts of all corrosion and all debris after the removal of items in point 2) and point 3) to facilitate the removal of the SKF Coupling.

6. The Contractor must follow the disassembly procedures provided in the SKF Installation manual for the removal of the shaft coupling. Care must be taken to ensure that all necessary measurements are recorded to ensure that the coupling is re-installed in the correct position and provided with the correct pressure upon re-installation.

7. The coupling must be slid aft to allow for the disconnection of the inner tube of the CPP system.

8. The Contractor must follow the disassembly procedure provided in the Rolls Royce Shaft Installation manual to disconnect the inner tubes of the CPP systems. Every effort must be made to recover the oil that will drain from the systems at this point. The oil must be disposed of ashore and disposal certificates must be presented to the TA proving that the oil was disposed of in accordance with Federal, Provincial and municipal regulations. Oil spilled into the bilges must be cleaned-up at the Contractor's expense.

9. The Contractors must remove the shafts aft and care must be taken to avoid damaging the intermediate and aft bearing surfaces as well as the propeller blades by providing sufficient support when the propeller shafts clear the individual bearing surfaces.

## HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

10. The Contractor must remove the SKF couplings and sling them out of the way once the shafts have been withdrawn the required distance to allow for the removal of the shaft couplings.
11. The Contractor must inspect the PORT and STBD stern tube bearings, the intermediate bearings and the AFT Bracket Bearings. All finding must be recorded and provided to the TA.
12. The Contractor must remove the aft seals between the aft liner and the propeller hub flange. This area must be inspected by a certified NDT Level II inspector using Magnetic Particle or Ultrasound inspection technique to determine if there are any surface cracks in propeller shaft flange area.
13. The Contractor must clean and inspect the PORT and STBD shafts for any defects. These must be noted and provided to the attending RO surveyor and the TA and IA. Shaft diameter measurements must be measured and recorded at the front and back of each bearing surface and the measurement must be taken in four places at each location. Measurements must be recorded and provided to the TA and IA.
14. The Contractor must inspect the liners of the propeller shafts for any anomalies and proper sealing at of the liners at all ends.
15. The contractor must remove both port and starboard P3 pumps to inspect both couplings on the port and stbd cpp hydraulic pump/motor set. The contractor must inspect the inside of the port and stbd main cpp tank as well as the port and starboard gravity tanks. Any parts found to be defective during the inspection will be covered under PSPC 1379 action.
16. The Contractor must provide the attending RO surveyor the opportunity to witness the internals of propeller hubs and the removed blade of each shaft line. Where required by the FSR, the Contractor must take and record readings and provide these to the TA.
17. The contractor must perform a spark test on both port and starboard shafts to determine the integrity of the existing Thor-coat shaft coating. The Contractor must inspect the Belzona 2141 transition sleeve coatings. Any coating repairs deemed necessary by the CGTA or RO to the existing Thor-coat and Belzona 2141 on both shafts will be covered by PSPC 1379 action.

### **Propeller HUBs and Blade Removal**

1. The Contractor must remove 1 blade from each propeller hub and its associated hardware for the inspection by the attending RO surveyor. The propeller blades must be removed under the direction of the Rolls Royce FSR. The Contractor must dispose of all oil that is drained from the propeller hubs in accordance with federal and provincial regulations.
2. The Contractor must reinstall the propeller blades of each propeller hub with a new O-ring and in accordance with the directions in the manual and the guidance of the FSR.

## HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

3. The Contractor must carry out NDT for all 8 (eight) propeller blades on Port and STBD propellers. Roots and flanges of all 8 blades and blade to boss securing arrangements must be inspected by a certified NDT Level II inspector using Dye Penetrant, Magnetic Particle or Ultrasound inspection technique to determine if there are any surface cracks. The

Contractor must provide the attending RO surveyor and TA the opportunity to witness the test to obtain credit.

### **Propeller shaft installation**

1. The Contractor must reinstall the shaft couplings on the shafts and then proceed to reconnect the shaft lines as per the installation manual, while exercising care to ensure that the shaft line bearings are not damaged during the insertion of the shafts back into the vessel.

2. The Contractor must protect the inner tube threaded ends of each shaft line from damage as they form part of the mechanical seal for the hydraulic system.

3. The Contractor must assemble the inner tubes and connect the shafts as per the installation instructions in the manual.

4. The Contractor must re-install the SKF coupling after the inner tubes of the shaft system have been reconnected and torqued. The Contractor must verify the position of the SKF coupling in relation to the measurements taken and recoded prior to the removal of the SKF coupling. Installation must be as per the supplied SKF Manual.

5. The Contractor must reinstall the shaft grounding systems as per the manual and must reconnect the system as per the documentation recorded prior to disassembly.

6. The Contractor must reinstall the speed measuring system and must ensure that all proximity sensors are adjusted to the correct distance from the shafting based on the recorded measurements prior to disassembly.

7. The Contractor must reinstall the aft propeller hub seals to the aft liners and once the propeller shafts are refitted into the vessel the Contractor must re-install the rope guards on each aft stern frame.

8. The Contractor must refill the CPP system with new Contractor supplied oil (Mobil gear 600 xp), approximately. The Contractor must follow the instructions in the installation manual ensuring that all air is bled from the system and must set to work the system, ensuring that system pressures are normal and that the propeller blades rotate in the ahead and astern directions as required.

## HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

9. Any deficiencies found during all inspections shall be brought immediately to the attention of the TA and IA for approval. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

### 2.2 Location

Stern of the vessel

### 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate data

Kamewa CP-A D Installation Manual (10Sooo239/49341-E)
Simplan Seal Manual

6099-24300-01_1	Shaft Line arrangement	
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### 3.2 Standards and Regulations

1. N/A

### 3.3 Allowances

1. \$30,000 for Simplex America FSR
2. \$30,000 for Rolls Royce FSR

### 3. 4 Owner Furnished Equipment

1. N/A

# HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

## 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

The Contractor must notify the CGTA upon completion of the work in this specification item and must afford the TA the opportunity to witness all completed work prior the undocking of the vessel.

### 4.2 Testing

1. The Contractor must develop a test and trials plan that will test all aspects of the propeller shafting systems. The test and trials plan must be submitted to the TA prior to the undocking of the vessel.
2. The Contractor must complete all work requirements as directed by the Rolls Royce FSR in order to validate the proper calibration, function and operational readiness of the CPP systems. Tests must include operational pressure tests in the dry dock to validate there are no leaks in the propeller hubs, the proper movement of the propeller blades, and that the correct pitch angles are displayed on the instrumentation. Sea trials must be conducted to test the CPP systems through their full range of adjustments for pitch and power transmission from the gearboxes to the controllable pitch propellers and that all pressures and temperatures are normal.
3. The Contractor must complete all work requirements as directed by the Simplex Americas LLC FSR in order to validate the shaft seals water tightness during a dock trial where the ship's crew will rotate the propellers at a moderate speed, determined by the TA in agreement with the Contractor, with the objective of finding any water leaks and overheating.
4. The Contractor must complete a sea trial with 100% engine load for one hour to verify that all systems operate within the equipment manufacturer's standards.
5. The Contractor must afford the CGTA the opportunity to witness all tests and trials.
6. The Contractor must correct any defects, at no cost to Canada, that are a result of any work carried out by the Contractor.

### 4.3 Certification

1. N/A

# HD -10 PROPELLER HUBS, SHAFT CLEARANCES AND SHAFT SEAL INSPECTION

## **5: DELIVERABLES:**

### 5.1 Reports

The Contractor must prepare and submit a comprehensive report to the TA of all work done, all measurements taken and all "AS LEFT" measurements for the SKF Couplings, the shaft seals and shaft bearing clearances before the end of the contract

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

# HD-11 TANK INSPECTIONS

## 1: SCOPE:

The Contractor must open, clean and present the Sewage Sludge tank, the Black Water tank, the Dirty Oil & Sludge tank, Grey Water tank, the Bilge Water tank and Lube oil tanks for inspection by the attending RO surveyor.

## 2: TECHNICAL DESCRIPTION:

### 2.1 General

1. The Contractor must stop and lock-out the ship's sanitary water system.
2. The Contractor must remove the Dirty Oil & Sludge Tank (#15) docking plug, drain the tank and dispose of the oil and sludge remaining in the tank.
3. The Contractor must contain the dirty oil and sludge and must dispose of these contents in accordance with all Federal, Provincial and Municipal regulations in effect. The Contractor must provide disposal certificates.
4. For bidding purposes, the Contractor must bid on the removal of 200 liters of liquid waste and 20 liters of solid waste for an estimated total of 220 liters from the tank. The amount of liquid and solid waste will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.
5. The Contractor must open the manhole to the Dirty Oil & Sludge tank (#15), pump dry, clean, ventilate the tank and certify it safe for entry to access the Sewage Sludge tank (#6) for the duration of the work inside these tanks.
6. The Contractor must remove the Sewage Sludge Tank (#6) docking plug, drain the tank and dispose of the liquid and sludge remaining in the tank in accordance with all Federal, Provincial and Municipal regulations in effect.
7. For bidding, the Contractor must bid on the removal and disposal of 100 liters of liquid waste and 20 liters of solid waste for an estimated total of 120 liters from the tank. The amount of liquid and solid waste will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.
8. The Contractor must open the manhole cover to the Sewage Sludge Tank, pump dry, clean, ventilate the tank and certify it safe for entry for the duration of the work inside.
9. The Contractor must remove the Grey Water Tank (#7a) docking plug, drain the tank and dispose of the liquids and solids remaining in the tank in accordance with all Federal, Provincial and Municipal regulations in effect.

## HD-11 TANK INSPECTIONS

10. For bidding, the Contractor must bid on the removal and disposal of 100 liters of liquid waste and 15 liters of solid waste for an estimated total of 115 liters from the tank. The amount of liquid and solid waste will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

11. The Contractor must open the manhole cover of the Grey Water Tank (#7a) giving access to the Black Water Tank (#7b), pump dry, clean, ventilate the tank and certify it safe for entry for the duration of the work inside.

12. The Contractor must remove the Black Water Tank (#7b) docking plug, drain the tank and dispose of the liquid and sludge remaining in the tank in accordance with all Federal, Provincial and Municipal regulations in effect.

13. For bidding, the Contractor must bid on the removal and disposal of 100 liters of liquid waste and 20 liters of solid waste for an estimated total of 120 liters from the tank. The amount of liquid and solid waste will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

14. The Contractor must remove the Bilge Water Tank (#4) docking plug, drain the tank and dispose of the liquid and sludge remaining in the tank in accordance with all Federal, Provincial and Municipal regulations in effect.

15. For bidding, the Contractor must bid on the removal and disposal of 100 liters of liquid waste and 15 liters of solid waste for an estimated total of 115 liters from the tank. The amount of liquid and solid waste will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

16. The Contractor must clean all 5 (five) tanks, mentioned above with a pressure wash system of at least 5000 psi.

17. The Contractor must open the manhole cover of the Lube Oil Tank, ventilate, wipe clean the tank and certify it safe for entry for the duration of the work inside.

18. For bidding, the Contractor must bid on the removal and disposal of 50 liters of remaining oil from the tank. The amount of oil will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

19. All six (6) tanks must be inspected by the RO surveyor and the TA for structural damage and the quality of each tank's coating system.

20. The Contractor must remove the suction pipes from each of the five (5) tanks (except Lube Oil Tank). Each pipe is connected to a flange. The pipes must be cleaned, inside and

## HD-11 TANK INSPECTIONS

out, with a water pressure system with at least 5000 psi. The Contractor must inspect these pipes for corrosion and advise the TA of any defects. Any approved repairs or replacements will be negotiated using form PSPC 1379, as applicable.

21. The Contractor must reinstall the five suction pipes with new Garlock style gaskets.

22. Once all work inside the tanks is complete the Contractor must reinstall the five docking plugs and must reinstall the manhole covers using new Contractor supplied manhole gaskets, nuts and washers. All replacement materials must be of the Stainless Steel.

### **Coating System Touch-Up Dirty Oil Tank**

If required and after any required structural work, the Contractor must prepare the surfaces in accordance with manufacturer's recommendations to be coated to an SP-11 standard with feathered edges to the existing coating system. The Contractor must quote for the preparation and coating of 5 square meters of surface area in the Dirty Oil Tank with 1 coat of Interline 624 Buff with a Dry Film Thickness of 6 mil and on 1 coat of Interline 624 White with a Dry Film Thickness of 10 mil. The Contractor must apply International Interline 925 to a Dry Film Thickness of 12mil. The actual area recoated will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

### **Coating System Touch-Up**

If required and after any required structural work, the Contractor must prepare the surfaces in accordance with manufacturer's recommendations to be coated to an SP-11 standard with feathered edges to the existing coating system. The Contractor must quote for the preparation and coating of 10 square meters of surface area in the Sewage Sludge Tank and the Black Water Tank, Grey Water Tank, Bilge Water Tank, Dirty Oil & Sludge Tank. The Contractor must apply International Interline 925 to a Dry Film Thickness of 12mil. The actual area recoated will be adjusted upwards or downwards as required and prorated using the PSPC 1379 process.

## 2.2 Location

1. Main machinery room below deck plates

## 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.

## HD-11 TANK INSPECTIONS

2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate data

Drawing number	Description	Electronic File
AF6099-89940-02	Tank Arrangement, Capacity Plan	
	MSPV International Coatings Maintenance Plan OBM	

#### 3.2 Standards and Regulations

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

#### 3.3 Allowances

See technical description

#### 3.4 Owner Furnished Equipment

1. Unless otherwise specified, all materials, labour, and equipment required to complete all specified work shall be Contractor supplied

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. The Contractor must advise the RO Surveyor and the CGTA when the tanks and their coating systems are ready for inspection and survey credit must be obtained for the tanks. Final inspection of all tanks to be carried out jointly by The Contractor and CGTA.

## HD-11 TANK INSPECTIONS

### 4.2 Testing

1. The Contractor must pneumatically pressure test all six (6) tanks to a head of 2.44 meters above the crown of the tank for duration of 1 hour. This pressure test must be witnessed by the RO with TA being able to witness the test.
2. The Contractor must provide a final vacuum test on each of the docking plugs if they are removed for the draining of the respective tanks. This vacuum test must be witnessed by the TA.
3. The Contractor must correct any defects, at no cost to Canada, that are a result of any work carried out by the Contractor.

### 4.3 Certification

1. Contractor shall provide all test certificates, and endorsement of safe operation required by the RO for certification to the CGTA.

## 5: DELIVERABLES:

### 5.1 Reports, Drawings and Manuals

1. The Contractor must provide the TA with a copy of all gas free and entry certificates for the tanks.
2. The Contractor must provide the TA with a copy of all disposal certificates for the liquids and sludge quantities removed from the 6 (six) tanks.
3. The Contractor must provide the TA with a written report of the condition of the tanks, their coating systems and where the coating systems have been touched up, the details of the substrate temperature the wet and dry bulb temperatures before, during and after coating system application and the relative humidity.

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

# HD-12 BOW THRUSTER GEAR OIL AND SEAL CHANGE

## 1: SCOPE:

The intent of this specification is for the Contractor to replace the bow thruster gear oil and the propeller shaft seals.

## 2: TECHNICAL DESCRIPTION

### General

1. The Contractor must ensure that all applicable safety precautions including equipment lock outs and tag outs are implemented prior to the start of work.
2. The Contractor must ensure that, prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all system and equipment will be as per original and in accordance with manufacturer's specification.
3. The Contractor must report, by email, all deficiencies as they are identified to the TA and make recommendations for their remedial action. Any approved repairs or replacements will be negotiated using PSPC 1379 action, as applicable.
4. The Contractor must remove the bow thruster grates to access the thruster unit.
5. The Contractor must notify the TA when the oil will be drained from the bow thruster unit such that the TA can take an oil sample for analysis mid-stream through the draining process. The oil must be drained into a clean container to allow for the examination of the oil condition by the TA and IA.
6. The Contractor must follow the TRAC shaft seal change procedure manual to change the oil and seals. The oil and seals will be provided by Canada.
7. All oil and debris must be removed from the vessel and disposed of ashore in accordance with Federal, Provincial and Municipal regulations in effect.
8. Following the completion of all disassembly, and prior to reassembly, the Contractor must afford the TA and TI the opportunity to inspect all disassembled components.

### 2.2 Location

Bow Thruster compartment/ bow region of hull

### 2.3 Interference

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation in good order.

## HD-12 BOW THRUSTER GEAR OIL AND SEAL CHANGE

2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

### 3: REFERENCES:

#### 3.1 Guidance drawings/Name plate data

1	Hydraulic Thruster (PKK 24 TRAC (24)
2	24 TRAC ASSY drawing #29351

#### 3.2 Standards:

1. Canadian Coast Fleet Safety Manual (DFO 5737)
2. Coast Guard ISM Lock Out/Tag Out Procedures
3. Canada Shipping Act 2001 - Machinery Inspection Regulations
4. ABS, Rules & Regulations for the Classification of HSC

#### 3.3 Allowances

1. N/A

#### 3.4 Owner Furnished Equipment

1. All oils necessary to complete the inspection will be supplied as GSM
2. Seals for both BT shafts will be GSM

### 4: PROOF OF PREFORMANCE:

#### 4.1 Inspection

1. N/A

#### 4.2 Testing

## HD-12 BOW THRUSTER GEAR OIL AND SEAL CHANGE

1. The Contractor must develop a test and trials plan to test the bow thruster. As a minimum, the hydraulic system must be tested in the dock prior to the undocking of the vessel to allow for inspection of the oil seal under static pressure.
2. The Contractor must conduct a dock trial where the bow thruster is checked for proper operation by verifying pitch angles from full PORT to full STBD.
3. The Contractor must conduct a sea trial where the thruster will be used with maximum thrust for a period of five minutes in each direction. The operational level of the oil header tank is to be recorded before trials and monitored during all trials.
4. The Contractor must afford the TA the opportunity to witness all tests and trials.
5. The Contractor must correct any defects, at no cost to Canada, that are a result of any work carried out by the Contractor.

### 4.3 Certification

1. N/A

## **PART 5: DELIVERABLES:**

### 5.1 Drawings / Reports

1. A comprehensive report of all inspections including all findings, recommendations, test result and recorded measurements must be prepared and submitted to the TA and TI prior to the close of contract.

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

### 5.4 Manuals

1. N/A

# H-01 LIFERAFTS ANNUAL INSPECTION

## 1: SCOPE:

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

## 2: TECHNICAL DESCRIPTION:

### 2.1 General

1. Contractor shall remove the Life rafts and their hydrostatic releases from their stowed positions on the vessel and transport them via commercial bonded carrier to and from a sub-contractor's premises for servicing / inspection.
2. Contractor shall subcontract the annual inspection and recertification of Life rafts to an Approved RO service facility that meets Original Equipment Manufacturer (OEM) certification.
3. An allowance of \$5,000 shall be provided for work completed by the sub-contractor. This allowance shall be adjusted up or down through PSPC 1379 action upon proof of invoices.
4. Contractor is responsible for ensuring Life rafts are witnessed by the RO Surveyor as required and for providing certificates to CGTA for the life rafts.
5. Contractor shall return Life rafts and their hydrostatic releases to the stowed position on the vessel.

### 2.2 Location

1. See **REFERENCES** section

### 2.3 Interferences

3. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
4. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## H-01 LIFERAFTS ANNUAL INSPECTION

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate data

<u>Liferaft</u>	<u>Size</u>	<u>Location</u>	<u>Serial #</u>
Port	16 pers.	Port Side Bridge Deck	XDC 1FC55B111
Stbd	16 pers.	Stbd. Side Bridge Deck	XDC 0FC30B111
SAR	4 pers.	Aft Bridge Deck	XDC 1FG80C212

#### 3.2 Standards and Regulations

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

#### 3.3 Allowances

1. Refer to Section 2.1, subsection 3 above

#### 3.4 Owner Furnished Equipment

1. Unless otherwise specified, all materials, labour, and equipment required to complete all specified work shall be Contractor supplied

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. Contractor and CGTA shall ensure life rafts are stowed and secured properly in their holders, and all required certification is present

#### 4.2 Testing

1. Inspection and testing shall be completed as per the RO's requirements.

#### 4.3 Certification

2. Contractor shall provide all test certificates, and endorsement of safe operation required by the RO for certification to the CGTA.

## H-01 LIFERAFTS ANNUAL INSPECTION

### **5: DELIVERABLES:**

#### 5.1 Reports, Drawings and Manuals

1. Contractor shall provide a list of the work that was performed on each life raft.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

## H-02 FIXED FIRE FIGHTING SYSTEMS

### 1: SCOPE:

The intent of this specification item is for Contractor to complete the annual inspection of the ships fixed fire extinguishing systems.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall arrange to have the vessel's fixed fire extinguishing systems (FM-200 and Galley Kiddie-System) inspected, tagged and dated by a service agency certified by the RO, and approved by the System Manufacturer.
2. Cylinders shall be individually weighed. All weights, levels, and pressures of cylinders shall be measured and recorded.
3. All rotating beacons and flashing lights shall be tested and proven in good working order.
4. All audible alarms shall be tested and proven in good working order.
5. All wires and cables shall be proven in good working order.
6. The FM-200 Nitrogen Driver shall be proven in good working order.
7. All piping and nozzles shall be proven clear.
8. Any required repairs identified as a result of the inspections shall be brought to the attention of CGTA before commencing any repair work. All repairs shall be negotiated through PSPC 1379 action.
9. All cylinders shall be properly secured in their original locations after inspection

#### 2.2 Location

1. FM-200 System – MMR and Emergency Generator Room
2. Kiddie System – Galley and Dry Stores.

#### 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## H-02 FIXED FIRE FIGHTING SYSTEMS

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate Data

1. N/A

#### 3.2 Standards and Regulations

1. The following Coast Guard Standards and or Technical Bulletins shall be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CGTA.
  - Canadian Coast Fleet Safety Manual (DFO 5737)
  - Coast Guard ISM Lock Out/Tag Out Procedures
2. Contractor shall refer to General Notes for any other applicable standards and regulations

#### 3.3 Allowances

1. N/A

#### 3.4 Owner Furnished Equipment

1. Unless otherwise stated, all materials, labour, and equipment required to complete all requirements of this specification shall be CFM.

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. Contractor shall arrange all necessary RO inspections related to the firefighting and fire detection system inspections.

#### 4.2 Testing

1. Systems shall be inspected to the satisfaction of the RO Surveyor and OEM

#### 4.3 Certification

1. Two (2) typewritten and one (1) electronic copies of all inspection reports and certifications shall be provided to CGTA

## H-02 FIXED FIRE FIGHTING SYSTEMS

### 5: DELIVERABLES:

#### 5.1 Reports, Drawings and Manuals

1. A record of all cylinder weights and levels, both before and after servicing, shall be provided in the final report.
2. A list (or drawing) of all audible alarms, rotating beacons, and wiring checked shall be provided in the final report. Any repairs completed shall be listed.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

## H-03 FIRE DETECTION SYSTEM INSPECTION

### 1: SCOPE:

The intent of this specification item is for Contractor to complete the annual inspection of vessel's Notifier CAB-4 Series Fire Detection System.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall arrange to have the ship's Notifier AFP-200 fire detection and alarm system inspected, tested and certified by a service agency certified by the RO, and approved by the System Manufacturer.
2. All components of fire detection system shall be tested for correct function as directed by the service agent. This includes, but is not limited to: primary and secondary control panels, all detectors, audible alarms, rotating beacons, and flashing lights.
3. Any repairs required as a result of the inspections findings shall be brought to attention of CGTA as early as possible. Repair work shall be approved by CGTA, and negotiated through PSPC 1379 action.
4. Two (2) copies of all inspection and test certificates shall be provided to CGTA.
5. All work shall be completed to satisfaction of CGTA and the RO Surveyor.

#### 2.2 Location

1. The system consists of:
  - Alarm & Monitor Panel located on the Bridge
  - Secondary panel in the MCR
  - Smoke Detectors, Heat Detectors, Pull Stations, Bells, Beacons, Alarm Activation and Fire Door Activation, installed throughout the ship.

#### 2.3 Interferences

1. N/A

### 3: REFERENCES:

#### 3.1 Guidance Drawings/Nameplate Data

- 1.N/A

## H-03 FIRE DETECTION SYSTEM INSPECTION

### 3.2 Standards and Regulations

1. CAN/ULC-S527M Standard for Control Units for Fire Alarm Systems

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. N/A

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

### 4.1 Inspection

1. Inspection shall be completed as per Manufacturers recommendations and as stated in Technical Description.

### 4.2 Testing

1. A functional test of entire system is required, as described in Technical Description. Acceptance is based on the satisfaction of the CGTA.

### 4.3 Certification

1. Fire Detection System shall be credited by the RO
2. Inspection and test certificates from Service Agent upon completion of this specification.

## **5: DELIVERABLES:**

### 5.1 Reports, Drawings and Manuals

1. Two (2) copies of inspection report shall be provided to CGTA.
2. A list of all defects and replacements shall be provided to CGTA.

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

## H-04 PORTABLE FIRE EXTINGUISHERS

### 1: SCOPE:

The intent of this specification item is for Contractor to complete the annual inspection of all 43 portable fire extinguishers onboard the vessel. This is also to include 2 hydro tests and 5 six year inspections.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall arrange to have all the vessel's portable fire extinguishers inspected, tagged and dated by a locally authorised service agency.
2. The following is a summary listing of extinguishers to be dealt with:

#	LOCATION	Type	S/N	Next Hydro	MFG
01	Bridge, Com Center, aft	10lb dry	121995	09/25	2013
02	Bridge, Com Center, fwd	15lb co2	799997	09/18	2013
03	Bridge, Com Center, fwd	10lb dry	121752	09/25	2013
04	Outside fwd Fi-Fi hatch	15lb co2	799995	09/18	2013
05	Outside fwd Fi-Fi hatch	20lb dry	121997	09/25	2013
06	Outside fwd Fi-Fi hatch	10lb dry	764695	09/25	2013
07	Outside fwd battery hatch	6L wet	369279	09/18	2013
08	Outside fwd battery hatch	9.4L afff	568098	09/18	2013
09	Fwd alleyway, port	9.4L afff	568144	09/18	2013
10	Electronic equip room	15lb co2	799964	09/18	2013
11	Galley	6L wet	889711	09/22	2017
12	Aft alleyway by dry stores	9.4L afff	568152	09/25	2013
13 *	Stdb breezeway outside F/O spill locker	10lb dry chem	121491	09/25	2013
14	Emergency generator room	10lb dry	121496	09/25	2013
15	Emergency generator room	15lb co2	799998	09/18	2013
16	Bow thruster compartment	9.4L afff	568149	09/18	2013
17	Fwd alleyway by washroom	9.4L afff	568139	09/18	2013
18	Outside MCR	9.4L afff	568146	09/18	2013
19	MCR	10lb dry	121893	09/25	2013
20	MMR, fwd center	9.4L afff	568140	09/18	2013
21	MMR, fwd stdb	20lb dry	764694	09/18	2013
22	MMR, midway stdb	9.4L afff	568143	09/18	2013
23	MMR, midway port	15lb co2	799959	09/18	2013
24	MMR, aft center	15lb co2	799957	09/18	2013
25	AMR room, fwd	15lb co2	799963	09/18	2013
26	AMR, aft	9.4L afff	568151	09/18	2013
27	Steering gear compartment	9.4L afff	568093	09/18	2013
28 *	RHIB, in front of console	5lb dry	E65956699	09/22	2017
29 *	RHIB, in front of console	5lb dry	D00 281080	09/22	2017
30 *	Rescue boat	5lb dry	BW 932128	01/22	2015
31	Fueling bay, aft main deck	20lb dry	D00 302421	08/29	2017

## H-04 PORTABLE FIRE EXTINGUISHERS

3. Extinguishers shall be dealt with so that no space will be left without a portable fire extinguisher at any one time. NOTE: Contractor shall provide temporary equivalent units for use if any extinguishers are required to be removed from the ship for servicing.
4. Any cost of transporting the extinguishers from vessel to the place of inspection, and including the return of the extinguishers to the vessel, shall be included in the overall bid.
5. The following fire extinguisher shall be hydro tested:
  - 15 lb CO<sub>2</sub> Serial # 737479, location: Main Machinery Room Aft Centre
6. The following five (5) fire extinguishers shall have a 6 year inspection completed:
  - 5 lb dry chem. Serial # 107657, location: FRC
  - 5 lb. dry chem. Serial # 821562, location: FRC
  - 4 lb. dry chem. Serial # 27344, location: Shepherd Boat
  -
7. Any required repairs identified as a result of the inspections shall be negotiated through PSPC 1379 action.
8. Extinguishers shall be properly secured in their original locations after inspection.

### 2.2 Location

1. All throughout ship

### 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate data

1. N/A

### 3.2 Standards and Regulations

## H-04 PORTABLE FIRE EXTINGUISHERS

1. The following Coast Guard Standards and or Technical Bulletins shall be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
  - Canadian Coast Fleet Safety Manual (DFO 5737)
  - Coast Guard ISM Lock Out/Tag Out Procedures
2. Contractor shall refer to General Notes for any other applicable standards and regulations

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. Unless otherwise stated, all materials, labour, and equipment required to complete all requirements of this specification shall be CFM.

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

### 4.1 Inspection

1. Contractor shall arrange all necessary RO inspections related to the portable fire extinguishers.

### 4.2 Testing

1. Systems to be inspected to the satisfaction of the RO and OEM.

### 4.3 Certification

1. Two (2) copies of all inspection reports and certifications shall be provided to CGTA.

## **5: DELIVERABLES:**

### 5.1 Reports, Drawings and Manuals

1. Contractor shall a report detailing all work completed on extinguishers

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

## H-05 ANNUAL DUCT CLEANING

### 1: SCOPE:

The intent of this specification item is for Contractor to access and clean the air ducting for galley exhaust (including the galley range hood) and Laundry. In addition Contractor shall clean dryer ducting from the laundry room.

### 2: TECHNICAL DESCRIPTION:

#### 2.1 General

1. Contractor shall provide the services of a qualified HVAC representative to mechanically clean the vessel's ducting. All ducting noted above shall be cleaned thoroughly of dust, dirt, debris, scale, rust, etc. Contractor is responsible for making penetrations for the cleaning equipment and the subsequent sealing of such access points with an approved material for the type of ducting being worked on, upon completion of all work. Plastic plugs shall not be used to seal up access point. Contractor shall co-ordinate the cleaning with the ship's staff in order to minimize interruption of normal work routines.
2. Contractor shall remove ceiling panels in order to access the applicable ventilation trunking, ducting, and tubes. All items shall be reinstalled in good order upon completion of all work. Any wiring, piping, lighting, fixtures, fasteners, metal work, etc. that has been removed or repositioned to carry out this work shall be reinstalled in good order in its original location and condition. All insulation removed shall be reinstalled accordingly and all taped seams shall be re-taped with new approved tape (foil-grip) for HVAC systems (duct tape shall not be used).
3. Prior to commencing any work, Contractor shall tag and lock out each system supply/exhaust fan set. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. CGTA will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the CGTA shall be in attendance when all locks/tags are removed.
4. Contractor is responsible for all materials, coverings, and equipment required for performing this task. All labor required for completing the cleaning, including that required for removals, reinstallation, opening, and closing up of equipment and ducting is Contractor's responsibility. Contractor shall remove all materials used in the performance of this specification requirement, from the vessel. Ship's waste receptacles will not be used for disposal of any removed materials.

## H-05 ANNUAL DUCT CLEANING

5. Contractor is responsible for the cleaning of all spaces, furniture, equipment, etc. that is contaminated or soiled during this scope of work.
6. All systems shall be closed up as per their original configuration upon completion of the cleaning process.

### GALLEY

7. The 120cm by 90cm range hood is serviced by a single duct approximately 160mm in diameter and approximately 3m in overall length.
8. The Range Hood and trunking shall be chemically and/or steam cleaned. All dirt, grease, debris, and cleaning fluids shall be trapped and shall be removed ashore and disposed of by Contractor.
9. Prior to cleaning, all mechanical and electrical connections to range hood shall be released by Contractor, including piping for fire extinguishing system, associated controls and electrical lighting. All fittings liable to interfere with cleaning of the range hood shall be temporarily relocated and protected.
10. The range hood filter screens shall be removed and steam cleaned.
11. Trunking in way of the exhaust fan shall be opened to allow complete degreasing of fan, fan motor, and its support brackets. Approximately 2m of 25cm by 20cm trunking is involved. Contractor shall remove sections of the stainless steel cladding for access.
12. Trunking and range hood shall be reassembled in good order and adjusted upon completion of cleaning and inspection by Contractor. All items removed or relocated to allow for the work to proceed shall be reassembled in good order and functionally tested to the satisfaction of the CGTA.

### Laundry Dryers

13. Laundry Room – Compartment  
Laundry/ Linen Locker Door #19
14. Natural supply ducting (approximately 15 cm diameter) and forced exhaust ducting (approximately 10cm by 15cm) shall be accessed, opened and cleaned of dust and debris.

## H-05 ANNUAL DUCT CLEANING

### 2.2 Locations

#### Galley

Below the main deck – bottom of stair well turn right into alleyway, look to the right into the alleyway and next door on the left.

#### Laundry Room

Located below the main deck at the foot of the stair well turn left.

#### HVAC Main Unit

Located on the main deck forward of the wheelhouse, access from outside the vessel.

### 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate Data

1. Contractor shall have access to 1:100 scale drawings: A/C System Diagrams which details the location of air handling units, outlets, return air dampers and ducting runs.

DWG: HVAC Single Line DWG AF6099-51000-01

### 3.2 Standards and Regulations

1. The following Coast Guard Standards and or Technical Bulletins shall be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
  - Canadian Coast Fleet Safety Manual (DFO 5737)
  - Coast Guard ISM Lock Out/Tag Out Procedures
2. National Air Duct Cleaners Association (NADCA), international standard for Assessment, Cleaning and Restoration (ACR) of HVAC Systems, 2013.

### 3.3 Allowances

1. N/A

## H-05 ANNUAL DUCT CLEANING

### 3.4 Owner Furnished Equipment

1. Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise advised.

### 4: PROOF OF PERFORMANCE:

#### 4.1 Inspection

1. Contractor and CGTA shall inspect all spaces to ensure the specification requirements have been met and all interference, insulation and coverings removed are reinstalled to their original condition.

#### 4.2 Testing

1. Upon completion of work a functional test of the system shall be conducted in the presence of the CGTA to prove the system is operating as per its original condition. All work shall be performed to the satisfaction of the CGTA.

#### 4.3 Certification

1. N/A

### 5: DELIVERABLES:

#### 5.1 Reports, Drawings and Manuals

1. Upon completion of all work, two (2) type written copies and one (1) electronic copy of the service report shall be provided to CGTA.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

## H-06 ANNUAL LIFEBOAT DAVIT INSPECTION

### 1: SCOPE:

The intent of this specification item is for Contractor to survey the Welin Lambie Life Boat Davit, for the RO annual inspection and testing.

### 2: TECHNICAL DESCRIPTION

#### 1.1 General

2. Contractor shall obtain the services of a RO approved Field Service Representative (FSR). Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work under the direction and guidance of the FSR.
3. Contractor shall include an allowance of \$20,000 to cover expenses of a RO approved FSR. The FSR shall be reimbursed for any necessary parts, services, authorized travel and living expenses reasonably and properly incurred in the performance of the work. Contractor shall provide the fee schedule from for the services of the FSR. This info shall be included in the PSPC data pricing sheet. Final costs for the FSR as well as parts and materials shall be adjusted up/down upon proof of invoices through PSPC 1379 action.
4. All manufacturer's procedures and recommendations shall be followed during the scope of work with technical specifications being adhered to as a minimum by Contractor. Contractor shall arrange for scheduling the on-site presence of a RO Surveyor as required for inspections/testing during the course of this work.
5. Contractor shall supply all the necessary staging and craneage as required to work on, remove, transport, and install the various components during this inspection and/or repair process if warranted. All personnel working on the davit system shall be suitably trained in fall restraint and all fall restraint equipment shall be certified and current.
6. Contractor shall supply certified weights for the load test as instructed by the FSR. Contractor shall contact Welin Lambie for the specific type of weight and quantity required for this specific lifeboat. The supply, transport, hook-up and removal of these weights for the specification shall be included in the overhaul bid.

## H-06 ANNUAL LIFEBOAT DAVIT INSPECTION

6. Prior to the commencement of any and all work, Contractor shall lock out the power pack unit, associated condensation heaters, and the oil reservoir immersion heater as per the Coast Guard ISM Safety Lockout Procedure 7.C.1.M S36-01 safety code. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT Contractor shall install /remove locks and tags accordingly during the scope of work. CGTA will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the CGTA shall be in attendance when all locks/tags are removed.
7. The release hooks in the Lifeboat shall be disassembled for inspection. All locks, diaphragms, bushings, hooks, side plates, and releases shall be proven for the RO inspection.
7. On completion of work, survey, and re-assembly, the davit assembly shall be both functionally tested alone, and then load tested using the lifeboat. A proper load test involves fully loading the Lifeboat to its weight capacity and includes hoisting the lifeboat aboard and stowing it in its resting position, lowering it to the water and then returning it to its stowed position. The Lifeboat shall be then lowered to a couple of inches off the water and the hook released to allow the lifeboat to drop into the water. While the Lifeboat is in the water, a buoyancy test shall be conducted. A RO Surveyor shall be present for all load / functional tests. All limit switches shall be proven functional. All weights shall be removed from the Lifeboat. Lifeboat shall be fully cleaned of any debris, dirt, or water and shall be stowed in its' davit.
8. All documentation shall be provided to demonstrate OEM compliance. No material substitutions shall be undertaken without the expressed written consent of a Welin Lambie representative.
9. Contractor shall supply hand written notes, two (2) typewritten and one (1) electronic copy of all reports upon completion of the work, from the FSR prior to leaving the dry-dock. The report shall at a minimum list all work undertaken, repairs, parts used, measurements, readings, etc.

### 2.2 Location

1. Midship starboard side bridge deck.

## H-06 ANNUAL LIFEBOAT DAVIT INSPECTION

### 2.3 Interference

3. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation in good order.
4. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

### 3: REFERENCES:

#### 3.1 Guidance Drawings / Nameplate Data

Welin Lambie Rescue Boat Davit Type PIV 1.0A  
DWG# - AF6099-O1201-1800-17\_AF Rescue Boat Davit

Manual: - Welin Lambie Resue Boat Davit

#### 3.2 Standards:

1. The following Coast Guard Standards and or Technical Bulletins shall be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CGTA.
  - Canadian Coast Fleet Safety Manual (DFO 5737)
  - Coast Guard ISM Lock Out/Tag Out Procedures

#### 3.3 Allowances

1. Refer to section 2.1 General, subsection 2 above.

#### 3.4 Owner Furnished Equipment

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

### 4: PROOF OF PREFORMANCE:

1. All documentation shall be provided to demonstrate OEM compliance.
2. Demonstrate operation to satisfaction of CGTA, FSR and the RO Surveyor.

## H-06 ANNUAL LIFEBOAT DAVIT INSPECTION

### **PART 5: DELIVERABLES:**

#### 5.1 Drawings / Reports

1. Typewritten and electronic reports upon completion of all work from the FSR
2. Safety Management System forms and checklists
3. RO Survey credit.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

#### 5.4 Manuals

1. N/A

### CONTACTS

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## H-07 ALLIED CRANE ANNUAL INSPECTION

### 1: SCOPE:

The intent of this specification item is for Contractor to complete the 5 year inspection routine on the ALLIED Crane

### 2: TECHNICAL DESCRIPTION

#### General

1. Contractor must complete all inspection items on the 5 year routine for the Allied Crane as described in the ALLIED CRANE manual. An Inspection checklist has been provided in Appendix B. The ALLIED crane technical Manual will be provided in PDF for the particulars of each job.
2. All oils required used during the inspection will be supplied as GSM, all other materials/equipment required to carry the inspection out must be contractor supplied.
3. Contractor is responsible for all crane and rigging to carry out the inspection. A provision for crane is made in the SERVICES section.
4. Contractor must remove and dispose of any remaining oil in accordance with all Federal, Provincial and Municipal regulations. Disposal certificates must be provided to the CGTA.
5. Prior to final load testing, using calibrated weights or a dynamometer contractor to calibrate the Omega weight display. Procedure for this calibration, as provided by Allied Crane is aboard the vessel.

#### 2.2 Location

Center of open after main deck

#### 2.3 Interference

5. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation in good order.
6. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

### 3: REFERENCES:

## H-07 ALLIED CRANE ANNUAL INSPECTION

### 3.1 Guidance drawings/Name plate data

1. Allied systems marine crane model TB10-23 Technical Manual edition 80-992 dated Dec 2011
2. Guidance Documents for Omega display calibration

### 3.2 Standards:

1. Canadian Coast Fleet Safety Manual (DFO 5737)
2. Coast Guard ISM Lock Out/Tag Out Procedures
3. Canada Shipping Act 2001 - Machinery Inspection Regulations
4. RO recommendations for Man lift devices.

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

All oils necessary to complete the inspection will be supplied as GSM  
All other materials are CSM

## **4: PROOF OF PREFORMANCE:**

### 4.1 Inspection

1. Contractor shall demonstrate following the replacements and inspections the functionality of crane to the satisfaction of the CGTA and attending RO surveyor.
2. Load display unit to accurately reflect loads applied to cranes hook.

### 4.2 Testing

1. Testing of the equipment shall be performed in the presence of the CGTA.

### 4.3 Certification

2. Crane performance to satisfy requirements of the RO surveyor for annual certification.

## H-07 ALLIED CRANE ANNUAL INSPECTION

### **PART 5: DELIVERABLES:**

#### 5.1 Drawings / Reports

1. The Contractor must provide to the CGTA:
  - Copies of readings taken and crane condition report in electronic format as well as two typewritten copies.
  - Updated reports for any circuits and/or deficiencies corrected with 1379 action.
  - Copy of the survey credit for the inspection of the crane.
2. The Contractor must provide to the RO Surveyor:
  - Copy of the readings taken and crane Condition Report to obtain Survey Credit.

#### 5.2 Spares

1. N/A

#### 5.3 Training

1. N/A

#### 5.4 Manuals

1. N/A

## H-08 FRESH WATER TANK CLEANING AND INSPECTION

### 1. TECHNICAL DESCRIPTION:

#### General

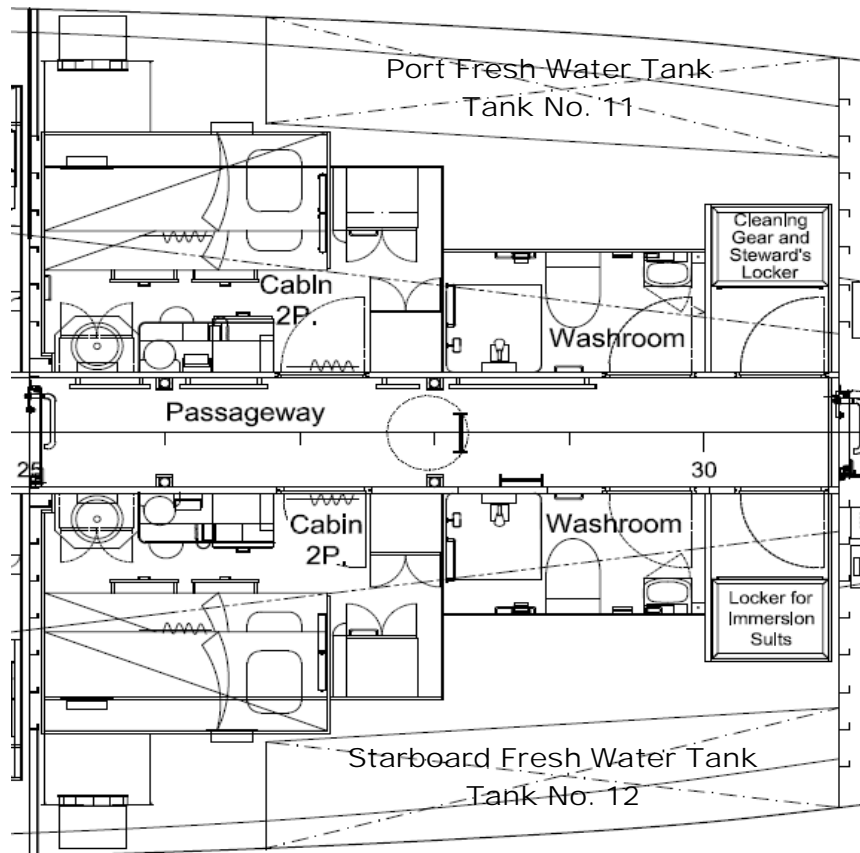
1. The intent of this specification item is to open the fresh water tanks, clean, inspect and touch up the coating.

**Table H-7.1 Fresh Water Tanks**

ID	Tank Name	Location	Volume	Manhole Location
Tank 11	FW Tank Port	Fr 26.75-31	3.205 cu M	Behind Port Shower Stall Access – Two manhole covers
Tank 12	FW Tank Stbd	Fr 26.75-31	3.205 cu M	Behind Stbd Shower Stall Access – Two manhole covers

Contractor must drain the tanks of water. The manhole covers shall be removed from each tank by Contractor. Contractor shall provide each tank with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers/extractors shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours, dust, dirt, etc. shall not be allowed to enter the Accommodation space of the ship and shall be directed by flexible ducting to the outside of the vessel.

## H-08 FRESH WATER TANK CLEANING AND INSPECTION



## H-08 FRESH WATER TANK CLEANING AND INSPECTION

Bow Thruster Compartment



Access location to tanks – Port and Starboard Washrooms



Starboard Access to  
Fresh Water Tank #12



Port Access to  
Fresh Water Tank  
#11

## H-08 FRESH WATER TANK CLEANING AND INSPECTION

The void space in the fresh water tank areas – hull plate, tanks and framing are insulated – be careful on entry

Contractor shall allow for 3m<sup>2</sup> of repairs to insulation – remove old damaged, supply and install new

Foil back / yellow soft insulation – bid on 2 inch thick

2. Tanks must be certified safe for personnel to enter prior to any work being carried out internally. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry certificates. A copy of a gas free certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Contractor shall take note of the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES.

3. Contractor must open both tanks and remove any remaining water from the tanks. The amount is estimated to be approximately 20 L per tank.

4. Approximate surface area of the tanks;

44 square meters for Starboard

44 square meters for Port

5. The internals of each tank shall be hydro-blast clean (2500 psi maximum). Contractor shall protect each tank sounding transducer and temperature transducer prior to commencing work and for the duration of all work in the tanks.

6. Contractor shall take precautions to ensure that no damage, unnecessary cleaning, or repairs shall occur from hydro blasting and/or the application of coatings. Contractor shall ensure that every internal tank opening, where paint chips and debris from hydro blasting can gain entry, is suitably covered. Measures shall be taken to ensure that surfaces and equipment other than those specified are not coated and that any inlets or discharges will not be blocked by the coating or grit.

7. Contractor will perform 20 shots of Ultrasonic NDT on the portion of deflected hull plating within the port freshwater tank. Any repairs to the affected hull plating will be negotiated under PSPC 1379 action.

## H-08 FRESH WATER TANK CLEANING AND INSPECTION

8. Any rust areas and/or bare areas in the tanks shall be power tool buffed with a hand wire wheel to remove rust and bring areas to clean metal surfaces. The bare areas shall be buffed to SSPC-SP-3 standards. Contractor shall be responsible for disposing of all removed paintwork, scale, dirt, etc. in an environmentally safe manner and shall demonstrate compliance to the CGTA.

9. Upon completion of **hydro** blasting and the removal of all debris, both tanks shall be thoroughly wipe down using lint free material or air swept to remove all visible signs of moisture on all surfaces. Contractor shall supply industrial dehumidification equipment to remove all moisture from each tank to a humidity level as required by the coating manufacturer for the application of their product. Contractor shall demonstrate that these conditions are met to the CGTA prior to the application of each coat. Contractor shall ensure that each coating application is thoroughly dry before any further applications take place. Contractor shall be responsible for landing this equipment on board and the subsequent removal including all personnel, hardware, lifting equipment, etc. Contractor shall also be responsible for monitoring this equipment as required.

10. Upon completion of **hydro** blasting all residue and debris shall be cleaned and removed from the tanks. Upon completion of all cleaning, the CGTA and attending RO Surveyor and local accredited Health Inspection Representative shall thoroughly inspect the tank internals.

11. Contractor is responsible for arranging and co-ordination the RO Surveyor and Health Inspection Representative for all required inspections identified in this specification item.

12. All distributed areas shall be coated with 1 coat of Royal Coatings Easy-prime and **1 or 2** coats of Royal Coatings Easy Flex (**as per manufacturers recommendation**). The **3** coats shall be applied to yield 5 mils DFT per coat, with a suitable drying time provided for between coats. Contractor will supply and maintain heating equipment to obtain a tank surface temperature of 18 to 20 degrees Celsius on steel. Steel shall be coated during periods of drying and curing. The tanks shall be allowed to cure as per the manufacturers recommendations under these conditions prior to being filled. When coating is thoroughly cured, tank shall be inspected by CGTA and local accredited health inspector. Coating adhesion and condition shall be acceptable to the CGTA and local accredited health inspector. For bid purposes, Contractor shall bid on repairing 5 square meters and provide a unit cost for repairing 1 square meter for adjustment purposes through PSpC 1379 action.

13. Upon completion of the above work and to the satisfaction of the Chief Engineer and accredited health inspection representative, tanks shall be wiped clean. Sounding pipes, suction pipes and vents shall be proven clear prior to filling the tanks with water. All debris shall be removed ashore and each tank closed up in good order. The Chief Engineer shall examine each tank prior to final closing. Manhole covers shall be replaced using new 1/4 inch neoprene gaskets.

14. Upon completion of all work each tank shall be filled with fresh water (contractor supply). Each vent shall be removed and each tank shall be filled to overflowing for a hydrostatic test on each tank to the satisfaction of the RO Surveyor. Vents shall be installed with new contractor supply gaskets upon completion of all work.

15. Contractor shall supply and add 12% chlorine to each tank and test to ensure a minimum level of 50 mg/l free chlorine. The solution shall be circulated by ship's personnel and then let set for 24 hours.

16. The super-chlorinated water shall then be run through various potable water piping systems on board the vessel for at least one hour. Testing shall be carried out to ensure that the super-chlorinated solution is flowing through each tap. Contractor shall test various locations to prove this.

17. Upon completion of super-chlorinated, the tank solutions shall be neutralised in each tank using CFM 35% hydrogen peroxide. The contents of the tank water shall be tested to determine that the chlorine has been neutralised. Once this has been achieved Contractor shall remove and dispose of the water. Contractor shall submit a type written report to the Chief Officer showing the results of the various tests during the super-chlorinated /de-chlorination process.

18. Upon completion of all testing, Contractor shall fill the tanks with potable water. Contractor shall dose and test the tank contents until a free chlorine maintenance level of 0.2-0.5 mg/l of free chlorine has been attained.

## 2.2 Location

1. Below main deck port and stbd washrooms (hatch cover), BT compartment

## 2.3 Interferences

1. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work

## 3: REFERENCES:

### 3.1 Guidance Drawings/Nameplate data

1. N/A

### 3.2 Standards and Regulations

1. DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES.

## H-08 FRESH WATER TANK CLEANING AND INSPECTION

### 3.3 Allowances

1. N/A

### 3.4 Owner Furnished Equipment

1. N/A

## 4: PROOF OF PERFORMANCE:

### 4.1 Inspection

1. Contractor shall arrange and co-ordinate the visits required for the Provincial Health Inspector or accredited testing authority.
2. CG will arrange a 3<sup>rd</sup> party NACE surveyor (level 2) to oversee coating application of this specification item.

### 4.2 Testing

1. Technical description covers testing

### 4.3 Certification

1. Contractor must obtain test certificates from the Provincial Regulator that certifies that the water in the tanks as "fit to drink". These certificates must be passed on to the CGTA.
2. Contractor must obtain test certificates from an independent lab that certifies the water in the tanks meets FSM standards. These certificates must be passed on to the CGTA.
3. Contractor must obtain NACE (level 2) report from the NACE surveyor on the fresh water tank coating application. Tis report must be given to the CGTA

## 5: DELIVERABLES:

### 5.1 Reports, Drawings and Manuals

1. Contractor/NACE inspector to deliver coating application report to CGTA

### 5.2 Spares

1. N/A

### 5.3 Training

1. N/A

H-09 INTENTIONALLY LEFT BLANK

# H-10 4500 HOUR PROPULSION ENGINE OVERHAUL

## 1: SCOPE:

The intent of this specification is to complete the 4500 hour service work on the starboard MTU propulsion engine, in order to obtain Classification Society (ABS) credit for Survey

## 2: TECHNICAL DESCRIPTION

### 2.1 General

1. Contractor must obtain the services of a qualified Field Service Representative (FSR) to complete the 4500 hour MTU engine overhaul.

Contractor to provide assistant to the FSR when required, this would include any equipment, hardware, personnel, material, etc. deemed necessary by the FSR and the CGTA to complete service work.

Suggested FSR Contact Information:

### Andrew Reid

Parts Technician

### WAJAX

[areid@wajax.com](mailto:areid@wajax.com) | wajax.com

Direct 902 468 6200 X 240 | Cell 902 292 3725

70 Raddall Ave, Dartmouth Nova Scotia B3B 1T7

2. Contractor must include, in their bid price, an allowance of \$100,000.00 for parts and services of an attending FSR. The cost must be included in the PSPC data pricing sheet as separate line item. FSR will be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of their work. The allowance must form part of the overall bid and will be adjusted through PSPC 1379 action upon proof of final invoice.

3. Contractor must supply all the necessary staging and crange as required to work on, remove, transport, and install the various components during this scope of work. Any crange required by the FSR will be covered by the SERVICES heading; subsection Cranage.

4. Contractor must provide the services of one labourer to assist the FSR, as required, for the duration of the FSR's onsite work and include in their bid a total of 24 labour hours for this period. Contractor must provide a separate cost for this work and include it as part of the overall bid. The actual labourer hours worked will be adjusted up or down through PSPC 1379 action.

## H-10 4500 HOUR PROPULSION ENGINE OVERHAUL

5. After the work is completed and upon undocking, an FSR must standby with the engine room crew to assist in any trouble shooting required to get the engine running or to deal with any issues that may arise. The FSR will accompany the vessel and crew on the sea trial and assist as necessary.

### 2.2 Location

1. Main Machinery Room (MMR)

### 2.3 Interference

1. Contractor is responsible for the identification of any interference items, their temporary removal as approved by the CGTA, and storage and refitting to the vessel.

2. Contractor is responsible for protecting surrounding area and equipment while carrying out this work.

## 3: REFERENCES:

3.1 Guidance drawings/Name plate data

### 250 Hour Inspection

Task	Completed By	Notes
Switch to standby Spin-on fuel filter (X0042421), replace filter that was in use		
Switch to standby Separ Fuel Filter Insert (925005), replace filter that was in use		

### 500 Hour Inspection

Task	Completed By	Notes
Obtain Oil Sample		CAT number: Results:
Clean Centrifugal Oil Filters (23540465)		Thickness:
Check and Clean Oil Indicator Filter		
Swap left and right air filters		

### 1000 Hour Inspection

Task	Completed By	Notes
500 Hour Inspection		
Change Engine Oil -220L of castrol HLX40		

Check engine mounts		

### 2000 Hour Inspection

Task	Completed By	Notes
500 & 1000 Hour Inspections		
Clean Compressor Wheel of Turbocharger		

### 3000 Hour Inspection

Task	Completed By	Notes
500 & 1000 Hour Inspections		
Check and Adjust Valve Clearances		
Replace Coolant Filter (2040791)		
Replace Air Filters (180943002)		

### 4500 Hour Inspection

Task	Completed By	Notes
500 Hour Inspection		
Replace Fuel Injectors		
Reset Drift Compensation Parameters		
Inspect Combustion Chambers		
Overhaul Turbochargers		
Test Run and record parameters		Start of component maintenance
Drain and Flush Coolant from Engine		
Clean Air Ducting		
Clean Intercooler and Check for Leaks		
Replace High Pressure Fuel Sensor		
Inspect Centrifugal Oil Filter for Wear		
Overhaul Starter		
Clean J.W. Cooler and Inspect for Leaks		
Clean L.O. Cooler and Inspect for Leaks		
Overhaul Jacket Water Pump		
Overhaul Sea Water Pump		
Inspect Rocker Arm and Valve Bridge for wear		
Check Operation of Diverter Valve		

Check Thermostat and Thermal Actuator		End of component maintenance
Engine Mounts: check buffer clearance, check seating of securing screws, check for cracks, measure height of rubber elements.		
Overhaul Cylinder Heads		
Replace all rubber sleeves		

### 3.2 Standards:

1. Canadian Coast Fleet Safety Manual (DFO 5737)
2. Coast Guard ISM Lock Out/Tag Out Procedures
3. Canada Shipping Act 2001 - Machinery Inspection Regulations

### 3.3 Allowances

1. \$200,000 for FSR parts and services
2. 24 labour hours to assist the FSR

### 3.4 Owner Furnished Equipment

1. N/A

## 4: PROOF OF PREFORMANCE:

### 4.1 Inspection

1. N/A

### 4.2 Testing

1. Contractor to perform a dock side trial and sea trial upon completion of all work.
2. Wajax FSR must be on site for the dock side trial and sea trials.
3. Sea trial must be conducted for a period of 4 hours to verify the operation of the starboard engine.
4. Contractor to perform the dock side trials and sea trials under the guidance of the FSR and CGTA.
5. Acceptance is based on a successful test and all equipment operating as per the manufacturer's requirements.
6. All work must be to the satisfaction of the FSR and CGTA.

### 4.3 Certification

## H-10 4500 HOUR PROPULSION ENGINE OVERHAUL

### 1. Component certification for Turbochargers

#### **PART 5: DELIVERABLES:**

##### 5.1 Drawings / Reports

1. Contractor to provide one type written report and an electronic copy, in Adobe PDF format, the report must include at a minimum any defects found, pictures taken, measurements recorded.
2. Contractor must maintain a complete and accurate record of all tests, trials and inspections conducted during the execution of the work. This must include those tests, trials and inspections performed by any sub-Contractors. The records must include all relevant documentation, test procedures, associated test sheets, test, trial and inspection data and observation results.
3. All original records of the test, trial and inspections must be signed by the RO Surveyor, Contractor and where necessary by the sub-Contractor and Field Service Representative (FSR) who witnessed the tests.

##### 5.2 Spares

1. N/A

##### 5.3 Training

1. N/A

##### 5.4 Manuals

1. N/A

## T-1 AIS ANTENNA RELOCATION

### T1-1 Scope

The intent of this specification is to move the AIS Antenna to a location further forward on the wheelhouse top more distant from the mast than the current location.

This project consists of swapping the AIS Antenna with a VHF Radio Antenna located further forward on the wheelhouse top more distant from the mast. See Figure #1 below.

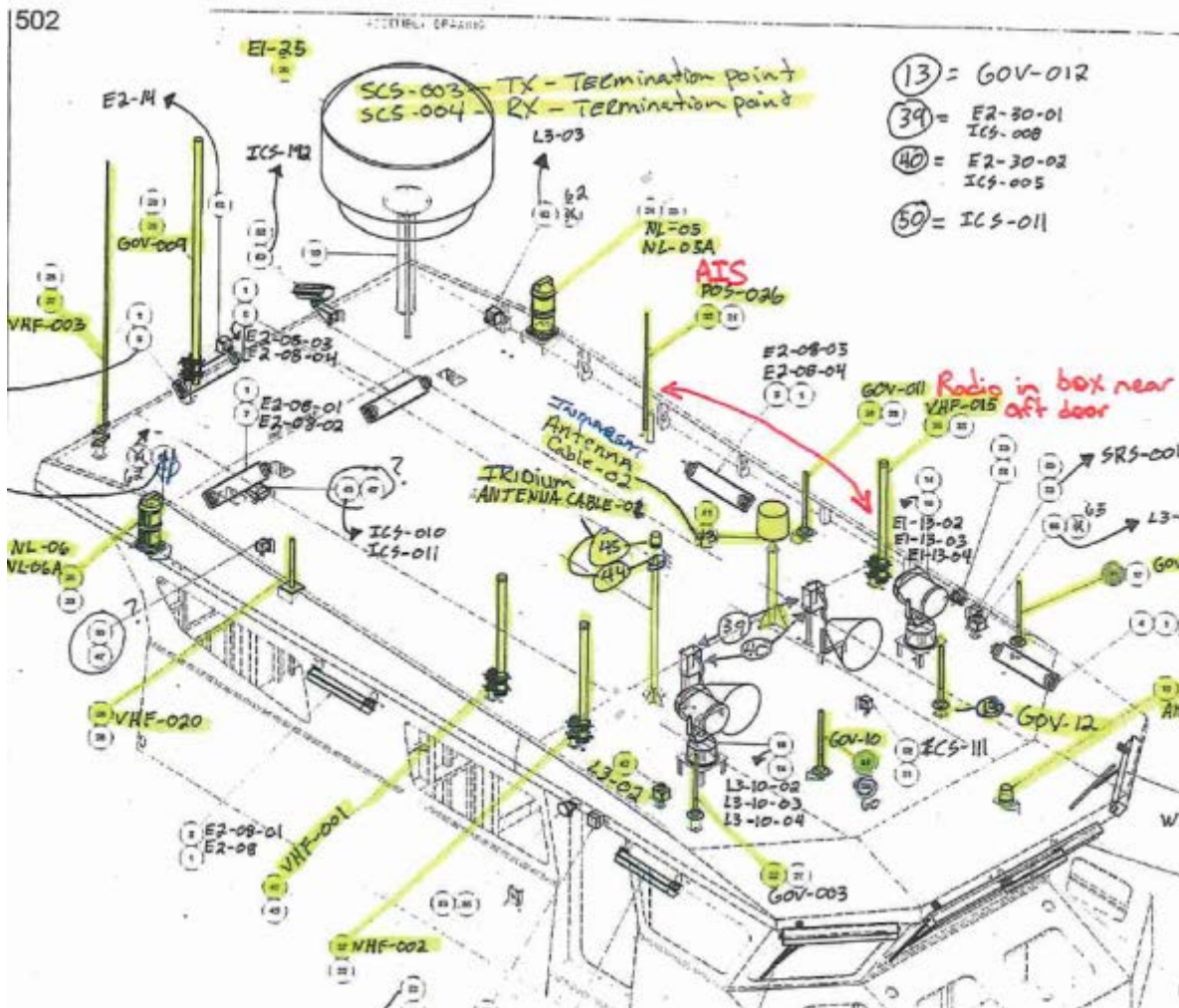


Figure #1 – MSPV Wheelhouse Top

### T1-2 Reference Drawings and Documents

- Dwg. C184-001-AL (Antenna General Arrangement Diagram)
- Dwg. C184-021-BD (VHF Radio Wiring Diagram)
- Dwg. C184-028-BD (AIS Wiring Diagram)

### T1-3 Standards

Fleet Safety and Security Manual (DFO/5737)  
TP127 – Ship's Electrical Standards  
IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships  
Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

#### **T1-4 Regulations**

Canada Shipping Act, 2001

#### **T1-5 Removal of Antennas from Current Locations**

**Note:** Testing is to be performed by the CCG On-Site Technical Representative on the VHF Radio and AIS transponder prior to removal of the antennas. Confirm this has been completed before beginning.

Disconnect and remove the AIS antenna from its old location under the mast on the PORT side if the wheelhouse top. Set the Antenna aside it will be reused. See Figure 1. Pull the cable (POS-026) inside and secure coiled in the deckheads.



**Photo #1 – Old AIS Antenna Location**

Disconnect and remove the VHF Radio Antenna from its old location forward from the mast on the PORT side of the wheelhouse top. Set the Antenna aside it will be reused. Pull the cable (VHF-015) inside.



**Photo #2 – Old VHF Radio Antenna Location**

#### **T1-6 Installation of Antennas**

Install the AIS Antenna in the location where the VHF Radio Antenna was removed  
– Forward from the mast on the PORT side of the wheelhouse top. See Photo #2.

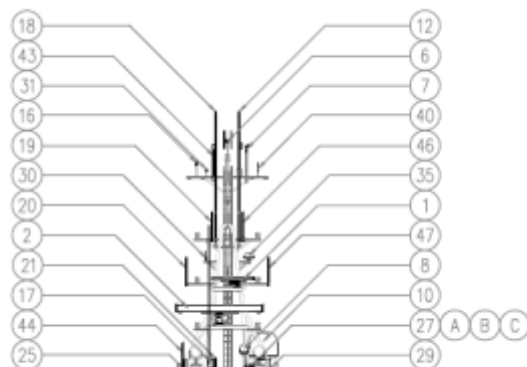
Install the VHF Radio Antenna in the location where the AIS Antenna was removed  
- under the mast on the PORT side of the wheelhouse top. See Photo #1.

# **T1-7 Cable installation**

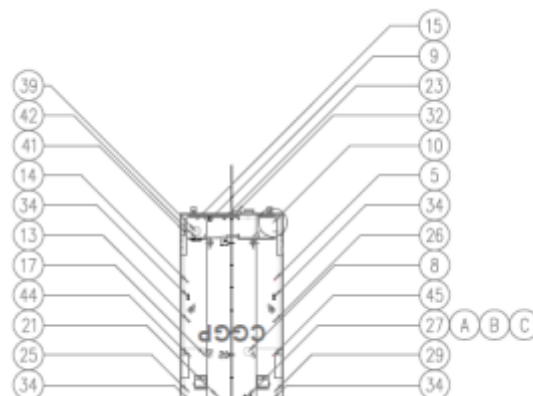
Install and label the following cables (Table 1) as per C184-021-BD and C184-028-BD or as directed by the onsite technical representative. Use existing cable ways and transits. The onsite technical representative will terminate the cables.

**Table 1 Cable List**

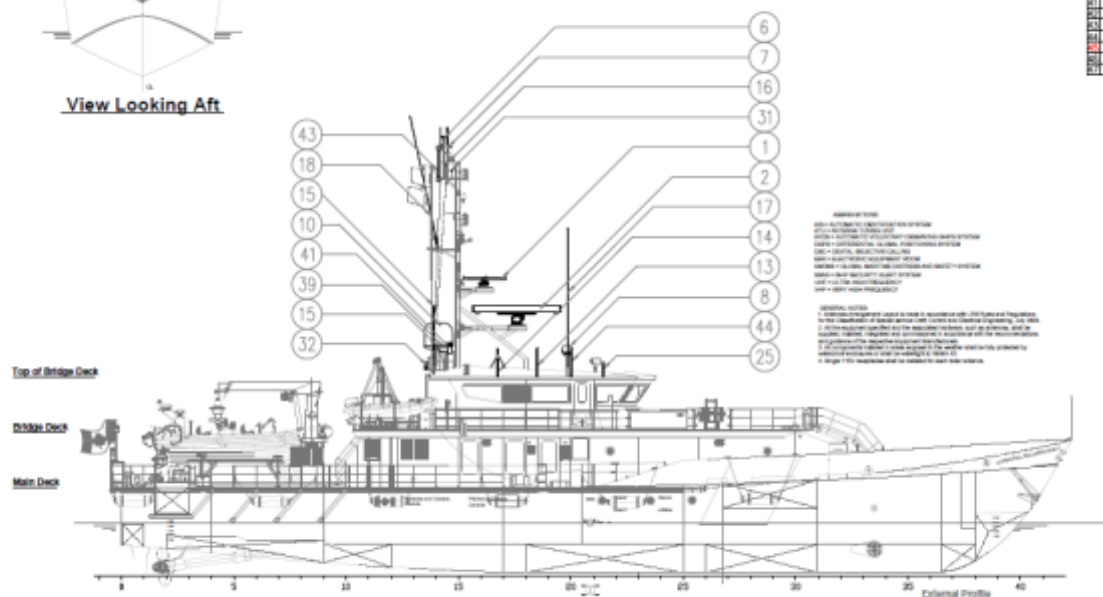
<b>CABLE LABEL</b>	<b>CABLE TYPE</b>	<b>FROM</b>	<b>TO</b>	<b>ESTIMATED LENGTH (IN FEET)</b>
<b>VHF-015-1</b>	<b>LMR400FR</b>	<b>Existing Cable in Wheel House Deckheads Below AIS Antenna</b>	<b>VHF Antenna on Bridge Top</b>	<b>20</b>
<b>POS-026A</b>	<b>LMR400FR</b>	<b>R4 AIS Transponder below GMDSS Console</b>	<b>AIS Antenna on Bridge Top</b>	<b>20</b>



View Looking Aft



Top of Bridge Deck



#	ANTENNA USE	ANTENNA TYPE	MAKER	ITEM #	CABLE #	COMMENTS
1	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
2	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
3	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
4	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
5	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
6	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
7	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
8	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
9	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
10	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
11	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
12	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
13	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
14	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
15	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
16	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
17	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
18	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
19	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
20	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
21	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
22	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
23	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
24	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
25	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
26	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
27	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
28	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
29	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
30	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
31	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
32	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
33	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
34	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
35	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
36	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
37	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
38	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
39	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
40	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
41	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
42	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
43	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
44	12-SWATH SCANNER	SONAR	SPERRY	NA500001		
45	12-SWATH SCANNER	SONAR	SPERRY	NA500001		

NO.	LOC.	REVISION	DATE:	BY:	APPR.
D		OMOSS + AIS ANT. RELOCATE	AUG 2018	MJW	
C		ADDED C&P APX7500 VHF Ant.	AUG 2016	JJ	
B		REVISED #3, 4, 24,27-29, 38-43	FEB 2015	ASH	
A		ORIGINAL ISSUE			
CANADIAN COAST GUARD/DEPARTMENT OF FISHERIES & OCEANS					
Technical Support Services					
Telecommunications & Electronics Workshop					
CCGS CPL MCLAREN ANTENNA ARRANGEMENTS					
DATE:	DRAWN:	CHECKED	APPR.		
JAN 2015	PL				
SCALE:	REFERENCE:	DRAWING #:	SHT.		
NTS		C184-001-AL	1/1		



**T1-8 Government Furnished Equipment**

**Cable and connectors.**

**T1-9 Material to be supplied by Contractor**

**All material s required to complete statement of work. All cables are to be properly secured in existing cable trays. In locations where trays do not exist, appropriate hangers are to be installed.**

## T-2 INSTALLATION OF SAILOR GMDSS 6000 SYSTEM

### T2-1 Scope

The purpose of this project is to replace the Sailor 5000 series GMDSS equipment installed onboard the CCGS Corporal McLaren M.M.V. The Sailor 5000 series GMDSS equipment has exceeded its lifetime and is no longer supported by Sailor.

This project consists of the removal of the existing Sailor 5000 series GMDSS equipment and the installation of the new Sailor 6000 series GMDSS equipment. Cabling and antennas will be reused where possible. There will be some relocation of existing equipment and electrical outlets.



### T2-2 Reference Drawings and Documents

Dwg. C184-001-AL (Antenna General Arrangement Diagram)  
Dwg. C184-020-BD (Old GMDSS 5000 System – Being Removed)  
Dwg. C184-027-BD (Primary DGPS Diagram)  
Dwg. C184-028-BD (Secondary DGPS Wiring Diagram)  
Dwg. C184-033-BD (New GMDSS 6000 System)

### T2-3 Standards

Fleet Safety and Security Manual (DFO/5737)  
TP127 – Ship's Electrical Standards  
IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships  
Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

### T2-4 Regulations

Canada Shipping Act, 2001

### T2-5 General

**T2-5.1** Prior to commencement of the work the Contractor shall inform the Chief

Engineer.

- T2-5.2** The Contractor shall ensure, with the help of the Chief Engineer, that all electrical systems which may be affected by their work have been locked out and tagged out before commencement of any work
- T2-5.3** The Contractor shall ensure all work areas are neat and tidy at the end of the work day to ensure a safe environment.
- T2-5.4** Contractor shall clean up all debris (including all old wire that is taken out) and dispose of it as per Provincial Regulations
- T2-5.5** Contractor is responsible for the identification of interference items which may affect the relocation, removal, or installation of equipment, their temporary removal, their storage and protection, and their refitting to the vessel
- T2-5.6** Contractor shall store all materials as instructed by Chief Engineer
- T2-5.7** Contractor shall paint any new steel as per client specification before installation of equipment. 1 coat of primer and 2 finish coats
- T2-5.8** The Contractor shall repaint any areas damaged during the relocation, installation, or removal of equipment as per client specs. 1 coat of primer and 2 finish coats
- T2-5.9** Any welding by the contractor shall be completed to CWB's latest revision, or equivalent
- T2-5.10** The Contractor shall ensure that the surrounding area is properly cleaned to ensure the area is safe prior to any hot work
- T2-5.11** The Contractor shall ensure all new and existing electrical penetrations are properly prepared and cleaned prior to hot work
- T2-5.12** The Contractor shall ensure all new and existing electrical wires are properly supported in accordance with accepted / approved practices
- T2-5.13** Electrical penetrations through frames or brackets shall be in accordance with accepted / approved practices
- T2-5.14** The Contractor shall ensure all electrical disconnections are labelled, stowed and protected
- T2-5.15** All Existing, unused Electrical penetrations shall be closed in accordance with accepted / approved practices
- T2-5.16** The Contractor shall provide and install all temporary staging, lifting appliances and rigging
- T2-5.17** Workers working aloft must be Fall Arrest Certified
- T2-5.18** The Contractor is responsible for all air quality testing to ensure hot work and entry is permitted
- T2-5.19** The Contractor shall issue and post hot work permits and shall maintain a fire watch
- T2-5.20** Areas where hot work is to be carried out are to be certified by a Chemist

or a qualified person to be determined by Chief Engineer

**T2-5.21** Welders, Chemists, and Technicians for NDT testing must be certified

**T2-5.22** The installation shall not be considered complete, until relocated or installed equipment has been tested, and considered operating as per the manufacturers specifications, to the satisfaction of the Chief Engineer, Class and/or Flag as applicable

## **T2-6 Equipment Relocation**

Pictures in this document may vary from what actually exist depending on the stage of the installation. To be used as location reference only.

### **Equipment located on the PORT side of the wheelhouse just AFT of the door:**

Relocate the wideband radio control head and speaker to the top shelf near the ICOM air to ground radio. A new bracket will be provided by CCG to mount the control head. See Photos #1 and #2 below. If necessary to accommodate the new console relocate the portable VHF Radio and charger a few inches higher.



**Photo #1 - #3**

The lower two outlets closest to the console will need to be relocated. The upper outlet is fed from breaker L3-6 and the lower from E2-10. Suggested locations are either higher on the same side of column they are currently attached to and more to starboard so that they are accessible, or on the PORT side of the column, or as otherwise directed by the On-Site CCG Technical Representative. Replace the cables if necessary. See cable list for details.



**Photo #4**

Relocate or remove any other electrical outlets which are found to be blocked from normal use by the equipment being installed as directed by the On-Site CCG Technical Representative.

If it is necessary, to accommodate the new console, move the mount that holds the VHF Radio Command Mic connectors closer to the chart table shelf or as otherwise directed by the on-site CCG representative.



**Photo #5**

Relocate the existing 24VDC junction box (JB AIS-01) and Power Outlet (Fed by cable E329-02) under the GMDSS desk on the Aft side of the aluminum plate.



**Photo #6**

The outlet will be moved to the far Starboard side of the existing plate and mounted so that it is accessible and does not interfere with the new or existing equipment or the routing of cables. See Drawing #2 for the suggested location. If necessary the cable (E329-02) will be replaced. See the cable list for details.

Relocate the 24VDC junction box which powers the RZ255 Multiplexers mounted on the forward side of the Aluminum plate under the GMDSS desk so that it is accessible and does not interfere with the new or existing equipment or the routing of cables. Suggested location would be to install this on the Starboard side of the forward compartment under the GMDSS Desk as shown below in Photo #7 or as otherwise directed by the onsite CCG Technical representative. Replace the cables (EM2-22, EM2-22-01, EM2-22-02) if necessary. See Cable List for details.



**Photo #7**

Relocate the SAAB displays using the CCG provided tandem bracket which will hold both displays. Install this bracket complete with displays in the location where the forward most SAAB display was removed from or as otherwise directed by the On-Site CCG Technical Representative.



**Photo #8**

## **T2-7 Equipment Removal**

Remove all components and cabling from the original GMDSS systems, with the exception of the VHF Antennas, MF-HF Antennas, Portable GMDSS VHF Radios, the EPIRB, the GMDSS batteries, the GMDSS DC junction box, and all cabling between that junction box and the batteries. The cable between the GMDSS DC Junction Box and the new chargers may be retained if they reach and are in good condition, otherwise they will be replaced. See DWGs: C184-020-BD, C184-033-BD and C184-001-AL

Remove the RZ 255 (Modified) DGPS Distribution Unit from below the Chart Table. Retain all cables except POS-002, POS-014, and POS-021. All other associated cables will be reused during this install.

Remove the old DGPS antenna cables POS-001 and POS-025\*. These were previously disconnected and the antennas relocated.

**NOTE:** Take care NOT to remove the cables POS-001A or POS-025A which replaced these cables.

Remove the terminal block from the DGPS selector switch Junction Box beside the GMDSS Console.

### **Equipment located on the PORT side of the wheelhouse just AFT of the door:**

GMDSS Console c/w All Equipment (MF-HF Control Head, Printers, etc.)  
GMDSS Battery Charger 5083  
GMDSS Power Supply #3 PS 4655  
GMDSS VHF #1 Power Supply N163S

MF/HF Transceiver

Navtex Display (Do not remove bracket)

Terminal Block inside DGPS Selector Switch JB





Photos #9-12

### Equipment in Forward Wheelhouse Console:

VHF DSC Radio (x2) and Handsets  
Inmarsat-C Remote Alarm Panel



Photos #13 & 14

### Equipment located in Command Centre:

Navtex Receiver under Starboard Desk



**Photo #15**

### **Equipment located in Galley:**

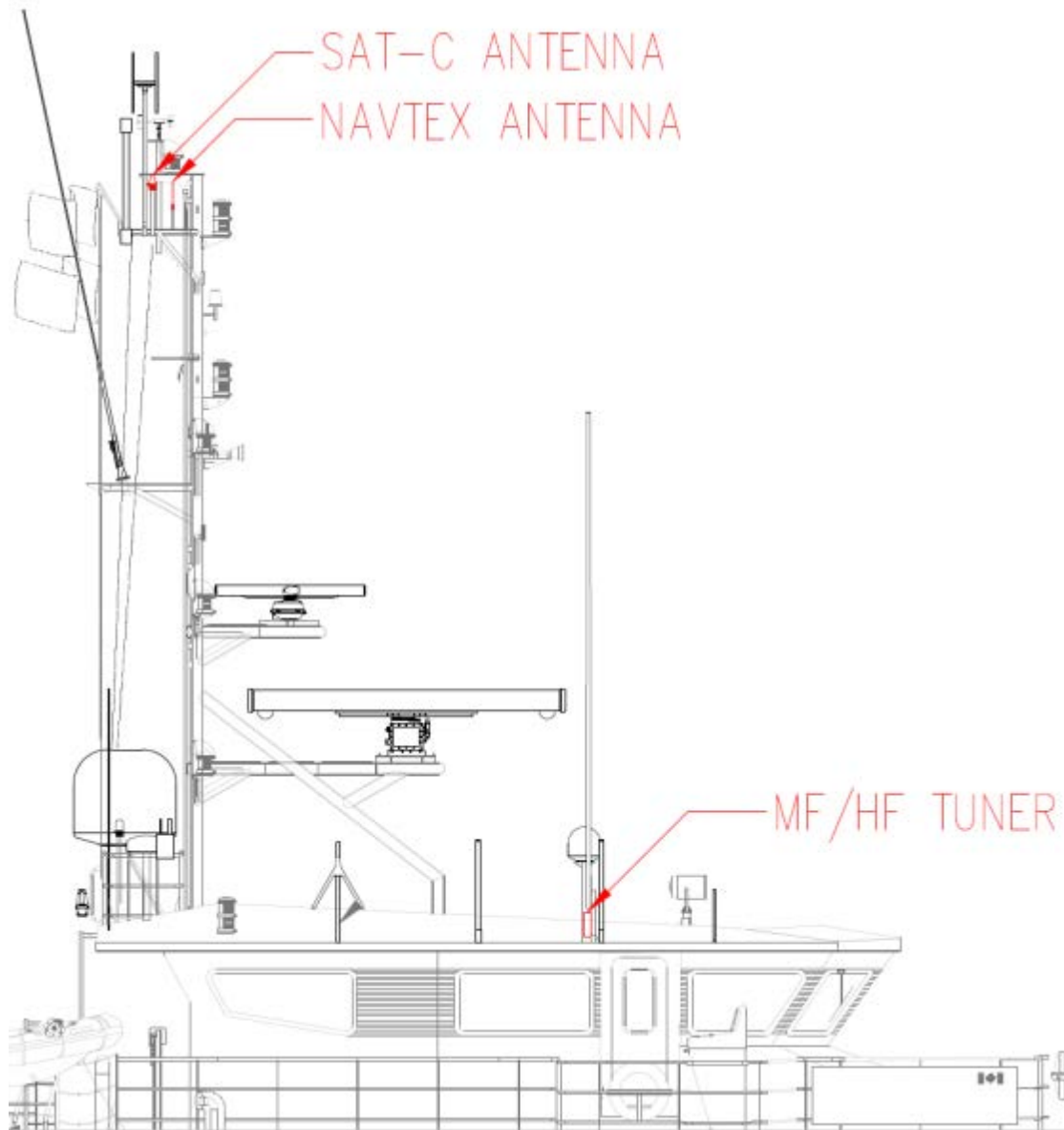
GMDSS AC Junction Box above Deckheads

### **Antenna Equipment:**

MF-HF Antenna Tuner

Inmarsat C Antenna on Main Mast

Navtex Antenna on Main Mast



Drawing #1

***NOTE: Distance from top of wheelhouse to top of Main Mast is approximately 35 feet***

### **Equipment located in the Emergency Switchboard:**

ABB S202-C25 Breaker labeled 3Q25 (E325) used to power old GMDSS Equipment

### **DGPS Distribution:**

RZ 255 (Modified) NMEA Multiplexer on bottom of Chart Table and unused cables that were previously disconnected. See the cable removal list below.



Photo #16 & 17

#### **Cable Removal:**

Remove cables E325, E325-01, E325-02, E325-04, GMD-001, GMD-002, GMD-003, GMD-004, GMD-005-04, GMD-006, GMD-007, GMD-008, GMD-009, GMD-010, GMD-011, GMD-012, GMD-013, GMD-014, GMD-015, GMD-016, GMD-017, GMD-019, GMD-20, GMD-21, GMD-22, GMD-23, GMD-24, GMD-25, GMD-26, GMD-27, GMD-28, GMD-29, GMD-30, GMD-31, NVT-001, NVT-002, SPECIAL CABLE-01, POS-001, POS-002, POS-014, POS-021, POS-25

**NOTE:** Cables GMD-005-01, GMD-005-02, GMD-005-07 and SPECIAL CABLE-02 shall be retained and used as part of new the installation.

**NOTE:** Cables GMD-005-03, GMD-005-06 will be retained if they are in good condition and reach the new 6081 power supply units while following proper cable routing. Otherwise they will be replaced.

#### **T2-8 Equipment Installation**

##### **ANTENNA Installation**

Install new Mini C antenna on Main Mast where Inmarsat C was removed.

Install new Active Navtex antenna on Main Mast where old Navtex antenna was removed.

Install new Sailor 6381 Antenna Tuning Unit on the Wheelhouse Top in the same location that the old MF-HF Tuner was removed. If there is bare metal other than

what is needed to ground the tuner then prime and paint this plate to match existing before installing the Tuner. Use the existing grounding arrangement making sure that the ground connection points are clean.

**See Drawing #1 above for locations.**

### **GMDSS Console Installation**

The provided console may be the 3 Bay version. If so disassemble this console enough to remove the central section that holds radios, and reassemble the console so that it is a 2 Bay GMDSS Console that consists of only the two sections each of which contains a display, printer, connection board, and keyboard. Return any unused equipment and parts to the CCG.

Install the 2 Bay GMDSS Console on desk as near to the same location as the old one as close to the PORT bulkhead as possible while still allowing for existing cables\*. The new console will be about 3 inches wider than the old one. The MF/HF Telex Terminal will be on left side and the Mini C Terminal on right side.

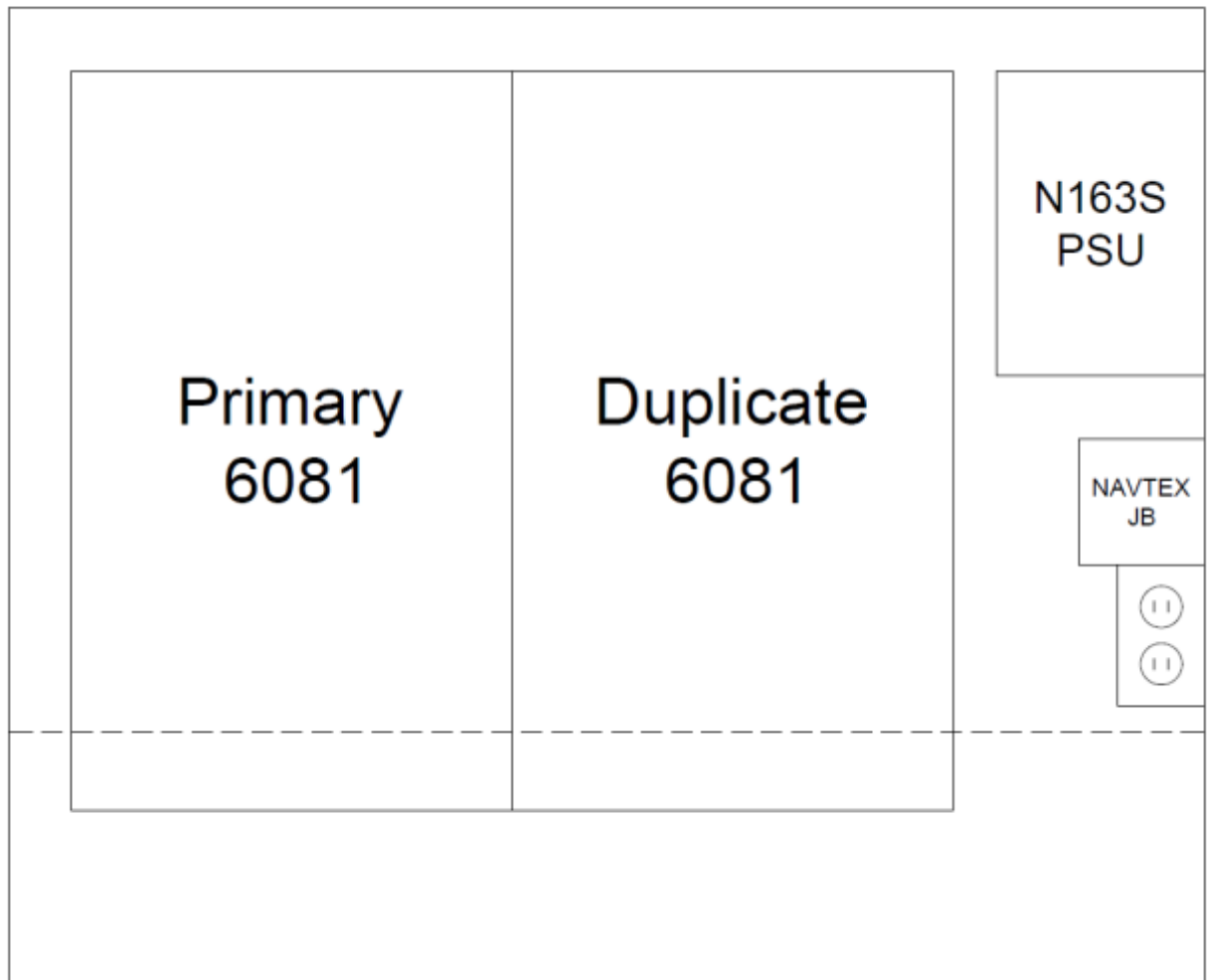
***\*NOTE:*** Watch for clearance of GPS cables that run along the port side of the console below the window.

Install both of the 6081 Power Supplies / Chargers, the N163S Power Supply\*, and the Navtex 24VDC Junction box under the GMDSS Console on the AFT side of the existing aluminum plate\*\*. If the kick plate is removed to allow for better access to this area during the installation re-secure it when work is complete. The exact location of the equipment is to be determined by the on-site technical representative.

***\*NOTE:*** Ensure N163S has been properly tapped for 115V and fuse is the proper 1A fuse recommended for this unit when tapped for 115V. Unit is supplied from factory tapped for 250V.

***\*\*NOTE:*** This is a 3/16 aluminum plate with available space approximately 38" tall by 31" long. Equipment is mounted on both sides. Relocate equipment and replace hardware as necessary and directed by the On-Site CCG Technical Representative to accommodate new and existing equipment.

## UNDER GMDSS DESK (AFT)



### **Drawing #2**

Install the new Navtex Display/Control Unit on the bracket above the GMDSS console where the old Navtex Display/Control Unit was removed from. See photo #12.

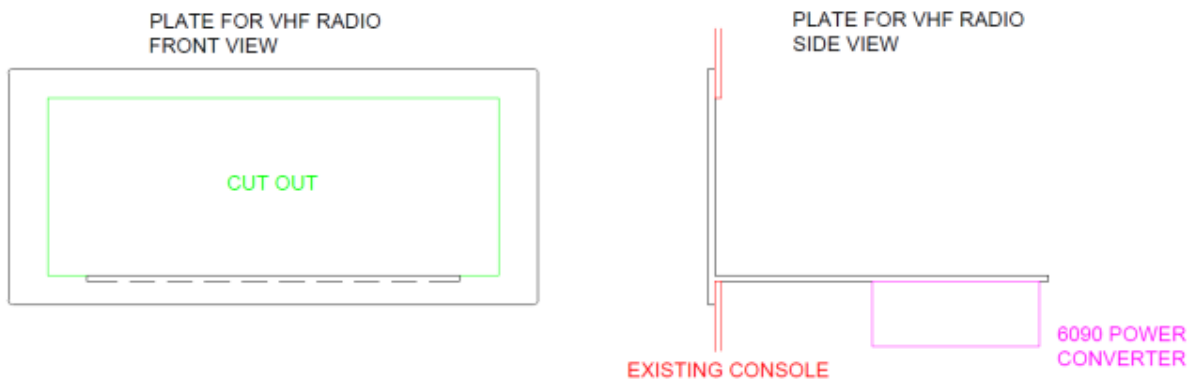
Install the MF/HF control-head c/w Handset, on the windowsill on the PORT side of the console where the aft most SAAB display was removed. Use the factory supplied U-Mounting Bracket and Handset Cradle. A spacer roughly 30mm wide, 250mm long, and 12mm tall will be needed to mount the bracket. The spacer will match existing. See photo #8.

The light and dimmer shall be mounted on the aft side of the console near to the displays in such a way that the goose neck light can be pointed to the keyboards as required. The exact location is to be determined by the on-site technical representative.

## Forward Wheelhouse Console Installation

Install the two Sailor 6222 VHF's c/w Handsets and the Sailor 6301 Alarm Panel in the Forward Console where the previous versions of this equipment were removed from using the CCG provided brackets. Cut the console as needed to fit the new VHF radios (the new radios are 30mm wider than the radios being removed).

**Install the 6090 power converted for each VHF radio on the CCG supplied mounting bracket. Bracket will be similar to that shown in drawing #3.**



## Drawing #3

Install the 6208 junction box above the Jastram Steering Unit, as shown below, with the entrance for cables on the Port side.

***\*NOTE: When wiring 6208 junction box isolate individual unused wires from each other and surrounding metal with heat shrink (12VDC and radio control functions present when radio powered on).***



Photo #18

### **Equipment located in the Emergency Switchboard:**

Install the CCG provided ABB S202-C16 Breaker where the ABB S202-C25 breaker labeled 3Q25 (E325) was removed from. Label to match existing.

### **GPS Distribution Installation**

Install the two CCG provided Actisense Pro-Buf-1 devices and junction box for 24VDC power below the Chart Table Desk where the RZ 255 (Modified) was removed from. Mount the Pro-Buf-1 devices far enough forward that the existing wiring for GPS distribution will reach the ports.

Install the CCG provided ABB Terminal Blocks inside the DGPS Selector Switch Junction Box as shown in the Primary DGPS Drawing C184-027-BD.

### **Grounding**

The existing grounding points shall be re-used where possible:

Ground the following using #6AWG Green wire:

Console Bays

MF/HF Transceiver Unit Sailor TU6363

Ground the following using #10 AWG Green wire:

Sailor 6081 Power Supplies/Chargers

Ground the following using #12AWG Green wire where required:

Sailor 6222 transceiver units

Sailor 6090 Power Converters  
Sailor 6018 Message Terminals  
MF/HF Control Unit CU 6301  
Sailor 6101 Alarm Panel  
Sailor 6004 Navtex Control Panel  
Sailor 6390 Navtex Receiver  
Sailor N163S Power Supply

Any additional equipment being installed or relocated which requires grounding shall be grounded as per the manual and/or as directed by the CCG On-Site Technical Representative.

#### **Ancillary Equipment**

The existing Portable VHF GMDSS Radios will not be replaced.  
Replace the existing SARTs and their mounts with the new equipment supplied.

**T2-9 Cable installation**

Install, label and terminate the following cables (Table 1) as per DWG. C184-001-AL, C184-020-BD, C184-027-BD, C184-028-BD, and C184-033-BD:

Note: ensure cables shields are terminated correctly as per GMDSS Console manual Section 3.1 Electrical Installation where applicable.

**Table 2 Cable List**

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
GMD-1	LMR400FR	TU6363 MF-HF Transceiver TX Connection under GMDSS Desk (forward)	MF-HF Antenna Tuning Unit Wheelhouse Top	15
GMD-2	LMR400FR	TU6363 MF-HF Transceiver RX Connection under GMDSS Desk (forward)	Connection Box for Starboard MF-HF Receive Whip (Ant #18) on Main Mast	60
GMD-3	Factory Cable	Starboard Console Connection Board J40 Terminal	New Sat C Antenna on Main Mast (Ant #16)	60
GMD-4	LMR400FR	Sailor 6390 Navtex Receiver Antenna Port under STARBOARD Command Centre Desk	New Active Navtex Antenna on Main Mast (Ant #31)	60
GMD-6	Cat6 patch cable of appropriate length	TU6363 MF-HF Transceiver LAN Port under GMDSS desk (forward)	MOXA Switch A Port #2 inside GMDSS Console	10
GMD-7	Factory supplied with MF/HF Sailor 6350	MF/HF Sailor TU6363 Transceiver TU-CU BUS Connection under GMDSS Desk (forward)	Console 6000 connection board "A" J35 TU connection inside GMDSS console	10
GMD-8	Cat6 patch cable	Sailor 6101 Alarm Panel in Forward Wheelhouse Console	MOXA Switch C Port #1 inside GMDSS Console	20
GMD-9	10/2 Marine	MF/HF Sailor TU6363 Transceiver	Primary 6081 Power Supply and	10

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
	cable	24VDC Connection under GMDSS Desk (forward)	Charger X15 Connection under GMDSS Desk (aft)	
GMD-10	Belden 9316	Console 6000 connection board "B" J43 connection inside GMDSS console	Duplicate 6081 Power Supply and Charger X15 Connection under GMDSS Desk (aft)	10
GMD-11	Belden 9316	Console 6000 connection board "B" J52 connection inside GMDSS console	Duplicate 6081 Power Supply and Charger X12 Connection under GMDSS Desk (aft)	10
GMD-12	Factory Supplied with Sailor 6101 Alarm panel	Primary 6081 Power Supply and Charger X13 Connection under GMDSS Desk (aft)	Sailor 6101 Alarm Panel in Forward Wheelhouse Console	20
GMD-13	Belden 9316	Console 6000 connection board "A" J52 connection inside GMDSS console	Primary 6081 Power Supply and Charger X12 Connection under GMDSS Desk (aft)	10
GMD-14	Belden 9316	Console 6000 connection board "B" J61 connection inside GMDSS console	Duplicate 6081 Power Supply and Charger X14 Connection under GMDSS Desk (aft)	10
GMD-15	10/2 Marine cable	Sailor 6090 Power Converter #2 in Forward Wheelhouse Console	Primary 6081 Power Supply and Charger X11 Connection under GMDSS Desk (aft)	20
GMD-15-1	Factory Supplied with Sailor 6222 VHF	Sailor 6090 Power Converter #2 in Forward Wheelhouse Console	6222 VHF #2 Power Connection in Forward Wheelhouse Console	5
GMD-16	10/2 Marine cable	Sailor 6090 Power Converter #1 in Forward Wheelhouse Console	Duplicate 6081 Power Supply and Charger X11 Connection under	20

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
			GMDSS Desk (aft)	
GMD-16-1	Factory Supplied with Sailor 6222 VHF	Sailor 6090 Power Converter #1 in Forward Wheelhouse Console	Sailor 6222 VHF #1 Power Connection in Forward Wheelhouse Console	5
GMD-17	Belden 8723	Primary 6081 Power Supply and Charger X8 Connection under GMDSS Desk (aft)	Duplicate 6081 Power Supply and Charger X8 Connection under GMDSS Desk (aft)	5
GMD-18	Standard AC Cord	E329 Outlet Under GMDSS Desk	N163S Power Supply Mains AC Connection Under GMDSS Desk	5
GMD-18-1	Belden 9316	N163S Power Supply 24V Connection under GMDSS Desk	24VDC Junction Box under GMDSS desk	5
GMD-18-2	Factory Supplied with Sailor 6004	24VDC Junction Box located underneath GMDSS desk	Sailor 6004 Navtex Control Panel above GMDSS Console	20
GMD-18-3	Belden 9316	24VDC Junction Box located underneath GMDSS desk	6390 Navtex Receiver underneath Command Centre Desk (Starboard)	30
GMD-19	Cat6 Patch Cable	MOXA Switch A Port #4 inside GMDSS Console	MOXA Switch B Port #4 inside GMDSS Console	5
GMD-20	Cat6 Patch Cable	MOXA Switch B Port #2 inside GMDSS Console	MOXA Switch C Port #2 inside GMDSS Console	5
GMD-21	LMR400FR	6222 VHF #1 DSC Antenna Connection in Forward Wheelhouse Console	Antenna # 47 - Sinclair 225M Antenna on Main Mast – Lower Port	60
GMD-22	LMR400FR	6222 VHF #1Tx/Rx Antenna Connection in Forward Wheelhouse Console	Antenna # 46 - Sinclair 225M Antenna on Main Mast – Upper Port	60

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
GMD-23	LMR400FR	6222 VHF #2 DSC Antenna Connection in Forward Wheelhouse Console	Antenna # 20 - Sinclair 225M Antenna on Main Mast – Upper Starboard	60
GMD-24	LMR400FR	6222 VHF #2Tx/Rx Antenna Connection in Forward Wheelhouse Console	Antenna # 19 - Sinclair 225M Antenna on Main Mast – Lower Starboard	60
GMD-25	Factory Supplied with Message Terminal	Message Terminal for Telex X5 Connection in GMDSS Console	Connection Board “A” J30 Connection inside GMDSS console	5
GMD-26	Factory supplied with MF Control Head	MF-HF Controlhead TU-CU Connection on Windowsill by GMDSS Console	Connection Board “A” J34 TU-CU BUS Connection in GMDSS Console	15
GMD-27	Factory supplied with MF Control Head	MF-HF Controlhead ACC Connection on Windowsill by GMDSS Console	Connection Board “A” J31 ACC Connection in GMDSS console	15
GMD-28	Belden 9316	Connection Board “A” J10 Connection in GMDSS console	Primary 6081 Power Supply and Charger X14 Connection under GMDSS Desk (aft)	10
GMD-29	Cat6 Patch Cable	Message Terminal for Sat C LAN Connection in GMDSS Console	MOXA Switch A Port #5 inside GMDSS Console	5
GMD-30	Cat6 Patch Cable	Primary 6081 Power Supply and Charger X6 Connection under GMDSS Desk (aft)	MOXA Switch B Port #1 inside GMDSS Console	10
GMD-31	Cat6 Patch	Duplicate 6081 Power Supply and	MOXA Switch A Port #3 inside	10

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
	Cable	Charger X6 Connection under GMDSS Desk (aft)	GMDSS Console	
GMD-32	Cat6 Patch Cable	6004 Navtex Control Panel LAN Connection Above Port Window	MOXA Switch C Port #2 inside GMDSS Console	20
GMD-33	Cat6 Patch Cable	6004 Navtex Control Panel LAN Connection Above Port Window	6390 Navtex Receiver underneath Command Centre Desk (Starboard)	30
GMD-34	Cat6 Patch Cable	Sailor 6222 VHF #1 LAN Connection in Forward Wheelhouse Console	MOXA Switch B Port #4 inside GMDSS Console	20
GMD-35	Cat6 Patch Cable	Sailor 6222 VHF #2 LAN Connection in Forward Wheelhouse Console	MOXA Switch C Port #4 inside GMDSS Console	20
GMD-36	9316	MOXA Switch A Power Connection inside GMDSS Console	Connection Board "A" J60 MOXA Power Connection in GMDSS Console	5
GMD-37	9316	MOXA Switch B Power Connection inside GMDSS Console	Connection Board "A" J60 MOXA Power Connection in GMDSS Console	5
GMD-38	9316	MOXA Switch C Power Connection inside GMDSS Console	Primary 6081 Power Supply and Charger X12 Connection under GMDSS Desk (aft)	10
GMD-39	Factory Supplied with Message Terminal	Message Terminal for Telex X4 Connection in GMDSS Console	Connection Board "A" J50 Connection inside GMDSS console	5
GMD-40	Cat6 Patch Cable	MF-HF Controlhead Network Connection on Windowsill by	MOXA Switch B Port #2 inside GMDSS Console	15

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
		GMDSS Console		
GMD-41	Cat6 Patch Cable	Message Terminal for Telex LAN Connection in GMDSS Console	MOXA Switch A Port #1 inside GMDSS Console	5
GMD-42	Factory Supplied with 6208 Connection Box	6208 Connection Box for VHF Radios in Wheelhouse Forward Console	6222 VHF #1 AUX Connection in Forward Wheelhouse Console	10
GMD-43	Factory Supplied with 6208 Connection Box	6208 Connection Box for VHF Radios in Wheelhouse Forward Console	6222 VHF #2 AUX Connection in Forward Wheelhouse Console	10
GMD-44	Factory Supplied with Message Terminal	Message Terminal for Sat C X5 Connection in GMDSS Console	Connection Board "B" J42 Connection inside GMDSS console	5
GMD-45	Factory Supplied with Message Terminal	Message Terminal for Sat C X4 Connection in GMDSS Console	Connection Board "B" J50 Connection inside GMDSS console	5
GMD-46	Factory Supplied with Printer/Console	Printer USB Connection on top of GMDSS Console (PORT)	Message Terminal for Telex USB Connection in GMDSS Console	5
GMD-47	Factory Supplied with Printer/Console	Printer Power Connection on top of GMDSS Console (PORT)	Connection Board "A" J51 connection inside GMDSS console	5

LABEL	TYPE	FROM	TO	Approximate Length (Feet)
GMD-48	Factory Supplied with Printer/Console	Printer USB Connection on top of GMDSS Console (STBD)	Message Terminal for Sat C USB Connection in GMDSS Console	5
GMD-49	Factory Supplied with Printer/Console	Printer Power Connection on top of GMDSS Console (STBD)	Connection Board “B” J51 Connection inside GMDSS console	5
GMD-MF	Belden 9322	Actisense Pro-Buf-1 for Ship’s GPS Distribution under Chart Table	Connection Board “A” J70 Connection inside GMDSS console	15
GMD-VHF	Belden 8723	Actisense Pro-Buf-1 for Ship’s GPS Distribution under Chart Table	6208 Connection Box for VHF Radios in Wheelhouse Forward Console	20
E327	14/3 Marine Cable	Emergency Switchboard Breaker 3Q27	Secondary 6081 Power Supply below GMDSS Desk	40
E325	14/3 Marine Cable	Emergency Switchboard Breaker 3Q25	Primary 6081 Power Supply below GMDSS Desk	40
POS- 41	Belden 9322	J4N for Primary DGPS under GMDSS Console (forward)	GPS Selector Switch Junction Box beside GMDSS Console	10
POS- 41-1	Belden 9322	GPS Selector Switch Junction Box beside GMDSS Console	PRO-BUF-1 for GPS Distribution under Chart Table	15
POS- 42	Belden 9322	J4N for Secondary DGPS under GMDSS Console (forward)	GPS Selector Switch Junction Box beside GMDSS Console	10
POS- 42-1	Belden 9322	GPS Selector Switch Junction Box beside GMDSS Console	PRO-BUF-1 for GPS Distribution under Chart Table	15
POS- 43	Belden 9322	DGPS Distribution PRO-BUF-1 #1 below Chart Table	DGPS Distribution PRO-BUF-1 #2 below Chart Table	5
EM2-25-1	Belden 9316	24VDC Junction Box for GPS	DGPS Distribution PRO-BUF-1 #1	5

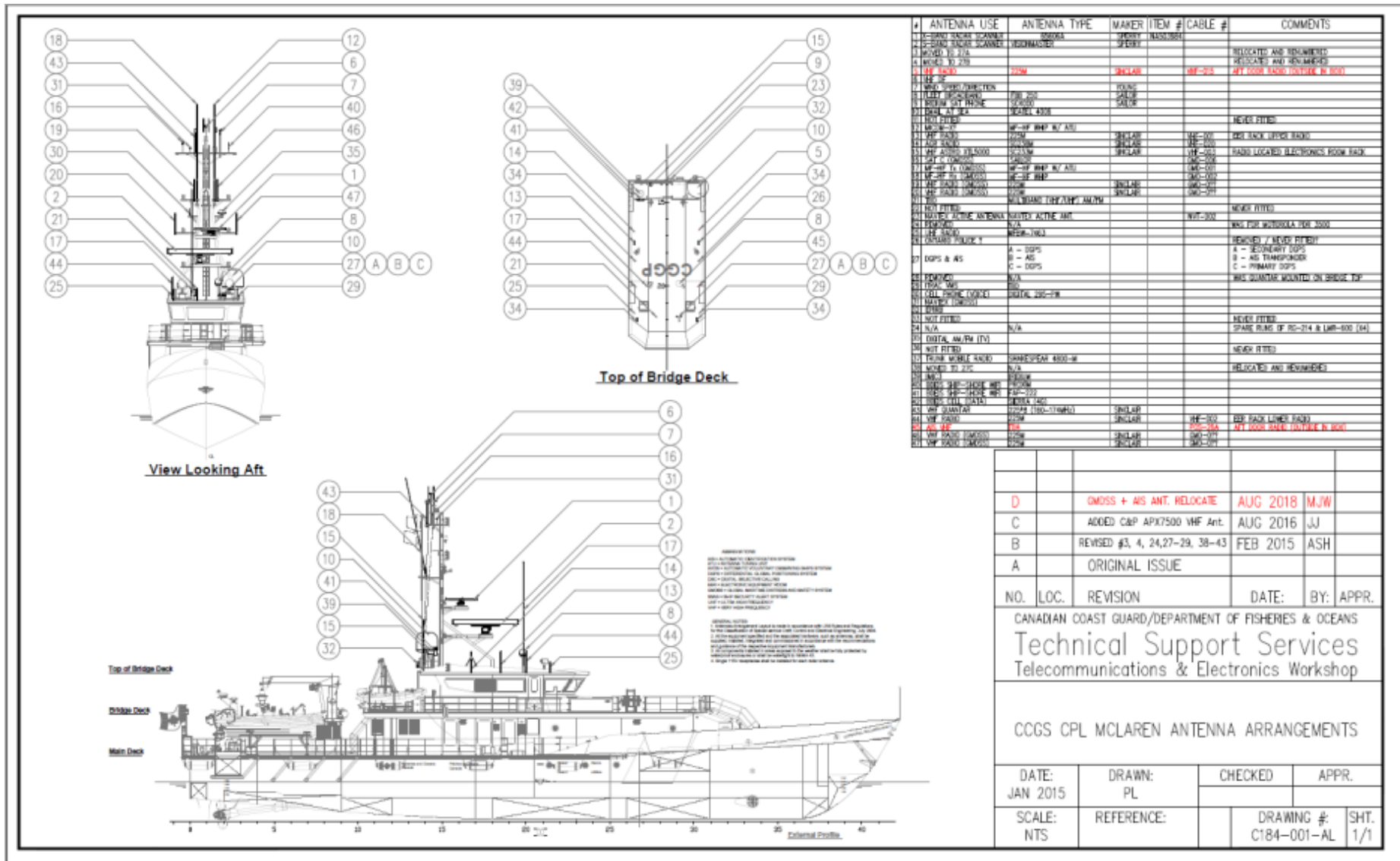
LABEL	TYPE	FROM	TO	Approximate Length (Feet)
		Distribution below Chart Table	below Chart Table	
EM2-25-2	Belden 9316	24VDC Junction Box for GPS Distribution below Chart Table	DGPS Distribution PRO-BUF-1 #2 below Chart Table	5
*GMD-50	6/2 Marine cable	GMDSS DC Junction Box above Galley Deckheads	Primary 6081 Power Supply and Charger X2 Connection under GMDSS Desk (aft)	30
*GMD-51	6/2 Marine cable	GMDSS DC Junction Box above Galley Deckheads	Duplicate 6081 Power Supply and Charger X2 Connection under GMDSS Desk (aft)	30
**E329	14/3 Marine Cable	Emergency Switchboard Breaker 3Q27	Power Outlet Below GMDSS Desk	40
**E2-10	14/3 Marine Cable	Panel E2 Breaker 10	Power Outlet Above GMDSS Desk	20
**L3-6	14/3 Marine Cable	Panel L3 Breaker 6	Power Outlet Above GMDSS Desk	20
**EM2-22	9316	Panel EM2 Breaker 22	JB AIS-01 Under GMDSS Desk	20
**EM2-22-01	9316	JB AIS-01 Under GMDSS Desk	RZ255 NMEA Multiplexer Under GMDSS Desk	10
**EM2-22-02	9316	JB AIS-01 Under GMDSS Desk	RZ255 NMEA Multiplexer Under GMDSS Desk	10

**\*NOTE:** To be installed in the event that existing cable does NOT reach new 6081 Power Supplies / Chargers

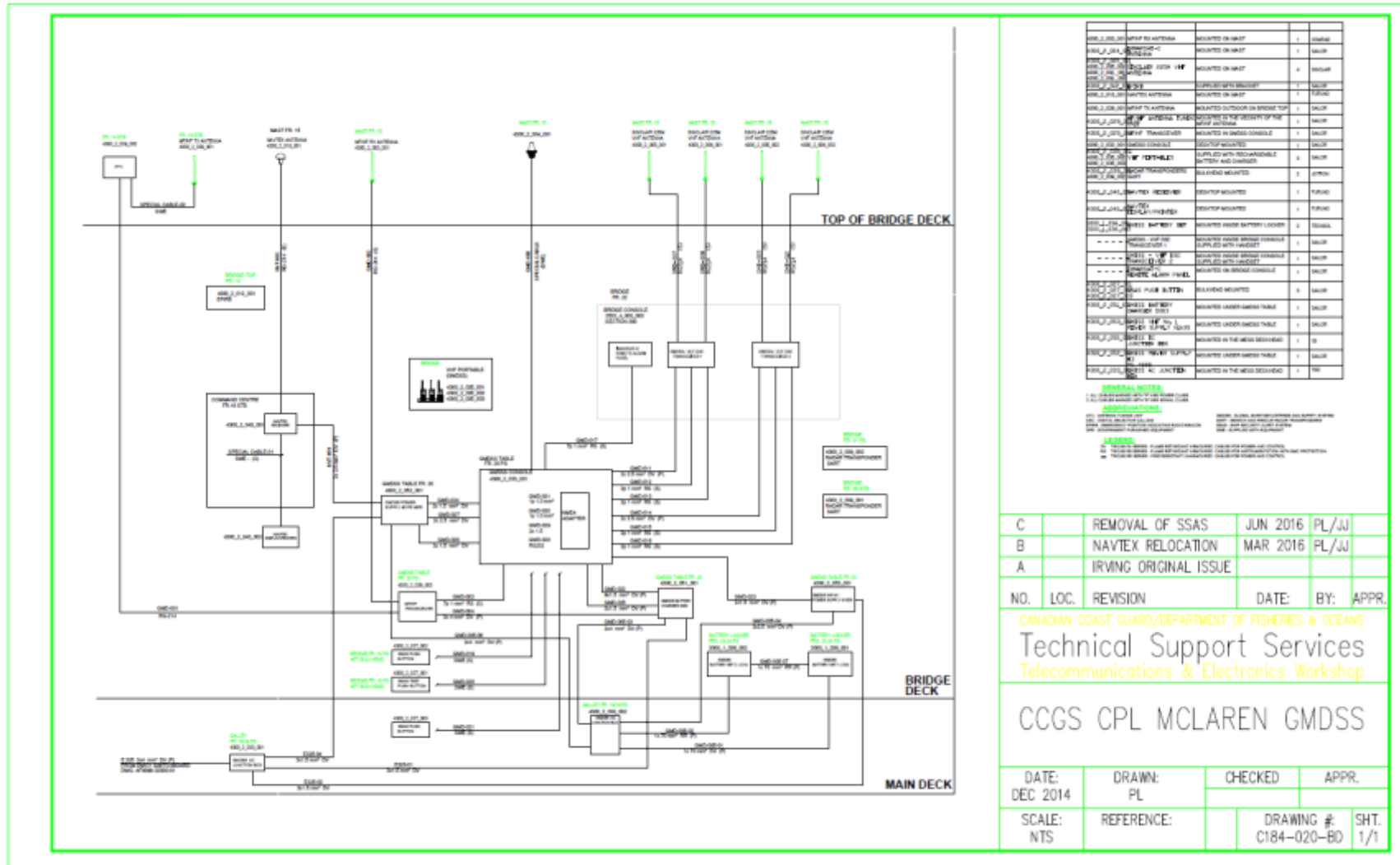
**\*\*NOTE:** To be installed in the event that existing cable does NOT reach relocated power outlet and/or JB

## T2-10 Drawings

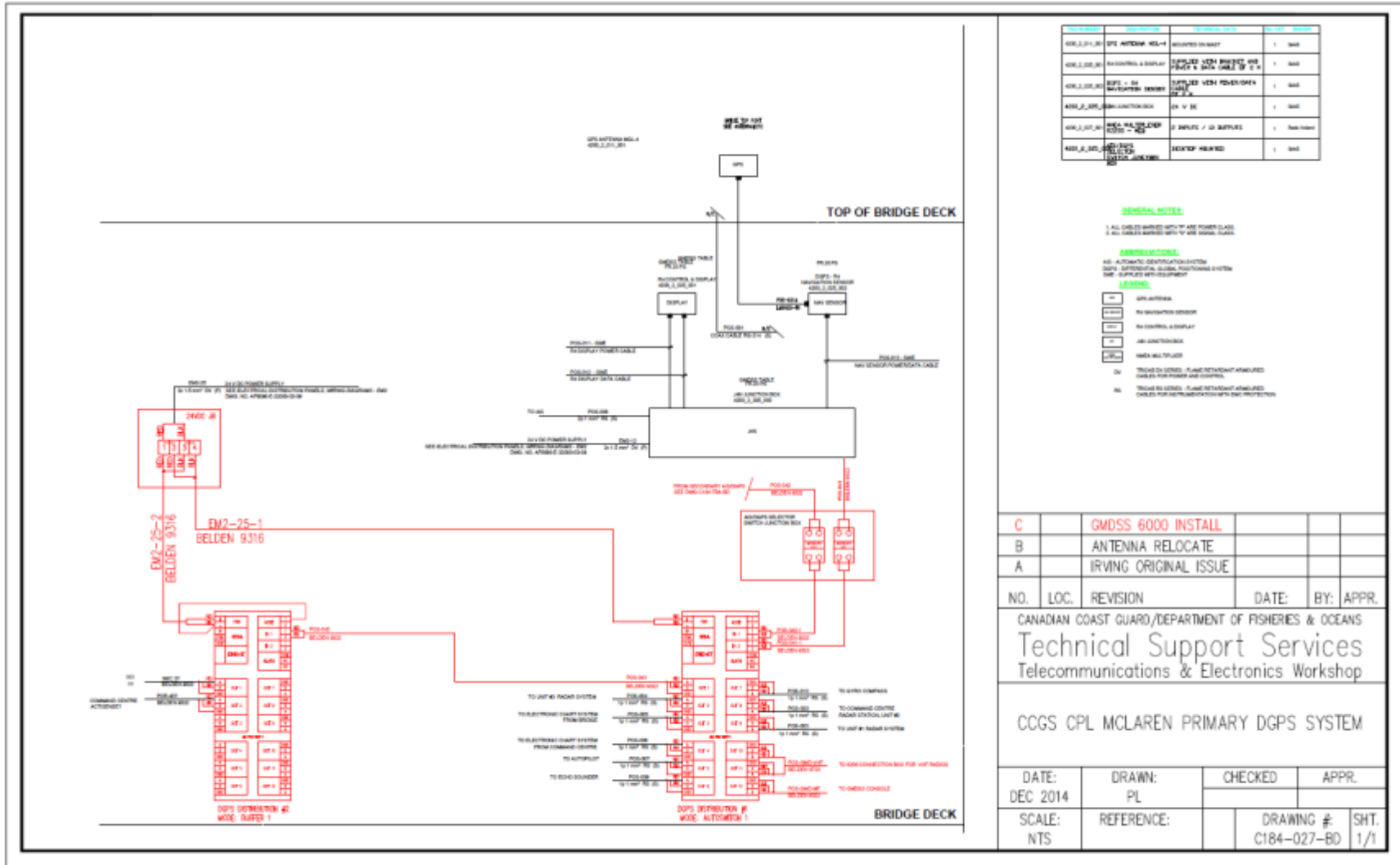
## Dwg. C184-001-AL (Antenna General Arrangement)



Dwg. C184-020-BD (Old GMDSS 5000 System – Being Removed)



Dwg. C184-027-BD (Primary DGPS)



[illegible]

Integrated Technical Services Electronics &amp; Informatics Atlantic



**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

**T2-11 Government Furnished Equipment**

The Sailor GMDSS 6000 System with peripherals:

3 Bay Console

Message Terminal x2

Printer x2

Keyboard x2

Moxa Switch x3

Navtex Control Panel

Navtex Receiver

Navtex Power Supply

VHF Radio x2

Power Converter for VHF Radio x2

MF-HF Radio Control Unit

MF-HF Radio Transceiver

MF-HF Radio Tuner

6081 Power Supply/Charger (Includes one 6080 Power Supply Each) x2

6080 Power Supply x 3

Mini C System

Mini C Antenna

Alarm Panel

6208 Connection Box

Actisense PRO-BUF-1 NMEA Device x2

Bracket for VHF Radio x2

Bracket for Alarm Panel

Bracket for SAAB displays

Junction box for 24VDC x2

Terminal Blocks for DGPS Switch

**All cables will be GSM:**

LMR400FR

Belden 1300SB

Cat 6 Patch Cables

Belden 9316

Belden 8723

Belden 9389

Belden 9322

Marine 14/3

Marine 10/2

Marine 6/2

Green Jacket Gnd Wire #6 AWG

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Green Jacket Gnd Wire #10 AWG  
Green Jacket Gnd Wire #12 AWG

**T2-12 Material to be supplied by Contractor**

Spacers which match existing for mounting equipment to Port Windowsill

All materials required to complete statement of work. All cables are to be properly secured in existing cable trays. In locations where trays do not exist, appropriate trays or hangers are to be installed.

# **CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018**

## **L-01 ANNUAL MEGGAR READINGS**

### **1: SCOPE:**

The intent of this specification item is to complete the annual megger survey for the vessel as per regulatory requirement.

### **2: TECHNICAL DESCRIPTION:**

#### **2.1 General**

1. Contractor shall carry out annual megger testing of all electrical panels and breakers listed in Appendix "D". Contractor shall not megger test circuits with either navigation equipment or electronic components. The generator breakers shall have their electronic components isolated before they are meggered.
2. Megger Testing shall be carried out within the first week of the vessel arriving at Contractors facility to allow sufficient time for repairs to any electrical system.
3. In regards to megger testing, motor circuits shall be tested in a two-step manner. Firstly, circuit is shall be tested between load side of circuit breaker and line side of motor starter; and secondly, between load side of starter and motor.
4. Any low readings or defects shall be brought to the attention of the CGTA as soon as possible. Repairs shall be carried out under PSPC 1379 action.
5. Two typewritten copies and one electronic copy of the final results shall be given to CGTA upon completion.

Note: It is important that CGTA receive the report immediately upon completion of this specification item.

#### **2.2 Location**

2. Throughout the vessel

#### **2.3 Interferences**

3. Contractor is responsible for the identification of any interference items, their temporary removal and storage and reinstallation on the vessel.
4. Contractor is responsible for protecting surrounding area and equipment while carrying out this work

# **CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018**

## **L-01 ANNUAL MEGGAR READINGS**

### **3: REFERENCES:**

#### 3.1 Guidance Drawings/Nameplate data

3. See Appendix "D"

#### 3.2 Standards and Regulations

2. TP127E latest edition.
3. Canada Shipping Act 2001 - Machinery Inspection Regulations

#### 3.3 Allowances

2. N/A

#### 3.4 Owner Furnished Equipment

2. N/A

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

#### 4.1 Inspection

3. Contractor shall ensure the functionality of all equipment disassembled for insulation testing following the completion of the vessels electrical system insulation test and prior to the end of the contract period.

#### 4.2 Testing

2. Testing of the equipment shall be performed in the presence of the CGTA.

#### 4.3 Certification

3. N/A

# **CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018**

## **L-01 ANNUAL MEGGAR READINGS**

### **5: DELIVERABLES:**

#### **5.1 Reports, Drawings and Manuals**

3. The Contractor must provide to the CGTA:
  - Copies of the ship's megger report in electronic format as well as two typewritten copies.
  - Updated reports for any circuits and/or deficiencies corrected with 1379 action.
  - Copies of the survey credit for the inspection and meggering of the vessel's electrical circuits.
4. The Contractor must provide to the RO Surveyor:
  - Copy of the updated Megger Report to obtain Survey Credit.
5. The Contractor must provide to the CGTA;
  - Copy of the updated Megger report within 24 hours of completion of the work and two weeks prior to completion of the refit.

#### **5.2 Spares**

2. N/A

#### **5.3 Training**

2. N/A

**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

**APPENDIX A**

**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## PANEL E-2 DISTRIBUTION PANEL 120 VOLT

MEGGER AT 50 V

CIRCUIT NUMBER	EQUIPMENT
E2-1	SECURITY DEVICE(SCIP)
E2-2	SPARE
E2-3	POWER SUPPLY FOR WIPER CONTROL SYSTEM
E2-4	SPARE
E2-5	ECHO SOUNDER PROCESSOR DISPLAY AND PRINTER
E2-6	SONAR ASSEMBLY
E2-7	SPEED LOG
E2-8	OPEN DECK AREA BRIDGE DECK LIGHTING
E2-9	FAX MACHINE CHART TABLE LIGHTING
E2-10	SOCKET FOR CHARGERS, PORTABLE RADIO TELEPHONE
E2-11	SPARE
E2-12	CHARGER FOR AUTOMATIC VOLUNTARY OBERVATION SHIPS (AVOS)
E2-13	SOCKET 115 VOLT 15 AMP TOP DECK RADAR ANTENNAE
E2-14	STAIR FR. 14 TOP DECK SOCKETS FOR PORTABLE FLOODLIGHTS
E2-15	CHART LAMP, RED LIGHT BRIDGE AND COMMAND CENTRE
E2-16	EMERGENCY LIGHT BRIDGE / COMMAND CENTRE
E2-17	SPARE

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

E2-18	SCANNER CONTROL UNIT ANTENNAE S-BAND
E2-19	SPARE
E2-20	ELECTRIC WHISTLE
E2-21	STBD, CENTRE, AND PORT HEATED FRONT WINDOWS
E2-22	SOCKET FOR DAY SIGNALLING LAMP
E2-23	PORT WING CONSOLE HEATER
E2-24	STBD WING CONSOLE HEATER
E2-25	AIR GROUND VHF TRANSCEIVER
E2-26	CCTV CONTROL STATION / MONITOR BRIDGE
E2-27	SPARE
E2-28	POWER SUPPLY UNIT MF / HF RADIO TELEPHONE
E2-29	FRONT CENTRE WINDOW WIPER CONTROLS (3 PHASE)
E2-30	LOUD HAILER
E2-32	SPARE
E2-33	PORT AND STBD WINDOW WIPER CONTROLS (3 PHASE)
E2-34	PORT, CENTRE, AND STBD HEATED FRONT WINDOWS
E2-35	SOCKET-BRIDGE WING CONSOLES
E2-36	SOCKET-MCR CONSOLE

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## PANEL E-1 EMERGENCY DISTRIBUTION 120 VOLT

MEGGER AT 100V

CIRCUIT NUMBER	EQUIPMENT
E1-01	SOCKET FOR ECHO SOUNDER TRANSCIEVER ARR. IN EER, FRS. 25-26 STBD
E1-02	JUNC. BOX FOR CCTV POWER OVER ETHERNET ADAPTERS ARR. IN EER FRS. 25-26 STBD
E1-03	SOCKET FOR E-MAIL AT SEA EQUIPMENT ARR. IN EER FRS. 23-24 STBD
E104	BRIDGE ELECTRONIC CHART SYSTEM (JB) ARR. IN BRIDGE FR. 22 STBD
E1-05	RADAR "X" BAND ISOLATION SWITCH ARR. ON TOP OF BRIDGE DECK FR. 15 PORT
E1-06	RADAR "S" BAND TRANSCIEVER AND UPS FOR RADAR STATION UNIT #3 COMMAND CENTRE FR. 18
E1-07	SPARE
E1-08	SOCKET FOR CCTV CONTROLLER ARR. IN EER FR. 24 STBD
E1-09	SPARE
E1-10	FIRE DETECTION CONTROL UNIT ARR. IN BRIDGE FRS. 18-19 PORT
E1-11	GYRO COMPASS INTERFACE AND POWER SUPPLY UNIT ARR. IN BRIDGE FRS. 25-26 STBD.
E1-12	SOCKET FOR MCR PRINTER
E1-13	SEARCHLIGHT FRS. 21 PORT TOP OF BRIDGE

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

<b>E1-14</b>	<b>SAT. CONNECTIVITY ADAPTER 4 PORT ARR. IN COMMAND CENTRE, FRS.16-17 PORT, SAT. CONNECTIVITY ADAPTER 8 PORT ARR. IN BRIDGE FRS. 19-20 PORT</b>
<b>E1-15</b>	<b>INDIVIDUAL STARTER FOR EMERGENCY GENERATOR COMPT FAN</b>
<b>E1-16</b>	<b>RECTIFIER FOR BATTERY BACK-UP SYSTEM</b>
<b>E1-17</b>	<b>SPARE</b>
<b>E1-18</b>	<b>SPARE</b>
<b>E1-19</b>	<b>ELECTRONIC CHART SYSTEM (JB) ARR. IN COMMAND CENTRE, FR. 16 STBD</b>
<b>E1-20</b>	<b>ELECTRONIC CHART SYSTEM DISPLAY ARR. IN BRIDGE WING CONSOLE, FR. 22 PORT</b>
<b>E1-21</b>	<b>ELECTRONIC CHART SYSTEM DISPLAY ARR. IN BRIDGE WING CONSOLE, FR. 22 STBD</b>
<b>E1-22</b>	<b>SPARE</b>
<b>E1-23</b>	<b>UPS FOR LAN ARR.IN EER FRS. 23-24 STBD</b>
<b>E1-24</b>	<b>DOUBLE SOCKET FOR CELLULAR PHONE TRANSCIEVER AND AMPLIFIER ARR. IN COMMAND CENTRE FR. 17 PORT</b>
<b>E1-25</b>	<b>SEATEL DOME HEATER</b>
<b>E1-26</b>	<b>SOCKET FOR RADIO COMMUNICATION RACK ARR. IN EER, FR. 24 STBD</b>
<b>E1-27</b>	<b>SOCKET FOR RADIO COMMUNICATION RACK ARR. IN EER, FR. 17-18 STBD</b>
<b>E1-28</b>	<b>REMOTE RADAR STATION UNIT #2 ARR. IN COMMAND CENTRE FR. 16 STBD</b>
<b>E1-29</b>	<b>SPARE</b>
<b>E1-30</b>	<b>HEATER FOR SOUND POWERED TELEPHONE (JB) ARR. IN MESSROOM FR. 21</b>
<b>E1-31</b>	<b>RED FLASHING BEACON FOR GENERAL ALARM SYSTEM ARR. IN BOW THRUSTER ROOM, FR. 34</b>

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

E1-32	FLASHING BEACON FOR AUTOMATIC TELEPHONE (JB) ARR. IN EMERGENCY GENERATOR COMPARTMENT, FR. 15 STBD
E1-33	SHORE CONNECTION BOX FOR AUTOMATIC TELEPHONE ARR. IN HVAC ROOM FR. 32 PORT
E1-34	BATTERY LOCKER HEATER ARR. ON BRIDGE DECK FR.24 CL
E1-35	SPARE
E1-36	SPARE
E1-37	SPEED LOG PRE-AMP
E1-38	SPARE
E1-78	ICIC3 UPS

### EMERGENCY GENERATOR DISTRIBUTION 240 VOLT

MEGGER AT 500V range

CIRCUIT NUMBER	EQUIPMENT
2Q24	ME STBD PRE-LUBRICATING PUMP
2Q25	ME PORT PRE-LUBRICATING PUMP
2Q26	IICS MAIN CABINET (ATS)
2Q27	EMER DG ROOM ACTUATORS
2Q28	COLD ROOM COMPRESSOR # 1
2Q29	COLD ROOM COMPRESSOR # 2
2Q30	S.W. COOLING PUMP
2Q31	SPARE

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

2Q32

SPARE

## EMERGENCY GENERATOR DISTRIBUTION 120 VOLT

MEGGER AT 500V

CIRCUIT NUMBER

EQUIPMENT

3Q01

EMERGENCY DISTRIBUTION PANEL E2

3Q02

EMERGENCY DISTRIBUTION PANEL E1

3Q03

RECTIFIER FOR AUTOMATION UPS B SYSTEM

3Q04

CHARGER EMER. GEN STARTING BATTERY

3Q05

INTERFACE BOX EX-PROFF HORN

3Q06

CCTV CAMERA IR ILLUMINATORS

3Q07

SPARE

3Q08

H2S ALARM SYSTEM

3Q09

SPARE

3Q10

NAVIGATION LIGHTS PANEL - BRIDGE CONSOLE STATION

3Q11

RESCUE BOAT DAVIT HEATERS

3Q12

RECTIFIER FOR AUTOMATION UPS A SYSTEM

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

3Q13	EMERGENCY LIGHTS
3Q14	EMERGENCY LIGHTS
3Q15	SPARE
3Q16	SPARE
3Q17	EMERGENCY LIGHTS
3Q18	SOCKETS FOR PORTABLE (3X) FLD LIGHTS STAIR AFT MN DECK
3Q19	SOCKETS FOR PORT AND STBD RHIB (RECTIFIER 2X)
3Q20	HEATERS EMERGENCY GENERATOR
3Q21	HEATERS PORT AND STBD GENERATORS
3Q22	SPARE
3Q23	SPARE
3Q24	RVHF/FMWIDE BAND ENCRYPTION TRANSCEIVER
3Q25	GMDSS CONSOLE
3Q26	GALLEY FIXED FF BOX
3Q27	SPARE
3Q28	SPARE
3Q29	NOT MARKED
3Q30	SPARE

## EMERGENCY GENERATOR DISTRIBUTION 600 VOLT

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

CIRCUIT NUMBER	EQUIPMENT
2Q01	SPARE
2Q02	ME STBD PREHEATING PUMP
2Q03	SPARE
2Q04	ME PORT PREHEATING PUMP
2Q05	TRAILING LO PUMP GEARBOX STBD
2Q06	SPARE
2Q07	RESCUE BOAT DAVIT ELECTRIC WINCH PUMP HPU
2Q08	SPARE
2Q09	STEERING GEAR STBD PUMP # 2
2Q10	STEERING GEAR PORT PUMP # 2
2Q11	TRAILING LO PUMP GEARBOX PORT
2Q12	EMERGENCY FIRE PUMP
2Q13	SPARE
2Q14	TRANSFORMER "ET2" 10KVA :600/240 V, 3PH, E-SWBD 240V DIST.
2Q15	SPARE
2Q16	AIR STARTING COMPRESSOR #2
2Q17	TRANSFORMER "ET1" 3X10KVA :600/120 V, 3PH, E-SWBD 120V DIST.
2Q18	SPARE

## MOTORS

**Meggered at**

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

500V

**CIRCUIT  
NUMBER**

**EQUIPMENT**

Macerator Pump (Sewage Treatment)

B/W Transfer Pump (Sewage Treatment)

Sludge Pump (Sewage Treatment)

HPU

EXHAUST FAN MOTOR MMR

EXHAUST FAN MOTOR AMR

STBD. TRAILING PUMP GEAR BOX

PORT TRAILING PUMP GEAR BOX

5510-1-118-001 AIRSTART COMP (Compressor 1)

5510-1-117-001 AIRSTART COMP (Compressor 2)

2000-1-014-003 CPP PUMP 2.1

2000-1-014-004 CPP PUMP 2.,2

2000-1-014-005 CPP PUMP 1.1

2000-1-014-006 CPP PUMP 1.2

GRAY WATER TRANSFER STATION

JET VAC COLLECTING UNIT

COALESCING PUMP

CDU1 COMPRESSOR

CDU2 COMPRESSOR

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## STEERING FLAT

STEERING HYDRAULIC UNIT STBD. AUX.

STEERING HYDRAULIC STBD. MAIN

STEERING HYDRAULIC UNIT PORT AUX.

STEERING HYDRAULIC PORT MAIN

EXHAUST FAN AMR

VFD1-SB09FA INLET FAN AMR

VFD1-SB08FA INLET FAN MMR

VFD1-SB09EA INLET FAN MMR

VFD1-SB08GA INLET FAN AMR

5510-1-117 AIR START COMPRESSOR

5510-1-118 AIR START COMPRESSOR

## FORE PEAK

MEGGER AT 500V

CIRCUIT NUMBER

EQUIPMENT

P-414

WATER HEATER ELEMENTS

P-119

INSTANT WATER HEATER ELEMENTS

P-118

A/C UNIT 2 MOTORS

P-101

HOT WATER CIR. PUMP

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

**BSD-40**

**BOWTHRUSTER ROOM FAN**

**E2 12**

**EM FIRE PUMP**

**#1 REVERSE OSMOSIS FILTER MOTORS HP # 1**

**#2 REVERSE OSMOSIS FILTER MOTORS HP #2**

## PANEL P-5 CONVECTION HEATER PANEL 240 VOLT

**MEGGER AT 500V**

**CIRCUIT NUMBER**

**EQUIPMENT**

**P5-1**

**WASHROOMS FR 29 & STEWARDS LOCKER BELOW M.  
DECK CONVECTION HEATERS**

**P5-2**

**CENTRAL STORE ROOM, MCR & MEDICAL SAR LOCKER  
BELOW MAIN DECK CONVECTION HEATERS**

**P5-3**

**WET GEAR STORE ROOM M. DECK CONVECTION HEATERS**

**P5-4**

**H.V.A.C. ROOM M. DECK CONVECTION HEATERS**

**P5-5**

**WASHROOMS FR. 26 STBD, GALLEY, STAIRCASE AND  
WASHROOM FR. 16 STBD M. DECK CONVECTION HEATERS**

**P5-6**

**SPARE**

**P5-7**

**SPARE**

**P5-8**

**SPARE**

## PANEL P-2 BLAST HEATER PANEL 600 VOLT

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

**MEGGER AT 1000V**

**CIRCUIT NUMBER**

**EQUIPMENT**

**P2-1**

**BLAST HEATERS AMR**

**P2-2**

**LINEN / LAUNDRY LOCKER BLAST HEATER**

**P2-3**

**BLAST HEATER STEERING GEAR ROOM PORT**

**P2-4**

**BLAST HEATER STEERING GEAR ROOM STBD**

**P2-5**

**SPARE**

**P2-6**

**SPARE**

## **PANEL P-1 BLAST HEATER PANEL 600 VOLT**

**MEGGER AT 1000V**

**CIRCUIT NUMBER**

**EQUIPMENT**

**P1-1**

**BLAST HEATERS MMR**

**P1-2**

**BLAST HEATERS MMR & EMERGENCY GENERATOR ROOM**

**P1-3**

**BLAST HEATERS BOW THRUSTER ROOM**

**P1-4**

**SPARE**

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

P1-5 SPARE

P1-6 SPARE

## PANEL L-5 (A.C. DISTRIBUTION 120 VOLT )

### MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
L5-1	LIGHTING IN FREEZER,GALLEY DRY FOOD,REFRIGERATOR,WET GEAR,TRASH COMPACTOR,
L5-2	LIGHTING IN ELECTRO. EQUIP. RM. FR.26 STBD, CAPT. CAB,CH. ENG. CABIN, HVAC ROOM, DECK EQUIP LOCKER, FUEL OIL SPILL LOCKER
L5-3	MIRROR AND WALL LAMPS IN ACCOMMODATIONS
L5-4	SOCKET-OPEN M.DK. FR.28 PORT
L5-5	SOCKET-OPEN M.DK. FRS.21 & 12 STBD
L5-6	OPEN MAIN DECK PORT AND STBD LIGHTING
L5-7	SOCKET-OPEN M.DK. FRS.28 STBD
L5-8	SOCKETS-MESS ROOM PORT
L5-9	SOCKET-OPEN M.DK. FR.33 PORT AND STBD
L5-10	LINEN/LAUNDRY LOCKER, MCR, 2ND ENG CABIN AND 2P CABINS BELOW M.DK.
L5-11	FR.29 STBD LOCKER, STEWARD LOCKER, FR.29 PORT AND BOW THRUSTER BELOW MAIN DECK
L5-12	SOCKETS-MESS ROOM FWD BULKHEAD STBD
L5-13	BED LAMPS BELOW M.DK. AND MAIN DECK

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

L5-14	SOCKET-LAUNDRY AND PASSAGEWAY BELOW MAIN DECK
L5-15	SOCKETS-MCR BELOW MAIN DECK
L5-16	SOCKETS-2ND ENG AND 2P CABINS BELOW MAIN DECK
L5-17	SOCKETS 1P & 2P CABINS BELOW MAIN DECK
L5-18	SOCKETS-EER AND CAPT. CABIN MAIN DECK
L5-19	SOCKETS-INCIDENT COMM. AND CHIEF ENG. CABINS MAIN DECK
L5-20	SOCKETS 2P CABINS PORT AND 2P CABIN STBD BELOW MAIN DECK
L5-21	SOCKET FOR WORKBENCH , EM'CY DG ROOM MAIN DECK
L5-22	SOCKETS 2P CABIN PORT AND 2P CABIN STBD BELOW MAIN DECK
L5-23	SPARE
L5-24	SOCKET-OPEN M.DK. FRS. 10-11 STBD
L5-25	SOCKET-OPEN M.DK FRS. 21 & 12 PORT
L5-26	SPARE

## PANEL L-4 (MESSROOM PANEL 120 VOLT A.C.)

MEGGER AT 250 V

CIRCUIT NUMBER	EQUIPMENT
L4-1	SOCKET FOR REFRIGERATOR-GALLEY

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

L4-2	SOCKET FOR FOOD PROCESSOR-GALLEY
L4-3	SOCKET FOR DEEP FRYER-GALLEY
L4-4	SOCKET FOR REFRIGERATOR-MESSROOM
L4-5	SOCKET FOR MICROWAVE OVEN-MESSROOM
L4-6	SOCKET FOR TOASTER-MESSROOM
L4-7	SPARE
L4-8	SPARE
L4-9	SOCKET FOR REFRIGERATORS (CAPT. AND CH. ENG.)
L4-10	SOCKET FOR COFFEE MAKER-MESSROOM
L4-11	SOCKET FOR SOUP WARMER-MESSROOM
L4-12	SOCKET FOR MIXER-GALLEY

### PANEL L-3 (120 VOLT)

**MEGGER AT 50 V**

**CIRCUIT NUMBER**

**EQUIPMENT**

L3-01	SOCKET TOP DECK FWD-PORT
-------	--------------------------

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

L3-02	SOCKET TOP DECK FWD-STBD
L3-03	SOCKET TOP DECK AFT-PORT
L3-04	SOCKET TOP DECK AFT-STBD
L3-05	NORMAL LIGHTING-COMMAND CENTRE
L3-06	SOCKETS FROM BRIDGE( CHART TABLE,GMDSS AND CELL PHONE CHARGER)
L3-07	SOCKETS FROM COMMAND CENTRE (INCIDENT COMMANDER AND STBD TABLE)
L3-08	SOCKETS FROM BRIDGE AND COMMAND CENTRE
L3-09	SPARE
L3-10	SEARCH LIGHT-STBD
L3-11	FLOODLIGHT BRIDGE DECK PORT (AFT AREA)
L3-12	FLOODLIGHT BRIDGE DECK STBD (AFT AREA)
L3-13	SOCKET RADAR ANTENNA TOP DECK PORT
L3-14	NORMAL LIGHTING-BRIDGE
L3-15	FIRE DETECTION CONTROL UNIT
L3-16	SOCKET FOR FR. 21 PORT AND STBD BRIDGE
L3-17	POWER SUPPLY-SATELLITE ANTENNA CONTROL UNIT
L3-18	SPARE
L3-19	SOCKET FOR FLOODLIGHT FR. 31 BRIDGE DECK
L3-20	SOCKET FOR FLOODLIGHT FR. 09 MAIN DECK PORT AND STBD
L3-21	SPARE
L3-22	SPARE

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## L2 PP TOGGLE SWITCH

Circuit Number	Equipment
L2-12-01	WET GEAR FAN
L2-12-02	SPARE
L2-12-11-09-03	WASHROOM MAIN DECK FORWARD FAN
L2-12-04	WASHROOM BELOW MAIN DECK FR. 26 PORT AND STBD. FANS
L2-12-05	WASHROOM MAIN DECK FR. 16 STBD FAN
L2-12-06	LAUNDRY FAN
L2-12-07	HVAC ROOM FAN
L2-12-08	FUEL OIL SPILL LOCKER FAN
L2-12-10	STAIR CASE FAN MAIN DECK FR. 18
L2-12-12	MEDICAL EQ AND SAR LOCKER FAN
L2-12-13	GALLEY HOOD FAN

## PANEL L-2 (HEATING AND GALLEY 240 VOLT A.C.)

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
L2-1	Galley Mini Split
L2-2	SPARE
L2-3	SPARE
L2-4	SPARE
L2-5	STAIR CASE DUCT HEATER
L2-6	MESS ROOM AND GALLEY DUCT HEATER
L2-7	BRIDGE DUCT HEATER
L2-8	COMMAND CENTRE DUCT HEATER
L2-9	SUPPLY BOX / HEATERS (4 COMPARTMENTS)
L2-10	SUPPLY BOX / HEATERS (7 COMPARTMENTS)
L2-11	SPARE
L2-12	FANS DISTRIBUTION

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## PANEL L-1 (120 VOLT A.C.)

**MEGGER AT 250V**

<b>CIRCUIT NUMBER</b>	<b>EQUIPMENT</b>
Q-20	BATTERY CHARGER (BATTERY BACK UP SYSTEM)
Q-21	BATTERY CHARGER (AUTOMATION UPS A)
Q-22	SOCKET AFT WORKING AREA (MAIN DECK FRAME 0)
Q-23	LIGHT STAIR BELOW MAIN DECK AND MAIN DECK
Q-24	SOCKETS STEERING GEAR , AMR, MMR, FORE
Q-25	LIGHTS STEERING GEAR, 1/2 AMR, 1/2 MMR
Q-26	LIGHTS STEERING GEAR, 1/2 AMR, 1/2 MMR
Q-27	NAVIGATION LIGHTS PANEL (BRIDGE CONSOLE)
Q-28	BATTERY CHARGER (AUTOMATION UPS-B)
Q-29	L-3 DISTRIBUTION PANEL 120 VOLT
Q-30	L-4 DISTRIBUTION PANEL 120 VOLT(GALLEY AND MESS EQUIPMENT)
Q-31	BRIDGE AFT HEATED WINDOWS
Q-32	SPARE
Q-33	L-5 DISTRIBUTION PANEL 120 VOLT
Q-34	SPARE
Q-35	ACTUATOR FOR CYCLONE FILTER (PURGING VALVE CONTROL PANEL)
Q-36	SPARE
Q-37	BRIDGE AFT HEATED WINDOWS

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## PANEL L-1 (240 VOLT BUSS A)

CIRCUIT NUMBER	EQUIPMENT
Q02	L2 DISTRIBUTION PANEL
Q03	SOCKET AFT WORKING AREA-PORT FR. 8-9
Q04	SOCKET AFT WORKING AREA-STBD FR. 8-9
Q05	SOCKET FORE WORKING AREA STBD FR. 10 MAIN DECK
Q06	SOCKET AFT MMR
Q07	SOCKET FORE MMR
Q08	BOW THRUSTER ROOM FAN
Q09	UV STERILIZER
Q10	IICS MAIN CABINET
Q11	SEWAGE TREATMENT PLANT
Q12	SOCKET GALLEY
Q13	ENGINEERS SHOP FAN
Q14	EXHAUST FAN AMR
Q15	EXHAUST FAN MMR
Q16	GRAY WATER TRANSFER PUMP
Q17	SCIENTIC FREEZER
Q18	DISHWASHER

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## DISTRIBUTION BOARD BUSS "B"

Q40	DISTRIBUTION BOARD BUSS"C"
-----	----------------------------

Q51	PORT CONVECTION HEATER DISTRIBUTION PANEL
-----	---

## DISTRIBUTION BOARD BUSS "C"

Q41	COOKING RANGE
-----	---------------

Q42	WASHING / DRYING MACHINE # 1
-----	------------------------------

Q43	WASHING / DRYING MACHINE # 2
-----	------------------------------

Q44	SPARE
-----	-------

Q45	DISHWASHER
-----	------------

Q46	FOOD WASTE DISPOSER
-----	---------------------

Q47	SCIENTIST FREEZER
-----	-------------------

Q48	SPARE
-----	-------

Q49	FW HYDROPHORE PUMP #1
-----	-----------------------

Q50	FW HYDROPHORE PUMP #2
-----	-----------------------

Q52	SPARE
-----	-------

Q53	SPARE
-----	-------

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## TRANSFORMERS

MEGGER AT 500 V

CIRCUIT NUMBER

EQUIPMENT

600/240V PRIMARY

PORT  
STBD.

600/240V SECONDARY

PORT  
STBD.

600/120V PRIMARY

PORT  
STBD.

600/120V SECONDARY

PORT  
STBD.

SHORE POWER TRANSFORMERS

PRIMARY  
SECONDARY

**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

**GENERATORS**

**MEGGER AT 500 V**

**EQUIPMENT**

---

**PORT GENERATOR # 2**

**CABLE TO SWBD**

**STBD GENERATOR # 1**

**CABLE TO SWBD**

**EM GENERATOR**

**600V BUSS**

**#1 Generator S/N: WA-576975-0111**

**#2 Generator S/N: WA-576977-0111**

**Emergency Generator S/N: MX-154850-0111**

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## LOCKOUT/TAGOUT PROCEDURE FOR GENERATORS:

1. Lockout Generator Circuit Breaker at Switchboard.
2. Inhibit Generator start at Local Control Panel.
3. Isolate Air Start and bleed off line to Air Starter for Main Generators/ Disconnect Battery for Emergency Generator.
4. Isolate Meg Alert System for respective Generators -
  - a. Emergency Generator open fuse FU03SB11CA in Section 1 Emergency Swbd.
  - b. Port (2) Main Generator open fuse FU09SB05AB Section 3 Main Swbd.
  - c. Stbd (1) Main Generator open fuse FU04SB05AB Section 3 Main Swbd.

## 600 VOLT DISTRIBUTION PANEL STBD.

CIRCUIT NUMBER	EQUIPMENT
1Q01	HOT WATER CIRCULATION PUMP #1 (B.T. ROOM)
1Q02	SPARE
1Q04	CPP STBD PRESS. MAINTAINING PUMP
1Q11	CPP STBD MAIN PUMP
1Q13	REVERSE OSMOSIS SYSTEM (B.T. ROOM)
1Q14	P-1 BLAST HEATER DISTRIBUTION PANEL
1Q15	SPARE
1Q17	SPARE
1Q18	CONDENSION UNIT HVAC CONTROL PANEL
1Q19	INLINE HEATER (ON DEMAND HOT WATER HEATER)

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

1Q20	SPARE
1Q21	HUMIDIFIER
1Q24	SPARE
1Q25	SPARE
1Q26	SPARE
1Q06	SPARE
1Q10	STEERING GEAR STBD PUMP # 1

## 600V 3 PHASE PORT DISTRIBUTION PANEL

MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
4Q02	CPP PORT MAIN PUMP
4Q03	SPARE
4Q06	VACUUM SYSTEM UNIT (240 VOLT)
4Q07	COALESCER FILTER CONTROL PANEL
4Q10	SPARE
4Q12	REVERSE OSMOSIS SYSTEM (B.T. ROOM)
4Q13	SPARE
4Q14	AIR COMPRESSOR # 1 AMR
4Q15	HOT WATER HEATER (B.T. ROOM)

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

4Q17	P2 BLAST HEATER DISTRIBUTION PANEL
4Q18	SPARE
4Q19	TRANSFORMER "T3" 30 KVA, 600/240V, 3PH, L1 DIST. SWBD BUSS-B
4Q20	DECK MACH. SYST. (INT HYDR, SYST.)
4Q21	AHU CONTROL PANEL DUCT. PANEL HEATER HVAC
4Q22	CPP PORT PRESSURE MAINTAINING PUMP
4Q26	SPARE
4Q08	STEERING PUMP PORT # 1
4Q09	SPARE

### MCC-STBD

### MEGGER AT 500V

CIRCUIT NUMBER	EQUIPMENT
1-A	SW SERVICE COOLING PUMP #1
1-B	F/O TRANSFER PUMP
1-C	DIRTY OIL TRANSFER PUMP
1-D	FRESH WATER TANK #11 IMMERSION HEATER
1-E	FIRE/BILGE PUMP AMR SELF PRIMING
1-F	INLET FAN MMR
1-G	INLET FAN AMR
1-H	SW PUMP CONDENSING UNIT
1-J	SPARE

**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

**MCC-PORT**

**MEGGER AT 500V**

<b>CIRCUIT NUMBER</b>	<b>EQUIPMENT</b>
2-A	FO CONTINOUS TRANSFER PUMP
2-B	SW SERVICE COOLING PUMP #2
2-C	L.O. TRANSFER PUMP
2-D	BILGE/FIRE PUMP MMR SELF PRIMING
2-E	INLET FAN MMR
2-F	INLET FAN AMR
2-G	FRESH WATER TANK #12 IMMERSION HEATER
2-H	SPARE
2-J	SPARE

**SECTION 3 SWBD**

**MEGGER AT 500 V**

<b>CIRCUIT NUMBER</b>	<b>EQUIPMENT</b>
3Q02	TRANSFORMER TI 3 X10KVA 600/240 3PH L1 DISTRIBUTION SWBD BUSS A

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

3Q03	CB-E TIE TO EM SWBD
------	---------------------

3Q04	TRANSFORMER T2 3X15KVA 600/120V 3 PH L1 DISTRIBUTION SWBD
------	--

	CB-TIE TIES PORT AND STRB SWBD
--	--------------------------------

### **SECTION 2 SWBD**

2Q04	TRANSFORMER T1 3X10 KVA 600/240V 3 PH L1 DISTRIBUTION SWBD BUSS A
------	--

2Q05	CB-E TIE TO EM SWBD
------	---------------------

2Q06	TRANSFORMER T2 3X15KVA 600/120V 3 PH L1 DISTRIBUTION SWBD
------	--

CB-SP-A	SHORE POWER A 600V AC 60 HZ 3 PH 200AMP
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CB-SP-B	SHORE POWER B 600V AC 60 HZ 3 PH 200 AMP
---------	--

**NOTE:** When taking Swbd Reading Ground Detection cables must be unplugged in Section 1 and 4 of Swbd and Ground Lead for Earth Detection Relay(IM01-SB05AB) must be disconnected in Section 3

## **APPENDIX B**

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

## Daily or Every 10 Hours

No	Description	Ref
1	Inspect all fasteners, checking for loose or corroded fasteners. Re-Torque as necessary.	Paragraph 6.3.2.1
2	Inspect hydraulic hoses, tubes, fittings, and connections, checking for damage or leaks.	Paragraph 6.3.2.2
3	Inspect winch drum, checking for mis-spoiled wire rope (bird-nesting or trapped loops).	Paragraph 6.3.2.3
4	Check for any defects or dangerous conditions.	

## Weekly or Every 50 Hours

No	Description	Ref
1	Repeat daily checks.	
2	Wash with fresh water.	
3	Cycle all crane functions.	Paragraph 6.3.3.1
4	Visually inspect the relief valve/breather on the top of the gear reducer on the CT winch. Check for proper operation, and ensure there is no physical damage and that it is not painted over.	

## Monthly or Every 200 Hours

No	Description	Ref
1	Repeat weekly checks.	
2	Wash with fresh water and detergent. Rinse with fresh water	
3	Lubricate the crane.	Paragraph 6.3.4.1
4	Inspect crane structure and associated components for cracks, corrosion and physical damage. Prepare and paint chipped or damaged surfaces. Apply a thin coat of silicone compound to bare metal surfaces. Return crane to readiness condition.	
5	Check security of electric cable connections.	
6	Inspect and lubricate the wire rope.	Paragraph 6.3.4.2
7	Check fluid level in the swing drive gear reducer	Paragraph 6.3.4.3
8	Test dynamometer functionality	Paragraph 6.3.4.4

# CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

Table 6-2. Service Intervals

6 - 2

## CCGS C MCLAREN MMV DRYDOCKING & REFIT 2018

### Every 5 Years or As Required

No	Description	Ref
1	Repeat annual checks.	
2	Replace all hydraulic hoses.	Paragraph 6.3.7.1

### Every 3 Months or Every 500 Hours

No	Description	Ref
1	Repeat monthly checks.	
2	Re-Torque Crucial Fasteners	Paragraph 6.3.5.1

### Every 6 Months or Every 1000 Hours

No	Description	Ref
1	Repeat every 3 months checks.	

### Annually or Every 2000 Hours

No	Description	Ref
1	Repeat every 6 months checks.	
2	Check swing bearing wear.	Paragraph 6.3.6.1
3	Inspect sheaves.	Paragraph 6.3.6.2
4	Change fluid in the swing drive gear reducer.	Paragraph 6.3.6.3
5	Change fluid in the CT winch.	Paragraph 6.3.6.4
6	Obtain hydraulic oil sample for analysis.	Paragraph 6.3.6.5

## **APPENDIX C**

**CCGS C MCLAREN MMV  
DRYDOCKING & REFIT 2018**

# **On-board Maintenance PLAN FOR HERO CLASS VESSELS**



## **MID SHORE PATROL VESSEL**

**Project Areas:** Superstructure  
Interior Bulwarks  
Topsides Hull  
Exterior Decks

## Vessel Details

General Information			
Vessel Name	Hero Class Patrol Vessels		
Year Delivered	2012		
Vessel Type	Patrol Vessel		
Port of Registry	Canada	Flag	Canada

Vessel Dimensions (Metres)		Surface Areas (Sq. Metres)	
Hull LOA	42.8	Vertical Sides	
Hull Width	7.11	Superstructure	N/A
Hull Depth	2.85	Weather Decks	N/A

General Comments
<p><b>This report is written to aid in the on board maintenance of the vessel by the crew.</b></p> <p><b>Proper planning is key, to receive the benefits of the coatings. A few steps to remember when completing on board maintenance are:</b></p> <ol style="list-style-type: none"> <li>1) Decide where you are going to work</li> <li>2) Clean the area. Scrape away any loose coatings and or rust then wash the area with a lot of fresh water. If there is grease or oil you may need to use a degreaser. A biodegradable degreaser, then rinse with a lot of fresh water. Most degreasers are very potent and require a high mixing ratio with water. International 950 cleaner is a 20:1 mix with water.</li> <li>3) Once the area is dry clean the corroded area to bare metal with hand or power tools.</li> <li>4) Feather back at least 5-10 mm to ensure a tight edge for the new coatings to adhere to</li> <li>5) When applying the coatings with a brush and roller you may have to apply multiple coats to ensure the proper mil thickness is achieved</li> </ol> <p><b>**Standards referenced are SSPC –SP-1 Cleaning, SSPC-SP2 &amp; SSPC-SP3 Hand and Power tool cleaning, and SSPC-SP 11 power tool cleaning to bare metal with a 1.25 mil profile.**</b></p>

## Project Specification

<b>Interspec #</b>	CM700436	<b>Issued:</b>	Apr, 14 2010
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### Specification Details

**Note: DFT – Dry Film Thickness in microns (25 microns = 1 mil)**

**Extent - % Surface Area in process (SC = Stripe Coat, TU = Touchup, FC = Full Coat)**

**Clean up is the solvent that should be used to clean equipment used with that product**

Location Topsides Hull					Sq. Metres:	146
<b>Preparation:</b>	Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges					
#	Product	Colour	DFT	Extent	Clean Up	
1	Intersheid 300	Bronze	5	T/U	GTA415	
2	Intergard 263	Light Grey	4	T/U	GTA415	
3	Interthane 990 Coast Guard Red	RAL 3000	2	T/U	GTA056	
4						
5						
<b>Total Build:</b>			11			

Location Topsides Hull White Markings					Sq. Metres:	10
<b>Preparation:</b>	Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges					
#	Product	Colour	DFT	Extent	Clean Up	
1	Intersheid 300	Bronze	5	T/U	GTA415	
2	Intergard 263	Light Grey	4	T/U	GTA415	
3	Interthane 990 White	RAL 9003	2	T/U	GTA056	
4						
5						
<b>Total Build:</b>			11			

Location Bollards, Fairleads, & Capstan Drums					Sq. Metres:	50
<b>Preparation:</b>	Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges					
#	Product	Colour	DFT	Extent	Clean Up	
1	Interprime 198	Red	3	T/U	GTA004	
2	Interprime 198	Grey	3	T/U	GTA004	
3	Interlac 665 Black Semi-Gloss	CLA164	2	T/U	GTA004	
4						
5						
<b>Total Build:</b>			8			

Location Interior Fwd Bullwark					Sq. Metres:	50
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges				
#	Product	Colour	DFT	Extent	Clean Up	
1	Interprime 198	Red	3	T/U	GTA004	
2	Interprime 198	Grey	3	T/U	GTA004	
3	Interlac 665 Black Semi-Gloss	CLA164	2	T/U	GTA004	
4						
5						
<b>Total Build:</b>			8			

Location Capstan Machinery					Sq. Metres:	135
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges				
#	Product	Colour	DFT	Extent	Clean Up	
1	Interprime 198	Red	3	T/U	GTA004	
2	Interprime 198	Grey	2	T/U	GTA004	
3	Interlac 665 RAL 7040 Buff	CLA165	2	T/U	GTA004	
4						
5						
<b>Total Build:</b>			5			

Location Hand rails main deck & Bridge deck and all life rails for stairs					Sq. Metres:	50
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges				
#	Product	Colour	DFT	Extent	Clean Up	
1	Interprime 198	Red	3	T/U	GTA004	
2	Interprime 198	Grey	3	T/U	GTA004	
3	Interlac 665 Black Semi-Gloss	CLA164	2	T/U	GTA004	
4						
5						
<b>Total Build:</b>			8			

Location Main Deck and Bridge Deck					Sq. Metres:	265
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges				
#	Product	Colour	DFT	Extent	Clean Up	
1	Intersheild 300	Bronze	5	T/U	GTA415	
2	Intersheild 300	Aluminum	5	T/U	GTA415	
3	Interbond 201	Storm Grey	5	T/U	GTA415	
4						
5						
<b>Total Build:</b>			15			

Location Calibre Mounts on Bridge Deck				Sq. Metres:	50
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean up
1	Interprime 198	Red	3	T/U	GTA004
2	Interprime 198	Grey	3	T/U	GTA004
3	Interlac 665 RAL 7040 Buff	CLA165	2	T/U	GTA004
4					
5					
<b>Total Build:</b>			8		

Location Top of Bridge Pilot House				Sq. Metres:	135
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean Up
1	Interprime 198	Red	3	T/U	GTA004
2	Interprime 198	Grey	3	T/U	GTA004
3	Interlac 665 White	RAL 9003	2	T/U	GTA004
4					
5					
<b>Total Build:</b>			8		

Location Superstructure (Aluminium)				Sq. Metres:	135
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean Up
1	Interprime 198	Red	3	T/U	GTA004
2	Interprime 198	Grey	3	T/U	GTA004
3	Interlac 665 White	RAL 9003	2	T/U	GTA004
4					
5					
<b>Total Build:</b>			8		

Location Superstructure outside, Mast & Slewing Davit				Sq. Metres:	135
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean up
1	Interprime 198	Red	3	T/U	GTA004
2	Interprime 198	Grey	3	T/U	GTA004
3	Interlac 665 RAL 7040 Buff	CLA165	2	T/U	GTA004
4					
5					
<b>Total Build:</b>			8		

Location Below Floor of Engine room and Aft Peak				Sq. Metres:	150
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean up
1	Intersheild 300	Aluminium	5	T/U	GTA415
2	Intersheild 300	Bronze	5	T/U	GTA415
3					
4					
5					
<b>Total Build:</b>			8		

Location Fore Peak and Void Spaces				Sq. Metres:	100
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean Up
1	Intersheild 300	Aluminium	5	T/U	GTA415
2	Intersheild 300	Bronze	5	T/U	GTA415
3					
4					
5					
<b>Total Build:</b>			8		

Location Grey water and Ballast Tanks				Sq. Metres:	100
<b>Preparation:</b>		Clean to an SP1, and the prep SP-2/SP-3/SP-11, and feather the edges			
#	Product	Colour	DFT	Extent	Clean Up
1	Interline 624	Buff	6	T/U	GTA415
2	Interline 624	Grey	6	T/U	GTA415
3					
4					
5					
<b>Total Build:</b>			8		



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# APPENDIX D

## Hero Class Installation Guide



**Step 1:** Remove the retaining ring from the forward face of the propeller hub that prevents the large screws from backing out. This piece gets in the way of our mounting plates and will no longer be necessary



**Step 2:** Look at where the mounting plate screws are located and back out the corresponding set screws from the specific mounting locations. There are 4 attachment screws per plate, 8 total per hub. With a wire brush, clean any debris from the forward face of the propeller hub and screws to ensure a flat, clean mounting surface.



**Step #3. Mounting plates are bolted to propeller hub using existing threaded set screw holes. There are two mounting plates per propeller hub. 4 total per ship set.**



**Step #4. After the mounting plates are installed, the rotary blades can then be bolted in place. There are 4 pockets milled into the face of the mounting plates, each pocket will accept one rotary blade. In some shipments this may have already been completed as shipped from Spurs factory. If so, ignore this step and proceed to step #5.**

**Installation Guide Continued**

**Step #5. Tack weld the top corners of the rotary cutters to the mounting plates. Make sure there is an independent ground placed on each blade as welding is performed.**



**Step #6. The outside seam between the two mounting plates should also be welded. After welding, touch up each weld with an angle grinder to make sure no weld is on the forward face of the mounting plates. This surface must be completely free and clear of welding slag. This completes the installation of the driven assembly on the propeller hub.**

**Installation Guide Continued**

**Step #7.** The new rope guards come tack welded together as one piece. Split the tack weld to separate the 2 halves of the rope guards.



**Step #8.**  $\frac{1}{4}$ " or 6mm flat bar should be cut into 12 small pieces. These pieces or "spacers" are to be welded to the aft end of the rope guard halves. These spacers set the distance between the aft end of the rope guard, and the forward face of the mounting plates. Three spacers are tack welded per half of each rope guard. They are to be removed after the rope guard has been fully welded to the stern tube.

## Installation Guide Continued



**Step #9.** Additional flat bar should be measured, cut and bent to fit the rope guard profile. This flat bar will be used as lap bars for the rope guards. It spans the gap between the upper and lower halves of the rope guards and will be completely welded in place.

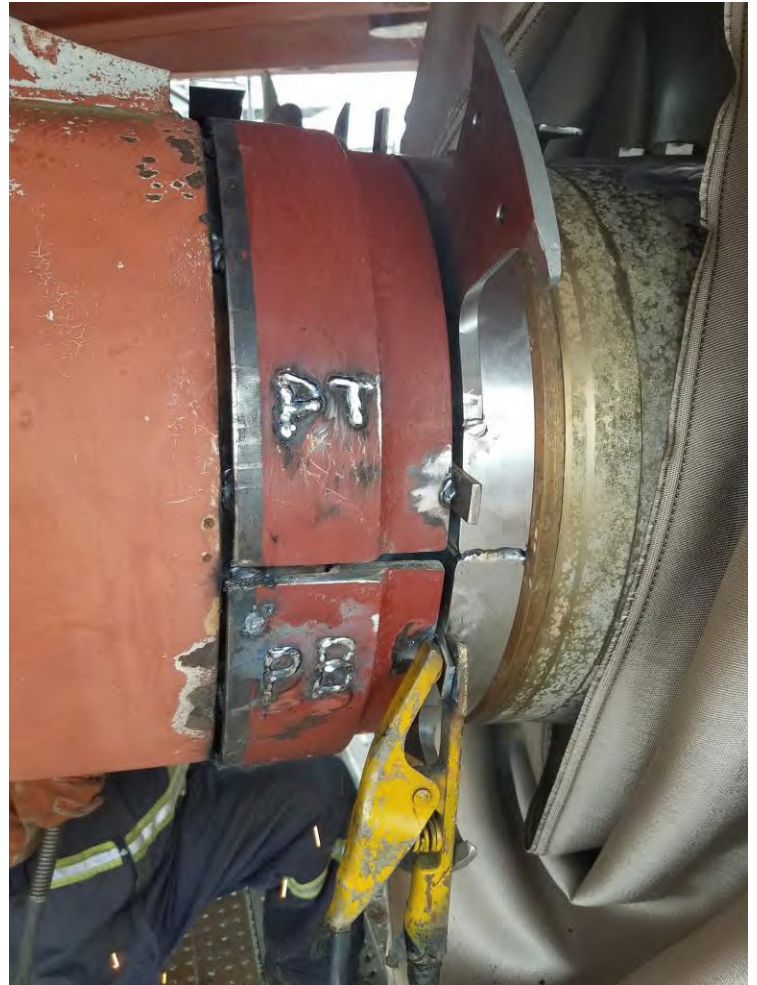


**Step #10.** The top half of the rope guard is fit in place first. The top half is the half with the large cut-out for the stationary assembly. This cut-out should be positioned at 45 degrees from top dead center on the upswing side of the propeller. Both rope guards ARE different as the propellers both rotate in opposite directions.

## Installation Guide Continued



**Step #11.** After the top half is firmly tacked in place, a strap is placed around the rope guard and the bottom half is then lifted into place. It is important the all 6 of the spacers touch the mounting plates, and that the OD of the aft end of the rope guard is flush with the OD of the propeller hub. The forward end of the rope guard is not as important and must be welded even if there are small gaps between the rope guard and the stern tube.



**Step #12.** The rope guard halves are labeled with weld so that they will not be confused when they are removed at the next dry-docking. "PT" stands for "Port Top" and so on. The top halves of each rope guard are mirror images of each other. The bottom halves should be exactly the same on both sides.

## Installation Guide Continued



**Step #13.** The lap bars are now fit and welded in place. As the last step, the  $\frac{1}{4}$ " spacers may be cut away from the rope guard. The rope guard is now ready for a complete 360 degree weld to the ship's structure. This weld should be continuous and consist of no less than 3 full passes using the welding method "one inside and two over".



**Step #14.** Once the rope guard has been completely welded in place and has had time to cool, the propeller is rotated 360 degrees to check and clean welding slag from the forward face of the mounting plates. One of the 4 rotary blades is positioned directly in the center of the cut-out for the stationary blade. We are now ready to install the stationary assembly.

Installation Guide Continued



**Step #15.** The stationary assembly should be positioned in the cut out on the top half of the rope guard so that it lines up perfectly with the rotary blade. The top of both blades should be flush with each other.



**Step #16.** To avoid future noise problems with these vessels, we are no longer allowing the stationary blade any ability to move forward and aft. Instead, a specific gap is set between the stationary blade and the rotary blades and then the stationary blade is locked or welded in place. The gap between the two blades should be set to approximately 1.5mm or 0.060". This is achieved with shims.

## Installation Guide Continued



**Step #17.** Once the shims are between the blades, the gap is set and the two blades are clamped together. We want to again make sure that the blades line up perfectly with one another and the tops of the blades are flush.



**Step #18.** Now that the blades are clamped together, we want to take the mounting box (pictured above) and pull it as far forward in the rope guard as we can get it. We want it to make contact with the aft face of the stern tube. The mounting box should be positioned such that there is an even gap on both sides of the box for welding.

Installation Guide Continued



**Step #19.** Our updated holding block has a rack and pinion type system that allows the stationary blade to be moved to set the gap of 1.5mm.



**Step #20.** The shaft of the stationary blade is also slotted to match the revised holding block. The blade will now interlock with the mounting block so that it can no longer move forward and aft.



**Step #21.** Here is a complete view of the new holding block which clamps down on top of the shaft of the stationary blade to secure it in place. This feature allows the gap between the stationary and rotary blades to be easily adjustable. The gap can be set and then locked in place instead of welded. This will make underwater repairs or replacement of the stationary blade much easier since welding should no longer be required.

Keep in mind that the holding block above is intentionally designed to be the weakest part of the system. If the cutter system encounters a steel cable or something that it was not designed to cut, this holding block will fail and the stationary blade should break away. This is to ensure that there is no severe damage to the shaft line or gearbox from the impact. It is best for the piece to fail and be replaced, than to cause much more expensive repairs further up the shaft line!



**Step #22.** There are 4 M10 securing bolts on the top half of the new holding block. These are locked down tight to secure the shaft of the stationary blade to keep it from moving.



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**Step #23.** Once the stationary blade, holding block and mounting box have all been positioned, the assembly should be covered with a fire blanket and prepped for welding. 309L rod should be used to weld the stainless steel mounting box to the mild steel rope guard. The heat should be minimized and applied evenly as to not cause any pulling during the welding process.



**Step #24.** After the weld has had time to cool, the clamps, shims and fire cloth are all removed and the propeller is once again rotated to check and adjust clearances. This completes the SPURS installation.

**Please note:** Field pictures of the new holding block assembly being installed are not yet available as this item is brand new and has only shipped for the final 4 vessels. On the other vessels, the same procedure is followed except the nose of the stationary blade is welded in place to the holding block to prevent any motion.

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