

CCGS CAPE ROGER

REFIT 2012

ALONGSIDE

APR. 4/12 – MAY 16/12

REVISED SPECIFICATION

CCGS CAPE ROGER

Annual Refit 2012

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PREAMBLE

1. INTENT

These specifications are supplied to the ship repairer, here in after referred to as the Contractor for the purpose of outlining the objectives, performance, standards and basic engineering requirements for the refit of the CCGS CAPE ROGER for the Canadian Coast Guard, Department of Fisheries and Oceans.

Intent of this specification shall describe the necessary work involved in carrying out the ship's Annual Refit. All work specified herein and all repairs, inspections and renewals shall be carried out to the satisfaction of the Owner's Representative and where applicable, the attending Transport Canada Marine Safety Inspector (TCMS). Unless otherwise specifically stated, the Owner's Representative is the Chief Engineer.
Refit to start April 4 and end May 16 2012.

2. MANUFACTURER'S RECOMMENDATIONS

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

3. TESTING AND RECORDS

All test results, calibrations, measurements and readings shall be properly tabulated, compiled and three typewritten copies shall be presented to the Owner's Representative and attending surveyors in a timely manner.

4. WORKMANSHIP

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

5. FACILITIES

Quotation is to include all the necessary labor and equipment required for the erection of access staging, rigging, lighting, necessary crange, transportation and line handling.

During the entire Refit the Contractor will maintain in a state of good order all walkways, scaffolding, ladders guardrails and similar appliances that are necessary for the safety of persons working or on business in the areas where work is in progress.

6. MATERIALS AND SUBSTITUTIONS

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

7. TOOLS

The Contractor is to supply all of the tools required to do the work except for certain specialty tools which will be issued to the Contractor and which must be returned in good order to the Chief Engineer. In all other instances, ship's tools are not to be used by the Contractor.

8. REMOVALS

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

9. EXPOSURE AND PROTECTION OF EQUIPMENT

The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit which might become damaged by exposure, movement of materials, sand grit or shot blasting, airborne particles from sand, grit or shot blasting, welding, grinding, burning, gouging, painting or airborne particles of paint. Any damage shall be the responsibility of the contractor.

Government furnished equipment and materials shall be received by the contractor and stored in a secure warehouse or storeroom having a controlled environment appropriate to the equipment as per the manufacturer's instructions. The contractor shall cover all deck machinery and openings into the ship to prevent ingress of grit from blasting. The contractor will remove any and all coverings after the coating operations are complete.

10. CLEANLINESS

The contractor shall at all times, maintain the work areas in which his personnel have access in a clean condition and free from debris. Upon completion of this refit, the contractor shall ensure that the vessel is in a clean condition, free from all foreign material in any system or location placed there as a result of this refit. The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall dispose of any and all oil and water residue, which accumulates in the machinery space bilges as a result of any refit work detailed in this specification.

11. LIGHTING AND VENTILATION

Temporary lighting and/or temporary ventilation, required by the Contractor to carry out any item of this specification, shall be supplied, installed and maintained in safe working condition by the Contractor. It is to be removed on completion of the work. The Contractor can use the ship's electrical receptacles for 120 VAC power providing that they do not overload circuits, use electrical equipment that is functioning properly and they do not impede the work of the ship's crew.

12. ASBESTOS

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

13. CHEMIST'S CERTIFICATES

The Contractor is to supply the Owner's Representative with Marine Chemist's certificates or a Qualified Person in accordance with CCG/SSB TP 3177E before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments. Certificates are to clearly state the type of work permitted and are to be renewed as required by regulations. Copies of the certificates are to be posted in conspicuous locations for the information of the Ship's and Contractor's personnel.

The Contractor is to ensure that any work carried out in confined spaces as defined by the Canada Labor Code must comply fully with all provisions of the code and follow the Coast Guard Fleet Safety Manual Confined space entry 7.D.9 and 7.D.9 (N) Version 3 dated November 24, 2006.

14. HOTWORK

Any item of work, involving the use of heat including welding, cutting, arc gouging in its execution, requires that the Contractor advise the Owner's Representative prior to starting such heating and upon its completion. The Contractor will be responsible for maintaining a competent and properly equipped fire watch during, and for one full hour after, all hot work. The fire watch is to be arranged such that all side of surfaces being worked on are visible and accessible. The Contractor is to provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled.

Ship's extinguishers are not to be used except in the event of an emergency. The Chief Engineer is to be notified immediately should an incident of this nature occur.

All Hot Work shall be completed in accordance with Coast Guard Fleet Safety Manual Section 7.D.11 and 7.D.11 (N) including Hotwork Permits.

15. LOCKOUT AND TAGOUT PROCEDURES

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

- Electrical currents
- Hydraulic
- Pneumatic
- Gas or stem pressure and vacuum
- High temperatures
- Cryogenic temperatures
- Radio frequency emissions
- Potentially reactive chemicals
- Stored mechanical energy
- Equipment actuation

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

The Contractor shall supply and install all locks and tags and shall complete the

Lockout Tagout Log sheet provided by the Vessel.

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

16. PAINTING

All new and disturbed steel work that will not be on the underwater wetted surface of the ship's hull is to be protected with two (2) coats of primer. Unless otherwise stated in the Individual Specification item the primer is to

be International Paints Interplate Zinc Silicate NQA262/NQA026 red. The paint will be applied as per the Manufacturer's Instructions on their product data sheet.

The contractor will strictly adhere to the manufacturer's instructions and will be supervised by a Coast Guard contracted National Association of Corrosion Engineers (Nace) Inspector in the preparation, application and curing of all coatings during this refit.

17. WELDING

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

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

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

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

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

18. SMOKING

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

19. RESTRICTED AREAS

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

20. ELECTRICAL STANDARDS

Any electrical installations or renewals shall be in accordance with the latest editions of the following marine standards:

(a) TP 127E-TC Marine Safety Electrical Standards.

(b) IEEE Standard 45: Recommended Practice for Electrical Installation on Shipboard.

If any cable installed within this contract is found to be damaged, shorted or opened as a result of the manner of installation, the entire length of cable shall be replaced and installed at no cost to the Department. Plastic tie-wraps may be used to secure wiring in panels or junction boxes only.

21. DRAWINGS

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

22. FIRE DETECTION AND SUPPRESSION SYSTEM

If any Specification Item will require disturbing, removing or isolating any heat or smoke sensors the Contractor will advise the Chief Engineer before work commences.

The Ship's Crew will perform any such work. The Contractor should note that failure to observe proper precautions while performing work of this nature could result in system malfunction and spontaneous discharge of FM-200 or CO₂.

23. ANNEX

The Contractor shall have in place a Safety Management System that complies with the Canada Labor Code and Provincial Regulations and deals with the contractor responsibilities for items such as Hot Work, Confined Space Entry, Diving, Diving Operations, and Lock out Tagout procedures and Working Aloft.

The Contractor shall be aware that the vessel is considered to be a Federal Work Place and thereby regulated by the Canada Labor Code.

The Contractor shall comply with the work requirements as outlined in the Canada Labor Code and applicable Provincial Regulations.

In addition, the Contractor is required to keep a log of all personnel entering and leaving any enclosed space.

The Contractor shall note that Canadian Coast Guard Ships are presently working under the International Safety Management System (ISM) code and each ship has a Fleet Safety manual on board. The fleet Safety Manual shall be adhered to when contract work involves CCG personnel and any other Public Service Employee during the contract period.

An electronic copy of the Fisheries and Oceans Canada, Canadian Coast Guard Fleet Safety Manual (DFO 5737) - (Adobe Acrobat .PDF version) can be found at

http://142.130.14.20/fleet-flotte/Safety/main_e.htm

24. SUSPENSION OF WORK

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

25. REGULATORY AUTHORITY INSPECTIONS

The Contractor shall confirm a schedule of inspections with the regulatory authority (TCMS) for all work described in this specification and shall be responsible for calling them when inspections are required.

26. VESSEL SECURITY

There will be a Visitor's Log at each main vessel access. Contractor shall ensure that all his employees and sub-contractor personnel sign-in when entering vessel and sign out when departing vessel. This requirement pertains to all visitors to the vessel including any Inspectors or Vendors. These Visitor's Logs will be available to the Shipyard's Security Personnel in the event of any emergency.

27. WHMIS

Any WHMIS-controlled products used onboard shall be accompanied by a current MSDS; any neutralizing chemicals or specialized protective equipment required shall be provided by the Contractor at all times these WHMIS-controlled products are onboard the vessel.

Spec item #: H - 1	SPECIFICATION	TCMSB Field #: N/A
PRODUCTION CHART		

Part 1: SCOPE:

- 1.1 The intent of this specification shall enable the owner's representatives an accurate time line on production and completion dates for Coast Guard Operational services.

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

2.1.1 N/A

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

2.4.1 N/A

Part 3: TECHNICAL DESCRIPTION:**3.1 General**

3.1.1 The successful Contractor shall supply three copies of a detailed bar chart showing the planned work schedule for the ship's refit. This bar chart shall show each specification item, the start date, the duration and the completion date.

3.1.2 A critical path of work shall be identified, which shows the critical tasks that may delay the completion of the refit, if they are not completed within the estimated time frame. The critical path may exist due to labor constraints or tasks which cannot be completed concurrently with other tasks.

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES:

5.1 Three copies of the original and three copies of each weekly update shall be given to the Chief Engineer one day prior to each weekly progress meeting.

5.2 The bar chart shall be updated weekly or for each production meeting to reflect the actual production on the refit and changes to the anticipated completion dates of each individual item. The contractor shall include on the updates to the production chart any Work Arising from PWGS 1379 action, and indicate how the additional work will impact the completion schedule for the vessel.

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

Spec item #: H - 2	SPECIFICATION	TCMSB Field #: N/A
ENGINEER OFFICERS WC 323 CONVERSION 819		

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to refurbish Engineer Officer's WC 323. Remove existing aft shower shell and partition and replace with new Owner supplied.
- 1.2 New Owner supplied toilet stall to be installed, with toilet removed and re-fastened appropriately to the deck on new contractor supplied / installed base.
- 1.3 New floor tiles and dex-o-tex shall be installed.

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

- 2.4.1. General Arrangement.

2.2 Standards

- 2.4.1.

2.3 Regulations

- 2.4.1.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:**3.1 General**

- 3.1.1. Contractor shall provide the services of a qualified Marine Electrician for the identification, disconnection and subsequent reconnection of all electrical fixtures, including, but not limited to, Heating, Lighting, Public Address System and Fire Detection Equipment.
- 3.1.2. Renew floor coverings: ½ inch mean thickness of Dex-O-Tex sub-floor. The Contractor shall remove existing floor tiles and Dex-O-Tex and deck-o-lite underlayment to steel deck and shall supply / install new 2.5 x 2.5 ceramic tiles retaining the services of a qualified flooring contractor for installation. Tiles / grout shall be colour matched to fit colour scheme of vessel in that area. The compartment size is 8-1/2 feet by 10-1/2 feet. Contractor shall bid price on 110 square feet, making allowances for rises along bulkheads. Contractor shall supply / install Baseboard of same tiles.

New Underlayment Scheme:

Layers of the Contractor supplied and installed New Scheme are as follows:

1. Existing Steel Deck
2. Layer of Magnabond coating shall be 1/8 inches thick.
3. Layer of Deck-O-Lite insulation at least 1 3/8 inches thick.

Note: 14 day curing time for deck-o-lite. This work to be started early during Refit.

4. Layer of Dex-O-TEX underlayment 1/2 inch thick (Sub Coat 1).
5. New Flooring, Ceramic Tiles.

- 3.1.3.** Steel deck shall be power tooled to remove rust and primed to suit new Dex-O-TEX.
- 3.1.4.** The Contractor shall remove existing Heat lamps, Shower Lighting, switches and wiring (junction box in deck head in washroom) as this is no longer utilized.
- 3.1.5.** The Contractor shall re-locate / lower location of electric forced draft heater. Location of heater will be on inboard bulkhead at deck level. Wiring for this heater to be taken from junction box in deckhead area. Contractor to allow 20 feet for this cabling.
- 3.1.6.** The Contractor shall supply, install a Dyson Air-Blade Hand Dryer on Aft Bulkhead (120volt power available for plug in of this unit in area above existing clothes washer that crew will remove).
- 3.1.7.** The Contractor shall disconnect and incorporate the HVAC Diffuser into the new deck head panels.
- 3.1.8.** The Contractor shall Renew deck head panels : The ceiling is to be an approved Join Lock Linear ceiling system from Joiner Systems Incorporated or equivalent. The ceiling tiles are to be aligned port and starboard with the supporting clip tracks installed longitudinally. The ceiling system is to incorporate two (2) only by four (4) foot long recessed fluorescent lighting fixtures compatible with deck head panel system. The contractor is to include the installation of all required support structure, fixtures and ceiling trim with 1 light fixture at 16 inches from outboard bulkhead and the second 64 inches from outboard bulkhead (both measurements from center of lights).
- 3.1.9.** The contractor shall bid to replace 4 only bulkhead panels (2 feet wide x 8 feet high) same as existing.
- 3.1.10.** The compartment is 8-1/2 feet by 10-1/2 feet. The Contractor shall quote on replacement of 120 square feet of ceiling tiles. Contractor shall bid per extra square foot of tiles to be adjusted up or down by PWGSC 1379 action.
- 3.1.11.** The Contractor shall remove toilet from existing base and supply / install new toilet base, then re-install toilet on new base.

3.2 Location

- 3.2.1.** WC 323, Main Deck , Port Side, Frames 20 to 25

3.3 Interferences

- 3.2.1. Contractor is responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.
- 3.2.2. The contractor is also responsible to provide all materials, labour, lighting, ventilation, staging and lifting capacity to complete the required tasks. The contractor is also responsible for all temporary enclosures to facilitate the work, and finally, all clean up and disposal of debris generated due to the work.

Part 4: PROOF OF PERFORMANCE:

4.2 Inspection

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

4.2 Testing

N/A

4.3 Certification

N/A

Part 5: DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1 Contractor shall supply amended General Arrangement drawings showing new layout. The “As Fitted” Drawings are not limited to the space modified. They shall also encompass other related items as mentioned in section 1.2

5.2 Spares

N/A

5.1 Training

N/A

5.2 Manuals

N/A

Spec item #: H - 3	SPECIFICATION	TCMSB Field #: N/A
FRESH WATER TANKS P&S CLEANING, INSPECTION & TESTING		

Part 1: SCOPE:

- 1.1** The intent of this specification shall be to open both Fresh water tanks for Cleaning, Inspection & Testing.

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

Tank capacity Plan.

2.2 Standards

- 2.2.1** The Fleet Safety and Security Manual 7.F.12 POTABLE WATER QUALITY, outlines clearly the calculation method for hyper-chlorination and methods of disposal/neutralization of Hyper-chlorinated water.

2.3 Regulations

- 2.3.1** The water in the tank will be subjected to laboratory testing once the super-chlorination procedure is completed and flushed. The water in the tanks after cleaning / testing must meet the highest drinking water regulations stated by Health Canada.

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION:**3.1 General**

- 3.1.1.** The Ships crew shall pump both tanks down to the suction levels until suction is lost. The contractor shall remove the manhole covers from each tank and remove the remaining residual water (approx. 2000 litres) including any ice that may have formed at that time..
- 3.1.2** The Contractor shall be responsible for the removal of the residual water in the tanks at the initial draining as well as the chlorinated water used to flush the tanks twice (2 times).

- 3.1.3** These tanks are used for the vessels drinking water, so proper protection shall be worn by workers inside the tanks at all times to reduce the contamination and dirt accumulation from performing the work. The contractor shall be responsible for cleaning the grit residue and any foot prints and black marks introduced by the workers.
- 3.1.4** The Contractor shall provide each tank with a mechanical ventilation system vented to the outside of the ship. Good ventilation must be provided and any blowers/extractors must ensure good air movement and solvent vapour removal from the lowest point in the tanks. Tanks are to be certified safe for personnel to enter prior to work being carried out internally.
- 3.1.5** The vent heads shall be removed prior to cleaning the tanks and dismantled to prove they are functioning properly. The vent heads shall be re-assembled / re-installed by the contractor.
- 3.1.6** The tanks shall be cleaned by removing all rust discoloration.. The cleaning method used is to be approved by the Provincial Health Services for its intended application. Proof of such approval shall be furnished to the Chief Officer before work begins.
- 3.1.7** No painting to be carried out on tank internals while vessel is in the water.
- 3.1.8** Any chemical residue or debris is then to be completely cleaned from the tanks. Upon completion of all cleaning, the Chief Officer shall thoroughly inspect the tank internals.
- 3.1.9** Upon completion of the above to the satisfaction of the Chief Officer, tanks shall be wiped clean. All debris removed ashore and tanks boxed up in good order. The manhole covers are to be replaced using new contractor supplied 1/4" "O" rings. Any studs broken during the removal and replacement of manhole covers shall be renewed. Anti seize compound is to be used on the fastener threads.
- 3.1.10** Contractor is to fill both tanks port and stbd with super chlorinated potable water (contractor supplied bleach level of 50 mg/L of free chlorine- as per Fleet Safety Manual 7.F.12 potable Water Quality). All taps from this tank should be turned on to supply super chlorinated water to all pipes. This water must be allowed to sit in the tanks for a minimum of 4 hours. After removing super chlorinated water from tanks, they must be flushed with at least two full volumes of freshwater until a free chlorine level of less than .5 mg/L is reached. The contractor is responsible for the proper disposal of the super chlorinated water in keeping with provincial regulations and the CSA. Sounding pipes, suction pipes and vents are to be proven clear prior to filling the tank with water.
- 3.1.11** Approximate surface area of the tanks 100 meters square (total for both tanks).
- 3.1.11** All work shall be as per the coating Product Data/ Application Instructions to the latest issue and to the satisfaction of the Chief Engineer and Chief Officer.

3.2 Location

3.2.1 Frames 52-56

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

4.2.1 The Contractor shall refer to Fleet Safety and Security Manual 7.F.12 POTABLE WATER QUALITY. This procedure outlines clearly the calculation method for hyper-chlorination and methods of disposal/neutralization of Hyper-chlorinated water.

4.2.2 The water sample shall be sent to the laboratory once all work is completed / after super chlorination / flushing and proven to meet the requirements for drinking water standards as set out by Health Canada.

4.2.3 3 Test samples will be taken 1 at tank location, 1 furthest from tank and 1 at random to be determined by Chief Officer.

4.3 Certification

4.3.1 All Certificates from water sampling shall be delivered to the vessel prior to putting the fresh water tanks back in service.

Part 5: DELIVERABLES:

5.1 Drawings / Reports

5.1.1 The contractor shall supply 3 copies of detailed work reports in electronic format on the condition of the fresh water tanks, the work performed and the water reports from the laboratory.

5.2 Training

5.3.1 N/A

5.3 Manuals

5.4.1 N/A

Spec item #: H - 4	SPECIFICATION	TCMSB Field #: N/A
LIFEBOAT DAVIT QUADRENNIAL INSPECTION / TESTING		

Part 1: SCOPE:

- 1.1 The intent of this specification is to have both enclosed lifeboats and davits inspected and certified by Schat-Harding, to obtain credit from Transport Canada Marine Safety.
- 1.2 This work shall be carried out in Conjunction with the following:
 - i. Lifeboat Annual Maintenance**

Part 2: REFERENCES:

- 2.5 **Guidance Drawings/Nameplate Data**
Lifeboat davit type SPG(L) 5400/3100
With Electric Winch Type BE5500
Enclosed Lifeboats 6.5M MKV TELB
- 2.6 **Standards**
 - 2.4.1.**
- 2.7 **Regulations**
 - 2.4.1.**
 - i. TP 127E;
 - ii. C.S.A., Hull and Machinery Regulations;
- 2.8 **Owner Furnished Equipment**
 - 2.4.2.** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3: TECHNICAL DESCRIPTION:

- 3.1 **General**
 - 3.1.1.** The contractor must include an allowance of \$8000.00 for a representative from Schat-Harding to inspect the lifeboat davits and lifeboats. This will be adjusted up or down by PWGSC 1379 action, upon proof of invoice.

- 3.1.2.** The lifeboats must be supported in a proper cradle away from the ship in a secure location for the duration of the refit at CCG Base.
- 3.1.3.** The representative from Schat-Harding will complete the annual inspection and maintenance, and provide a certificate to the Chief Engineer at the end.
- 3.1.4.** The Contractor shall dismantle, inspect and certify both davits assemblies. There are a total of 12 pins and sheaves on each davit which will require dismantling, cleaning and measuring. All pin diameters, bushing bores, clearances and Sheaves shall be inspected / measured by Schatt FSR and TCMS. Any worn parts to be renewed (PWGSC 1379 action).
- 3.1.5.** The wire on each davit was replaced in the fall of 2009 and does not need replacing, but shall be stored by the contractor on reels during disassembly.
- 3.1.6.** The winches shall be taken apart to inspect / overhaul the brakes, and gearbox assemblies. The Contractor shall bid an allowance of \$5,000 for any parts used on the gear box assembly or hydraulic fittings deemed unsafe will be adjusted up or down by PWGSC 1379 action. The oil shall be drained and properly disposed of by the contractor. Gear case to be thoroughly cleaned for inspection. Once complete, gear case to be re-filled with Contractor supplied Gearbox oil is EP 100 or equivalent by contractor. Any covers removed will have new, contractor supplied, gaskets and sealing materials.
- 3.1.7.** The electric motors, Rotor BV: The Contractor shall take Meggar readings prior to removal for maintenance. Electric motors shall be removed and sent to reputable electric shop for overhaul / balance. New contractor supplied bearings shall be installed, outside housing to be cleaned / blasted and painted prior to returning to ship.
- 3.1.8.** The contractor must uncouple the motor from the pump and remove it from its bedding, carefully tagging the disconnected wires. Contractor shall open and steam clean motor armature, and stator of dirt, dust, grease, salt or oil films accumulated on the windings. The motor shall be baked in an oven to ensure complete removal of residual humidity. The unit must then be re-varnished and inspected by TCMS prior to re-assembly.
- 3.1.9.** The Contractor shall visually check for loose or broken wires and connections and shall measure insulation integrity again once all work is completed.
- 3.1.10.** The Contractor shall include an allowance of \$5,000 which shall be adjusted up or down by PWGSC 1379 action to cover the costs of repairs / bearings to the motor which may be found necessary as a result of this inspection. The Contractor shall supply all parts and material to perform the specified work.
- 3.1.11.** Insulation tests completed and results given to Chief Engineer before re-installing.
- 3.1.12.** The Contractor shall re-couple the motors to the pumps ensuring correct alignment and direction of rotation. The condition of the shaft coupling shall be checked.

- 3.1.13.** Once everything has been inspected by the Schat-Harding representative, the Chief Officer and the Chief Engineer, all components shall be re-assembled by the contractor. Note: No requirement needed for welds to be buffed of paint and NDT. Grease must be added to all points Esso Beacon EP2 or equivalent (contractor supplied). Wire Ropes must be greased with Esso Surett Fluid N 5K or equivalent (contractor supplied).
- 3.1.14.** The contractor must complete a load test on the davits prior to installing the lifeboats, considering the boats are 2844kgs. The load test must be determined by Schat-Harding (1.1 x SWL Dynamic Testing) and must be approved and witnessed by TCMS. A certificate must be supplied to the Chief Engineer for the testing of both davits including the date, weight and signature of Schat-Harding and TCMS (T3). All weights / crange shall be supplied by the contractor.
- 3.1.15.** Once this has been completed, the boats can be re-installed onto the davits. A functional test must then be performed for TCMS.
- 3.1.16.** All work shall be performed to the satisfaction of Chief Engineer, Chief Officer and TCMS.

3.2 Location

Port and starboard, Foc'sle Deck, frames 21 to 32

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

- 4.2.1** Testing to be conducted by Schat-Harding, to obtain TCMS survey credit.

4.3 Certification

- 4.3.1 This specification is to be carried out in order to obtain TCMS survey credit. The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Copies of all certificates shall be forwarded to Chief Officer and TCMS Inspector.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: H - 5	SPECIFICATION	TCMSB Field #: N/A
MIRANDA DAVIT QUADRENNIAL INSPECTION / TESTING		

Part 1: SCOPE:

- 1.1 The intent of this specification is to have both Miranda davits inspected and certified by Schat-Harding. To obtain credit from Transport Canada, Marine Safety.
- 1.2 This work shall be carried out in Conjunction with the following:
 - ii. **Zodiac-CG-265, CG-266 Annual Inspection**

Part 2: REFERENCES:

- 2.1 **Guidance Drawings/Nameplate Data**
Miranda Boat Davit type MRT 3900
Electric-Hydraulic Winch: General Arrangements M902624 & M903384
Sectional Arrangement S711550
- 2.2 **Standards**
 - 2.2.1 All inspections and work performed on this equipment shall be completed to the highest standards regarding this essential equipment.
- 2.3 **Regulations**
 - 2.3.1 The following documents are applicable to or interface with the task requirements of this section:
 - iii. TP 127E;
 - iv. IEEE 45 STD -2002;
 - v. Lloyd's Classification Society Rules;
 - vi. C.S.A., Hull and Machinery Regulations;
- 2.4 **Owner Furnished Equipment**
 - 2.4.1. The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3: TECHNICAL DESCRIPTION:

3.1 General

- 3.1.1 Prior to commencement of work, the following is to be measured and recorded by the contractor: a. motor rotational direction, b. peak startup motor current, and c. Meggar reading of each phase of the motor. Meggar test shall be conducted at 500Vdc. These readings must be included in the inspection report supplied by the contracting shop performing the work.

- 3.1.2 The Contractor shall remove the FRC's, port and stbd and store them in a proper cradle at CCG Base in an area away from ship and debris. Contractor to include six hours of crane time, to remove and re-install the FRC's considering the boats are approximately 3900 kgs each. This shall be adjusted up or down by PWGSC 1379 action.
- 3.1.3 Contractor shall remove the 2-pump power pack units from the vessel for overhaul. The hydraulic pumps shall be opened for inspection and any defects found, repaired.
- 3.1.4 The electric motors shall be meggar tested. The electrical breaker for the pump motor, located in the Machinery Control Room, Essential breaker, ESS 14, 250Amp shall be locked out by contractor as per ISM Shipboard Work Procedure to prevent accidental starting. Cables are to be carefully tagged and protected.
- 3.1.5 Contractor shall remove both Electric Motors, Electric motors shall be removed and sent to reputable electric shop for overhaul / balance. New contractor supplied bearings shall be installed, outside housing to be cleaned / blast and painted prior to returning to ship. The Contractor shall include an allowance of \$5000 which shall be adjusted up or down by PWGSC 1379 action to cover the cost of repairs / bearings to the motor which may be found necessary as a result of this inspection. The contractor shall supply all parts and material to perform the specified work.
- 3.1.6 The contractor must uncouple the motor from the pump and remove it from its bedding, carefully tagging the disconnected wires. Contractor shall open and steam clean motor armature, and stator of dirt, dust, grease, salt or oil films accumulated on the windings. The motor shall be baked in an oven to ensure complete removal of residual humidity. The unit must then be re-varnished and inspected by TCMS prior to re-assembly.
- 3.1.7 The Contractor shall visually check for loose or broken wires and connections and shall measure insulation integrity again once all work is completed.
- 3.1.8 The Contractor shall supply / install new bearings and dynamically balance the motor armature after reassembly. Bearings to be SKF or equivalent sealed bearings as per original. Upon reassembly, motor is to be Meggar tested and readings recorded. Motor shall be bench tested and vibration levels to be checked; "Very Smooth" will be considered satisfactory.
- 3.1.9 The motor exterior surface shall be painted to marine standards; finish coat to be Matchless 700 white enamel paint.
- 3.1.10 The Contractor shall re-couple the motor to the pump ensuring correct alignment and direction of rotation. The condition of the shaft coupling is to be checked.
- 3.1.11 The contractor shall take bearing temperatures, starting current and running load readings. A copy of these readings is to be given to the Chief Engineer.
- 3.1.12 The hydraulic pumps are to be flushed with hydraulic oil after re-assembly.
- 3.1.13 Contractor to request the services of a Schat-Harding representative to over-see the dismantling, inspection, rebuilding, and testing of both davits. Contractor to include \$10,000 allowance for the representative's services, which will be adjusted up or down by PWGSC 1379 action, with receipts of expense claims.

- 3.1.14 The wire on each davit was replaced in Fall 2009 (does not need replacing).
- 3.1.15 The gear box shall be completely drained of oil (11 liters EP 100, or equivalent), disposed of by the contractor, and the gear box covers removed. The gear box and gears are to be fully examined for wear and contamination. All reports shall be made to the Chief Engineer. Once inspection is complete, the necessary covers must be replaced with new contractor supplied gaskets. It must then be replenished with the correct type and quantity of oil supplied by the contractor.
- 3.1.16 The disc brakes and centrifugal brakes are to be opened and inspected. The condition of the bearings and seals are to be inspected by the Schatt representative and renewed if necessary. The Contractor shall bid an allowance of \$2,000 for any parts used on the gear box assembly or hydraulic fittings deemed unsafe will be adjusted up or down by PWGSC 1379 action. All limit switches to be inspected, confirmed working, and replaced as necessary by the contractor. Any disturbed painted areas to be primed before re-installing a component with metal to metal contact. Any new hydraulic fitting installed must be completely wrapped in denso tape upon completion, or stainless fitting used.
- 3.1.17 All pins diameters, bushing bores, clearances and sheeves to be removed, cleaned and inspected / measured by Schatt FSR and TCMS. Any worn parts to be renewed (PWGSC 1379 action). All parts to be greased when reassembling, using Esso Beacon EP2 or equivalent grease contractor supplied. (10 units on each davit).
- 3.1.18 Hook and chain assembly to be carried to contractors shop for load testing from each davit. The chain has to be tested at 9750 kgs, and the hook tested at 9750 kgs.. Certificates to be supplied to the owner upon completion of test.
- 3.1.19 All items are to be reassembled onto the ship and new wires installed. All grease connections to be filled with proper grease prior to running equipment (contractor supplied). This must be coordinated through the Chief Officer at the time. Once complete, the davits will have to be load tested to 1.1 x SWL of 3900 kgs Dynamic Testing and witnessed by TCMS inspector. All weights and craneage will be supplied by contractor. TCMS inspector must be contacted by the contractor to inspect the davit items and to witness the load test. Note: No requirement needed for welds to be buffed of paint and NDT.
- 3.1.20 Vessels Crew shall inspect / overhaul Cradle / Wheels.
- 3.1.21 The units shall be installed back on the vessel and a function test of the units performed to the satisfaction of TCMS, Chief Engineer. Contractor is to provide stand-by personnel for a maximum 4 hour test run. The Motor and pump shall be test run for 4 hours, and the contractor shall record Function test will include comparison of winding currents for the motors. Copies of load certificates and certified weights used to be presented to the Chief Officer and Chief Engineer. Final certificate of use to be issued by Schatt representative to the Chief Officer.

3.2 Location

Port and starboard, Foc'sle Deck, frames 38 to 42

3.3 Interferences

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

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

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

4.2 Testing

4.2.1 Testing to be conducted by Schat-Harding, to obtain TCMS survey credit.

4.3 Certification

4.3.1 This specification is to be carried out in order to obtain TCMS survey credit. The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections. Copies of all Certificates for this work shall be given to the Chief Officer / Chief Engineer / TCMS.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Copies of certificates are to be forwarded to Chief Officer and TCMS Inspector.

5.2 Spares N/A

5.3 Training N/A

5.4 Manuals N/A

Spec item #: E - 1	SPECIFICATION	TCMSB Field #: N/A
PORT & STBD M/E CLUTCHES INSPECTION / TESTING		

1.1 SCOPE:

The intent of this specification shall be for the Contractor to open up both Port & Stbd M/E Clutches for TCMS inspection.

2.1 REFERENCES:2.1.1 Nameplate Data

Pneumaflex model KAE 260

2.2 Standards

2.2.1 Ships ISM Hot-Work, Confined Space, Fall Protection Lockout Procedures. The contractor will be responsible for completion of the lockout/tag out log sheets. The contractor is to demonstrate how the lockout/tag out procedure meets the requirements before work begins. For audit purposes the completed lockout/tag out log sheets are to be delivered to the Chief Engineer when completed.

2.4 Owner Furnished Equipment

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

Related Specifications

This work shall be carried out in Conjunction with the following E-1& E-3.

3.1 TECHNICAL DESCRIPTION:

3.1.1 The Contractor shall supply all equipment, staging, chain falls, cranage, slings and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification shall be welded into place by CWB-certified welders certified to welding Std. W47.1, Div. 1 and 2). Proof of certification must be provided to the Chief Engineer prior to commencement of steel work. Prior to any hot work taking place the Contractor shall ensure the area of work is gas freed suitable for hot work and the appropriate gas free certificates issued and placed as per the requirements of CCG Fleet Safety Manual.

3.1.2 The Contractor shall isolate and lockout both main engines associated with this clutch, lockout are to be entered into the ships lockout record book and lockouts shall be removed and entered into lockout book after completion of repairs.

The Contractor shall provide the services of FSR (allowance for \$10,000 to be adjusted up or down by PWGSC 1379 action upon proof of invoice) for the survey inspection and re-building / re-installation of clutches. **Siemens.** The Contractor shall include a bid of \$5,000 to be adjusted up or down by PWGSC 1379 action for the procurement of any additional parts not supplied by the Owner.

Pre Removal

- 3.1.3 The contractor shall remove the clutch guard surrounding the clutch as well as any necessary piping, wiring, etc to facilitate the removal of the clutch assembly.
- 3.1.4 The contractor shall measure and record the clutch travel in the ahead and astern positions as per the manufacturers' specifications.
- 3.1.5 The contractor shall measure and record the torsional deformation "angle of twist" on the spiroflex elements as per the manufacturer's instructions.
- 3.1.6 Copies of the above readings shall be given to the Chief Engineer prior to continuing removal of the clutch.
- 3.1.7 Ship's personnel can assist in taking the readings and special tools for the measurements can be supplied by the ship.

Removal and Disassembly

- 3.1.9 Remove the clutch to the contractor's facilities for disassembly.
- 3.1.10 The contractor shall be aware of the central feed line and seal ring before removal.
- 3.1.11 During disassembly of the clutch pack, the contractor shall ensure that all elements of the pack are proof marked for correct orientation during re-assembly.
- 3.1.12 Disassemble the clutch to clean and lay out the parts for inspection by the attending TCMSB Surveyor and Chief Engineer. All work to be under the supervision of FSR.

Cleaning and Inspection

- 3.1.13 Thoroughly clean both tapered jackets and inspect them closely for heat cracks and discolouration. Lightly buff both sets of friction pads to remove any dirt, grease, oil, etc. and inspect them closely for wear and defects. Friction linings to be measured and replaced if below manufacturer's specification (PWGSC 1379 action). Clean and inspect all fasteners for wear and defects.
Clean and inspect all spiroflex elements for wear and defects. Clean and inspect the cylinder and piston, especially in way of the seal surfaces, for wear and defects.
- 3.1.14 The attending Transport Canada Marine Safety Surveyor and Chief Engineer shall inspect the clutch components before re-assembly.

3.1.15 The contractor shall be responsible for arranging the attendance of the TCMS Surveyor.

Re-assembly

3.1.16 Reassemble the piston and seal rings in good order using new Owner Supplied seals, reassemble the friction cones and spiroflex elements and reassemble the tapered jackets all in accordance with the manufacturer's instructions.

3.1.17 All fasteners are to be torqued as per the manufacturer's specifications. All proof marks shall be checked. Reassemble any additional removals.

Pre-Installation Testing

3.1.18 Before the clutch assembly is returned to the vessel the contractor shall pressurize it to demonstrate that all components are tight and that all seals are operating correctly in accordance with Manufacturer's specifications. This test shall be carried out in the presence of the Chief Engineer.

3.1.19 The duration of the test will be for one hour to the satisfaction of the Chief Engineer.

3.1.20 The alignment of the Engine and the driven unit are to be verified without the clutch.

Re-Installation and Testing

3.1.21 The contractor shall transport the clutch assembly back to the ship and re-install it in good order ensuring correct orientation of associated flanges and spacer rings using the proof marks. All proof mark locations shall be verified. All fasteners shall be properly torqued.

3.1.22 Alignment of the clutches shall be verified again once the clutches are installed.

3.1.23 The contractor shall advise the Chief Engineer when the clutch is ready to be tested.

3.1.24 The ship's crew will manually operate the clutch to check for correct operation and air leaks after installation with the contractor's personnel in attendance.

3.1.25 The contractor shall record the clutch travel readings and present them to the Chief Engineer at this time.

3.1.26 The contractor shall replace all guards, disturbed piping, wiring, and other removals in good order on completion of the above work.

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

- 4.1.1 This specification is to be carried out in order to obtain TCMS survey credit. The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections.
- 4.1.2 All work shall be completed to the satisfaction of the Chief Engineer and under supervision of Siemens FSR.

4.2 Testing

- 4.2.1 Upon completion of all work, the clutch shall be tested for correct operation with the engine running to the satisfaction of the Chief Engineer. This will include a load or sea trial at the Chief Engineer's discretion. The duration of the test will be for one hour.

4.3 Certification

- 4.3.1 All service reports and inspection certificates from the work specified shall be provided to the Chief Engineer.
- 3.1.1 The Contractor shall include a bid of \$5,000 to be adjusted up or down by PWGSC 1379 action for the procurement of any additional parts.

3.2 Interferences

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

5.1 DELIVERABLES:

- 5.1.1 The Contractor shall produce and give to the Chief Engineer two copies of all readings taken (electronic format). The Contractor will prepare a written report, detailing any defects or deficiencies discovered and the proposed corrective action to the attending Transport Canada Marine Safety (TCMS) Inspector.

Spec item #: E - 2	SPECIFICATION	TCMSB Field #: N/A
MAIN ENGINE STBD & STBY S/W COOLING PUMPS		

1.2 SCOPE:

The intent of this specification shall be for the Contractor to open up both pumps for overhaul and TCMS inspection.

2.2 REFERENCES:2.2.1 Nameplate Data ABS

Pump type JMW Z16A-154

No: 91451

Flow: 180 m³/h

Head: 25m

Speed: 1780 rpm

2.2.2 Standards.

The pumps and electrical motors will require isolation, locking out of service, and tagged by the Owner's representative prior to commencing work. The contractor shall meet the manufacturer's standards for installation, along with compliance with TC Electrical and Mechanical regulations. The contractor must adhere to / follow the ship's ISM Hot Work, and Lock out procedures. All Hot Work shall be completed in accordance with Coast Guard Fleet Safety Manual Section 7.D.11 and 7.D.11 (N).

2.5 Owner Furnished Equipment

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

Related Specifications

This work shall be carried out in Conjunction with the following: Removal of the electric motor. Spec E-#5

3.1 TECHNICAL DESCRIPTION:

3.1.1 The Contractor shall be responsible for any transportation of the pumps to and from any shore facilities. All measurements are to be recorded, and given to the Owner's Rep within 1 day of measuring. Work on the pumps is to be carried out in conjunction with the spec for the removal of the electric drive motor.

3.1.2 Pumps shall be dismantled, cleaned and examined for defects at the contractors facility:

- (i) Pumps shafts and casings shall be examined for corrosion/erosion and wear.

- (ii) Impellers to be examined for scoring, pitting, corrosion/erosion and wear.
- (iii) All defective parts shall be replaced (owner supplied) as decided upon by the Chief Engineer at the time of inspection by himself and TCMSB. It will be the Contractor's responsibility to call the regulatory body for these inspections as work progresses.
- (iv) Pumps are then to be reassembled using new gaskets and mechanical seal, Owner's supply.

3.1.3 The following measurements are to be taken, recorded and type written copy (electronic Format) given to Chief Engineer:

- Shaft and housing diameters
- Impeller diameter
- Internal housing diameter's
- Impeller thickness

3.1.4 Alignment shall be checked and adjusted using a dial indicator and coupling reconnected when the correct alignment is achieved.

3.3 **Interferences**

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

4.1 PROOF OF PERFORMANCE:

- 4.1.1 On completion of work the pumps shall be test ran for one (1) hour. Pressures and temperatures to be monitored.
- 4.1.2 All work shall be completed to the satisfaction of the Chief Engineer.
- 4.1.3 This specification is to be carried out in order to obtain TCMS survey credit. The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections.

5.2 DELIVERABLES:

- 5.2.1 The Contractor shall produce and give to the Chief Engineer two copies of readings (electronic Format).

Spec item #: E - 3	SPECIFICATION	TCMSB Field #: N/A
MAIN ENGINE STBD & STBY S/W COOLING PUMPS MOTORS		

1.3 SCOPE:

The intent of this specification shall be for the Contractor to open up both motors for overhaul and TCMS inspection.

2.3 REFERENCES:2.3.1 Nameplate Data ABB

Motor type MBT 180m

No: 95101672101

23 kW 460 volts

Speed: 1765 rpm

2.1 Owner Furnished Equipment

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

2.2 Standards.

The pumps and electrical motors will require isolation, locking out of service, and tagged by the Owner's representative prior to commencing work. The contractor shall meet the manufacturer's standards for installation, along with compliance with TC Electrical and Mechanical regulations. The contractor must adhere to / follow the ship's ISM Hot Work, and Lock out procedures. All Hot Work shall be completed in accordance with Coast Guard Fleet Safety Manual Section 7.D.11 and 7.D.11 (N).

Related Specifications

This work shall be carried out in Conjunction with the following: Removal of the S/W cooling pump. Spec E #4

3.1 TECHNICAL DESCRIPTION:

3.1.1 Contractor shall be responsible for any transportation of the motors to and from any shore facilities. Work on the motors is to be carried out in conjunction with the spec for the removal of the pumps.

3.1.2 The contractor shall disconnect cabling and remove the Motors and bring to the contractor's shop. Motors are to be Meggar tested and readings recorded. Motors are to be completely disassembled, cleaned and inspected by TCMS inspector. Bearings and any shaft seals, if fitted, are to be renewed, part numbers of renewal parts to be recorded. An allowance of \$2000 for contractor supplied bearings and parts shall be adjusted up or down by PWGSC 1379 action.

3.1.3 On reassembly, motors are to be Meggar tested and readings recorded again .
Motors are to be bench tested and vibration levels to be checked and motors balanced. At completion of overhaul, motors are to be given two spray coats of good quality marine grade paint of similar colour to original paint.

3.1.4 Motors are to be returned to Engine Room and re-installed onto the pumps.

3.1.5 The Contractor shall verify rotation prior to removal and again after re-installation.

3.4 Interferences

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

4.1 PROOF OF PERFORMANCE:

4.1.1 On completion of work, the motors shall be test ran for one hour. Temperatures to be monitored.

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

4.1.3 This specification is to be carried out in order to obtain TCMS survey credit. The Contractor shall be responsible for contacting the TCMS surveyor when items are ready for the inspections.

5.3 DELIVERABLES:

5.3.1 The Contractor shall produce and give to the Chief Engineer three copies of readings (electronic format).

Spec item #: E - 4	SPECIFICATION	TCMSB Field #: N/A
WATERTIGHT DOOR UPGRADE AND INSTALLATION		

1.1 SCOPE:

The CCGS Cape Roger is fitted with two sliding watertight doors and a third Walz and Krenzer door at frame 67 Lower deck, access to the Cargo Hold Tween deck. The doors have local manual and remote manual operations through a hand hydraulic pump. The intent of this specification shall be to upgrade the watertight door control system to include powered operation with a wheelhouse mounted controller and install Walz and Krenzer hydraulic operating devices to existing doors.

2.1 REFERENCES:

2.1.1 Guidance Drawings/Nameplate Data

- Hanston watertight door -Manual-Ships Office
- MSI dwg W/T Door Control System Upgrade No. 1923-01-00
- Walz and Krenzer Contractor Supplied Parts List

2.1.2 Standards

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

(a) TP 127E-TC Marine Safety Electrical Standards.

(b) IEEE Standard 45: Recommended Practice for Electrical Installation on Shipboard.

2.1.3 Regulations

- CANADA SHIPPING ACT - Marine Machinery Regulations

2.1.4 Owner Furnished Equipment

The vessels owners will supply Class Approved watertight door actuating devices for remote closing and rotary pump for local operation at door. The vessels owners will also supply electro-hydraulic power packs to enable remote closing from the Bridge. The contractor shall supply and install all of the requirements for upgrading the hydraulics to electro-hydraulic controls with a bridge control station.

2.1.5 Contractor's Responsibility

It is the contractor's responsibility to follow all applicable provincial and local regulations. The contractor is to adhere to all DFO-Coast Guard / PWGS work requirements and must complete the work to the satisfaction of both the Chief Engineer and the attending TCMS Surveyor.

The contractor is responsible to provide all materials, labor lighting, ventilation, staging and lifting capacity to complete the required tasks. The contractor is also responsible for all temporary enclosures to facilitate the work, and finally, clean up and disposal of debris generated due to the work.

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

Related Specifications:

3.1 TECHNICAL DESCRIPTION:

3.1 General

3.1.1 Materials

The contractor shall use new and clean Lloyds Grade "A" plate and sections.

All plate and sections are to be clean and primed with a weldable primer prior to fabrication. Material certificates for the steel to be provided. Any substitution of plate or stiffener sizes for the specified metric plate is to be made by written request and must be accepted by owner prior to fabrication.

3.1.2 Welding

The contractor shall remove weld splatter and smooth weld seams and sharp edges and remove grease, smoke, and soot marks as per SSPC-SP 1. All welds shall be power tool cleaned to SSPC-SP 3 and primer applied by hand brush.

3.1.3 Coatings and Paint Work

3.1.3.1 The contractor will be responsible to prepare and coat any new or heat effected steel in the work area. The heat affected area shall be power tool cleaned to SSPC-SP 3 feather edged and primer applied by hand brush and 2 coats Matchless Red Primer reapplied.

3.1.3.2 The contractor is to supply all coatings. All coatings are to be in accordance with the ships painting system.

3.1.3.3 The contractor is to complete the coating and all associated machine tooling to feather back the effected areas.

3.1.3.4 All coatings, glues, and solvents must be supplied with acceptable WHIMS data sheets and correctly marked. The contractor is responsible to remove all containers of paint and solvents from the work place daily.

3.2 Hydraulic Specifications

3.2.1 Existing Door Controls

Currently, the existing two WT doors are controlled manually with hand pumps located on the main deck and locally at the doors. These two doors will require modification to allow the Walz & Krenzer rotary manual control and electrically driven hydraulic pumps

for remote control or local operation to be incorporated. Refer to MSI Drawing #1923-01-00 for location of Manual Closing Station of Aft Doors. The two existing doors are located at position '4' & '5' and each requires installation of the new electrically driven hydraulic pump/manifold assembly. The contractor will install two (2) new electrically driven hydraulic pump/manifold assemblies. The pump units (Owner supply) Walz and Krenzer supplied as per the attached parts list in **Appendix C- Walz and Krenzer Parts List..**



3.2.2 **New Door Controls**

The new watertight door at frame 67 will require to be connected to Ship's Electrical distribution and Bridge Control to operate electrically driven hydraulic pump for remote control. The contractor will install all control system components for the existing water tight doors. See attached list of components required in Appendix C- Walz and Krenzer Owner Supplied Parts List. Power supply is fed from Panel EM3 (Emergency Switchboard). Note: Cabling previously installed.



3.3 Installation of the Wheelhouse Control Panel

The contractor is to install the Wheelhouse Water Tight Door Control Panel as per Appendix C- Walz and Krenzer Owner Supplied Parts List. This panel is to be an integrated control panel that will close all three water tight doors, individually or all at once, and show door position indication. The wheelhouse control panel is to be supplied by the contractor with a 24 volt D.C. power supply from Navigation Panel # 2 on the port side of wheelhouse. (Note picture of similar panel on CCGC Cygnus)



3.4 Steel Work to Install Components

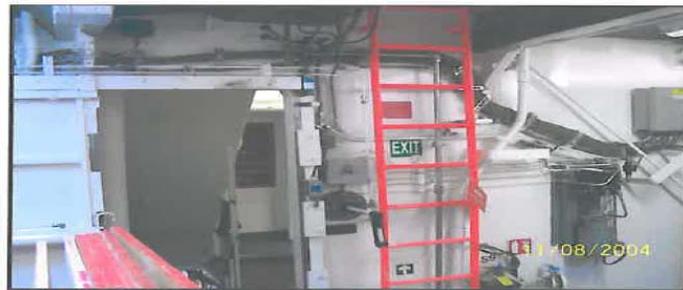
The contractor will be responsible to complete all steel work to install the Watertight Door Control Systems. This will include the following,

1. Note that the existing hand pumps/supply tanks located at the Manual Closing Station for Aft Doors will not be utilized and will be replaced / supplied by the contractor.
2. Remove 2 existing remote, hand-operated pump station located at frame 38.
3. Mount the supply tanks (approx. 2 gallons) at existing Watertight door remote station frame 38 and new remote hand pump.
4. Mount rotary pump set and electro-hydraulic power pack at existing door at frame 11 complete with controls on each side of bulkhead.
5. Mount rotary pump set and electro-hydraulic power pack at existing door at frame 21 complete with controls on each side of bulkhead.
6. Fit brackets, cable clamps, tubing supports and bulkhead penetrations as needed.

3.5 **Installation Details Control System**

The contractor shall follow the manufacturer recommendation for the installation of the water tight door control system components. Cabling and power has been routed to the required locations. The contractor shall perform wire terminations at watertight door locations. Each existing door is to be fitted with an electrically operated pump set. Each pump set is to be connected to the ships main power supply system from Watertight door panel EMS-9 located at entrance to Cool Room by the contractor. The power supplies for the three doors shall be from this panel.

The cable is already in place in existing cable routing trays. The contractor is to include the installation of bulkhead cable penetrations locally at the doors as required.



The following addition installation notes apply to this installation,

1. All valves (relief valves, directional control valves, check valves) and pressure switches shall be supplied / installed by the contractor as a block assembly mounted on the same plate as the electric motor/pump for ease of installation.
2. Isolation/Shut-off valves with lockable handles will be supplied / installed by the contractor on each pressure and return line below the bulkhead location. (1/2" pressure, 3/4" return).
3. The motor, pump, valve assembly and the local hand pumps must be installed within 10' from the door. Tubing between the motor, pump, valve assembly, local hand pumps and the door cylinders must also be within 10' from the door.

New tubing and associated fittings are required and to be supplied by the contractor for modification of the existing doors and the new door.

Local control of motor/pump shall be installed by the contractor at each door.

3.6 **Hydraulic Tubing Specifications**

The contractor will supply and install the hydraulic lines from the power pump sets to the doors and from the local and remote hand pumps to the door such that a complete system is provided. The following recommendations regarding tubing apply,

1. All tubing shall be 316 stainless steel, ASTM A213,A269, ASME SA213, TP316L
2. -3/4" O.D. tubing (the return lines to tank).
3. -1/2" O.D. tubing (some pressure lines and hand pump suction).
4. -3/8" O.D. tubing (cylinder work ports).
5. -1/4" O.D. tubing (sensing lines on motor/pump manifold assembly).
6. Tubing to be pressure tested and flushed to AS 4059 Class 6B-F.
7. The system will be designed to operate at a working pressure of 500 psi for the manual pumps and 800 psi for the electrically driven pump.

3.7 **System Components and Testing pressure**

Based on information from Walz and Krenzer, the following system and test pressures are offered as guidance.

Cylinder specifications for the WT doors:

- Normal operating pressure 800 psi (500 psi w/ hand pump)
- Design pressure 1200 psi
- Test pressure 1800 psi

Local hand pumps specification:

- Flange mounted reversible hydraulic pump
- Pump capacity 0.85 G.P.M. @500 psi rotated at 80 RPM.

Remote hand pump specification:

- Flange mounted unidirectional pump
- Pump capacity 0.85 G.P.M. @ 500 psi rotated at 80 RPM.

Hydraulic pump specification:

- 1.5 G.P.M. @1800 RPM

Valve specifications:

- Working pressure of 800 psi
- Design pressure 1200 psi
- Test pressure 1800 psi

3.8 **Location**

As per MSI Drawing #1923-01-00

3.9 **Interferences**

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

4.1 PROOF OF PERFORMANCE:

4.1 **Inspection**

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

The work is to be completed to the satisfaction of the attending TCMS inspector and the technical Authority. The completed steel work is to be visually inspected after welding is completed.

After acceptance of the installation by the TCMS and owner's representatives, the area is to be inspected to ensure all debris have been removed, then the contractor will coat and insulate the areas.

4.2 **Commissioning and Testing of the System**

The contractor will be responsible for commissioning and testing the systems. The commissioning and testing shall be witnessed by Transport Canada, the Chief Engineer, and the technical Authority. All components and tubing section are to be flushed and or proven clean before filling the system with fluid. Once the system is filled with fluid and all electrical components operational, the doors are to be cycled. The commissioning and final testing is to include the following items.

1. Each door to be opened and closed (cycled) a total of ten times from all three of the control options. Local power control, local manual control and remote manual control.
2. During the door cycling the system pressures are to be monitored and recorded as part of the documentation package.
3. After cycling the hydraulic connections are to be leak tested

The system is to have any and all entrapped air bleed off. The contractor is responsible for any air quality testing to ensure hot work and entry is permitted. The contractor shall issue and post hot work permits and shall maintain a fire watch.

4.3 **Certification** CWB Welding Certificates.

5.1 DELIVERABLES:

5.1 **Drawings/Reports**

The contractor is to complete digital pictures of the current watertight door installation before and after the work is completed. These pictures are to be used to verify that all equipment has been reinstalled as per the original. Three copies of the following documentation are to be supplied upon completion of work scope:

- Picture before and after –about 8 at each time.
- CWB Certificates for Welders
- CWB Certificates for Weld Supervisor
- CWB Weld Procedures
- CWB Weld Data Sheets
- MPI Testing Documentation
- Report on the Hydraulic Flushing

5.2 **Spares** N/A

5.3 **Training**
N/A

5.4 **Manuals**
N/A