CCGS FCG SMITH

DRYDOCKING SPECIFICATION

2012-2013

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ITEM NO H.D. – 1 **DRYDOCKING** **REMARKS**

1.1 Reference: Docking plan Drawing. No. 45058

1.2 **Ship's particulars**

Length overall	34.8 meters
Length between beam	14.0 Meters
Forward mean draft	**2.0** meters
After mean draft	**2.1** meters
Load displacement	430 tonnes

1.3 Unless otherwise stated, the contractor shall supply all materials and labor required to complete all work described in this specification.

1.4 The shipyard shall be responsible for mooring the vessel at a wharf adjacent to the slipway in which it will be drydocked as well as the ship's displacement to the wharf adjacent to the slipway or drydock and to return the vessel to the same wharf upon completion of work, including the installation and removal of a gangway, to be supplied by the shipyard.

1.5 The shipyard shall supply labour, material and equipment required for docking, towing and undocking of vessel, including lay days throughout drydocking period (2012/12/03 to 2013/03/15), to perform the work described hereunder, in view of obtaining renewal of seaworthiness certificate from Transport Canada.

1.6 The blocks supporting the ship, but in way of drain plug, grattings, sea chest and keel cooler will be removed. Avoid any blocks in way of the echo sounder transducer as shown in drawing No.45058

1.7 As the shipyard will be in possession of the docking plan upon contract award, the shipyard will move any misplaced blocks at its own expense.

ITEM NO H.D. – 1	DRYDOCKING	REMARKS

1.8 The shipyard shall supply the material and labour required to number the hull frames and bulkheads in order to facilitate external inspection. The shipyard shall ensure that the frames remain numbered during the entire drydock period.

1.9 If the Coast guard representative asks for removal of blocks for any reason, the contractor shall submit a firm price in annex of this item.

1.10 A four hour sea trial shall be done when all the work described in this specification is completed. The sea trial shall be performed during a normal eight hour working day.

1.11 The shipyard Forman and two mechanics shall be on board the vessel for the trial and all the personnel needed for mooring and unmooring the vessel shall be provided by the contractor.

1.12 The contractor shall be responsible for the handling of all ships mooring lines. Any yard shifts shall be at the contractor's expense including mooring and fenders. The crown shall have access to the vessel at all times during the dry-docking period. The vessel's crew shall be present two weeks prior to the close of contract for remobilization and sea-trials.

ITEM NO H.D. – 2	SERVICES	REMARKS

2.1 Unless otherwise stated, the following services shall be provided to the ship throughout the entire dry-docking period, for which a global price shall be submitted. This price will encompass the entire drydocking period. The service identified by asterisk shall be provided during drydock and also at the contractor wharf.

2.2 *Supply labour and services for the installation and removal of 1 gangway, handling of lines and ropes and installation of a safety net under the gangway. Gangway is shipyard supply.

2.3 *During the two week remobilization period, the contractor shall supply and connect 1 telephone line to the ship's internal communication system. Disconnect the telephone line at the end of the drydocking period. The telephone line shall be in service 24 hours a day, ensuring communication with the exterior of the shipyard at all times. The invoice itemising cost of long distance calls shall be forwarded to the attention of the TA.

2.4 In order to protect floors and alleyways, supply and install 1/16" thick cardboard throughout the entire internal surfaces on the main deck, alleyways, Chief Engineer's cabin, wheelhouse, main deck toilet and dining room. The cardboard shall be installed as soon as the ship enters drydock and replaced when damaged. The surface to cover is 102 m^2.

2.5 Throughout the duration of work on shipyard premises, in and out of drydock, supply material and labour to connect and disconnect 1 ship's electrical cable to shore power supply. Power supply shall be a 3 phase alternating current, 600 volts and 100 amp capacities. The ship has a 100 foot cable fitted with a male connector (3wires, 3 pole, 200 amperes and 1 ground wire).

2.6 During the two week remobilization period, when the vessel is in drydock, the contractor shall supply material and labour to install required connections to provide fresh water supply for services. Disconnect upon completion of work.

2.7 The Contractor shall provide continuous fire monitoring and extinguishing services in accordance with the Contractor's standing operating procedures for the duration of the contract period. A signed hard copy and a copy in pdf format shall be submitted to the CCG Technical Authority (TA) upon awarding of the contract.

2.8 Supply material and labour to temporarily connect drainage hoses to keep waste water away from ship's hull and drain these waters to drydock drainage system during painting work.

2.9 Supply refuse and garbage containers on the after deck of the ship. Remove and empty daily.

2.10 Provide a docking plan outlining the position of the blocks during this drydocking so that the ship may be painted under the blocks during the next drydocking. This docking plan shall be submitted for approval upon completion of the current work in drydock.

ITEM NO H.D. – 2	SERVICES	REMARKS

2.11 Contractor shall ensure that upon completion of work the ship is delivered to the Coast Guard representative in a clean state and free of all dust on all internal as well as external areas.

2.12 Provide a firm price to ensure ship security for the duration of the contract.

2.13 Supply the materiel and labour to connect two sewage o'board discharges as indicated by the chief engineer.

2.14 Provide free and continuous access to the shipyard and vessel by Coast Guard representatives for the duration of the contract.

2.15 Provide an office for two Canadian Coast Guard representatives. This office will be equipped with two telephones (one line) allowing communications out, 2 desks, 2 chairs, one shelf and one coat-peg. Supply a high speed internet modem, a printer, a fax machine, the connection cables and all supplies for this hardware.

ITEM NO H.D. – 3 INSPECTION AND ADDITIONAL WORK REMARKS

3.1 The Contractor shall afford the TA (or his representative), the opportunity to inspect each work item prior to reassembly and/or closing of the item and upon completion of all work for that particular item. The Contractor shall give the TA a minimum of one day notice for the opportunity to inspect a work item.

3.2 The Contractor shall be responsible to schedule all regulatory inspections directly with the office of Transport Canada Marine Safety (TCMS). Inspection fees shall be forwarded to the TA.

3.3 Failure to notify the Coast Guard representative does not absolve the shipyard of the responsibility of providing the opportunity to inspect any completed item.

3.4 Inspection of any item by the Coast Guard representative does not substitute for any required TCMS inspection.

3.5 The shipyard shall provide of the Coast Guard Technical Support representative with 4 complete logs and one copy in PDF format of all measures and readings taken throughout the duration of the specification work as well as all additional work arising from inspection of the hull and its components.

3.6 All additional work shall be processed in accordance with the Public Works and Government Services (PWGSC) Standard Acquisition Clauses and Conditions (SACC) Manual. A written description shall be drafted by the Coast Guard representative so that the PWGSC Contracting Authority (CA) may obtain a negotiated firm price before the start of work.

3.7 The selected shipyard will have to abide by the Canada Labour Code and the ISM (International Safety Management) code applicable on the ships.

3.8 Should the ship be required to sail away from its usual operational zone to carry out its dry dock, all additional expenses for ship safety licensing application, installation of electronic equipment and additional rafts, etc. required by the different regulations will be at the contractor's expenses.

3.9 All specified work other than dry-docking, undocking and services shall be performed while the vessel is completely secured in dry-dock.

ITEM NO H.D. – 4	**STAGING AND CRANES**	**REMARKS**

4.1 Supply necessary material and labour to erect staging for all work to be performed on the ship's hull including underwater area, above water line area, propellers, rudders, etc. as well as additional work. Remove staging upon completion of work.

4.2 Supply the services of a crane and crane operator including a signalman and the personnel required for the work to be performed throughout the drydocking period.

4.3 Supply the services of a shipyard crane for eight (8) hours for general ship purposes (indicate an hourly rate).
(The crane is for ship purposes and does not include shipyard work included in your bid.)

ITEM NO H.D. – 5	RUDDERS	REMARKS

5.1 All necessary staging for this work shall be erected and later dismantled at the end of the works.

5.2 The rudder stocks shall be given zero helm in the steering gear compartments and then the rudders position checked for corresponding alignment outside the ship.

5.3 Remove the bars and rods mechanism from each of the rudder stocks located in the compartment aft of the ship.

5.4 Unscrew the rudders locking nuts.

5.5 Dismantle the pins from the port and starboard rudder hydraulic cylinders.

5.6 Remove the jumping collars from each of the rudders.

5.7 Each rudder carrier bearing and rudderhead gland shall be disassembled, clean and then inspected by TCMS. The contractor will provide and install an eyescrew to be fitted in the top of the rudderhead and the rudderstocks securely supported.

5.8 Each rudder shall be laid down in the dock. A hydrostatic test shall be performed on each rudder (2.45m head of water) for TCMS approval. Following the inspection, each rudder shall be filled with a hot bitumastic solution and then turned over three times to ensure that the solution adheres to all surfaces inside the rudder. Drain and dispose the bitumastic in a container supplied by the contractor.

ITEM NO H.D. – 5	RUDDERS	REMARKS

5.9 Clearances shall be taken between each of the rudder stocks and their bearings prior to dismantling. Clearances shall be recorded in a measurements log

5.10 Remove the rudder stock and lay it down in the dock. Clean rudder stocks and rudder trunk. Take a dimensional reading of the stocks and bearings.

5.11 Following inspection by the TA and TCMS, reinstall the rudder system according to the described procedure.

5.12 Renew the packing of each gland with a marine type packing supplied by the contractor and approved by the chief engineer.

ITEM NO H.D. – 6	STERN TUBES AND SHAFTS	REMARKS

6.1 Once the vessel is dry docked contractor shall clean and flush the port and starboard stern tubes of the vessel

6.2 Contractor shall withdraw the port and starboard tail shaft such that TCMS may inspect the stern tube bushings and shafts.

6.3 Contractor shall provide all necessary staging and rigging required to withdraw the shafts and the propellers. The rope guard and the rudders shall be removed prior to removing the tail shafts and propellers.

6.4 Propeller blade tip to nozzle clearance readings shall be taken at the 12, 3, 6 and 9 o'clock positions prior to uncoupling the tail shafts. The contractor shall afford the TA the opportunity to witness the measurements. Punch marks shall be made so that on replacement of the tail shaft, the propeller can be measured again to prove trueness of installation. The propellers shall be rotated 90 degrees and the same procedure shall be performed again with another set of readings taken. Two copies of all readings shall be submitted to the TA prior to the close of contract.

6.5 The Contractor shall remove and dispose of all stern tube oil (≈ 250 liters) in accordance with all applicable governmental regulations.

6.6 Hand rails, floor plates, stringers and any other interference items that can be readily seen at the time of viewing shall be removed for access and replaced on completion. Propeller control gear covers and propeller hub shall be opened up and the control rod disconnected. Inner and outer stern seals shall be removed.

6.7 Prior to docking the vessel, the contractor shall take port and starboard alignment readings with a dial gauge. The Contractor shall afford the TA the opportunity to witness the readings and the contractor shall give two copies of all the readings to the TA. The contractor shall uncouple the forward coupling of port and starboard line of shafting in order to take a set of readings then the contractor shall measure the port and starboard tail shaft alignment. A second set of readings shall be taken following vessel undocking.

Note: Each shaft shall be properly supported following the alignment readings process.

6.8 Each shaft shall be withdrawn outboard. The two journal bearing, the two MUFF couplings and the crane seal of the port and starboard line of

shafting shall be disassembled and cleaned prior to TCMS inspection. The port and stbd tail shafts shall be sufficiently supported to protect against damage and sagging.

The port and stbd shafts shall be reinstalled as per original following TCMS approval.

6.9 Pitch control gears shall be reconnected; covers replaced and pitch activators tested to prove satisfactory operation.

6.10 All required replacement parts shall be CCG supplied. The Contractor shall flush the complete port and starboard sterntube lube oil systems for a minimum one hour period using new Contractor supplied EXMAR 24TP30 oil or equivalent in accordance with manufacturer's specifications. All equipment and materials for this work shall be Contractor supplied.

6.11 Upon completion of the flushing, each stern tube shall be drained of the flushing oil into suitable containers and disposed of by the contractor in accordance with applicable governmental regulations.

6.12 Contractor shall disconnect the pump from each system and reconnect any disturbed piping. The Contractor shall supply new manufacturer recommended oil (EXMAR 24TP30) and replenish the stern tubes to operating levels in accordance with manufacturer's specifications and in consultation with the TA.

Once the tubes are filled, they shall be bled of all air in the system. This is done via the bleed cocks found on each forward shaft seal and the bleed screw found on the propeller shaft and the forward coupling.

6.13 Header tank for each stern tube shall be opened up cleaned and visually inspected by the chief engineer prior to filling with fresh oil. Tanks shall be reassembled using new gasket witness by the chief engineer.

ITEM NO H.D. – 7 GRIDS, SEA CHESTS AND SEA BAYS, ZINC ANODES **REMARKS**

7.1 Open the sea bays and the two sea suction grids.

7.2 Clean with a high pressure water jet all the internal surfaces of the sea bays. Clean all the waste sludge. The sea chests shall be sand blasted and painted as described for item H.D.-12.

7.3 The contractor must remove all anodes and replace same with new following the painting process. The TA shall inspect the anodes. A unit price for replacement of the anodes must be given by the contractor.

7.4 All grids shall be reinstalled upon completion of the coating drying process. The grids shall be bolted in place with new stainless steel bolts and stainless steel lock wired.

7.5 Each KORT nozzle has 6 anodes type Z-3 (tear drop shaped) for a total of 12. Each sea bay has 2 anodes for a total of 4. The contractor shall disconnect and remove and from each hull 3 cathodic protection elements before the start of sand blasting and coating. All openings and threads shall be protected during the sand blasting and coating processes. The cathodic protection element shall be reinstalled.

ITEM NO H.D. –8 SEA WATER SUCTION AND O'BOARD DISCHARGE VALVES **REMARKS**

8.1 Supply material and labour to dismantle, clean and lap the ship's sea valves.

8.2 Upon completion of TCMS inspection, all valves shall be reinstalled with Contractor supplied new marine grade seals and packing as per original. The Contractor shall afford the TA the opportunity to witness the final reassembly of all valves.

8.3 All damaged valves shall be repaired or replaced in accordance with clause 3.6 of this specification.

8.4 All the sea suction valves are globe valve screw lift type and all the over board discharge valves are non return screw lift type.

Note :(See next page for identification of valves).

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ITEM NO H.D. –8 SEA WATER SUCTION AND O'BOARD DISCHARGE VALVES **REMARKS**

Type of valves

(See figure 1 at the end of the specification for position of the valves)

No.	Diameter	Description	Remarks
1	¾ inch	O'board discharge sewage port side	
2	2 inches	Suction sanitary and air conditioning	
3	¾ inch	O'board discharge air conditioning	
4	2 inches	O'board discharge main engine cooler port side	
5	2 inches	Suction bilge pump port side	
6	1 inch	Suction main engine cooler port side	
7	2 inches	Suction fire pump port side	
8	2 inches	O'board discharge bilge pump port side	
9	2 inches	O'board discharge galley and dishwasher	
10	2 inches	O'board discharge washing machine	
11	¾ inch	O'board discharge sewage starboard side	
12	2 inches	O'board discharge main engine cooler starboard side	
13	2 inches	Suction fire pump starboard side	
14	1 inch	Suction main engine cooler starboard side	
15	2 inches	Suction bilge pump starboard side	
16	¾ inch	O'board discharge oily water separator	
17	2 inches	O'board discharge bilge pump starboard side	
18	2 inches	O'board discharge shower starboard side	

ITEM NO H.D. –9	FUEL TANKS	REMARKS

9.1 Upon entering dry-dock, all fuel tanks shall be completely drained and removed fuel shall be stored in clean Contractor supplied containers for return to the vessel as per original prior to refloating. The quantity of fuel removed and stored shall be recorded in the presence of the TA. Once drained of all fuel, all fuel tanks shall be steam cleaned and ventilated in accordance with Marine Occupational Health and Safety (MOHS) regulations for entry into confined spaces. All waste shall be disposed of in accordance with all applicable environmental regulations.

Entry into all confined spaces shall be prohibited until such time as all MOHS regulation requirements for entry into confined spaces have been met. A copy of all required documentation associated to the aforementioned regulations shall be submitted to the TA at the earliest possible convenience.

9.2 All fuel tanks shall be inspected in accordance with the Hull Inspection Regulations of the Canada Shipping Act (CSA). Prior to tank closing, the Contractor shall afford the TA and TCMS the opportunity to inspect all fuel tanks. Fuel tanks shall then be closed with new Nitrile gaskets, bolts, nuts and washers as per original and tested in accordance with the Hull Inspection Regulations of the CSA. The Contractor shall afford the TA and TCMS the opportunity to witness all tank testing. Tanks shall then be drained and dried of all water. The Contractor shall afford the TA the opportunity to witness the final closing of all tanks.

ITEM NO H.D. –9 **FUEL TANKS** **REMARKS**

Fuel tanks identification

Identification	Location	Capacity
Port after	Between frames 8-10	10550 litre
Starboard after	Between frames 8-10	10550 litre
Port forward	Between frames 17-18	8660 litre
Starboard forward	Between frames 17-18	8660 litre

ITEM NO H.D. – 10 FRESH WATER TANKS REMARKS

10.1 The four following tanks shall be considered.

No. 1	Starboard double bottom	Between frames 18-20	5250 litre
No. 2	Port double bottom	Between frames 18-20	5250 litre
No. 3	Port after	Between frames 3-4	2900 litre
No. 4	Starboard after	Between frames 3-4	2900 litre

10.2 All water tanks shall be completely drained immediately following the dry-docking process. Manhole covers shall be removed and tanks ventilated. Entry into all confined spaces shall be prohibited until such time as all MOHS regulation requirements for entry into confined spaces have been met. A copy of all required documentation associated to the aforementioned regulations shall be submitted to the TA at the earliest possible convenience.

10.3 Tanks interiors are coated with white epoxy. All water tanks shall be thoroughly cleaned using a high pressure water jet without damaging the coating. Tank residues shall be completely removed and tanks dried. All water tanks shall be inspected in accordance with the Hull Inspection Regulations of the Canada Shipping Act (CSA). Prior to tank recoating, the Contractor shall afford the TA and TCMS the opportunity to inspect all water tanks.

10.4 The Contractor shall supply and apply a coating of white epoxy INTERLINE 925 in compliance with manufacturer's specifications. One coat of 12 mils dry shall be applied on all metal surfaces and a second coat applied to all surfaces. Following the drying period, and prior to final closing, the Contractor shall afford the TA and Health Canada the opportunity to inspect all water tanks. All manhole covers shall be reinstalled as per original using new gaskets, and fasteners.

10.5 Tanks shall be tested in accordance with Hull Inspection Regulations of the CSA. The Contractor shall afford the TA and TCMS the opportunity to witness all tank testing. All water tanks shall then be disinfected in accordance with procedure 3.5.2 section 7.F.12 of the CCG Fleet Safety and Security Manual (FSSM) (current copy available on request). Disinfection water shall be disposed of in accordance with procedure 3.5.2 section 7.F.12 of the CCG Fleet Safety and Security Manual (FSSM) (current copy available on request). Tanks shall then be dried of all water.

10.6 Following the completion of all work in this contract and avoiding all risk of freezing and prior to the close of contract, the Contractor shall fill all water tanks to 95% capacity with potable water to the standard specified in procedure 3.5.1 section 7.F.12 of the CCG FSSM (current copy available on request).

ITEM NO H.D. – 11 HULL REPAIRS AND PLATING WELDING REMARKS

11.1 The contractor shall provide 250 linear feet of welding on the ship's hull including the keel, curtain plates and port and starboard anchor pockets.

The specified feet of welding may vary subject to inspection of the ship's hull by Coast Guard and Ship Safety representatives. Any variance shall be adjusted in accordance with the PWGSC Standard Acquisition Clauses and Conditions (SACC) Manual. A written description shall be drafted by the Coast Guard representative so that the PWGSC Contracting Authority (CA) may obtain a negotiated firm price before the start of work.

11.2 Personnel performing the work must be certified in accordance with current and applicable Canadian Welding Bureau (CWB) regulations.

11.3 Contractor shall ensure that ideal conditions are met to undertake work according to the recommendations of the Canadian Welding Bureau (CWB).

11.4 All weld gouging shall be carried out in consultation with the attending TCMS Surveyor and in accordance with all applicable CSA regulations and applicable CWB specifications.

ITEM NO H.D. – 12	HULL PAINTING	REMARKS

12.1 The Contractor shall recoat approximately 4200 feet^2 of the vessel's hull to incude all underwater surfaces, rudders, Kort nozzles, sea bays, keel cooler housing and grids.

12.2 Prior to coating application, all aforementioned surfaces shall be prepared in accordance with the coating manufacturer's specifications.

12.3 The Contractor shall erect a temporary shelter heated as required and covering all areas to be coated such that the coating application process can be carried out in accordance with the coating manufacturer's application procedure regardless of weather conditions. The shelter shall be removed at the end of the coating process.

12.4 The shipyard shall supply and apply **International red** paint using appropriate equipment and in accordance with the paint manufacturer's specifications. The contractor shall follow the manufacturer's technical date sheets at every step of the works for preparation, application and drying of the surfaces.

12.5 Precautions shall be taken to prevent oxidation of all surfaces to be coated prior to the application process. The Contractor shall afford the TA the opportunity to inspect all surfaces to be coated immediately prior to coating application. Oxidized surfaces shall be corrected prior to coating application at the Contractor's expense.

12.6 All equipment and surfaces which are not part of but are in proximity of the recoating process shall be protected from damage during surface preparation and from overspray during coating application. All damage or overspray resulting from the coating process shall be repaired and returned to original condition at the Contractor's expense. Anodes, sea

suction grids, keel coolers, and all other obstructions shall be removed as required such that all identified surfaces can be coated as specified. All removed obstructions shall be reinstalled as per original upon completion of the recoating process.

12.7 Care shall be taken when applying the **International** paint to ensure that the minimum dry film thickness is obtained over the entire surface area. Paint sags and runs shall be avoided.

12.8 The Contractor shall adhere to the manufacturer's specified drying period and shall ensure that all coatings are completely dry prior to refloating the ship.

12.9 The Contractor shall apply one initial coat of INTERGARD 264 red epoxy in accordance with manufacturer's specifications. Code FPL274/FPA327 or (FPL274/FCA321 low temperature version as deemed necessary). The thickness of the coating shall be 5 mils dry film (6.5 mils wet film) on all surfaces identified in 12.1 of this specification.

The Contractor shall apply a second coat of INTERGARD 263, code FAJ034/FAA262 grey epoxy, 5 mils dry film (9 mils wet film) on all surfaces identified in 12.1 of this specification in accordance with manufacturer's specifications.

The Contractor shall apply a third and fourth coat of INTERVIRON BRA640, anti-fouling (red), 5 mils dry film per coat (8 mils wet film) on all surfaces identified in 12.1 of this specification in accordance with manufacturer's specifications.

12.10 The entire recoating process shall be carried out in close consultation with the manufacturer's representative.

ITEM NO H.D. – 13 HULL RECOATING ABOVE WATERLINE REMARKS

13.1 The Contractor shall recoat approximately 5700 feet^2 of hull surface area above the water line including all bulwarks and bulwark rails.

13.2 All surfaces identified in 13.1 shall be prepared in accordance with the coating manufacturer's specifications.

13.3 Precautions shall be taken to prevent oxidation of all surfaces to be coated prior to the application process. The Contractor shall afford the TA the opportunity to inspect all surfaces to be coated immediately prior to coating application. Oxidized surfaces shall be corrected prior to coating application at the Contractor's expense.

13.4 Starting from the maximum load line apply one coat of INTERGARD 264. Codes FPL274/FPA327 red or (FPL274/FCA321 low temperature version) for a thickness of 5 mils dry film (6.5 mils wet film) on all unpainted surfaces (15%) in accordance with manufacturer's specifications.

13.5 Apply a second coat of INTERGARD 264 codes FPL274/FPA327 red or (FPL274/FCA321 low temperature version) for a thickness of 5 mils dry film (6.5 mils wet film) in accordance with manufacturer's specifications.

Apply a third and fourth coat of INTERTHANNE 990, red Ral 3000, for a thickness of 2.5 mils dry film (6.5 mils wet film) in accordance with manufacturer's specifications.

13.6 The Contractor shall ensure a well defined division at the maximum load line.

13.7 The entire recoating process shall be carried out in close consultation with the manufacturer's representative.

ITEM NO H.D. – 14	FREE BOARD, DRAFT MARKS AND IDENTITY PROGRAM MARKING	REMARKS

Reference: Drawing no. 07964SFB

14.1 The letters and draft marks inside and outside fore and aft, port and starboard shall be painted with 2 coats of white paint compatible with the paint that will cover the ship's hull.

14.2 All identification signs must also be repainted with 2 coats of paint. The name of the ship on both port and starboard sides, fore and aft, as well as the port of registry. On both port and starboard sides, the diagonal white stripes and the demarking black stripes, the "Coast Guard" and "Garde côtière" inscriptions, the official "Canada" flag acronyms, and "Danger" with the symbols for "propellers ".

The "Pêches et Océans Canada" and "Fisheries and Oceans Canada" inscriptions on either side of the aft section of the ship.

14.3 Contractor shall supply white paint (ral 9003) for all inscriptions and white acronyms and black paint (ral 9004) for black stripes compatible with paint already applied.

ITEM NO H.D. – 15 ANCHORS, CHAINS AND WIRES CABLES REMARKS

15.1 Lower the anchors, chains and wire cables to the bottom of the drydock. Disconnect the chains and wire cables in order to invert there extremity and then connect them together.

15.2 Chains shall be cleaned with a high pressure water jet and Anchors shall be lightly sandblasted clean. The Contractor shall afford the TA and TCMS the opportunity to inspect all equipment identified in 15.1 of this specification.

15.3 Anchors shall be painted with one coat of PRIMER CPA 039 and 2 coats of semi-gloss ALKIDE black paint following TCMS inspection.

15.4 Following the TCMS inspection, chains shall be coated with 2 coats of International INTERTUF in accordance with manufacturer's specifications. Following inspection, wire cables shall be greased with CCG supplied grease.

15.5 The Contractor shall exercise extra precaution during the reassembly of the joining shackles. The Contractor shall afford the TA the opportunity to witness the reassembly of all joining shackles.

15.6 Anchors, chains and wire cables shall be reconnected and returned to original locations upon completion of all work in item HD-15 of this specification.

ITEM NO H.D. – 16	KEEL COOLERS	REMARKS

16.1 The Contractor shall drain the port and stbd main engine cooling systems of all coolant and dispose of same in compliance with all applicable environmental regulations.

16.2 The port and stbd keel coolers shall be disconnected, removed from the hull and all interior and exterior surfaces thoroughly cleaned of all dirt, scale and other contaminants. The Contractor shall afford the TA and TCMS the opportunity to inspect the keel coolers after cleaning and prior to reassembly.

16.3 Both keel coolers shall be hydrostatically tested using an 8 foot water column or pneumatically tested at 4 psi. The Contractor shall afford the TA and TCMS the opportunity to witness keel cooler testing.

16.4 The contractor shall reassemble and reinstall both keel coolers as per original using new original equipment manufacturer's (OEM) seals and gaskets. The Contractor shall refill both main engine cooling systems to manufacturer's specified operating levels using Contractor supplied and manufacturer's recommended coolant rated to minimum -50 degrees C ambient temperatures.

16.5 Following completion of all work in item HD-16 of this specification, the Contractor shall test both main engines for a minimum one hour period each. The Contractor shall afford the TA the opportunity to witness the testing of both main engines. All defects and leaks resulting from all work performed in item HD-16 of this specification shall be repaired at the Contractor's expense prior to the close of contract.

ITEM NO H.D. – 17 ULTRASOUND READINGS REMARKS

17.1 Hull thickness testing shall be performed by a NDT UT Level II certified Technician in full compliance with ISO 9712:2005, International Standards for Qualification and Certification of NDT Personnel.

17.2 The number and location of UT shots taken shall be in accordance with Canada Shipping Act 2001, Hull Inspection Regulations (C.R.C., c. 1432) Section 27 Quadrennial or Quinquennial Inspection of a Ship Over 24 Years Old and shall in no case be less than 150 shots total evenly spaced on the shell plating.

17.3 All thickness measurements shall be recorded with their location identified on a copy of the vessel's shell expansion drawing. The percentage wastage from original thickness shall be provided.

17.4 Following the completion of all hull thickness measurements, the Contractor shall recoat all shot locations in accordance with item 12 of this specification.

ITEM NO H.D. – 18 PORT GENERATOR DIESEL SURVEY REMARKS

18. The port ship service diesel (Caterpillar 3306), shall be completely disassembled, cleaned and laid out for TCMS inspection.

18.1. All applicable safety precautions including equipment lock outs and tag outs shall be implemented prior to the start of work.

18.2. Prior to the start of disassembly, precautions shall be taken to ensure the reassembly and reinstallation of all system and equipment components are as per original and in accordance with manufacturer's specifications.

18.3. The Contractor shall report by email all deficiencies as they are identified, to the TA and make recommendations for their prompt remedial action.

18.4. All diesel engine lube oil and coolant shall be removed and disposed of in accordance with provincial and federal environmental regulations.

18.5. All work on the port ship service diesel shall be performed by a qualified Caterpillar factory service representative (FSR).

18.6. The port ship service diesel engine shall be completely disassembled, cleaned and laid out for TCMS inspection.

18.7. The diesel engine manufacturer's recommended standard core exchanges shall apply.

18.8. All diesel engine components not subject to core exchange shall be visually inspected for defects and findings recorded. Recommendations for component replacement shall be made accordingly.

18.9. Engine component wear measurements shall be taken and recorded where applicable and compared against manufacturer's specified tolerances. Recommendations for component replacement shall be made accordingly.

18.10. Following the completion of all cleaning, inspection and repairs, and prior to reassembly, the Contractor shall afford the attending TCMS Surveyor and the TA the opportunity to inspect all disassembled components.

18.11. Following inspection, the port ship service diesel engine shall be reassembled as per original and in accordance with manufacturer's specifications using new Contractor supplied OEM seals and gaskets.

18.12. Following reassembly, the engine shall be replenished to operational levels with CSM new lube oil and coolant rated at -50^{o}C in accordance with manufacturer's specifications.

18.13. Following the completion of all work, operational testing under full load shall be conducted on all disturbed equipment and systems until such time as all identified deficiencies have been corrected and full system functionality has been established.

ITEM NO H.D. – 18 PORT GENERATOR DIESEL SURVEY REMARKS

18.14. Following initial testing and subsequent repairs, the Contractor shall afford the attending TCMS Surveyor and TA the opportunity to witness a comprehensive operational test under full load of all disturbed equipment and systems.

18.15. Disposal certificates for all removed and disposed fluids shall be submitted to the TA prior to the close of contract.

18.16. A comprehensive report of all inspections including all findings, recommendations, test results and recorded measurements shall be prepared and submitted to the TA prior to the close of contract.

ITEM NO H.D. – 19 PORT TRANSMISSION BEARING REMARKS

19. The Contractor shall replace the defective port transmission bearing.

19.1. All applicable safety precautions including equipment lock outs and tag outs shall be implemented prior to the start of work.

19.2. Prior to the start of disassembly, precautions shall be taken to ensure the reassembly and reinstallation of all system and equipment components are as per original and in accordance with manufacturer's specifications.

19.3. The Contractor shall report by email all deficiencies as they are identified, to the TA and make recommendations for their prompt remedial action.

19.4. All lube oil shall be removed and disposed of in accordance with provincial and federal environmental regulations.

19.5. In consultation with the Chief Engineer, the Contractor shall perform an operational test to troubleshoot and identify the defective port propulsion transmission bearing.

19.6. The defective port propulsion transmission bearing shall be removed and disposed of.

19.7. The Contractor shall supply a new bearing having identical specifications as per original.

19.8. Only new Contractor supplied OEM seals, gaskets and replacement parts shall be used for equipment and systems reassembly and reinstallation.

19.9. The Contractor shall afford the TA the opportunity to inspect the new bearing prior to installation.

19.10. Following all inspections, the new bearing shall be installed as per original in accordance with manufacturer's specifications.

19.11. The Contractor shall supply and replenish the bearing lube oil reservoir as required using manufacturer specified oil.

19.12. The port propulsion system shall be run up and tested under load for a minimum 30 minute period such that bearing performance can be assessed.

19.13. Following the completion of all work, operational testing under full load shall be conducted on all disturbed equipment and systems until such time as all identified deficiencies have been corrected and full system functionality has been established.

ITEM NO H.D. – 20 SHAFT ALIGNMENT & COUPLING INSPECTION

20. The Contractor shall verify port and starboard propulsion shaft alignment and assess engine/transmission coupling condition.

20.1. The Contractor shall provide the services of shaft alignment specialist such that the pour and starboard propulsion shaft alignments from engine to sterm tube can be precisely measured while the vessel is afloat.

20.2. The results from the shaft alignment verification and recommended corrective action as required shall be communicated to the TA at the earliest possible convenience.

20.3. The Contractor shall inspect the condition of the port and starboard Vulkan transmission couplings (mod: Vulastik-P-7520-1) for defects and recommended corrective action as required shall be communicated to the TA at the earliest possible convenience.

20.4. Following the completion of all work, operational testing under full load shall be conducted on all disturbed equipment and systems until such time as all identified deficiencies have been corrected and full system functionality has been established.