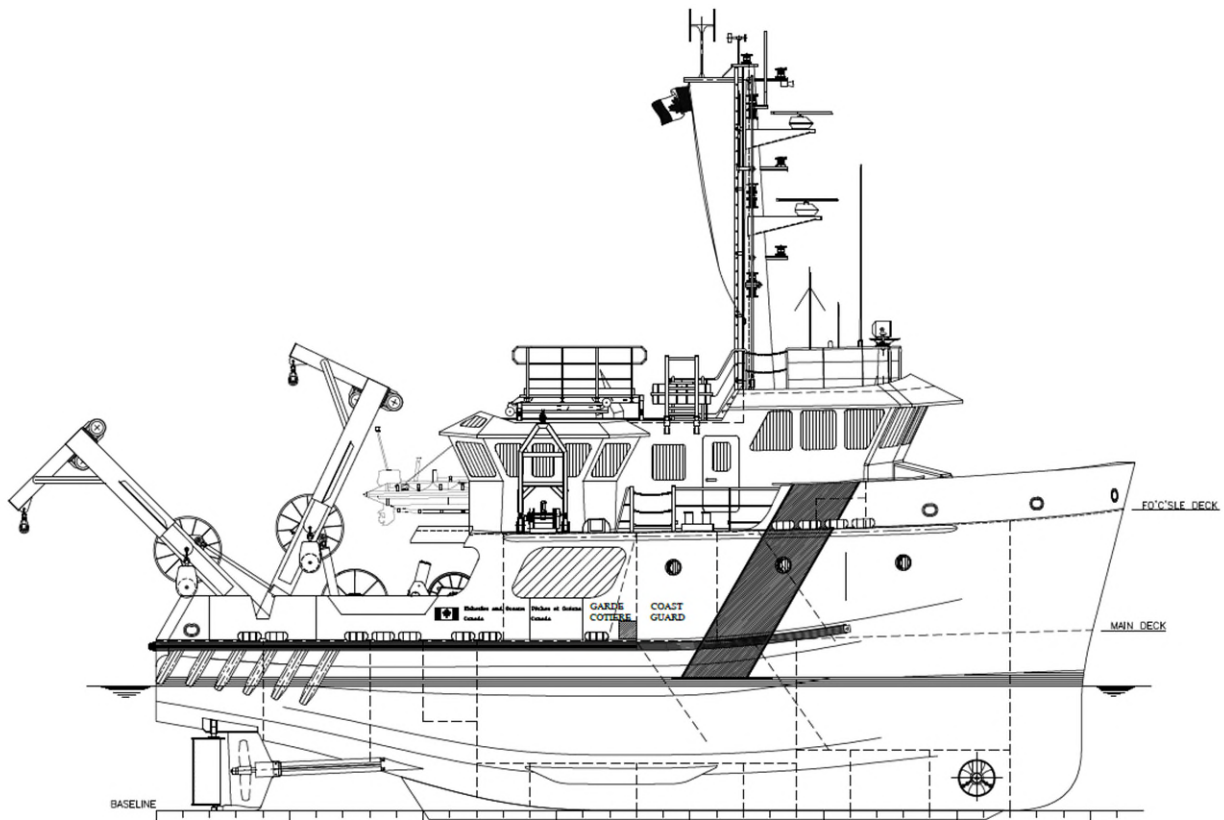


CCGS Vladykov

Annual Refit, Drydocking and Storage

2019/2020



Storage: December 3rd, 2019 – Feb 10th , 2020

Refit: Feb 11th , 2020 – March 24th , 2020

Contents

PREAMBLE.....	3
SHIP'S PARTICULARS	10
H-01 Storage	11
H-02 Production Chart	15
H-03 Services.....	18
H-04 Life Raft Servicing	22
H-05 Ships Portable Fire Extinguishers	24
H-06 Fire Detection System	27
H-07 Bilge Cleaning	29
H-08 Fixed Fire Fighting System Annual Inspection.....	32
H-09 Global Davit Annual Inspection	35
H-10 Annual Refrigeration Leak Detection Test	37
H-11 Port Main Engine Top End Overhaul	40
H-12 Galvanized Pipe Replacement to Copper Nickel	43
H-13 Forward and Aft Ballast Tanks Inspection	46
H-14 Sea Trials.....	50
H-15 Mess Area Deck Replacement.....	52
H-16 CTD Davit Re-surfacing	56
H-17 A-Frame Pin Modifications	59
HD-01 Dry Docking.....	62
HD-02 Hull Cleaning and Painting	66
HD-03 Sea Chests	72
HD-04 Mechanical Shaft Seal Installation	75
HD-05 Anodes	79
HD-06 Sea Connections and Storm Valve Inspections.....	82
HD-07 Sea Water Pipe Cleaning.....	87
L-01 Annual Electrical Insulation Testing	90
A-1 Galvanized Pipe Replacement to Copper Nickel	93
A-2 Mess Area Decking Replacement	97
A-3 CTD Davit Resurfacing	100
A-4 A-Frame Pin Modifications	101
A-5 Mechanical Shaft Seal Installation.....	103

PREAMBLE

1. INTENT

The intent of this specification shall describe the necessary work involved in carrying out the ship's Annual Refit and Storage. The total storage for this vessel will be from December 3rd, 2019 to March 24th, 2020 and includes a refit period from February 11th, 2020 to March 24th, 2020. 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 American Bureau of Shipping (ABS) Inspector. Unless otherwise specifically stated, the Owner's Representative is the Chief Engineer.

2. MANUFACTURER'S RECOMMENDATIONS

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

3. TESTING AND RECORDS

All test results, calibrations, measurements and readings are to be recorded. All tests are to be witnessed by the Inspection Authority, Technical Authority and where required, ABS Inspector. In the event that a Class Inspector is required, CG Technical Authority will make necessary arrangements. The recorded test results, calibrations, measurements and readings from the entire refit specification shall be provided in 3 typewritten bound reports on 8.5" X 11" paper. The bound reports shall be tabbed as per table of contents in the refit specification. The bound reports shall be provided to the Chief Engineer prior to the end of refit.

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

4. WORKMANSHIP

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

5. FACILITIES

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

6. MATERIALS AND SUBSTITUTIONS

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

7. REMOVALS

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

8. EXPOSURE AND PROTECTION OF EQUIPMENT

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

9. LIGHTING AND VENTILATION

Temporary lighting and/or temporary ventilation required by the contractor to carry out any item of this specification shall be supplied, installed and maintained in a safe working condition by the contractor and removed upon the completion of work.

10. CLEANLINESS

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

11. ASBESTOS

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

12. ENTRY INTO ENCLOSED SPACES

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

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

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

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

13. Suspension Of Work

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

14. HOTWORK

Any item of work involving the use of heat in its execution requires that the contractor advise the owner's representative prior to starting such heating and upon its completion. The contractor shall be responsible for maintaining a competent and properly equipped fire watch during and for one full hour after all hotwork. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. The contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers shall not be used except in an emergency. The Contractor shall abide by the Coast Guard Hotwork Policy. The policy is listed in the Coast Guard's Safety Management System, section 7.D.11 and section 7.D.11 (N). The contractor shall be responsible

to ensure the contractor's personnel including any subcontractors shall follow the policy.

15. LOCKOUT AND TAGOUT PROCEDURES

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

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

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

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

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

16. PAINTING

All new and disturbed steelwork that will not be on the underwater wetted surface of the ship's hull is to be protected with two coats of Contractor supplied primer. Unless otherwise stated in the individual specification item, the primer is to be Matchless Red Oxide Alkyd Primer 713. The paint is to be applied as per the manufacturer's instructions on their respective product data sheets. Finish coats are described in individual specification items.

17. WELDING

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

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

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

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

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

18. SMOKING

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

19. RESTRICTED AREAS

The following areas are out of bounds to shipyard personnel except to perform work as required by the specifications: all cabins, offices, Wheelhouse, public washrooms, cafeteria, dining room, lab spaces and any other area identified by the Owners Representative at time of refit.

20. ELECTRICAL STANDARDS

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

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

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

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

21. DRAWINGS

All drawings and drawing revisions that the contractor is requested to do in the execution of this contract shall be of a quality equal to that of the drawings that are requested to be updated. For example, drawings that have been lettered and dimensioned in a professional manner shall not be updated using freehand. Prints and reproductions that a contractor is required to provide shall be made on one piece of paper. Sign off and acceptance of jobs will not occur until any and all drawings are updated to the satisfaction of the Owner's representative.

22. TRANSDUCERS

The contractor shall not paint the transducers and all transducers shall be afforded the necessary protection during hull cleaning, blasting, burning, welding and coating operations.

23. OWNER'S REPRESENTATIVE

Throughout this document, there is made reference to the Owner's Representative. For the purpose of this document, the Owner's representative is defined as the Chief Engineer of the Vessel.

24. Regulatory Authority Inspections

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

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

Notwithstanding any errors, omissions, discrepancies, duplication or lack of clarity in these project requirements, it shall be the responsibility of the Contractor to ensure that the execution of the work specified herein is to the satisfaction of the Chief Engineer, VMM, PWGSC and Class Inspector.

25. Waste Oil Products

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

26. WHMIS

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

27. SAFETY ANNEX

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

SHIP'S PARTICULARS

Length O.A.	25.0 Metres
Beam Moulded	9.2 Metres
Beam Extreme	9.5 Metres
Depth Moulded	3.8 Metres
Navigational Draft	3.6 Metres
Lightship Displacement	259.5 T
Year Built	2012

Rigging Weights

Propellor Shaft	363 kg (800 lbs) Length 5.67 meters
Propeller	215 kg (473 kg)
Anchor (Complete)	315 kg (694 lbs)
Rudder and Stock	775kg (1709 lbs)

Dec 3, 2019 – March 24, 2020	CCGS VLADYKOV	Draft
Spec Item #: H-01	SPECIFICATION	
STORAGE		

H-01 Storage

Part 1 – SCOPE

- 1.1.1** The intent of this specification shall be for the contractor to provide quotes on storage, shore power and security from Dec 3rd, 2019 to March 24th, 2020. All dry docking, blocking, hull cleaning, relaunching and other items as noted shall be quoted on in additional spec items. Exact dates may be adjusted due to operational requirements of the vessel and shall be adjusted at by PWGSC 1379 action at daily rates provided by contractor.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

Length O.A.	25.0 Metres
Beam Moulded	9.2 Metres
Beam Extreme	9.5 Metres
Depth Moulded	3.8 Metres
Navigational Draft	3.6 Metres
Lightship Displacement	259.5 T
Year Built	2012

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The contractor shall provide services as described below from Dec 3rd, 2019 to March 24th, 2020. Total days in storage 112 days. Exact dates may be adjusted due to

Dec 3, 2019 – March 24, 2020	CCGS VLADYKOV	Draft
Spec Item #: H-01	SPECIFICATION	
STORAGE		

operational requirements of the vessel and shall be adjusted at by PWGSC 1379 action at daily rates provided by contractor.

- 3.1.2** Contractor shall dock and undock vessel as per Refit Spec item HD-01 Dry docking.
- 3.1.3** Crew will be on board when putting vessel on and off dock.
- 3.1.4** The Contractor shall be responsible if required for the safe transfer of the ship from its pre-docking berth or location onto its docking blocks. During docking, radio contact is to be maintained between the vessel's Commanding Officer and the Contractor's Docking Officer. The Contractor is to include in his bid, tug and/or pilotage services as required.
- 3.1.5** Contractor shall clean underwater hull as per Refit Spec item HD-02 Hull Cleaning and Painting.
- 3.1.6** Prior to commencing hydroblasting, all hull mounted equipment and openings are to be fully protected.
- 3.1.7** Prior to undocking the contractor shall re-check the security of the keel/bilge blocks and docking plugs in the presence of the owner's representative. The condition of the vessel shall be the same as at the time of docking.
- 3.1.8** At undocking, all tanks to be refilled to obtain same draft and trim as at docking, and condition agreed by the Docking Master, the ship's Captain and the Chief Engineer.
- 3.1.9** Contractor shall open up Sea Chests as per Refit Spec item HD-03.
- 3.1.10** The Contractor is not to remove or transfer any tank contents without first discussing same with the Chief Engineer.
- 3.1.11** Contractor to supply services during storage as per Refit Spec Preamble
- 3.1.12** Contractor shall bid on below Storage Items separate from Refit Items portion of contract:
 - 3.1.12.1** Contractor shall supply and hook up shore power from December 3rd , 2019 to March 24th , 2020. Shore power required 440 volts three phase 100amp.
 - 3.1.12.2** Contractor to bid on supplying 67200 KWHs of power and quote on per KWH. Actual cost shall be adjusted up or down by PWGSC 1379 action according to final meter reading.
 - 3.1.12.3** Contractor shall supply and install a separate meter for the Vladyskov and shall

Dec 3, 2019 – March 24, 2020	CCGS VLADYKOV	Draft
Spec Item #: H-01	SPECIFICATION	
STORAGE		

record and submit bi-weekly readings to the Vessel Maintenance Manager by email.

3.1.12.4 Contractor shall supply shore power cable.

3.1.12.5 Lay up to include security 24hrs a day 7 days a week. This means that a Shipyard employee has a cell phone that will tie into the Ship own security system. That in event an alarm goes off on board the vessel this alarm will dial to the shipyard's employee so that they can go on board the vessel to investigate. Types of alarms that are incorporated into the security system hatches and doors opening, fire detection systems, motion sensors, bilge alarm, temperature sensing etc.

3.1.12.6 In the event alarm goes off the contact person with Canadian Coast Guard is Cody Barrett, at cell 709-691-9341 or email cody.barrett@dfo-mpo.gc.ca . An alternate contact person in the event of an emergency shall be Marine Engineering Deputy Superintendent Terry Hunt, at 709-552-6362 or Terry.Hunt@dfo-mpo.gc.ca.

3.1.12.7 Shipyard personal will be familiarized with the vessel's security system.

3.1.12.8 Security or shipyards personal to keep a log of temperature readings twice a day in five areas: steering gear compartment, engine room, forward lower cabins, mess and wheelhouse. Contractor shall contact Cody Barrett at 709-691-9341 or email cody.barrett@dfo-mpo.gc.ca if the temperature of any compartment goes to down to 7 or rises to 40 degrees Celsius.

3.1.13 The crew will be on board for 7 days winterizing the vessel starting December 3rd , 2019.

3.2 Location

3.2.1 N/A

3.3 Interference

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 All work shall be completed to the satisfaction of the Chief Engineer, VMM, and if required the Class Inspector.

Dec 3, 2019 – March 24, 2020	CCGS VLADYKOV	Draft
Spec Item #: H-01	SPECIFICATION	
STORAGE		

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

5.1.1 Contractor shall deliver two (2) hard copies of all checklists and reports to the Chief Engineer and one (1) electronic copy of all reports to VMM upon completion of refit.

5.1.2 Contractor shall submit electronically, bi-weekly power meter readings to VMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-02	SPECIFICATION	
PRODUCTION CHART		

H-02 Production Chart

Part 1 – SCOPE

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

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-02	SPECIFICATION	
PRODUCTION CHART		

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, VMM and PWGSC. Every effort shall be made to prevent the vessel from delay in completing the refit in the time frame provided. Regular QA procedures shall apply.

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-02	SPECIFICATION	
PRODUCTION CHART		

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-03	SPECIFICATION	
SERVICES		

H-03 Services

Part 1 – SCOPE

- 1.2** The intent of this specification shall be to supply and connect as specified, the necessary services to the vessel at the start of refit and to disconnect the same services at the completion of the refit.
- 1.3** This work shall be carried out in conjunction with the entire refit period under the supervision of the Chief Engineer. The Contractor shall supply all material and tools to the point of connection and quote on the cost of each individual service.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25 – 30000RMM9 - General Arrangement Drawing

2.2 Standards

- 2.2.1** The following Coast Guard Standards and/or Technical Bulletins must be followed while executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.

- 2.2.1.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall quote a global price and daily rates for all services supplied to the vessel during the contracted period.
- 3.1.2** The Contractor shall quote on supplying the following services:

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-03	SPECIFICATION	
SERVICES		

3.1.2.1 Readings and Reports – The Contractor shall collect and bind all readings and reports in a booklet form. Two (2) bound copies shall be delivered to the Chief Engineer prior to the end of the contracted refit period. Contractor shall deliver 1 electronic copy of all reports/certs to VMM prior to the end of the refit period.

3.1.2.2 Electrical Power – Shore power facilities shall be supplied to the ship using a single 100 amp source using Contractors cables and fittings. Ship requires 1 x 100 amperes x 440VAC x 60 Hz x 3-phase power source for connection to the ships shore power transformer. Contractor shall quote on supplying 600 kW-hours per day. The Contractor shall quote per kW hour for adjustment purposes by PWGSC 1379 action based on actual amount consumed.

Kilowatt-hour meter readings shall be taken from the Contractor supplied meter. The meter readings shall be recorded by the Contractor and the Chief Engineer at the time of connection and disconnection. Readings shall also be supplied to the VMM on a Bi-Weekly basis.

3.1.2.3 Fire Main – Water shall be available to the vessels fire main at a pressure of 550 kPa (80 psi) and be available 24 hours per day. Supply line shall be fitted with an isolating valve to ensure fire main remains dry unless needed and a pressure-regulating valve (with pressure gauge) which shall be located on the ship connected to the ships international shore connection. Supply line from hydrant to vessel shall remain dry to prevent freezing.

3.1.2.4 Gangways – The Contractor shall supply and erect a gangway, complete with safety nets, guardrails, and adequate lighting to the satisfaction of the Commanding Officer. Gangway shall land on aft deck. Gangways shall be safe, well lit and structurally suitable for the passage of shipyard workers and ship's crew. Contractor shall maintain gangways in a safe condition throughout the duration of the dry-docking. Ships gangway shall not be used during the refit/dry-dock period except with the approval of the Commanding Officer and at no liability to CCG. Any movement of the gangways required by Contractor shall be at the expense of the Contractor.

3.1.2.5 Washrooms – Contractor shall provide 1 washroom ashore at their facility for the vessels crew usage. This washroom shall be serviced regularly.

3.1.2.6 Garbage Removal – A suitable garbage container with cover shall be provided for the duration of the refit. Garbage containers may be used by Coast Guard and Contractor for the disposal of debris etc. These containers shall be emptied on a regular basis.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-03	SPECIFICATION	
SERVICES		

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

During the contract period, if the ship is not in the dry-dock, the ship shall be berthed at the Contractor's wharf at a safe and secure berth with adequate water at extreme low tide to ensure the vessel will not touch bottom. Contractor is responsible for all movements of the vessel during the contract period, including arrangements and costs for line handlers, tugs, pilots, etc.

3.1.2.8 Cleaning – Contractor shall ensure all spaces, compartments and areas of the ship, external and internal, are left in an “as clean condition as found”.

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

3.1.2.9 Oily Bilge Water – Contractor shall quote on removing 3m³ of oily water from the ships bilge and tanks at the start of the storage. The quotation shall include the cost of crane, pumping, trucking and disposal of oily mixture. Contractor shall provide the name of the firm contracted for the pumping and disposal of the waste oil. Contractor shall quote the cost of disposal for each additional 1m³ for adjustment purposes by PWGSC 1379 action. Contractor will advise the Chief Engineer when oily bilge water shall be pumped out and a copy of the shipping manifest, indicating volume of oily water removed, shall be given to the Chief Engineer.

3.1.2.10 Cranage - Contractor shall bid on supplying general services of a dockside crane, driver and rigger for 20 hours during drydock period as and when requested by the Chief Engineer. Contractor shall quote an hourly rate for adjustment purposes by 1379 action.

3.1.2.11 Shore Facility – Contractor shall make available to ship's crew a washroom in close proximity to the vessel. The washroom shall be cleaned daily.

3.2 Location

3.2.1 N/A

3.3 Interference

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-03	SPECIFICATION	
SERVICES		

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and if required the Class Inspector.

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** The Contractor shall collect and bind all readings and reports in a booklet form. Two (2) bound copies shall be delivered to the Chief Engineer prior to the end of the contracted refit period. Contractor shall deliver 1 electronic copy of all reports/certs to VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-04	SPECIFICATION	
LIFERAFT SERVICING		

H-04 Life Raft Servicing

Part 1 – SCOPE

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

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

- 2.4.1** The Contractor shall supply all materials, equipment and parts required to perform the specified work unless otherwise stated.
- 2.4.2** 2 X 16 Person “Surviva” Life raft – Wheelhouse Top (Port and Stbd)

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractors quote shall include the removal of the vessels two (2) inflatable life rafts and releases from the ship and transport them to the OEM service center for annual inspection. Upon return of the rafts they are to be replaced onboard the vessel in their respective locations and secured.
- 3.1.2** An allowance of \$1000 per life raft shall be quoted for replacement of survival equipment for a total allowance of \$2000 for this specification item; this cost shall be adjusted by PWGSC 1379 action on proof of invoice.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-04	SPECIFICATION	
LIFERAFT SERVICING		

3.2 Location

3.2.1 1 X 16 Person “Surviva” Life raft – Wheelhouse Top (S) – B04199

1 X 16 Person “Surviva” Life raft – Wheelhouse Top (P) – B04198

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

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

Part 5 – DELIVERABLES

5.1 Drawings/Reports

5.1.1 Contractor shall deliver two (2) hard copies of all checklists and reports to the Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (1) electronic copy of all reports to VMM.

5.2 Spares

5.2.1 N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-05	SPECIFICATION	
SHIPS PORTABLE FIRE EXTINGUISHERS		

H-05 Ships Portable Fire Extinguishers

Part 1 – SCOPE

- 1.1** The Contractor shall remove and reinstall all the ships portable fire extinguishers and transport them to an authorized service center for annual servicing and testing. If possible the authorized rep may travel to vessel and complete inspections onsite.
- 1.2** This work shall be carried out in conjunction with spec items:
 - 1.2.1** H-06 Fire Detection System
 - 1.2.1** H-08 Fixed Fire Fighting System Annual Inspection

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** See list of ships extinguishers in Technical Description.
- 2.1.2** ISV25 – 3000RMM9 – General Arrangement

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The portable extinguishers are to have an annual inspection. All extinguishers are to be inspected and serviced by a qualified representative.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-05	SPECIFICATION	
SHIPS PORTABLE FIRE EXTINGUISHERS		

3.1.2 The Contractor shall ensure that the extinguishers are removed so that the total ashore at any one time does not exceed one-third the total of the extinguishers onboard. The Chief Engineer will determine which extinguishers go ashore at any given time.

3.1.3 Upon completion of servicing ashore, the Contractor is to transport all extinguishers back onboard the ship and is to install them in their original positions as directed by the Chief Engineer.

3.2 Location

3.2.1 Listing of Extinguisher Types onboard:

#	LOCATION	TYPE	S/N	D.O.M	6 YEAR DUE	HYDRO DUE	CAPACITY
1	Wheelhouse Aft	CO ²	886828				10lb
2	Mess	CO ²	886820				10lb
3	Galley	CO ²	885130				10lb
4	Lower Accomodation	Foam	16078				9Ltr
5	Dry Lab	Dry Powder	213155				10lb
6	Engine Room Center Fwd	CO ²	884695				10lb
7	Engine Room Port Fwd	Foam	16073				9Ltr
8	Engine Room Port Aft	Foam	16079				9Ltr
9	Workshop	Dry Powder	212506				10lb
10	Aux Machinery Room	Dry Powder	21507				10lb
SP	Safety Locker	Dry Powder	213153				10lb
SP	Zodiac	Dry Powder	847620				2.5lb

3.3 Interferences

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-05	SPECIFICATION	
SHIPS PORTABLE FIRE EXTINGUISHERS		

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Commanding Officer, Chief Engineer and/or VMM.

4.2 Testing

- 4.2.1** Testing of all extinguishers to be within Bureau Veritas Classification Society Regulations.

4.3 Certification

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

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver two (2) hard copies of all checklists and reports to Chief Engineer outlining any work and/or modifications required. Contractor shall deliver one (1) electronic copy of all reports to VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-06	SPECIFICATION	
FIRE DETECTION SYSTEM		

H-06 Fire Detection System

Part 1 – Scope

- 1.1** The intent of this specification shall be for the contractor to arrange for a certified company to perform an annual inspection and certification of the fire detection system.
- 1.2** This work shall be completed in conjunction with:
 - 1.2.1** H-05 Ships Portable Fire Extinguishers
 - 1.2.2** H-08 Fixed Fire Fighting System Annual Inspection

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Integrated Fire Detection System (IFDS) – Instruction Manual
- 2.1.2** ISV25- 36000RMM7 - Fire Safety Plan
- 2.1.3** Notifier NFS2-640

2.2 Standards

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

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The system is a Techsol Integrated Fire Detection System which uses a Notifier NFS2-640 Fire Alarm panel. The Notifier NFS2-640 panel is connected to the IFDS which is part of the ships Alarm and Monitoring System.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-06	SPECIFICATION	
FIRE DETECTION SYSTEM		

3.1.2 The contractor shall contact ABS Class Society prior to commencing work and will arrange for an inspector to be present if required.

3.1.3 The Contractor shall arrange for a certified company to perform an annual inspection on the fire detection system and to provide certification.

3.2 Location

3.2.1 The control panel for the fire detection system is located on the port side wheelhouse.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

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

Part 5 – Deliverables

5.1 Drawings/Reports

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

Part 6- Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-07	SPECIFICATION	
BILGE CLEANING		

H-07 Bilge Cleaning

Part 1 – SCOPE

- 1.1** The intent of this specification shall be to carry out cleaning of the engine room, cargo hold, aux machinery space and steering gear bilges. Contractor shall clean the tank top, bilges, piping, machinery seats, and frames below deck plates. The Contractor shall physically clean the vessels bilges of all debris and fluids.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25 – 30000RMM9 – General Arrangement Drawing

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall be aware that this spec item involves lifting and replacing deck plates and gratings as required. All debris and liquids shall be removed by means of high pressure water spray, degreasing solvent and vacuum hose service. Areas that are hard to access with a vacuum hose shall be thoroughly washed out with high pressure spray to an area that is accessible. The above areas shall be thoroughly cleaned to the finished surface. Any debris taken up from the bilges shall be removed ashore daily.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-07	SPECIFICATION	
BILGE CLEANING		

3.1.2 Any chemicals used for cleaning are to be non-flammable and the vapours are non-toxic. The chemicals shall be Oily Water Separator compatible. A copy of the WHIMIS MSDS shall be provided to the Chief Engineer before the work commences.

3.1.3 Care is to be taken to keep overspray to a minimum from areas and equipment above the deck plates. Such overspray shall be wiped clean upon completion of all work to the satisfaction of the Chief Engineer.

3.1.4 All liquid and debris remaining as a result from the cleaning shall be removed from the vessel. Ships systems and equipment shall not be used to dispose of any liquids and/or sludge. All bilges shall be shown to be clean upon completion of all work. Bilge float alarms shall be proven operational.

3.1.5 The Contractor shall supply all material and equipment to perform the specified work, including the services of a vacuum truck.

3.1.6 All bilge cleaning shall be done with the Chief Engineer or delegate present.

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

3.2 Location

3.2.1 Engine Room – Frame 14 to Frame 21

3.2.2 Cargo Hold/Workshop – Frame 8 to Frame 14

3.2.3 Aux Machinery Space – Frame 4 to Frame 8

3.2.4 Steering Gear – Frame 0 to Frame 4

3.3 Interferences

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-07	SPECIFICATION	
BILGE CLEANING		

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

4.3.1 N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-08	SPECIFICATION	
FIXED FIRE FIGHTING SYSTEM ANNUAL INSPECTION		

H-08 Fixed Fire Fighting System Annual Inspection

Part 1 – Scope

- 1.1** The intent of this specification shall be to have the fixed firefighting systems serviced and re-certified for use on the CCGS Vladyskov.
- 1.2** The Contractor shall report to the Chief Engineer prior to any work commencing with this item. This work shall be carried out in conjunction with the servicing of the portable fire extinguishers, in a manner that does not compromise the ability to extinguish a shipboard fire.
- 1.3** The fixed firefighting system is a 3M Novec 1230 system.
- 1.4** This work shall be completed in conjunction with:
 - 1.4.1** H-05 Ships Portable Fire Extinguishers
 - 1.4.2** H-06 Fire Detection System

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

2.1.1

2.2 Standards

- 2.2.1** The Contractor must be approved to recertify these systems and must be done so in accordance with the latest regulations concerning marine safety.
- 2.2.2** The Contractor must adhere to the ships ISM hot work, confined space entry, fall protection and lockout procedures.

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-08	SPECIFICATION	
FIXED FIRE FIGHTING SYSTEM ANNUAL INSPECTION		

Part 3 – Technical Description

3.1 General

- 3.1.1** The Contractor shall provide an authorized representative to perform the tests and inspections of the vessel's Novec 1230 system for annual safety inspection and certification. The Chief Engineer must witness all tests.
- 3.1.2** The Contractor shall complete the following tests, as well as any other tests requested by the attending ABS Inspector. The Contractor shall include in their quote on the cost of testing of alarms (lights and sirens) on all units, testing of all of the Nitrogen start cylinders, testing of the ventilation shut downs, testing of the releasing loops, and pull cables.
- 3.1.3** The Contractor shall blow through all piping and pneumatic actuator and prove that they are operational. All piping and nozzles are to be proven clear and free.
- 3.1.4** The Contractor shall prove operational all alarm displays and sirens. The Contractor shall weigh all bottles and the weight shall be recorded. The Contractor shall provide the Chief Engineer with all certificates upon completion of the refit, in duplicate.
- 3.1.5** Once all the testing and inspections are completed, the systems must be re-assembled and put back into operation by the Contractor.

3.2 Location

- 3.2.1** The Novec bottles are located in the cargo hold.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and ABS Inspector.

4.2 Testing

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-08	SPECIFICATION	
FIXED FIRE FIGHTING SYSTEM ANNUAL INSPECTION		

4.2.1 The Chief Engineer shall be present during the inspection and testing of the system.

4.3 Certification

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

Part 5 – Deliverables

5.1 Drawings/Reports

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

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

Part 6- Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-09	SPECIFICATION	
GLOBAL DAVIT ANNUAL INSPECTION		

H-09 Global Davit Annual Inspection

Part 1 – SCOPE

- 1.1** The intent of this specification shall be for the contractor to arrange for a Global Davit certified company to perform an annual inspection and certification of the rescue boat davit and all fitted lifting gear.

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 Canada Shipping Act 2001

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

3.1.1 The davit is a Global Davit GmbH.

3.1.1.1 Davit Type - Rhs.13/3.5

3.1.2 The Contractor shall arrange for a Global Davit certified company to perform the annual inspection and certification on the deck crane and connected lifting gear.

3.1.2.1 Recommended local FSR is:

Nord Marine Services

Jim Griffin – jgriffin@nordmarine.ca

42 Dundee Ave

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-09	SPECIFICATION	
GLOBAL DAVIT ANNUAL INSPECTION		

Mt Pearl, NL AN1 4R7

1-709-747-7733

3.1.3 Contractor shall allow an allowance of \$2500 to include FSR invoice and any parts that may be provided by the Contractor to the FSR. Actual amount shall be adjusted up or down by PWGSC action upon receipt of parts invoice.

3.2 Location

3.2.1 The davit is located on the port side of the wheelhouse deck.

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

4.2.1 N/A

4.3 Certification

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

Part 5 – DELIVERABLES

5.1 Drawings/Reports

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

Part 6-Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-10	SPECIFICATION	
ANNUAL REFRIGERATION LEAK TEST		

H-10 Annual Refrigeration Leak Detection Test

Part 1 – Scope

- 1.1** The intent of this specification shall be to test the identified refrigeration systems onboard for leaks, certify the system as being leak free and indicate any deficiencies/repairs that shall be addressed by PWGSC 1379 action.
- 1.2** The Contractor shall report to the Chief Engineer prior to any work commencing with this item.

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

2.1.1

2.2 Standards

- 2.2.1** The Contractor shall test the systems for leaks according to the standards for protecting the environment.

2.3 Regulations

- 2.3.1** All the regulations pertaining to the protection of the environment, Canada Shipping Act, and Coast Guard policies must be strictly followed concerning the release of any halocarbon.

2.4 Owner Furnished Equipment

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

Part 3 – Technical Description

3.1 General

- 3.1.1** The Contractor shall notify the Chief Engineer when conducting the tests on each piece of equipment.
- 3.1.2** The Contractor shall follow the lockout and tag out procedures of the vessel.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-10	SPECIFICATION	
ANNUAL REFRIGERATION LEAK TEST		

- 3.1.4** An allowance of \$1000 shall be included for any repairs to the refrigeration system. Any additional changes to be adjusted by PWGSC 1379 action on proof of invoice.

3.2 Location

- 3.2.1** N/A

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

- 4.1.1** The Contractor shall complete all work to the satisfaction of the Chief Engineer.
- 4.1.2** The Contractor shall apply tags to each piece of equipment stating that it has been leak tested, and suitable for use.
- 4.1.3** The refrigeration technician must possess a halocarbon certificate and number and sign the work performed in the Halocarbon Logbook, held by the Chief Engineer.

4.2 Testing

- 4.2.1** Each system shall be tested to ensure proper operation by the refrigeration technician and witnessed by the Chief Engineer.

4.3 Certification

- 4.3.1** Refrigeration technician must possess a halocarbon certificate and provide his/her certificate number to be recorded in the log book.

Part 5 – Deliverables

5.1 Drawings/Reports

- 5.1.1** The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 1 electronic copy of all reports/certs to VMM. This report must include the condition of the system as found, all work performed on it and the condition as left.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-10	SPECIFICATION	
ANNUAL REFRIGERATION LEAK TEST		

Part 6-Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-11	SPECIFICATION	
PORT MAIN ENGINE TOP END OVERHAUL		

H-11 Port Main Engine Top End Overhaul

Part 1 – SCOPE

- 1.1** The intent of this specification shall be to have the contractor supply the services of a Caterpillar Field Representative (FSR) to carry out entire maintenance as listed below in the technical description. The contractor shall submit an allowance of \$3500 for the services of the FSR. Any items found to be defective shall be replaced or repaired by FSR and will be adjusted by PWGSC 1379 action.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 Port Main Engine C18

2.1.1.1 Port Main Engine – Serial # T2P01011

2.2 Standards

2.2.1 As per Manufacturer's recommendations

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-11	SPECIFICATION	
PORT MAIN ENGINE TOP END OVERHAUL		

Part 3 – TECHNICAL DESCRIPTION

3.1 General

3.1.1 The Contractor shall supply the services of the FSR to carry out the below maintenance as listed in the Owner's Manual.

3.1.1.2 Main Engines – 5000 Hour

- Inspect Alternator
- Inspect Water Pump
- Check/Clean/Test Oil Cooler Core
- Inspect Turbocharger
- Inspect Heat Exchanger
- Clean/Test Aftercooler Core
- Replace CCV Fumes Disposal Filter
- Cylinder Head Assembly
- Fuel Injectors

3.1.2 Contractor shall allow for 1 labourer to assist/oversee FSR during job completion

3.2 Location

3.2.1 Engine Room

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-11	SPECIFICATION	
PORT MAIN ENGINE TOP END OVERHAUL		

4.2 Testing

- 4.2.1** FSR shall be present for sea trials upon completion of refit to confirm correct operation of all CAT equipment.

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver 2 hard copies of test certificates and reports from FSR to the Chief Engineer. Contractor shall deliver 1 electronic copy of certs/reports to VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-12	SPECIFICATION	
GALVANIZED PIPE REPLACEMENT TO COPPER NICKEL		

H-12 Galvanized Pipe Replacement to Copper Nickel

Part 1 – Scope

- 1.1** The intent of this specification is to have the contractor remove the galvanized sea water cooling piping from the sea bay header to the starboard main engine, as well as the outlet sea water piping from the starboard main engine back to the low sea-chest, and then replace with copper nickel piping. Piping varies from 3” to 2.5” depending on location in the pipe spool. Contractor is to bid on 20ft on 3” piping and 10ft of 2.5” piping. Contractor is to bid on 13 flanges and 5 gauges. Actual size/length and orientation of piping and flanges will be adjusted by PWGSC 1379 action once piping is removed and jigged.

Part 2 – References

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Pictures of existing piping can be found in Annex A-1.
- 2.1.2** ISV25-73510RMM3 – Sea Water Service Cross Connection Arrangement
- 2.1.3** ISV25-73500RMM12 – Cooling Water System Diagram

2.2 Standards

- 2.2.1**

2.3 Regulations

- 2.3.1**

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. Currently the pipe in the system is schedule 40 3” and 2.5”. Actual lengths to be determined once piping is removed and jigged.

Part 3 – Technical Description

3.1 General

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-12	SPECIFICATION	
GALVANIZED PIPE REPLACEMENT TO COPPER NICKEL		

- 3.1.1** The Contractor shall notify the Chief Engineer when commencing work on the sea-water cooling system to ensure all systems are turned off and no water pressure is in the system.
- 3.1.2** The contractor is to remove any deck plating that will interfere with the removal/installation of the piping, and then re-install the deck plating once piping is installed and tested.
- 3.1.3** The existing piping is to be removed from the system and the vessel.
- 3.1.4** Contractor shall replace the galvanized piping with copper nickel piping, in an arrangement as similar as possible to the routing of old piping. In instances where piping has to be re-routed chief engineer is to be informed prior to construction.
- 3.1.5** Chief engineer to be present when testing the new piping system for final approval.

3.2 Location

- 3.2.1** Piping is located in the Engine Room from frame 17 to frame 24 surrounding starboard main engine.

3.3 Interferences

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

Part 4 – Proof of Performance

4.1 Inspection

- 4.1.1** The Contractor shall complete all work to the satisfaction of the Chief Engineer.
- 4.1.2** The Contractor shall apply tags to each piece of equipment stating that it has been leak tested, and suitable for use.
- 4.1.3**

4.2 Testing

- 4.2.1** Each system shall be tested to ensure proper operation by the contractor and witnessed by the Chief Engineer. Chief engineer to test the system by operating main engine(sea

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-12	SPECIFICATION	
GALVANIZED PIPE REPLACEMENT TO COPPER NICKEL		

trial) to ensure it is adequate for similar use as it was before the work. Contractor to ensure there are no leaks in the system.

4.3 Certification

4.3.1

Part 5 – Deliverables

5.1 Drawings/Reports

- 5.1.1** The Contractor shall provide the Chief Engineer with a hard copy of the typewritten report outlining the details of the inspection and any alterations / repairs made prior to the acceptance of this item. Contractor shall deliver 1 electronic copy of all reports/certs to VMM. This report must include the condition of the system as found, all work performed on it and the condition as left.

Part 6-Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-13	SPECIFICATION	
FWD AND AFT BALLAST TANKS INSPECTION		

H-13 Forward and Aft Ballast Tanks Inspection

Part 1 – SCOPE

- 1.1** The intent of this specification shall be to have the contractor open the Fore Peak and Aft Water Ballast tanks for cleaning, coating, inspection and testing for ABS certification. Any items found to be defective shall be repaired by PWGSC 1379 action.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 ISV25-10130RMM11 – Tank Plan

Fore Peak Tank – Frame 32 to 35 – Capacity 6.8m³

Aft Peak Tank Port and Stbd – Frame 0 to 4 – Capacity 5.6m³ per tank

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 Canadian Coast Guard Fleet Safety Manual (DFO 5737)

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

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall provide a method to have the spaces certified gas free, safe for personnel to enter and safe for hot work. Hard copy of certificate shall be given to Chief Engineer and electronic copy shall be forwarded to VMM. A copy shall also be posted in a conspicuous location near the entrance to each space. Contractor is responsible for removing and re-installing manhole covers.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-13	SPECIFICATION	
FWD AND AFT BALLAST TANKS INSPECTION		

- 3.1.2** Contractor shall supply all ventilation equipment required for the gas free certificate and the certificates continued validity for the duration of the work.
- 3.1.3** All functional tank openings (vents, ducts, valves, controls, transducers etc.) and related equipment shall be blanked or otherwise protected prior to and during cleaning, blasting or painting.
- 3.1.4** The tanks shall be pumped as low as possible using the ships pumps. Contactor will use their own pumps and hoses to pump out remaining water, mud, dirt and debris.
- 3.1.5** Contractor shall clean by mechanical means (may include high pressure fresh water) the entire interior to of the tanks. All steel surfaces in this area are to be cleaned of all loose paint, scale, salt deposits, dirt and any other debris. All debris and water shall be removed from tank and disposed of ashore.
- 3.1.6** Prior to blasting and paint operations, each tank shall be inspected by ABS Inspector, Chief Engineer and VMM.
- 3.1.7** Areas of bare steel after mechanical cleaning to be power tooled to SSPC-SP10. If oxidation occurs between blasting and application of Intershield 300, the surface must be re-blasted to the specified visual standard prior to application of Intershield 300. All edges shall be feathered to provide a minimum of a 3 cm smooth transition between new and existing coatings.
- 3.1.8** Contractor shall bid on power tooling 20 m² and provide a unit cost per square metre.
- 3.1.9** Contractor to apply:
- 3.1.9.1** One coat of: Intershield 300 Bronze color at 5 to 8 mils D.F.T. per coat to all bare areas.
- 3.1.9.2** One coat of: Intershield 300 Aluminum color at 5 to 8 mils D.F.T per coat to all primed areas and at least an overlap of 3 cm onto existing coating.
- 3.1.10** Contractor shall follow paint manufacturer's instructions for mixing, ventilation, application and precautions.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-13	SPECIFICATION	
FWD AND AFT BALLAST TANKS INSPECTION		

- 3.1.11** The VMM, Chief Engineer or if required ABS Inspector shall be present when the manhole covers are reinstalled. The contractor shall clean the sealing surfaces around the manhole and cover and install the cover using new ¼ inch thick neoprene gaskets. Anti-seizing compound shall be used on all threads. The Contractor shall quote separately the unit cost per stud to replace any broken manhole securing studs.
- 3.1.12** The contractor shall bid on pneumatic testing of each individual tank as well as quoting a unit price for each tank to be hydrostatic tested. The quote shall include the installation and removal of blanks for suction, overflow pipes and vent head removals, additional tank openings, and tank drainage (including the disposal of water and the wiping down of the tank internals).
- 3.1.13** The attending ABS Class inspector solely shall determine the test method. All tests shall be witnessed by the attending ABS Inspector, Chief Engineer and VMM.

3.2 Location

- 3.2.1** Fore Peak Tank – Frame 32 to 35
Aft Peak Tank Port and Stbd – Frame 0 to 4

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and ABS Inspector.

4.2 Testing

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-13	SPECIFICATION	
FWD AND AFT BALLAST TANKS INSPECTION		

4.2.1 As determined by attending ABS inspector, either pneumatic or hydrostatic testing.

4.3 Certification

4.3.1 N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

5.1.1 Contractor shall deliver 2 hard copies of test certificates and reports to the Chief Engineer. Contractor shall deliver 1 electronic copy of certs/reports to VMM.

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

March 3, 2015 – March 31, 2015	CCGS VLADYKOV	Draft
Spec Item #: H-14	SPECIFICATION	
SEA TRIALS		

H-14 Sea Trials

Part 1 – SCOPE

- 1.1** The intent of this specification shall be to carry out sea trials as a functional test of the ships propulsion and other systems.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** N/A

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** On completion of all specification items, sea trials shall be carried out as a functional test of the ships propulsion and other systems
- 3.1.2** Sea trials shall last a minimum of 2 hours.
- 3.1.3** Trials will contain ahead and astern movements at various power levels.
- 3.1.4** Trials will be carried out to the satisfaction of the Chief Engineer, Commanding Officer, VMM, Contracting Officer and ABS Inspector.
- 3.1.5** The contractor shall ensure that any subcontractors or FSR's used during this refit be present for trials unless otherwise indicated by VMM.

March 3, 2015 – March 31, 2015	CCGS VLADYKOV	Draft
Spec Item #: H-14	SPECIFICATION	
SEA TRIALS		

- 3.1.6** Contractor shall have sufficient supervisory staff on board, during these trials to witness the operation of machinery which was worked on during this refit.

3.2 Location

- 3.2.1** N/A

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** N/A

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-15	SPECIFICATION	
MESS AREA DECK REPLACEMENT		

H-15 Mess Area Deck Replacement

Part 1 – SCOPE

- 1.1** The intent of this specification shall be for the contractor to remove/dispose of the Mess decking and then replace the old decking with new Dexotex Insul deck A60 decking. Total deck area is roughly 20 square meters. Pictures are to be taken prior to beginning of work to ensure the equipment is replaced in the same manner as before.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Pictures of mess deck and interference items can be found in Annex A-2.

2.2 Standards

2.2.1

2.3 Regulations

2.3.1

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** The contractor shall inform the Chief Engineer prior to commencing the deck inspection and repair and shall confirm that no equipment will be damaged due to deck work. The contractor shall also ensure that all equipment in the Mess that will need to be moved (Tables, Chairs) for work to begin will be moved prior to the decking removal, stored off the vessel, and then be replaced and installed when the work is completed.
- 3.1.2** The contractor will have to cover all vents, ducts and electronics prior to decking removal, and also ensure no other equipment will be damaged by debris from

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-15	SPECIFICATION	
MESS AREA DECK REPLACEMENT		

deck removal. Contractor shall also set up a negative air system and plastic in the Mess.

- 3.1.3** Deck to be removed consists of vinyl flooring covering roughly ¼ “ steel sheeting. Steel sheeting is laid upon roughly 2 inches of hard insulation. Contractor is to remove all debris on the deck and machine prep for primer installation. Contractor is responsible for all removals and disposal of old flooring.
- 3.1.4** Contractor is to apply sp11 and 2 coats of primer
- 3.1.5** Contractor is to supply and install new Dexotex IMO VLW underlay, and Dexotex IMO approved color flake system (blue)
- 3.1.6** Contractor must be a certified Dexotex IMO approved installer with certificates in hand during duration of refit.
- 3.1.7** Contractor is to install Dexotex with blue color flake. Pictures of sample deck shown below:



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-15	SPECIFICATION	
MESS AREA DECK REPLACEMENT		

3.1.8 The contractor shall submit three (3) signed type written copies of the final report to the Chief Engineer and Class Inspector before completion of refit.

3.1.9 Contractor is to clean area after work is completed.

3.1.10 Any unforeseen issues shall be adjusted up or down by PWGSC 1379 action.

3.2 Location

3.2.1 The location of the Mess can be found on the General Arrangement.

3.3 Interferences

3.3.1 Contractor is responsible for the identification of interference items, their temporary removal, and storage and refitting to vessel. Some main interference items in the Mess are the chairs, and tables. They are to be removed prior to deck work and re-installed after deck work is completed

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

4.2.1

4.3 Certification

4.3.1 The contractor shall provide a copy of the Dexotex certificates for the workers doing the installation.

Part 5 – DELIVERABLES

5.1 Drawings/Reports

5.1.1 The contractor shall submit three (3) signed type written copies of the final report to the Chief Engineer and Class Inspector before completion of refit. Contractor shall provide PWGSC Contracting Officer with an electronic copy of any test

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-15	SPECIFICATION	
MESS AREA DECK REPLACEMENT		

equipment certificates as well as an electronic copy of the signed type written Final Report.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-16	SPECIFICATION	
CTD DAVIT RE-SURFACING		

H-16 CTD Davit Re-surfacing

Part 1 – SCOPE

- 1.1** The intent of this specification is to have the contractor remove, repair(if necessary) and re-install the CTD Davit. Contractor is to disconnect all hoses and wires, unbolt the CTD frame, and remove it from the vessel. Contractor should then sandblast the frame, and inspect for any cracks or abnormalities in the CTD frame. If any damages to the frame need to be repaired, contractor should consult with the VMM prior to commencing work, which would be adjusted by PWGSC 1379 action. Once frame is inspected by contractor and VMM/Chief Engineer, and ABS Surveyor frame is to be coated with (TBD at bidders conference). Prior to end of refit, contractor shall re-install CTD frame, and connect all hoses/wires to same arrangement prior to removal. Contractor is to include cost of crane for removal/installation.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25-30000RMM9 - General Arrangement
- 2.1.2** ISV 25-40100RMM7 – Deck Machinery and Fittings Arrangement
- 2.1.3** Please see attached pictures in Annex A-3

2.2 Standards

- 2.2.1** The following Coast Guard Standards and/or Technical Bulletins must be followed while executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - 2.2.1.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
 - 2.2.1.2** Coast Guard ISM Lockout/Tagout
 - 2.2.1.3** Coast Guard ISM Hotwork procedures

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-16	SPECIFICATION	
CTD DAVIT RE-SURFACING		

- 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 is to disconnect all hydraulic hoses from CTD frame, and unbolt the frame from the vessel.
- 3.1.2** Contractor is to use a crane to remove the frame from the vessel for storage in the shop.
- 3.1.3** Contractor is to remove any damaged hydraulic fittings from either the vessel connections or CTD connections, and purchase/install new fittings once the CTD frame is re-installed. To be adjusted by PWGSC 1379 action if necessary.
- 3.1.4** Contractor is to sandblast and inspect the CTD winch for any cracks/ imperfections. If anything needs to be repaired, contractor is to consult VMM and adjust any work by PWGSC 1379 action. If any welding takes place, Non Destructive Testing (NDT) shall be used to identify integrity of repairs.
- 3.1.5** Contractor is to re-coat the CTD frame once all repairs have been made(if any), and re-install the frame to the vessel by using a crane. Once the CTD frame is mounted, all hoses are to be reconnected to their previous arrangement.

3.2 Location

3.2.1

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-16	SPECIFICATION	
CTD DAVIT RE-SURFACING		

4.2 Testing

- 4.2.1** Contractor shall prove the CTD Davit is operational by performing a load test to ABS surveyor satisfaction. Load is to be 1.1 x the Safe Working Load. (S.W.L. of 350KG) tested at maximum travel for the CTD Davit perpendicular to the vessel.

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** N/A

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-17	SPECIFICATION	
A-FRAME PIN MODIFICATIONS		

H-17 A-Frame Pin Modifications

Part 1 – SCOPE

- 1.1** The purpose of this specification is for the contractor to un-seize the A-frame pins as shown in the pictures in annex A-4 so that the pins may allow the A-frame to rotate freely. Currently the port side pin is welded up due to the fact that it had seized and sheared off the bolts holding it in place, which can be seen on the starboard leg of the A-Frame.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25-30000RMM9 - General Arrangement
- 2.1.2** ISV 25-40100RMM7 – Deck Machinery and Fittings Arrangement
- 2.1.3** Please see attached pictures in Annex A-4

2.2 Standards

- 2.2.1** The following Coast Guard Standards and/or Technical Bulletins must be followed while executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
 - 2.2.1.1** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
 - 2.2.1.2** Coast Guard ISM Lockout/Tagout
 - 2.2.1.3** Coast Guard ISM Hotwork procedures

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-17	SPECIFICATION	
A-FRAME PIN MODIFICATIONS		

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The contractor shall remove welds holding pin in place in the portside of the A-frame and free the seized pin.
- 3.1.2** Contractor shall weld angle iron from the bulwark/deck to the A-frame to ensure that the A-frame does not move during removal/installation of seized pins.
- 3.1.3** Contractor shall replace seized pins with new pins. Contractor shall provide in the quote cost of (2) new pins for A-frame.
- 3.1.4** Contractor is to remove angle iron holding the A-frame in place and power tool and paint areas altered by A-frame work. **Paint specification TBD at bidders conference.**
- 3.1.5** Contractor is to complete same steps above for Starboard side Pin.

3.2 Location

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

- 4.2.1** Contractor shall prove A-frame is operational by testing to chief engineers visual acceptance, by moving the A-frame through its range of motion.

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: H-17	SPECIFICATION	
A-FRAME PIN MODIFICATIONS		

5.1 Drawings/Reports

5.1.1 N/A

5.2 Spares

5.2.1 N/A

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-01	SPECIFICATION	
DRY DOCKING		

HD-01 Dry Docking

Part 1 – SCOPE

1.4 The intent of this specification is for the Contractor to provide all required services to dock and undock the vessel including all tugs and handling of ships lines.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 The Contractor shall dock the vessel in accordance with the vessel’s docking plan.

2.1.1.1 ISV25-14100RMM3 – Docking Plan

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

3.1.1 The Contractor shall include in the bid all costs for docking and undocking the ship, allowing time to complete all the identified known work within the February 11th , 2020 – March 24th , 2020 timeframe.

3.1.2 The Contractor shall quote on the unit cost per additional day at the Contractor’s facility for a) Vessel on Dock and b) Vessel Floating, and provide the unit cost per day for services a) Vessel on Dock and b) Vessel Floating.

3.1.3 The Contractor shall dock and undock the vessel under the direct supervision of a Certified Docking Master.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-01	SPECIFICATION	
DRY DOCKING		

- 3.1.4** A copy of the Docking Plan, Drawing ISV25-14100RMM3 will be made available to the Contractor prior to the docking date. The Contractor shall prepare blocks and necessary shoring to maintain the true alignment of the vessel's hull and machinery during the docking period. A laser alignment of the blocks is to be performed by the Contractor and an alignment report is to be prepared and provided to the Owner's Representative.
- 3.1.5** The following information is to be recorded by the Contractor on Ship Condition Reports:
- 3.1.5.1** Prior to docking, all tanks on the vessel to be sounded and contents recorded. Copy to be signed by the ship's Captain, the chief engineer and the Contractors docking master.
- 3.1.5.2** On docking, all tanks emptied to be listed, and copies held by Contractor and Chief engineer.
- 3.1.5.3** At undocking, all tanks to be refilled to obtain same draft and trim as at docking, and condition agreed by the Docking master, the ship's captain and the chief engineer.
- 3.1.6** The Contractor shall supply the services of a diver to confirm that the vessel is settling evenly on the bilge and keel blocks.
- 3.1.7** A minimum clearance of 4' (1.22m) is to be available below the keel.
- 3.1.8** The Contractor will be responsible for all line handling during docking and undocking operations, and is to include any tug and/or pilotage service cost.
- 3.1.9** The Contractor shall ensure that the docking blocks are clear of transducer faces, docking plugs, sea inlet grids and anodes.
- 3.1.10** The frame spacing is to be marked on the hull as to aid in the initial hull survey by the owner's representative and Class Society. Immediately after hydro-blasting, but prior to any grit blasting for the underwater hull coating, the Contractor is to mark the frame spacing at 5 frame intervals from the stern post (Fr"0"); markings are to be in a contrasting colour, approx. 6" in height, and are to be at the turn of the bilge, port and stbd. Where keel blocks align with the frame spacing, they are also to be marked in a similar manner, port and stbd.
- 3.1.11** The Contractor shall remove five (5) docking plugs to drain water accumulation. All docking plugs removed shall be tagged immediately after removal, stored in a suitable

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-01	SPECIFICATION	
DRY DOCKING		

container and given to the owner's representative. A ships officer is to be present when docking plugs are removed and reinstalled. Docking plugs to be removed are located in three (3) water ballast tanks and two (2) grey water tanks. The location of plugs is shown on the docking plan. Any docking plugs removed will require openings to be temporarily filled with wood plugs during operations such as sandblasting, painting, etc. which could cause contamination of the tanks to occur.

- 3.1.12** During undocking, the Contractor is to have sufficient personnel in attendance to standby any sea connections, stern tubes, sea chests, etc. that were opened up during the dry docking period to correct any deficiencies that may arise.

3.2 Location

- 3.2.1** N/A

3.3 Interference

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and if required the Class Inspector.
- 4.1.2** The Contractor shall dock the vessel in accordance with the vessels docking plan drawing ISV25-14100RMM3 – Docking Plan

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-01	SPECIFICATION	
DRY DOCKING		

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** At undocking, all tanks to be refilled to obtain the same draft and trim as at docking, and condition agreed by the Docking Master, the ship's captain and the chief engineer.
- 5.1.2** Three (3) copies of all checklists and reports shall be given to the Chief Engineer along with an electronic copy forwarded to the VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

HD-02 Hull Cleaning and Painting

Part 1 – SCOPE

- 1.1** The intent of this specification shall be to remove all marine growth and completely hydro blast the hull from keel to main deck and to install new underwater hull coating and coating from the water line to main deck, including the complete bow area above the waterline. This shall include outboard side of bulwarks.
- 1.2** This work shall be carried out in Conjunction with spec items:
 - 1.1.1** HD-05 Anodes
 - 1.1.2** HD-01 Dry Docking

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25-38541RMM4 - Draft Marks
- 2.1.2** ISV25-38400RMM3 - Cathodic Protection Plan
- 2.1.3** CCGS Vladyskov – Vessel Exterior Coatings Area

2.2 Standards

- 2.2.1** The coatings shall be applied to the manufacturer's instructions and on-site NACE Inspector.

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

- 2.4.1** The Contractor shall supply all staging, cranes, screens, lighting and any other support services and equipment for cleaning and coating the hull.

Part 3 – TECHNICAL DESCRIPTION

3.1 General

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

- 3.1.1** The Contractor shall ensure that the entire hull from main deck to keel including (but not limited to) rudders, propellers and the thruster tube is cleaned by high pressure fresh water washing (5000PSI Minimum) within 2 hours of docking to remove all marine growth and allow a preliminary hull inspection. Prior to commencing hydro blasting, all hull mounted equipment and openings are to be fully protected. The Owner's representative will then inspect the entire hull.
- 3.1.2** The area of the hull from the keel to the waterline including appendages is: 285 m².
- 3.1.3** The area from the waterline to main deck, including the complete bow area above the waterline is: 199 m².
- 3.1.4** The Contractor shall remove all sacrificial zinc anodes mounted on the underwater hull, and appendages in conjunction with HD-06. Old attachment straps shall be removed and ground down flush. Any disturbed steel work shall be coated as per below paint scheme.
- 3.1.5** The Contractor shall assign a representative to view the ship as it sits on the blocks, subsequent to cleaning and prior to blasting and painting. An owner's representative and Contractor's representative will view the ship and agree upon the total area of the underwater hull which is to be grit blasted and touched up.
- 3.1.6** The Contractor shall bid on abrasive blasting or UHP Water Washing (if conditions permit) 40 m² of underwater hull and 35m² above waterline hull to SSPC SP10 and provide unit cost for abrasive blasting or UHP Water Washing per square meter. All spots taken to an SSPC-SP10 shall be given a feather edge by power tool if required and to provide a minimum of 3cm smooth transition between new and existing coatings.
- 3.1.7** The Contractor shall paint all configurations, markings, draft marks etc. to similar arrangement previous to docking. The Contractor shall bid on supplying and applying 40m² of the following to the underwater portion (40m²) where required:
- 3.1.7.1** One coat of: Intershield 300 Aluminum color at 5 mils DFT to all bare areas.
- 3.1.7.2** One coat of: Intergard 263 Grey at 4 mils DFT to all primed areas and 3 cm overlap onto existing coating.
- 3.1.7.3** One spot coat of: Interspeed 640 Black 6 mils DFT to all areas coated with Intergard 263.
- 3.1.7.4** Complete topcoat of:

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

3.1.7.4.1 Interspeed 640 Black 6 mils DFT keel up to the waterline – one coat

3.1.7.4.2 Interspeed 640 Black at 7 mils DFT to Kort Nozzle – two coats

3.1.7.4.3 Interspeed 640 Black at 7 mils DFT to Bowthruster tunnel – two coats

3.1.7.4.4 Intergard 345 White at 4 mils DFT to Draft Marks – two coats

3.1.8 Contractor shall draw and mark off the waterline which runs across the stern and forward from the 3.7 meter draft aft to the 3.7 meter draft forward.

3.1.9 Contractor shall provide a light sweep blast of the area above the waterline in order to allow the new coating to adhere to the existing product.

3.1.10 The Contractor shall paint all configurations, markings, draft marks etc. to similar arrangement previous to docking. The Contractor shall bid on supplying and applying 35m² of the following to the main deck level, including the complete bow portion above the waterline, the following:

3.1.10.1 One coat of: Intershield 300 Aluminum color at 4 mils DFT to all bare areas.

3.1.10.2 One coat of: Intershield 300 Bronze color at 4 mils DFT to all primed areas and 3 cm overlap onto existing coating.

3.1.10.3 One spot coat of: Interthane 990 Red RAL3000, White Ral9003 or Black to all areas coated with Intershield 300.

3.1.10.4 Complete topcoat of:

3.1.10.4.1 Interthane 990 Red RAL3000 at 2 mils DFT or;

3.1.10.4.2 Interthane 990 White Ral9003 at 2 mils DFT or;

3.1.10.4.3 Interthane 990 Black at 2 mils DFT

3.1.11 Contractor shall ensure that all sea bay grids are protected during application of coating and orifice diameters are to be verified as original before undocking (i.e. not blocked or reduced).

3.1.12 The Contractor shall be responsible and liable for ensuring that the hull is clear and clean prior to, during and immediately after the coating application.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

- 3.1.13** The Contractor shall arrange for the services of a certified NACE Inspector to ensure that all surface areas are prepped and coatings applied to Manufactures instructions.
- 3.1.14** All staging, cranes, screens, lighting and any other support services and equipment for cleaning and coating the hull shall be Contractor supplied.
- 3.1.15** Contractor shall ensure suitable storage facilities are to be provided close to the work site for the material and equipment, to ensure they will be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application.
- 3.1.16** Contractor shall ensure the mixing and spraying equipment be kept heated and protected as necessary, while in use, to ensure that he coating is maintained at the recommended temperature.
- 3.1.17** Any docking plugs removed will require openings to be temporarily filled with wood plugs during operations such as sandblasting, painting, etc. which could cause contamination of the tanks to occur.

3.2 Location

- 3.2.1** Hull including outboard side of bulwarks to keel and appendages.

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, Commanding Officer, VMM and onsite NACE inspector.
- 4.1.2** Grit for the blast cleaning is not permitted to enter any part of the vessel. The Contractor is to ensure that every opening into the vessel where grit can gain entry is suitably covered. All traces of grit used for blast cleaning shall be removed from the vessel by the Contractor.
- 4.1.3** The Contractor shall plug deck scuppers and discharges as well as take other measures necessary to prevent liquids from contaminating areas being prepared or coated.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

Measures shall also be taken to ensure that surfaces and equipment other than those specified are not coated and that inlets or discharges in the shell will not be blocked by the coating. Deck machinery and other gear susceptible to damage by grit or coating material shall also be protected as necessary. The Contractor will be responsible for removing all protection prior to acceptance of vessel. The Contractor shall be responsible for removing any overspray on the vessel as a result of this work.

4.2 Testing

- 4.2.1** Paint thickness readings shall be taken along with environmental conditions and distributed as per 5.1.1. Readings shall include but not limited to hull temperature, air temperature, humidity etc.

4.3 Certification

- 4.3.1** Certificates from Paint Supplier for all coatings used.

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** The Contractor shall prepare a report that indicates:

5.1.1.1 The areas on the underwater hull that were repaired.

5.1.1.2 Which areas were blasted and indicate the blast media type and air pressure

5.1.1.3 Which areas were coated **with** what type of product and how much of each coating was used.

5.1.1.4 Thickness measurements of the applied coatings.

5.1.1.5 Atmospheric conditions (temp, humidity, etc.)

5.1.1.6 Temperature of the vessels hull

5.1.2 Three (3) copies of all checklists and reports shall be given to the Chief Engineer along with an electronic copy forwarded to the Vessel Maintenance Manager.

5.2 Spares

- 5.2.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-02	SPECIFICATION	
HULL CLEANING AND PAINTING		

5.3 Training

5.3.1 N/A

5.4 Manuals

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-03	SPECIFICATION	
SEA CHESTS		

HD-03 Sea Chests

Part 1 – SCOPE

1.1 The intent of this specification is to open up the sea chests for BV Inspection and cleaning.

1.2 This work shall be carried out in conjunction with the following Spec Items:

1.2.1 HD-01 Dry docking

1.2.2 HD-05 Anodes

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 ISV25-10130RMM11 - Tank Plan

2.1.2 ISV25-73500RMM12 - Cooling Water System Diagram

2.1.3 ISV25-82000RMM7 - Chilled Sea Water System Diagram

2.2 Standards

2.2.1 The coatings shall be applied to the manufacturer's instructions.

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

3.1.1 Contractor shall remove the sea chest grids and water blast the sea chest area. The grids and inlet areas shall be cleaned and mechanically reamed to the original diameter. The sea chests shall be thoroughly cleaned of marine growth, loose scale and rust.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-03	SPECIFICATION	
SEA CHESTS		

3.1.2 In conjunction with Spec Item HD-07 Sea Connections, contractor shall clean pipe between sea chest and ship side valves.

3.1.3 The Contractor shall bid on abrasive blasting or UHP Water Washing (if conditions permit) 3m² to SSPC SP10 and provide unit cost for abrasive blasting or UHP Water Washing per square meter. All spots taken to SSPC-SP10 shall be given a feather edge by power tools if needed and to provide a minimum of 3cm smooth transition between new and existing coatings.

3.1.6 Contractor shall apply:

3.1.6.1 One coat Intershield 300 at 5 mils DFT to all bare areas

3.1.6.2 One coat Intergard 263 Grey at 4 Mils DFT to all primed areas.

3.1.6.3 One spot coat Interclene 640NA Black at 6 Mils DFT to all primed areas and overlapping existing coating by 3 cm.

3.1.6.3 Contractor shall bid on applying a 20m² complete topcoat of Interclene 640 NA Black at 6 Mils DFT to entire sea chest areas.

3.1.7 Contractor shall arrange for the services of a certified NACE Inspector to ensure that all surface areas are prepped and coatings applied to Manufactures instructions.

3.1.8 Following completion of specified work and other related work, the grids shall be reinstalled with new contractor supplied bolts and locking wire.

3.2 Location

3.2.1 Sea Chest Upper Port– Frames 19 to 20 and Lower Port – Frames 18 to 19

3.2.2 Sea Chest Upper Stbd – Frames 19 to 20 and Lower Stbd – Frames 18 to 19

3.2.3 Aft Sea Chest – Slightly Stbd of Midships - Frames 7 to 8

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-03	SPECIFICATION	
SEA CHESTS		

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and BV Inspector.

4.2 Testing

- 4.2.1** Paint thickness readings shall be taken along with environmental conditions and distributed as per 5.1.1. Readings shall include but not limited to hull temperature, air temperature, humidity etc.

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver two (2) hard copies of all checklists and reports to Chief Engineer. Contractor shall deliver 1 electronic copy of all reports to VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-04	SPECIFICATION	
MECHANICAL SHAFT SEAL/ LINER INSTALLATION		

HD-04 Mechanical Shaft Seal Installation

Part 1: SCOPE

- 1.1** The intent of this specification is to remove the current stuffing box arrangement as fitted and install an Owner supplied Class Approved PSE Shaft Seal with adaptor plate, as well as new shaft liners for both port and starboard shafts.

Part 2: REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Technical Manual for Type PSE Seal
- 2.1.2** Wartsila GA of 127 mm PSE Type Seal
- 2.1.3** ISV22-52500RMM9 - Shafting Arrangement
- 2.1.4** ISV22-52600RMM6 - Stern Tube & Shaft Bracket Arrangement
- 2.1.5** ISV25 - 90520RMM4 – Rudder and Nozzle Arrangement
- 2.1.5** Please see attached pictures of current arrangement in Annex A-5

2.2 Standards

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

2.3 Regulations

- 2.3.1** Canada Shipping Act 2001 – Marine Machinery Regulations

2.4 Owner Furnished Equipment

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

Part 3: TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall arrange for a Wartsila Propulsion representative (FSR) to oversee the installation of the seal. Contractor shall bid an allowance of \$7500 for the provision

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-04	SPECIFICATION	
MECHANICAL SHAFT SEAL/ LINER INSTALLATION		

of a Wartsila FSR complete install. Actual amount shall be adjusted based on invoice using PWGSC 1379 action

- 3.3.2** The bolt pattern for the new seal shall be confirmed with measurements at the stuffing box attachment to the stern tube prior to proceeding with any work in this specification.
- 3.3.3** The Seal Mounting Adapter shall be installed on the flange as per the Wartsila PSE Seal Installation instructions. The contractor shall replace the 12 mounting studs as per the PSE Type Seal Approved drawing. All mounting studs are 7/8" – 9UNC.
- 3.3.4** Installation of the new seal shall be carried out under the guidance and instruction of the Wartsila Propulsion FSR and printed instructions as provided. All studs and the adapter plate mounting gasket required for installation are to be contractor supplied.
- 3.3.5** The contractor shall allow for piping in sea water to the new seal as per the PSE Type Seal drawing along with the installation of a vent line and compressed air connection. The contractor shall use the existing packing gland sea water feed and returns. The compressed air line will be terminated within 18" (0.45 m) of the seal connection and fitted with a ball valve and flexible section complete with quick connect female coupling. The compressed air connection on the seal will be fitted with the corresponding male fitting and a ball valve for isolation. Contractor is responsible for supply and installation of all air/water connections.
- 3.3.6** The contractor shall remove all 6 rudders and 2 propellers from the vessel in order to pull the shaft back far enough to install the liners and mechanical seals.
- 3.3.7** The contractor shall let go of the rudders at the top and bottom bolting patterns and remove the rudders by crane. All rudder internals in the steering gear compartment should remain connected. Contractor shall carefully remove propellers by crane as well. Connections can be seen in the attached drawing/annex pictures.
- 3.3.8** Old Shaft liner will need to be cut off in order to be removed. Extreme caution should be taken when removing the liner as not to damage the shaft underneath. Contractor should bid on using a zip-cut to remove liner. Liner is roughly 12" long.
- 3.3.9** Once rudders and propellers are removed Contractor shall remove current stuffing box and shaft liner, then pull back the shaft so that the new liner and mechanical seal can be installed.

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-04	SPECIFICATION	
MECHANICAL SHAFT SEAL/ LINER INSTALLATION		

3.4.0. Contractor should follow procedure in Duramax liner specifications for installation, as well as Wartsila drawing from mechanical seal installation, as well as water and air hook-ups.

3.4 Location

3.4.1 Cargo Hold/Workshop

3.5 Interferences

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

Part 4: PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 All work shall be subject to witness by the Chief Engineer or delegate, and acceptance by the Wartsila Propulsion FSR and the attending ABS surveyor.

4.2 Testing

4.2.1 Testing to be completed as per the manufacturer's instruction prior to the refloating of the vessel as well as once the vessel has been refloated after docking. This is required in order to obtain ABS survey credit.

4.3 Certification

4.3.1 N/A

Part 5: DELIVERABLES

5.1 Drawings/Reports

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

5.2 Spares

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-04	SPECIFICATION	
MECHANICAL SHAFT SEAL/ LINER INSTALLATION		

5.2.1 All spares as delivered with the PSE shaft seal shall be delivered to the Chief Engineer or Technical Authority prior to the acceptance of this item.

5.3 Training

5.3.1 N/A

5.4 Manuals

5.4.1 All manuals, installation and operation, that were supplied with the PSE shaft seal shall be delivered to the Chief Engineer or Technical Authority prior to the acceptance of this item.

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-05	SPECIFICATION	
ANODES		

HD-05 Anodes

Part 1 – SCOPE

- 1.1** The intent of this specification is for the Contractor to replace all the wasted anodes on the underwater portion of the vessel.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** ISV25-38400RMM3 - Cathodic Protection Plan
- 2.1.2** ISV25-90520RMM4 - Rudder and Nozzle Arrangement

2.2 Standards

- 2.2.1** The following Coast Guard Standards and/or Technical Bulletins must be followed while executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- 2.2.1.1** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.1.2** Coast Guard ISM Hotwork procedures
- 2.2.1.3** Coast Guard ISM Fall Protection procedures
- 2.2.1.4** Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E).

2.3 Regulations

- 2.3.1** N/A

2.4 Owner Furnished Equipment

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

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-05	SPECIFICATION	
ANODES		

Part 3 – TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** The Contractor shall, after consulting with the Chief Engineer and/or VMM remove any wasted anodes. Anodes are located on the vessel's hull, bow thruster tunnel, port and stbd upper and lower sea chests, rudder, kort nozzle, keel and shaft guard. Wasted anodes shall be replaced with new anodes as described in included drawings.
- 3.1.2** The Contractor shall quote on supplying and installing eleven (36), 2.5kg steel strapped bar anodes as described in attached Nozzle and Rudder Arrangement drawing. Contractor shall quote on the cost of a single anode for adjustment purposes by PWGSC 1379 action.
- 3.1.3** The Contractor shall quote on supplying and installing twelve (15), Z22 steel strap anodes as described in attached ISV25-38400RMM3 - Cathodic Protection Plan. Contractor shall quote on the cost of a single anode for adjustment purposes by PWGSC 1379 action.
- 3.1.4** Contractor will have to remove and re-install bow thruster grate in order to service anodes in the bow thruster tunnel.
- 3.1.5** Any additional anodes found during dry docking will be replaced by PWGSC 1379 action at the rates given above.

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, VMM, and if required the Bureau Veritas Class Inspector.

4.2 Testing

- 4.2.1** N/A

4.3 Certification

- 4.3.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS Vladykov	Draft
Spec Item #: HD-05	SPECIFICATION	
ANODES		

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver two (2) hard copies of all checklists and reports to the Chief Engineer. Contractor shall deliver one (1) electronic copy of all reports to VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-06	SPECIFICATION	
SEA CONNECTIONS AND STORM VALVE INSPECTIONS		

HD-06 Sea Connections and Storm Valve Inspections

Part 1 – SCOPE

1.1 The intent of this item is for the contractor to open up the Sea Connection and Storm Valves as listed below for cleaning, overhaul and inspection for ABS credit.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 ISV25 – 30000RMM9 – General Arrangement Drawing

2.1.2 Below table:

BR – Bronze, BS – Brass, SS – Stainless Steel, DI – Ductile Iron, CS – Carbon Steel

Number	Application	TAG #	Description	Location
1	Sewage Pump Ovbd Discharge	25-830-V-018	1.5" SS Swing Check V/V (Flanged)	E/R Stbd Side, aft at Deck Head
2	Sewage Pump Ovbd Discharge	25-830-V-019	1.5" SS Ball Valve (Flanged)	E/R Stbd Side, aft at Deck Head
3	Grey Water Transfer Pump Ovbd Discharge	25-830-V-058	1.5" SS Swing Check V/V (Flanged)	E/R Stbd Side, aft at Deck Head
4	Grey Water Pump Ovbd Discharge	25-830-V-059	1.5" SS Ball Valve (Flanged)	E/R Stbd Side, aft at Deck Head
5	Port High Sea Chest Suction	25-735-V-001	6.00" DI Globe Valve (Flanged)	E/R Fwd, Port Inboard side of high sea chest
6	Port Low Sea Chest Suction	25-735-V-002	6.00" DI 90Deg Globe Valve (Flanged)	E/R Fwd, Port On top of low sea chest
7	Stbd High Sea Chest Suction	25-735-V-003	6.00" DI 90Deg Globe Valve (Flanged)	E/R fwd, Stbd inboard side of high sea chest
8	Stbd Low Sea Chest Suction	25-735-V-004	6.00" DI Globe Valve (Flanged)	E/R fwd, stbd On top of low sea chest
9	Port Main Engine High Sea Chest Recirculation	25-735-V-026	3.00" DI SDNR Globe Valve (Flanged)	E/R fwd, Port Aft on high seachest
10	Port M.E. Discharge	25-735-V-027	3.00" DI SDNR Globe Valve (Flanged)	E/R fwd, port On discharge Manifold

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-06	SPECIFICATION	
SEA CONNECTIONS AND STORM VALVE INSPECTIONS		

11	Stbd Main High Sea Chest Recirculation	25-735-V-043	3.00" DI SDNR Globe Valve (Flanged)	E/R fwd, Stbd Aft on high sea chest
12	Stbd Main Low Sea Chest Recirculation	25-735-V-044	3.00" DI SDNR Globe Valve (Flanged)	E/R fwd, Stbd On top of low sea chest
13	Cooling Manifold Overboard Discharge Stbd	25-735-V-055	6.00" DI 90 Degree SDNR Globe Valve (Flanged)	E/R fwd, port Fwd of gen.
14	Cooling Manifold Overboard Discharge Port	25-735-V-014	6.00" DI 90 Degree SDNR Globe Valve (Flanged)	E/R fwd, port Fwd of valve 014
15	AFT Sea Chest Suction	22-820-V-001	2.00" BS Ball Valve (Flanged)	Aux mach compt Below deck
16	AFT Sea Chest Suction	22-820-V-005	2.00" BS Ball Valve (Flanged)	Aux mach compt Below deck
17	Chiller Exchanger Overboard Discharge	22-820-V-053	1.25" BS SDNR Globe Valve (Flanged)	Aux mach compt Port side aft F/W tank, deck head
19	Port Side Discharge	25-832-V-001	2.00" CS Ball Valve (Flanged)	Port side aft Inside HPU aux oil tank.
20	Port Side Discharge	25-832-V-002	2.00" CS Swing Check Valve (Flanged)	Inboard of v/v 25-832-v-001
21	Stbd Side Discharge	25-832-V-003	2.00" CS Swing Check Valve (Flanged)	Stbd side aft Over HPU units
22	Stbd Side Discharge	25-832-V-004	2.00" CS Ball Valve (Flanged)	Inboard of V/V 25-750-v-003
23	Oily Water Separator Discharge Overboard	22-750-V-029	0.75" Steel SDNR Globe Valve (Flanged)	Port side aft Inside HPU aux oil tank
24	Bilge Ballast Pump Overboard Discharge	22-715-V-029	2.00" BR SDNR Globe Valve (Flanged)	Port side fwd Escape hatch
25	Sea Chest FR 7-8 Vent	25-705-V-038	1.5" BR/BR Ball Valve (Flanged)	Aux mach compt Fwd ,stbd
26	High Sea Chest Stbd Vent	25-705-V-039	1.5" BR/BR Ball Valve (Flanged)	Fwd of stbd gen On top of chest
27	Low Sea Chest Stbd Vent	25-705-V-040	1.5" BR/BR Ball Valve (Flanged)	Fwd of M/E Below deck
28	Low Sea Chest Port Vent	25-705-V-041	1.5" BR/BR Ball Valve (Flanged)	Fwd of M/E Below deck.
29	High Sea Chest Port Vent	25-705-V-042	1.5" BR/BR Ball Valve (Flanged)	Fwd of port gen On top of chest
30	R/O unit sea water supply	825-v-004	1" SDNR Glob valve	Aux mach compt Below deck

2.2 Standards

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-06	SPECIFICATION	
SEA CONNECTIONS AND STORM VALVE INSPECTIONS		

2.2.1 The following Coast Guard Standards and/or Technical Bulletins must be followed while executing the specification. Copies of these standards and bulletins can be obtained from the VMM

2.2.1.1 Canadian Coast Guard Fleet Safety Manual (DFO 5737)

2.2.1.2 Canadian Coast Guard ISM Lockout/Tagout

2.2.1.3 Canadian Coast Guard ISM Hotwork procedures.

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.1 General

3.1.1 Contractor shall remove all listed valves from their original location and place in an area suitable for viewing. All valves shall be suitably tagged such that they may be reinstalled in their respective original locations.

3.1.2 The contractor shall disassemble all valves listed. The globe valves shall have their spindles removed; wire brush cleaned and laid out for inspection. The internals of the valve bodies, valves and sealing surfaces shall be cleaned thoroughly and laid out for inspection.

3.1.3 The butterfly valves shall be removed, disassembled, cleaned and laid out for inspection. The butterfly valves are to be carefully inspected, paying close attention to the seals. Any seal replacements will be with contractor supplied; this cost to be adjusted by PWGSC 1379 action.

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

3.1.5 Any disconnections or other removals necessary for access to the valves to carry out this work shall be included in the quotation.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-06	SPECIFICATION	
SEA CONNECTIONS AND STORM VALVE INSPECTIONS		

3.1.6 The contractor shall provide a test method to insure that a watertight seal is maintained between the valve and the valve seat for the screw type valves. This method shall be determined to be acceptable by the attending ABS Inspector.

3.1.7 Following all inspections and tests, all valves shall be assembled with new gland packing and jointing material, and installed in good order in their original respective locations.

3.1.8 Contractor shall supply all material required to carry out the specified work. Contractor shall allow \$5,000 for new valves, parts and additional materials.

3.2 Location

3.2.1 Please see table in Reference 2.1.1.

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

4.1.1 The contractor shall be responsible for all inspections and shall consult with ABS, prior to commencement of work, to determine an inspection schedule; at each inspection point, the contractor shall advise the CG Representative, in advance, to allow his/her attendance.

4.1.2 Upon the refloating of the vessel all valves shall be inspected for water tightness. Any leaks are to be repaired by the contractor.

4.2 Testing

4.2.1 Reassembled valves are to be functionally tested by the Chief Engineer for proper operation and watertight to the satisfaction of the Chief Engineer and BV.

4.3 Certification

4.3.1 N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-06	SPECIFICATION	
SEA CONNECTIONS AND STORM VALVE INSPECTIONS		

- 5.1.1** Two (2) copies of all checklists and reports shall be given to the Chief Engineer along with an electronic copy forwarded to the VMM.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

5.4 Manuals

- 5.4.1** N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-07	SPECIFICATION	
SEA WATER PIPE CLEANING		

HD-07 Sea Water Pipe Cleaning

Part 1 – SCOPE

1.1 The intent of this specification is to clean the interior of the s/w piping between the port high and low sea chests and the stbd high and low sea chest by either mechanical means or water jet.

1.2 This work shall be carried out in conjunction with the following Spec Items:

1.2.1 HD-01 Dry-docking

1.2.2 HD-03 Sea chests

1.2.3 HD-06 Sea Connections and Storm Valve Inspections

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

2.1.1 ISV22-73500RMM11- Cooling Water System Diagram

2.2 Standards

2.2.1 N/A

2.3 Regulations

2.3.1 N/A

2.4 Owner Furnished Equipment

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

Part 3 – TECHNICAL DESCRIPTION

3.2 General

3.1.1 Contractor shall clean by either mechanical means or high pressure water washing all s/w pipe from the port and stbd upper and lower seachests up to the isolation valves for each piece of equipment.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-07	SPECIFICATION	
SEA WATER PIPE CLEANING		

- 3.1.2** Contractor shall remove all equipment isolation butterfly valves connected to this pipe prior to starting cleaning.
- 3.1.3** Contractor shall protect all surrounding equipment (switchboards, panels, motors, etc..) with plastic wrap prior to starting cleaning.
- 3.1.4** Contractor shall ensure all debris is removed from piping prior to reinstalling butterfly valves.
- 3.1.5** Crossover pipe is made from copper nickel and is 6 “ in diameter and approx. 9’ in length.

3.2 Location

- 3.2.1** Fwd Engine Room Port to Stbd

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

- 4.1.1** All work shall be completed to the satisfaction of the Chief Engineer, SVMM, and BV Inspector.

4.2 Testing

- 4.2.1** All disturbed valves shall be checked for water tightness once vessel is back in the water.

4.3 Certification

- 4.3.1** N/A

Part 5 – DELIVERABLES

5.1 Drawings/Reports

- 5.1.1** Contractor shall deliver two (2) hard copies of all checklists and reports to Chief Engineer. Contractor shall deliver 1 electronic copy of all reports to SVMM.

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Draft
Spec Item #: HD-07	SPECIFICATION	
SEA WATER PIPE CLEANING		

5.2 Spares

5.2.1 N/A

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
Spec Item #: L-01	SPECIFICATION	
ANNUAL ELECTRICAL INSULATION TESTING		

L-01 Annual Electrical Insulation Testing

Part 1 – SCOPE

- 1.1 The intent of this specification shall be for the contractor to test the insulation resistance of all the electrical distribution systems onboard (Generators, Motors, Panels, Cables/Feeds, Heaters, Etc.) using a 500V DC “Meggar” – type Direct Indicating Ohm tester, provided by the contractor.

Care shall be taken not to test circuits while electronics (including voltage regulators), which may be damaged by high voltages, are connected.

Part 2 – REFERENCES

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 Contractor shall use previous years test results as a guideline for what to test and to compare to previous test results.

2.2 Standards

- 2.2.1 Meggar readings shall be taken and recorded in accordance with the normal Shipboard practices and procedures, keeping in mind that UPS and electronic equipment is susceptible to damage if meggared.
- 2.2.2 CG Lockout Procedures, ISM Hotwork, Confined Space Entry and Fall Protection Procedures shall be strictly adhered to.

2.3 Regulations

- 2.3.1 The readings shall be recorded and be acceptable according to the limits stated in the TP 127 Electrical Code for Ships.
- 2.3.2 The report of readings shall be delivered to the Chief Engineer and attending Class Inspector and be accepted.

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

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
Spec Item #: L-01	SPECIFICATION	
ANNUAL ELECTRICAL INSULATION TESTING		

3.1 General

- 3.1.1** The contractor shall inform the Chief Engineer prior to commencing the Meggar Tests and shall confirm that no electronic equipment is connected or shall be damaged by the tests.
- 3.1.2** The contractor shall submit three (3) signed type written copies of the final readings to the Chief Engineer and Class Inspector before completion of refit.
- 3.1.3** The contractor shall include in their quote an allowance of 20hrs at the standard hourly rate for the tracing and repair of any/all ground faults detected. This shall be adjusted up or down by PWGSC 1379 action.

3.2 Location

- 3.2.1** The location of the breakers can be found on the included Meggar Report.

3.3 Interferences

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

Part 4 – PROOF OF PERFORMANCE

4.1 Inspection

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

4.2 Testing

- 4.2.1** Any repairs to ground circuits shall be tested before it is considered complete.

4.3 Certification

- 4.3.1** The contractor shall provide current a copy of the calibration certificates for all meters used during testing to the

Part 5 – DELIVERABLES

5.1 Drawings/Reports

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
Spec Item #: L-01	SPECIFICATION	
ANNUAL ELECTRICAL INSULATION TESTING		

- 5.1.1** The contractor shall submit three (3) signed type written copies of the final readings to the Chief Engineer and Class Inspector before completion of refit. Contractor shall provide PWGSC Contracting Officer with an electronic copy of any test equipment certificates as well as an electronic copy of the signed type written Meggar Report.

5.2 Spares

- 5.2.1** N/A

5.3 Training

- 5.3.1** N/A

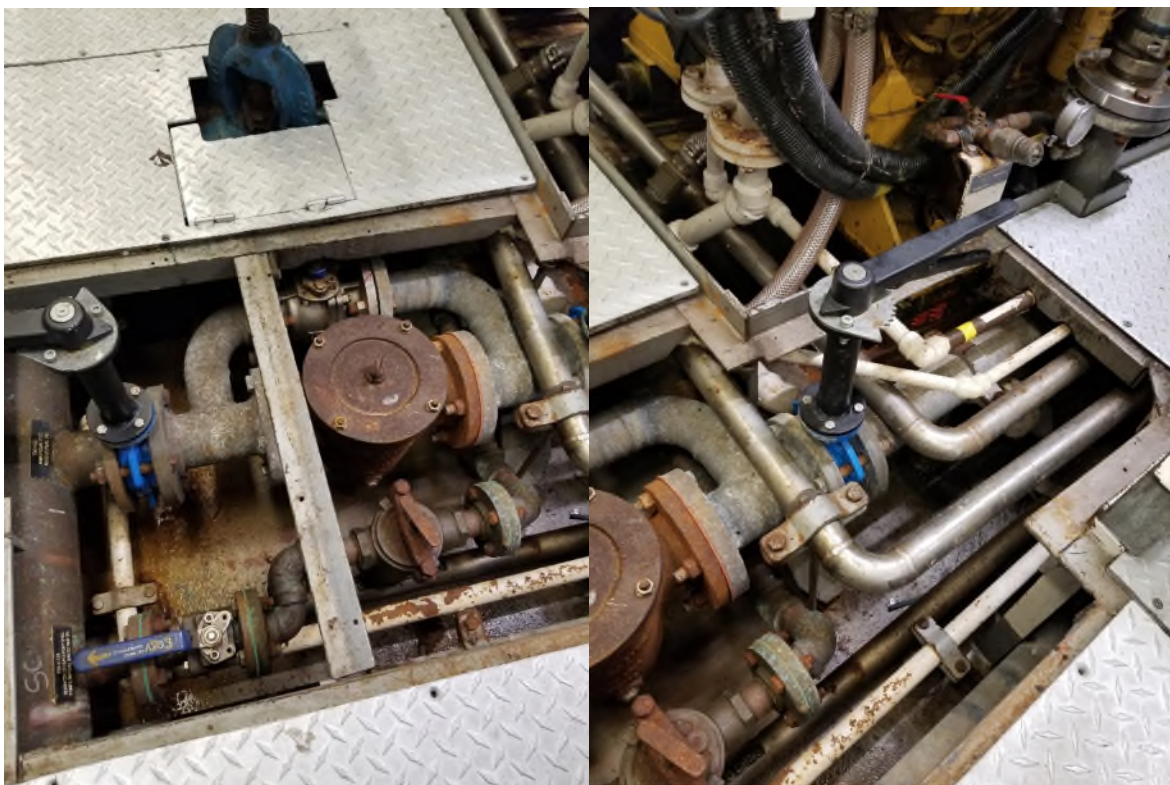
5.4 Manuals

- 5.4.1** N/A

Part 6-Notes

February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		

A-1 Galvanized Pipe Replacement to Copper Nickel



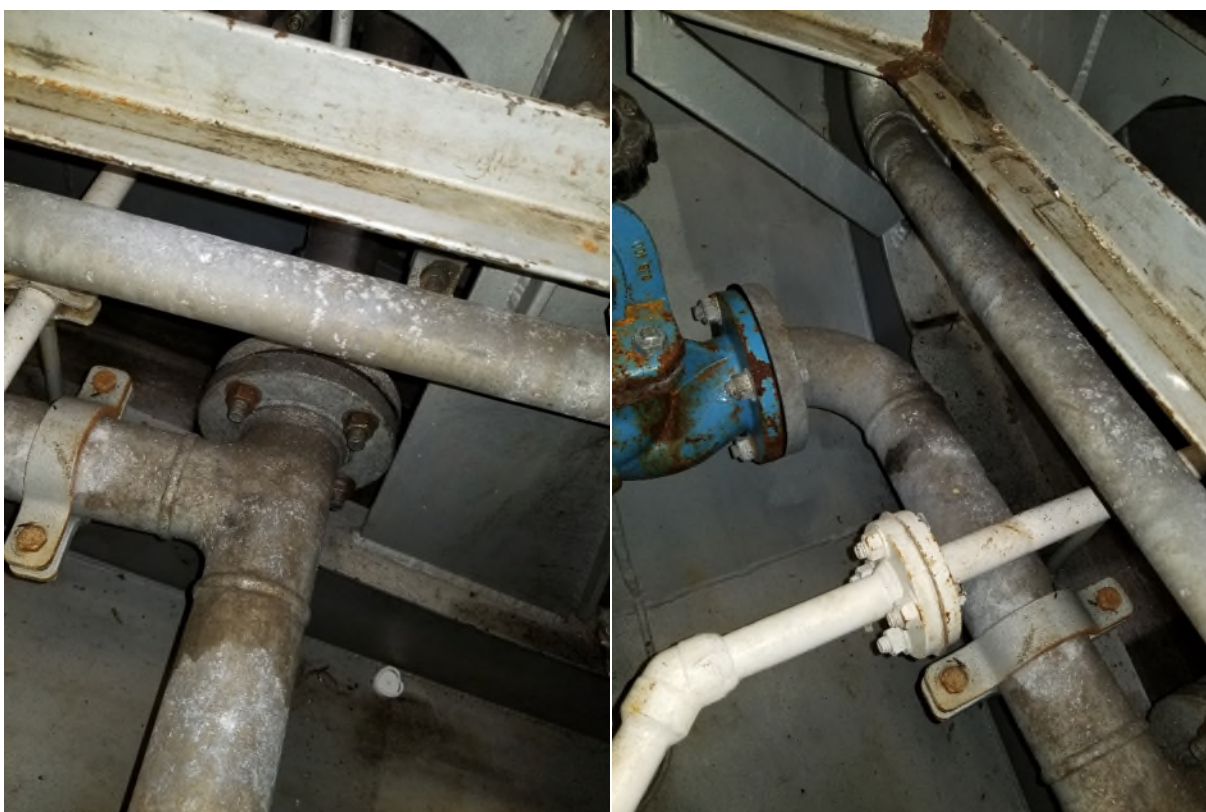
February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		

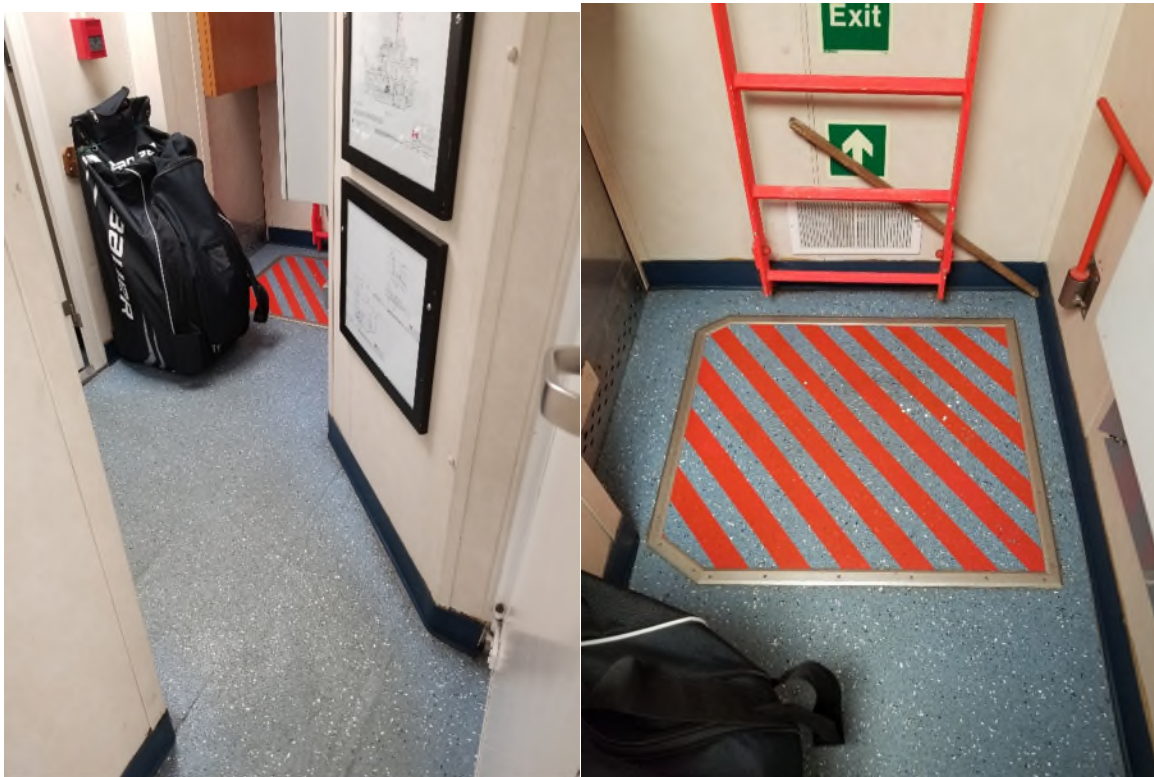
A-2 Mess Area Decking Replacement



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		

A-3 CTD Davit Resurfacing



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		

A-4 A-Frame Pin Modifications



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		



February 11 th , 2020 – March 24 th , 2020	CCGS VLADYKOV	Final Draft
	ANNEX	
ANNEX		

A-5 Mechanical Shaft Seal Installation

