

**CCGS M. Charles MB
5 Year Survey Renewal Dry Docking**

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CCGS M Charles
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Specification No: F1782-18C922

G1.0 GENERAL

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V8L 4B2

G 1.0 GENERAL NOTES

G 1.1 Vessel Particulars

G 1.1.1 Details

Name:	CCGS M Charles MB
Official No.:	
IMO No.:	
Type:	Twin Screw, Mid Shore Patrol Vessel
Class:	Near Coastal Class 1
Year Built:	2012 Irving Shipbuilders
Principle Dimensions	
Length Overall:	39.72 m
Breadth:	7.00 m
Depth:	3.80 m
Tonnage, Gross:	253 tonnes
Tonnage, Net	75 Tonnes
Propulsion	Twin screw, Controllable Pitch Propeller, MTU S4000 M93L 12V. 1 bow thruster
Construction Material	Steel

G 1.1.2 Equipment - Not Used

Equipment	Make	Model	Serial#

G 1.2 References

G 1.2.1 Regulations

G 1.2.1.1 All regulations, standards, publications, and procedures listed below are to be used as reference. The Contractor will ensure all work completed in the specification are done to all pertinent federal and provincial regulations and standards. CCG procedures are to be used as a guide if no other regulation takes precedence.

G 1.2.1.2 In the following table “Included – Yes” means that the document will be provided by CCG to the Contractor. “Included – No” means that the Contractor must obtain the document separately. “Included – N/A” means that the document is not relevant to this specification.

FSM Procedures	Title	Included Yes/No
FSM	Fleet Safety Manual (Latest Edition)	Yes
Ship Specific	Vessel Specific - Asbestos Risk Assessment Report and Management Plan	No
Ship Specific	Vessel Specific – Lead Paint Test Report	No
Publications		
TP 127	Ships Electrical Standards	No
TP 3669	Standards for Navigating Appliances and Equipment	N/A
TP3177	Standard for the Control of Gas Hazards in Vessels to be Repaired or Altered	No
TP 11469	Guide to Structural Fire Protection	No
TP 14231	Marine Occupational Health and Safety Program	No
TP 14612	Procedures for approval of Life-saving appliances and fire safety systems, Equipment and Products	No
TP 4414 E	Guidelines Respecting Helicopter Facilities on Ships.	N/A
IEEE 45	Institute of Electrical and Electronics Engineers, Recommended Practice for Electrical Installations on Shipboard	No
70-000-000-EU-JA-001	Specification for the Installation of Shipboard Electronic Equipment	N/A
IEC 60533	Electrical and Electronic installations in ships – Electromagnetic Compatibility	No
IEC 60945	Maritime Navigation and Radio communication equipment and systems – methods of testing and required test results.	N/A

Standards		
CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures Division 2 Certification	No
CSA W47.2	Certification of Companies for Fusion Welding of Aluminum	No
CSA W59	Welded Steel Construction – Metal Arc Welding	No
CSA W59.2	Welded Aluminum Construction	No
ISO 9712:2005	International Standards for NDT	No
18-080-000-SG-001	Welding of Ferrous Materials	No
18-080-000-SG-002	Welding of Aluminum and Aluminum Alloys	No
SSPC	The Society for Protective Coatings	No
ISO 8501-1:2007	Preparation of steel substrates before application of paints and related products	No
ISO 10816-1:1995	Mechanical vibration -- Evaluation of machine vibration by measurements on non-rotating parts -- Part 1: General guidelines	No
Regulations		
MOHS	Maritime Occupational Health and Safety	No
CSA	Canada Shipping Act 2001	No
Machinery Regs.	Marine Machinery Regulations (SOR/90-264)	No
Hull Regs.	Hull Inspection Regulations (C.R.C., C. 1432)	No
Canada Labour Code	Canada Labour Code (R.S.C., 1985, c. L-2)	No
WorkSafe BC.	Occupational Health and Safety (OHS) Regulation https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation	No

G 1.2.2 Guidance Drawings

G 1.2.2.1 The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	Description
AF6102-89940-02	Tank Arrangement, Capacity Plan
6094-63300-01_B	Scheme of cathodic protection Sheet 5_5
AF6101-59300-04	Oily Waste System
AF6101-5200-01	Bilge Drainage And Dewatering System
AF6101-53000-02	Sanitary Fresh Water system
AF6101-63100-01	Paint Schedule
AF6102-25600-01	AS-BUILT COOLING WATER SYSTEM
AF6102-52600-01	AF SCUPPERS AND DRAINS
AF6102-55100-01	AS-BUILT COMPRESSED AIR SYSTEM.
AF6102-59300-02	AS-BUILT BLACK GREY WATER AND SANITARY FLUSHING SYSTEM
J16003-S01_R0	Sea Chest Modification Details
J15073-M01-R4	M.E. Exhaust Outlets Sheet 1
J15073-M01-R4	M.E. Exhaust Outlets Sheet 2
J15073-S01-R0	Strip-Out
AF6101-56100-02	AS-BUILT STEERING SYSTEM SCHEMATIC OF THE HYDRAULIC SYSTEM.
AF6101-56100-03	AF STEERING GEAR ROOM ARRANGEMENT.
AF6101-10000-11	AF Rudders Construction Plan 1
AF6101-10000-11	AF Rudders Construction Plan 2
C185-12-02	Kamewa CP-A D Installation Manual (10Sooo239/49341-E)
C185	Simplan Seal Manual
6094-25433-01-01	Shaft Line arrangement
C15-49-002-02.pdf Rev.1	R1 Installation Drawing
C15-49-506-01 Rev. 1	Air Pipes and Sounding Diagram
C185-17-06	Marine Crane Model TB10-23 Manual.pdf
	EcoShield Application Guide
	EcoShield technical information

G 1.2.3 Abbreviations

ACM	Asbestos Containing Material
CA	Contract Authority (PWGSC)
CCG	Canadian Coast Guard
CFM	Contractor Furnished Material and/or equipment
CLC	Canada Labour Code
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
DFO/CCG	Department of Fisheries and Oceans, Canadian Coast Guard
DFT	Dry Film Thickness
FSSM or FSM	Fleet Safety Manual (CCG)
FSR	Manufacturer’s Field Service Representative
GSM	Government Supplied Material and/or equipment
HC	Health Canada
IACS	International Association of Classification Societies
IEEE	The Institute of Electrical & Electronic Engineers Inc.
ITS – ME	Integrated Technical Services, Marine Engineering
ITS – E&I	Integrated Technical Services, Electronics & Informatics
LOA	Length Overall
RO	TBD, will announce at bidders conference
MSDS	Material Safety Data Sheet
NDT	Non Destructive Testing
OHS	Occupational Health and Safety
PWGSC	Public Works and Government Services Canada
SSMS	Safety & Security Management System
RO	Recognized Organization as defined by Canada Shipping Act.
TA	Technical Authority - CCG Superintendent, Marine Engineering Western Region, or her delegated Representative.
TBS	Treasury Board of Canada Secretariat
TCMS	Transport Canada Marine Safety
TI	Technical Inspector – CCG delegated.
VCA	Vessel Condition Assessment
VLE	Vessel Life Extension
WCB	Workers’ Compensation Board of North West Territories

Note: For the purposes of this specification the TA will be the TI.

G 1.3 Conditions and Definitions

G 1.3.1 The following conditions and definitions are applicable to all work contained in the Specifications and are intended to outline the quality of workmanship and practice that is the minimum acceptable level:

- a) the word "install" means that the Contractor must connect mechanically and electrically and provide the labor and materiel to complete the installation;
- b) The word "reinstall" means a piece of equipment that the Contractor has affected repairs on and is to be returned/installed in its original location and be mechanically and electrically connected. The Contractor must provide the labor and materiel to complete the reinstallation;
- c) The word "remove" means that the Contractor must provide all labor and materiel to remove the unit, equipment, materiel, or system in its entirety. Part of the removal process is to blank openings, restore insulation and paint;
- d) the word "relocate" means that the Contractor must provide all labor and material to remove the unit, piece of equipment, or system and to install the same unit, piece of equipment, or system in the new location;
- e) The term "or equivalent" means a substitute which has equal characteristics i.e. (size, materiel type, life, weight, input, and output) as approved by the TA. A comparison of the general specifications must be provided to the TA for the equipment specified and the "or equivalent" (i.e. old compared to the new);
- f) the term "overhaul" as applied to any mechanical equipment, structure or system comprises: disassembly into component parts; cleaning examination of parts for defects; gauging of parts for wear; reporting of parts worn beyond specification limits or otherwise defective and reassembly followed by specification adjustments; tests; and functional trials;
- g) the word "disconnect" means the Contractor must mechanically and electrically disconnect the piece of equipment of all piping, wiring, seatings and other attachments permitting the removal of the unit as a whole;
- h) the word "disassemble" means that the Contractor must provide all labor to take apart, piece by piece, the equipment, machinery or system to be examined or repaired;
- i) the word "reassemble" means that the Contractor must provide all labor and material to put together, piece by piece, the equipment, machinery or system on completion of examination or repair;

- j) the words "Additional Work Procedures" means the procedures as defined in solicitation and contract and includes any additional work required on a system, sub-system or equipment which the original specification did not specify;
- k) the word "calibrate" means the adjustment of readings and measurements to a known standard;
- l) The word "check" means that the Contractor must provide labor to find faults by sighting, feeling or listening. The checking of any equipment does not involve the disturbance or removal of parts, components or sub-assemblies;
- m) the word "examine" means that the Contractor must provide labor for the process of systematically examining, checking and testing equipment, records or administrative procedures to detect actual or potential defects or errors;
- n) the word "test" means that the Contractor must provide labor to conduct the operation of a unit in relation to a stated standard or procedure;
- o) The words "set-to-work" means the tuning, alignment and adjustment of equipment/systems required subsequent to satisfactory installation. Inspection to make the equipment/systems ready for technical acceptance trials;
- p) the word "trials" is an element of QA that means an action(s) by which the Contractor proves by a visual or instrumental presentation that the equipment or system satisfies the requirements of the specified trials agenda; and
- q) the term "functional test" means operation of a piece of equipment in all its normal operating modes and throughout its operating range to establish that it will perform its designed function within normal operating parameters as indicated in the manufacturer's documentation.

G 1.4 Miscellaneous Information

G 1.4.1 Occupational Health and Safety

- G 1.4.1.1 The Contractor and all sub-contractors must follow Occupational Health and Safety (OHS) procedures in accordance with applicable federal and provincial OHS regulations ensuring that Contractor activities are carried out in a safe manner and do not endanger the safety of any personnel. The Contractor and Contractor's employees will not have access to the vessel's washrooms and crew mess facilities. The Contractor must provide the necessary amenities as required.
- G 1.4.1.2 Where "Safety Management System" is referenced in this document, it is referring to the Contractor's Safety Management System, which must be in affect while in the Contractor's Care and Custody and must be in accordance with the applicable OHS regulations and procedures.
- G 1.4.1.3 When the Contractor works on the vessel while in the Care and Custody of the Canadian Coast Guard, the Safety Management System of CCG must be followed.
- G 1.4.1.4 The Contractor must identify a specified person that is responsible for the safety management of the work site. The Safety Manager must insure that daily safety rounds are carried out and that safety issues are identified and safety precautions are maintained.
- G 1.4.1.5 Areas that pose a hazard as a result of the specification work are to be secured and clearly identified by the Contractor with signage to advise and protect all personnel from the hazard in accordance with applicable regulations.

G 1.4.2 Lead Paint and Paint Coatings

- G 1.4.2.1 The Contractor must not use lead based paints.
- G 1.4.2.2 CCG ships have been painted with lead based paints in the past and as a result some of the Contractor's processes such as grinding, welding and burning may release this lead from the coatings. The CCG will provide copies of all available lead testing results.

G 1.4.3 Asbestos Containing Materials (ACM)

- G 1.4.3.1 The Contractor must use insulation that contains 0% ACM.
- G 1.4.3.2 The Contractor will be supplied the most recent copy of the vessel's Green Passport, by CCG prior to Assumption of Custody.

- G 1.4.3.3 Handling of any asbestos containing materials must be performed by trained personnel and/or a company certified in the removal of asbestos in accordance with Federal, Provincial and Municipal regulations.
- G 1.4.3.4 The Contractor must provide the TA with disposal certificates for all asbestos containing material removed from the vessel indicating that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.
- G 1.4.3.5 The vessel maintains a Green Passport under RO's Register which states in Part A.1A Summary of Asbestos Status: Material Declarations confirms that no asbestos has been used in the construction of this vessel. The Contractor must provide an "Observation Report (OR)" with reference to any concerns or intentions in regards to asbestos containing materials not aROeady specified. Any approved work resulting from the OR will follow the Additional Work Procedures.

G 1.4.4 Confined Spaces

- G 1.4.4.1 Prior to commencing work in any confined space, the Contractor must ensure that a qualified person issues a "Gas Free Certificate" for that space. Certificates must specify, "Safe for persons" or "safe for hot work" as appropriate. Contractor must adhere to the safety management system requirements as determined in the Pre-Work Meeting. All copies of certificates generated are to be provided to the TA in accordance with the Documentation section of the General Notes.
- G 1.4.4.2 Any entry into confined spaces onboard the vessel during the contract period must be conducted in accordance with the safety management system as determined in the Pre-Work Meeting.

G 1.4.5 Hot Work

- G 1.4.5.1 The Contractor must, as a minimum, ensure the following items are followed when conducting hot work while in their care and custody:
 - a) The compartment(s) affected must be certified gas free by a qualified person. The Contractor must provide all certificates to the TA in accordance with the Documentation section of the General Notes. Certificates must specify, "Safe for persons" or "safe for hot work" as appropriate. The Contractor must post a copy of all certificates at the entrance to the affected spaces;
 - b) All portable combustible materials within 2m of hot work must be removed from the vicinity;
 - c) Protective material must be used to prevent the spread of sparks, protecting electrical cables and other services;

d) Fire sentries must be provided in each space and in the adjacent space where welding, grinding, or burning is being carried out on bulkheads, deck-heads or decks. Fire sentries must be provided with an appropriate fire extinguisher (Contractor supplied) and must be trained in its use. The fire sentry must maintain a watch in his designated area for at least thirty (30) minutes after any hot work has been completed.

G 1.4.5.2 Any hot work carried out onboard the vessel during the contract period must be conducted in accordance with the safety management system. A copy of the site generated hot work permits must be provided to the TA in accordance with the Documentation section of the General Notes named in accordance with the specification item generating the required work.

G 1.4.6 Work Aloft

G 1.4.6.1 Any work aloft onboard the vessel during the maintenance/refit period must be conducted in accordance with the safety management system. Notices must be placed to prevent operation of Radars while personnel are working aloft on the mast or on the wheelhouse top.

G 1.4.7 Electrical Equipment

G 1.4.7.1 When working on electrically operated equipment, the following precautions must be taken at a minimum:

- a) All electrical equipment undergoing work must be isolated at the main power and alternate distribution panel;
- b) Electrical lock-outs must be used to isolate the equipment and electrical caution tags posted at the main power and distribution panel on those switches supplying equipment under maintenance and verification made at the terminals to ensure power is not present.
- c) Only after completion of the work must the lock-outs and electrical caution tags be removed and the switches engaged.

G 1.4.7.2 Any lock-out requirements onboard the vessel during the contract period must be conducted in accordance with the safety management system.

G 1.4.7.3 The TA must be notified of all such ongoing work.

G 1.4.8 Workplace Hazardous Materials Information System (WHIMS)

- G 1.4.8.1 The Contractor must provide the TA with Material Safety Data Sheets (MSDS) for all Contractor and sub-contractor supplied WHIMS controlled products. MSDS sheets are to be the formats requested in the Documentation section of the General Notes.
- G 1.4.8.2 All MSDS sheets must be maintained in accordance with OHS procedures.
- G 1.4.8.3 The TA will provide the Contractor with access to MSD sheets for all controlled products on the ship for all specified work items on request.

G 1.4.9 Smoking in the Work Space

- G 1.4.9.1 The Contractor must ensure compliance with the Non- Smokers' Health Act. The Contractor must ensure that there is absolutely no smoking onboard the vessel by their employees, sub-contractors, including the employees of any sub-contractors.

G 1.4.10 Touch-up / Disturbed Paint

- G 1.4.10.1 The Contractor must prepare and coat all touch-up work in accordance with the paint specification provided for the particular area involved in accordance with interspec.

G 1.4.11 Contractor Furnished Materials (CFM) and Tools

- G 1.4.11.1 The Contractor must ensure replacement material such as jointing, packing, insulation, small hardware, oils, lubricants, cleaning solvents, preservatives, paints, coatings etc. are in accordance with the equipment manufacturer's drawings, manuals and/or instructions.
- G 1.4.11.2 Where no particular item is specified or where substitution must be made, the Contractor must submit an Observation Report indicating the substitution or item not specified to the TA. The Contractor must provide information about materials used, certificate of grade and quality of various materials to the TA prior to use.
- G 1.4.11.3 The Contractor must provide all equipment, devices, tools and machinery such as crange, staging, scaffolding, hoarding, and rigging necessary for the completion of the work in this specification.
- G 1.4.11.4 The Contractor must deliver and store all new CFM equipment at their facility. The CFM must be stored in a secure, environmentally controlled space in accordance with the equipment storage section of this specification.

G 1.4.12 Government Supplied Materials (GSM) & Tools

- G 1.4.12.1 All tools are Contractor supplied unless otherwise stated in the technical specifications.
- G 1.4.12.2 Where tools are supplied by the TA they must be returned by the Contractor in the same condition as when they were borrowed. Borrowed tools must be inventoried and signed for by the Contractor on receipt and return to the TA.
- G 1.4.12.3 All GSM material will be brought to the Contractor's facility onboard the vessel and will remain stored onboard the vessel until required by the Contractor.

G 1.4.13 Storage

- G 1.4.13.1 Equipment (i.e. covers, cowling and other items that may need to be removed and stored) must be stored in accordance with the equipment manufacturer's or equipment vendor's specific storage instructions. The Contractor must make these instructions available to the TA.
- G 1.4.13.2 All equipment and items must be stored in such a manner so as to be easily accessible for inspection. No items are to be stored directly on floors.

G 1.4.14 Regulatory Inspections and/or Class Surveys

- G 1.4.14.1 The Contractor must contact, coordinate, schedule, and be completely prepared for all regulatory inspections and surveys by the applicable authority: i.e. RO, HC, Environment Canada or others as indicated by individual specifications.
- G 1.4.14.2 For the purposes of this contract all regulatory inspection will be conducted by RO, Canada will be paying all RO's fees, including all TCMS inspections. TCMS retains the authority to inspect the vessel at any time. Inspection expenses occurred by TCMS or the RO will be handled outside of this contract. Any work arising within this contract due to TCMS inspections results or additional work not covered by this statement of work handled though PWGSC 1379 action.
- G 1.4.14.3 Documentation generated by the above inspections and/or surveys indicating that the inspections and/or surveys were conducted (i.e. original signed and dated certificates) must be provided to the TA in accordance with the "Documentation" Section of these General Notes.
- G 1.4.14.4 The Contractor must not substitute inspection by the TA for the required regulatory inspections.
- G 1.4.14.5 The Contractor must provide timely advance notification (minimum of 2 working days) of scheduled regulatory inspections to the TA so they may witness the inspection.

G 1.4.14.6 The Contractor must arrange for all visits and inspections associated with ROS, HC, Environment Canada, or any other Inspection required by the specification unless otherwise indicated. All costs and fees associated with these visits and inspections will be billed directly to Canada.

G 1.4.15 Contractor Inspections

G 1.4.15.1 The Contractor must afford the opportunity for the TA to conduct an inspection with the Contractor on the condition and location of items to be removed prior to either carrying out the specified work or gaining access to a location to carry out the work.

G 1.4.15.2 Prior to the close out of any item under this specification, the Contractor must afford the TA the opportunity to verify the work has been completed in accordance with the specification. At that time the Contractor must have available all photos, documents, reports, and trials in relation to the item being closed out as completed.

G 1.4.16 Recording of Work in Progress

G 1.4.16.1 The TA may record any work in progress using various means including, but not limited to photography and video, digital or film.

G 1.4.17 Access for Maintenance, Installation, and Removal.

G 1.4.17.1 The layout of newly installed machinery and equipment must be designed and constructed to permit ready access for routine maintenance, operational checks and operational inspections without disturbance of other machinery, equipment or structure.

G 1.4.17.2 The Contractor must determine best routes for installing and removing equipment. All lifting points currently fitted on the ship must be treated as uncertified, and must be certified before use by the Contractor.

G 1.4.17.3 Temporary lifting points installed by the Contractor must be removed prior to transfer of custody with welds ground flush, and paint coatings applied in accordance with the Interspec paint specification.

G 1.4.17.4 Manufacturer's recommended removal clearances must be allowed for.

G 1.4.17.5 After equipment installation and/or removal the Contractor must make good all equipment relocations, blemishes, and penetrations and must return the affected areas of the ship to the As-Delivered working condition.

G 1.4.18 Assembly of Components

- G 1.4.18.1 The Contractor must ensure that during installation of specified equipment, that parts and assembled equipment are cleaned of smudges, spatter or excess solder, weld metal and metal chips or any other foreign material which might detract from the intended operation, function, or appearance of the equipment. (This would include any particles that could loosen or become dislodged during the normal expected life of the equipment). All corrosive material must be removed. This cleaning must take place before the parts are assembled into the equipment.
- G 1.4.18.2 Covers, cowlings and components damaged by the Contractor must be replaced with a new CFM cover, cowling, or component.
- G 1.4.18.3 Where torque specifications are not provided by the manufacturer, standard SAE nut and bolt torques must be used.

G 1.4.19 Protection of Equipment

- G 1.4.19.1 The Contractor must take measures to ensure that surfaces and components of equipment installed on the vessel are protected against damage, soiling, and contamination as a result of contracted work.
- G 1.4.19.2 All electrical and electronic equipment and components must be protected during the contract against physical damage, internal damage, and by the effects of adverse temperatures or other environmental conditions.
- G 1.4.19.3 The Contractor must protect equipment that could be damaged as a result of movement of materials and equipment nearby. The Contractor must also protect equipment from nearby sources of contamination including but not limited to burning, welding, grinding and painting.
- G 1.4.19.4 Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance must be returned to As Delivered condition by the Contractor.
- G 1.4.19.5 All openings in machinery and/or systems prior to connections being made must be kept covered by suitable inserts or covers at all times.
- G 1.4.19.6 The Contractor must obtain and follow instructions from its sub-Contractors for any special protection required for their equipment during the project work. Such instructions must be made available to the TA.
- G 1.4.19.7 Physical protection including but not limited to plastic sheets, fireproof covers, heavy weight material covers, wood plugs, wood encasements and heaters must be used as required.

G 1.4.19.8 The Contractor must protect the vessel from the possibility of vermin infestation (insect/mammal/bird). If an infestation does occur during the contract period the Contractor must bear all costs to ensure the vessel is made vermin free before the vessel's departure and contract completion.

G 1.5 Documentation

G 1.5.1 Documentation is identified as a deliverable in the specification items requesting them.

G 1.5.2 Data Book

G 1.5.2.1 The Contractor must provide all documentation generated as a result of specified deliverables in both electronic and paper formats. There must be 2 paper copies of each document, in two separate binders, as part of the Contractor's QA program. An electronic copy of all documentation must also be provided to the TA in accordance with the formats described in this specification item.

G 1.5.2.2 All copies of documents generated as a result of specified deliverables will be referred to as the "Data Book".

G 1.5.2.3 The Contractor must provide to the TA all the files generated as part of the Data Book must be received prior to the contract being considered complete. The files must be in hard format (CD-ROM, DVD-ROM, Flash Drive / Memory Stick). Each specification item is to have its own folder named according to the specification item. For example "G1.0 General Notes".

G 1.5.2.4 Any documentation, media, and reports, that are the result of Additional Work, are also to be included as part of the Data Book.

G 1.5.3 File Naming

G 1.5.3.1 File naming must be in the following format: *Specification#.# – Date (yyyy-mm-dd) – File Name Describing Information*. For Example: "G1.0 – 2016-12-01 – Details of file naming.pdf".

G 1.5.4 E-mails

G 1.5.4.1 Any files sent to the CA/TA by e-mail must be named as per the "File Naming" section of this specification. All files that are e-mailed must have in the subject name: "Contract# - DATA BOOK – Date – Specification #". For Example: **F1782-0 – DATA BOOK – 2015-11-30 – G1.0 General Notes** . Files sent by e-mail must also be included in the "Data Book".

G 1.5.5 File Formatting

G 1.5.5.1 All documentation, reports, test results, certificates, or data obtained by the Contractor in paper form must be scanned into unprotected (preferably searchable) Adobe PDF formatted files and named according to the File Naming section of this specification.

G 1.5.5.2 All reports, test results, certificates, or raw data obtained by the Contractor in electronic format must be converted to unprotected Adobe PDF formatted files and named according to the “File Naming” section of this specification. Both the original and the converted copy are to be provided as part of the Data Book.

G 1.5.6 Photos

G 1.5.6.1 All photos obtained by the Contractor as requested in the specification must be provided in .JPG formatted files at a resolution of at least 640 x 480 and named according to the “File Naming” section of this specification.

G 1.5.7 Measurements, Calibrations, and Readings.

G 1.5.7.1 All measurements, calibrations and readings recorded, must be signed by the person taking the measurements, dated and scanned into electronic format as part of the Data Book.

G 1.5.7.2 Recorded dimensions must be to a precision of three decimal places (unless otherwise stated) in the measuring system currently in use on the vessel.

G 1.5.7.3 The Contractor must provide to the TA current and valid calibration certificates for all instrumentation used in the Test and Trials Plan showing that the instruments have been calibrated in accordance with the manufacturer’s instructions. These copies are to be provided as part of the Data Book under any specification where measurements are required.

G 1.5.8 Test Inspection Records and Certificates

G 1.5.8.1 Test Inspection Records and Certificates are identified as a deliverable in the individual specification item requesting them.

G 1.5.8.2 Test Inspection Records and Certificates must be included as a separate section in the DATA BOOK and indexed/arranged in numeric order by specification number.

G 1.5.8.3 The Contractor is responsible for maintaining a complete and accurate record of all tests and trials conducted on the vessel and on each piece of equipment. Prior to the commencement of a trial, all relevant documentation and associated test sheets, including shop test data, must be complete and attached to the trials agenda.

G 1.5.8.4 All tests and trials data must be legible both in hard copy and electronic format. If necessary, handwritten records may require transcription into electronic format in order to be acceptable. The original must be signed by RO, the TA, the Contractor and where necessary by the sub-Contractors and/or FSR's who witnessed the tests. All the Data must be submitted to the TA in accordance with the "Documentation" section of these General Notes.

G 1.6 Drawings

G 1.6.1 This section, to be referred to as the Drawings section of the General Notes, is intended to be used as reference for the minimum standards when specified deliverables are to be drawings.

G 1.6.2 The Contractor must have on staff or through a sub-contractor a person qualified and experienced in the use of AutoCAD who will create or modify drawings that result from the work.

G 1.6.3 The Contractor must comply with the Canadian Coast Guard National CAD Standards titled "*Computer Aided Design (CAD) using AUTOCAD*" provided.

G 1.6.4 Drawing disks must be clearly labeled with the Contract Number, file names and drawing numbers. If a complete listing exceeds the label size, a "readme.txt" file in ASCII format must be provided with each disk. A printed copy of the Readme file must accompany each disk. Disks must be labeled As-Fitted drawings for those drawings that have been approved and finalized.

G 1.6.5 Final As-Fitted prints/plots must not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.). Drawings containing mark-ups must be revised and re-printed/plotted.

G 1.6.6 The Contractor must prepare all the working drawings necessary for the project requirements and modernization work.

G 1.6.7 The Contractor must furnish all drawings required by sub-Contractors, trades and other consultants.

G 1.6.8 Schematic drawings of systems must include all pertinent system information, including sizes, dimensions, labeling, equipment locations, and all information relating to system fittings.

G 1.6.9 The Contractor must have in place a complete system of documenting and controlling all drawing revisions affected by the work of this project. Drawing numbering system and titles must match the original drawings for clarity and include a revision number with date.

G 1.6.10 Guidance Drawings

G 1.6.10.1 All technical guidance drawings are issued to the Contractor for guidance purposes only. It is the responsibility of the Contractor to develop working drawings and to ensure that all such drawings receive applicable regulatory approval. The Contractor is to note that not all technical guidance drawings supplied are As-Fitted drawings. It is the responsibility of the Contractor to physically verify all affected items.

G 1.6.10.2 All departures from the provided guidance drawings and project specifications must be clearly indicated by the Contractor and written approval obtained from the TA before carrying out such alterations or departures.

G 1.6.10.3 Specification deviations must be documented using an Observation Report.

G 1.6.11 As Fitted Drawings

G 1.6.11.1 The As-Fitted Drawings are identified as a deliverable in the specification item requesting them.

G 1.6.11.2 Upon completion of specified work, the Contractor must transfer the mark-ups from any working drawings where installation changes were made to drawings affected by the project work. These drawings become the As-Fitted drawings for the project work. The Contractor is responsible for providing updated vessel drawings affected by the project work to the TA prior to completion of the contract. The affected drawings must be submitted in the following formats:

- a) Five (5) plotted copies of the latest revision of each of the As-Fitted drawings;
- b) Two (2) electronic copies of the latest revision of each As-Fitted drawing.

G 1.6.11.3 Plotted drawings must be on standard ANSI paper sizes.

G 1.6.11.4 Marked up drawings are to be AutoCAD drawings where original AutoCAD drawings are provided. If no AutoCAD drawings were provided then scanned files (raster format) must be supplied to CCG in one of the following formats:

- a) DXF format;
- b) TIFF format;
- c) PDF format.

G 1.7 Manuals

G 1.7.1 This section, to be referred to as the Manuals section of the General Notes, is intended to be used as reference for the minimum standards when specified deliverables are to be manuals.

G 1.7.2 General

G 1.7.2.1 Instruction Manuals must be individually bound in a hard cover 3 ring book format with a page size of 8 1/2" x 11". Drawings of a larger size must be concertina folded to suit. The covers must have the following information printed thereon:

- a) CCGS M Charles;
- b) Equipment Identification;
- c) Equipment Manufacturer;
- d) Date.

G 1.7.2.2 Plastic tabbed indices must be provided for all sections of the manuals. Major equipment components must be subdivided into separate sections of the manuals.

G 1.7.2.3 A master index must be provided at the beginning of each binder indicating all items included in each section.

G 1.7.2.4 A list of names, addresses and telephone numbers of contacts associated with the equipment manufacturers must be provided that can be used after the project completion for maintenance and information data purposes.

G 1.7.2.5 A copy of the final reviewed and approved As-Fitted drawing(s) must be provided within the maintenance manual.

G 1.7.2.6 One (1) electronic copy of each manual must be provided in accordance with the Data Book section of this specification.

G 1.7.2.7 Two (2) paper copies of manuals and data sheets must be supplied in English for all Contractor Furnished Equipment items.

G 1.7.3 Operation Manuals – As-Fitted

G 1.7.3.1 Operation manuals must include the following items:

- a) General description of equipment operating sequence;
- b) Step by step procedure to follow in commissioning the equipment;
- c) Schematic wiring diagram for the fitted equipment; and

d) All pertinent equipment performance criteria.

G 1.7.3.2 Where software/hardware systems are fitted, the operation manual must include the full software documentation manual in paper form for the system and an electronic copy in accordance with the Documentation Section. The minimum software documentation must include:

- a) System level diagrams describing the overall scheme of the software/hardware system;
- b) The functional specifications, which must describe in detail the functional capabilities of the system and each software components; and
- c) Project specific program listings including all comments describing the details of the code functions.

G 1.7.4 Maintenance Manuals – As-Fitted

G 1.7.4.1 Maintenance manuals are to include:

- a) Manufacturer's maintenance instructions for each item of the equipment requiring maintenance activity;
- b) Instructions are to include installation instructions, part numbers, part lists, master drawings and exploded views with part identification for all mechanical, electrical and electronic parts, name of suppliers;
- c) Summary list of each item of the equipment requiring lubrication, indicating the name of the equipment item, location of all points of lubrication, type of lubricant recommended, and frequency of lubrication; and
- d) Troubleshooting sections must be included for all equipment in the maintenance manual under a separate heading.

G 1.8 Identification

G 1.8.1 Nameplates

- G 1.8.1.1 Nameplates are identified as a deliverable in the individual specification item requesting them.
- G 1.8.1.2 All nameplates must be in English, except where required in English and French by RO for reasons of emergency operation.
- G 1.8.1.3 Lettering must be clear and concise with the minimum use of abbreviations. Primary information must be given in larger size lettering than secondary information.
- G 1.8.1.4 The type of nameplates must suit the location in the vessel as specified below:
- G 1.8.1.5 Plastic:
 - a) Laminated plastic nameplates, black with white core engraved through to the center core, must be provided for all devices located on the exterior surfaces of switchboards, MCC's, or local control panels. Nameplates must be secured to the equipment with machine screws.
 - b) New nameplates to be fitted on the existing equipment must be consistent in size and lettering with those already fitted or those being replaced.
 - c) Nameplates indicating feeder circuits must identify each circuit by name and number and the fuse size or trip element rating.
 - d) The Following Labels must be of laminated plastic, red with white core engraved through to the center core:
 - i) Safe Working Loads,
 - ii) Warning/Caution labels,
 - iii) Circuit Breakers with shunt trips requiring completion of remote circuits prior to being operated,
 - iv) Equipment with multiple power sources,
 - v) Circuit breaks having a potential power source connected to both sides
 - vi) Indication of any other potentially hazardous condition.

G 1.8.1.6 Engraved on Metal:

- a) Must be used in machinery spaces and where exposed to the weather or susceptible to covering by paint, oil or grease. Nameplates exposed to weather must be stainless steel or brass. Engraved metal nameplates must be of stainless steel or brass with lettering accentuated by means of black wax unless otherwise noted, and secured with stainless steel or brass machine screws.
- b) A complete list of nameplates, detailing size of plate, size of lettering and inscription must be submitted to the TA for review prior to ordering and/or manufacturing.

G 1.8.2 Wire Labeling

G 1.8.2.1 Wire Labeling is identified as a deliverable in the individual specification item requesting them.

G 1.8.2.2 All permanently installed cables must be tagged with the circuit designation at all points of connection and on both sides of bulkheads, decks, etc. Tags must be of metal compatible with the armor or cable sheathing. Both ends of the tags must be strapped to the cable with compatible metal strap after all painting has been completed. Straps must pass through holes in the tags so that tags are positively secured. Strap ends must be permanently folded and crimped. Adhesives of any kind will not be acceptable.

G 1.8.2.3 All wiring in panels specified to be labeled must be labeled with the Cable Number and their conductor # unless otherwise specified in equipment installation drawings.

CCGS M Charles Docking Refit 2017

Specification No: F1782-17C812

S1.0 SERVICES

Prepared by:

Marine Engineering Western Region
P.O. Box 6000
9860 W. Saanich Rd.
Victoria BC
V8L 4B2

S 1.0 SERVICES

S 1.1 GENERAL

- S 1.1.1 The Contractor must supply the following services to the vessel for the entire work period and disconnect upon completion of the work period. The Contractor must re-establish all services if the vessel is moved during the work period.
- S 1.1.2 The Contractor must supply all material, hoses, cables, etc. and labor required to connect and disconnect the services to the vessel. Unless otherwise stated these services must be available 24 hours a day 7 days a week for the entire contract period.
- S 1.1.3 All staging, crantage, screens, lighting, and any other support service, equipment, and material necessary to carry out the work identified in these specifications must be Contractor supplied.
- S 1.1.4 The CCG will announce the RO at the bidders conference

S 1.2 BERTHING

- S 1.2.1 The berthing and mooring facilities must be suitable for a vessel of this size in local weather / tide / sea conditions. Fenders must be supplied by the Contractor to prevent the vessel from contacting the wharf in said local conditions.
- S 1.2.2 The length of the dock must be a minimum of 90% of the keel length of the vessel.
- S 1.2.3 During the contract period, when the ship is afloat, the ship must be berthed at the Contractor's wharf at a safe and secure location with a minimum clearance of 0.45 meters (1.5 feet) under the vessel at extreme low tide to ensure the vessel will not touch bottom.
- S 1.2.4 The Contractor must responsible for all movements of the vessel, including berthing and mooring of the vessel for the contract period and arrangements and costs for line handlers, tugs, and pilots.

S 1.3 MOORING LINES

- S 1.3.1 The Contractor must provide the labor required to secure the vessel alongside the facilities.
- S 1.3.2 The Contractor must provide CFM mooring lines while vessel is secured alongside the Contractor's facilities. The ship's mooring lines must not be used.

S 1.4 GANGWAYS

- S 1.4.1 The Contractor must supply two means of access to the vessel and escape from the vessel while in possession of the vessel. One means of access and escape must be by gangway.
- S 1.4.2 The Contractor must supply all labor and services required for the installation and removal of all gangways, complete with handrails, safety nets, and lighting for the duration of the contract while the vessel is moored.
- S 1.4.3 Any movement of the gangway required by the Contractor is the responsibility of the Contractor.
- S 1.4.4 The Contractor must provide gangways in accordance with TCMS, Worksafe BC, and Canada Labour laws and regulations.

S 1.5 ELECTRICAL POWER

- S 1.5.1 The Contractor must supply 600 Volt Alternating Current, 60 hertz, 3 Phase, 4 wire with floating neutral, 200 Ampere electrical power, through the vessel's shore power system, for the duration of the contract.
- S 1.5.2 The Vessel's shore power cable and associated plug connection may be used by the Contractor. However, the Contractor is responsible to replace the entire length of cable with an equal quality, size, and length of cable should the shore power cable be damaged during the contract period. Damage to the shore power cable also includes damage to the plug-in connections which must be replaced if damaged. Splicing any section of the cable is not acceptable.
- S 1.5.3 The Cable condition must be inspected at the start and completion of the work period. The Contractor and the TA must record in writing all defects prior to the start of the contract period and all parties must sign the original document. Photos must be taken of general condition and close-ups of existing damage. All photos and documents are to be provided to the TA in accordance with the Documentation section of the General Notes.
- S 1.5.4 The Contractor must ensure the correct phase rotation on a 3 phase system is established prior to energizing the ship's distribution system from shore. Any changes to the ship's power system to accommodate the Contractor supplied shore power connections must be returned to the original setup by the Contractor upon the disconnection of the Contractor supplied power cable and equipment. All work must be carried out by certified electricians.

- S 1.5.5 When connected to shore power, it must be connected to a Contractor supplied kilowatt-hour meter. The Contractor must read the kilowatt-hour meter when the connection is made and once again when the power is disconnected. Both readings of the meter must be witnessed by the TA and recorded.
- S 1.5.6 If temporary lighting is required for any of the work, the temporary power system must be feed through a Contractor supplied kilowatt-hour meter. The Contractor must read the kilowatt-hour meter when the connection is made and once again when the power is disconnected. Both readings of the meter must be witnessed by the TA and recorded.
- S 1.5.7 Temporary lighting and power must meet provincial regulations for safe work conditions and there must be sufficient number of lights set up to provide safe passage through the accommodation and machinery spaces.
- S 1.5.8 The Contractor must supply a price quote per kilowatt-hour for electrical power for the duration of the work period. The final price for this item must be determined at the end of the contract once the meter has been read The final power consumption total must be adjusted up or down by PWGSC 1379 action .
- S 1.5.9 For the purposes of this contract the bidders are to quote for 25,000 kilowatt-hours.

S 1.6 ACCOMMODATION/MACHINERY AREA DECK PROTECTION

- S 1.6.1 The Contractor must supply and install ¼” hard board deck covering protection on all accommodation decks. Hard board edges and joints must be taped and damaged protection must be repaired within 24 hours of receiving damage.
- S 1.6.2 The Contractor must protect decks in machinery spaces from damage to structure and coating systems during the process of specified work. Damage to the coating systems or structure of machinery spaces decks must be repaired by the Contractor. Any coatings are to be applied according to manufacturer’s specifications.
- S 1.6.3 Removal and storage of components that may be subject to damage during the work period, such as deck plates, grating, etc. is the responsibility of the Contractor.

S 1.7 HEATING

- S 1.7.1 The Contractor must supply the heating required onboard and around the vessel to facilitate specified work.

S 1.8 WORKSITE INSPECTIONS

- S 1.8.1 Before the Contractor starts any work on the vessel the Contractor’s Quality Assurance Representative and the TA must walk through each space and area where

work is to take place, including access and removal routes and areas adjacent to those where the work is to be done as a result of this specification. The Walk-through must occur during vessel demobilization and the Contractor's Quality Assurance Representative must identify all items that are to be removed or secured prior to the Contractor assuming Care and Custody of the Vessel.

- S 1.8.2 The Contractor's Quality Assurance Representative must take digital pictures of each area showing the outfit therein. Each picture must be dated and named as to the location on the vessel and that it represents As-Delivered conditions. These photos must be in the format; as well as named, in accordance with the Documentation section of the General Notes. A Copy of these photos must be provided to the TA within 48 hours of the start of contract on a memory stick, CD, or DVD.
- S 1.8.3 During the work period, the Contractor must maintain work areas in the vessel, in a clean condition, free from debris and remove garbage daily.
- S 1.8.4 Upon completion of the contract, the Contractor must return the vessel to the As-Delivered state of cleanliness.
- S 1.8.5 Prior to the completion of the Acceptance Document, the Contractor's QA Representative, and the TA must perform an inspection of the vessel to view all areas where work was performed by the Contractor.
- S 1.8.6 Copies of all photos, documentation, and inspection sign off sheets must be provided in accordance with the Documentation section of the General Notes.

S 1.9 FIRE PROTECTION

- S 1.9.1 The Contractor must ensure protection against fire 24 hours/day and 7 days/week throughout the contract period.
- S 1.9.2 The Contractor must isolate the vessel's fixed fire suppression system for the duration of the contract period to prevent accidental discharge.
- S 1.9.3 The Contractor must ensure the isolation, removal, installation and reactivation of the shipboard fire detection and suppression systems or any components thereof, is performed by a qualified technician. When the shipboard fire detection or fire suppression system is deactivated or disabled by the Contractor during the contract period, the system must be recertified by a qualified technician prior to the end of the work period, as fully functional. A signed and dated original copy of the certificate must be delivered according to the Documentation section of the General Notes.
- S 1.9.4 The Contractor must note that failure to take the necessary precautions while performing work on the vessel's fire suppression system(s) could result in the

accidental discharge of the fire suppression agent(s). The Contractor must recharge and certify at his cost, container(s) or systems that are discharged as a result of the Contractor's or subcontractor's activities.

S 1.10 PROJECT FACILITIES

- S 1.10.1 The Contractor must provide 1 secure office space. The space must have 2 separate desks; one for the TA and delegates, and one for the CA. The space is for the exclusive use of Government personnel, must be within suitable distance to rest rooms, and must be environmentally controlled. The space must be available from one week prior to the work commencing to two weeks after vessel acceptance.
- S 1.10.2 Each desk must include a minimum of 2 chairs; and have a minimum of 2 electrical plugin sockets per desk.
- S 1.10.3 There must be a telephone that has a direct outside telephone line. The cost of long distance telephone calls must be directly billed to CCG. Cellular services are not acceptable.
- S 1.10.4 Each desk must be provided with a wired Ethernet LAN connection with direct internet access. The Contractor must supply a broadband high speed internet service to this connection.
- S 1.10.5 Contractor must provide 4 reserved parking spots adjacent to building with offices specified. Parking spaces are for the exclusive use of Government Personnel; 3 spots for the TA and 1 for the CA and are to be available 24-7 from one week prior to work commencing to one weeks after vessel acceptance.

The Contractor must supply and maintain a washroom facility that is accessible to the CCG personnel for the duration of the contract.

S.11 SECURITY

- S.1.11.1 The Contractor must provide security for the vessel during quiet hours at the Contractor's facility. Security rounds must be conducted at minimum every 4 hours during quiet hours 7 days a week including holidays during the entire work period.
- S.1.11.2 Contractor provided Security log books are to be signed during every set of rounds in the following spaces –

Bridge

Forward Machinery Space (Bow Thruster Compartment)

Main Machinery Room
Auxiliary Machinery Room
Steering Gear Compartment

10.0 SAFETY AND SECURITY

10.1 NOT USED

11.0 HULL AND RELATED STRUCTURES

11.0 PAINTING AND PRESERVATION

11.0.A Hoarding and Containment

A.1 The Contractor must hoard the vessel to ensure it meets the coating requirements as laid out in the Interspec. The Contractor is advised that inclement weather must be anticipated during the Work Period and the Contractor must include the cost of hoarding in its bid. Canada will not pay for any additional hoarding or repairs to the hoarding unless at least one of the following conditions is recorded at the Environment and Climate Change Canada buoy or land station closest to the Contractor's work site:

- (a) Temperatures fall below -5.0 degrees Celsius for more than 72 consecutive hours; or
- (b) The accumulation of more than 40.0 centimetres of snow; or
- (c) Steady winds over 45.0 km/h; or
- (d) Wind gusts over 75.0 km/h.

The data from the Environment and Climate Change Canada buoy or land station closest to the Contractor's work site will be used for measuring and verifying the parameters above as well as to provide the recorded environmental conditions.

The location of the Environment Canada buoy or land stations can be found at http://weather.gc.ca/marine/weatherConditions-currentConditions_e.html?mapID=02&siteID=16200&stationID=WHC.

The conversion rates identified in the Environment and Climate Change Canada Weather and Meteorology Glossary available at <http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=B8CD636F-1&def=show0FA7E4EE1> will be used in the event that any of the recorded data needs to be converted to the measurement units used in the parameters above.

11.0.B Preparation and Paint Quality Management

- B.1 The Canadian Coast Guard will be contracting International Paint contact - Mr. Keegan Gemmil, Account Executive, International Paint, tel 604 2, cell 604 315 4347, Keegan.Gemmill@akzonobel.com directly as its technical inspector for all coating system work. International Paint will be given authority by The Canadian Coast Guard to perform technical inspections. The contractor must present International Paint a coating time line and update International Paint of any changes.
- B.2 Keegan Gemmill may designate another NACE inspector within International Paint to act as technical inspector if agreed to by the TA. The Designate must be NACE level 2 with 2 years experience in the marine industry, or under the direct supervision of a NACE Level 3 inspector.
- B.3 The Contractor must hoard the vessel to ensure they meet the coating requirements as laid out in the Interspec.
- B.4 The Contractor must follow the quality control requirements identified in the Paint Specification (CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1) and Product Data Sheets.
- B.5 The Contractor must afford the International Paint NACE inspector the opportunity to view the work prior to commencement of painting, and after each coating.

11.1 DOCKING AND UNDOCKING (RO SURVEY)

11.1.A Identification

- A.1 The intent of this specification it is to conduct docking and undocking activities for the purpose of conducting an underwater hull survey by RO and other work specified.
- A.2 The vessel must be docked at the Contractor’s facility, and the vessel hull must be surveyed by the TA and by RO. On completion of all related work the vessel must be undocked and secured alongside at the Contractor’s facility.
- A.3 RO must complete initial inspection of the hull as soon as the dock is clear of water and before the hull is washed.

11.1.B References

B.1 Equipment Data – Not Used

B.2 Drawings

B.1.2 AF6102-10000-14_AF Dry-Docking Plan-1_2

B.1.3 AF6102-10000-14_AF Dry-Docking Plan-2_2

B.1 Regulations

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No
	Hull Inspection Regulations (C.R.C., C. 1432)	No

11.1.C Technical

- C.1 The Contractor must afford the ship’s crew the opportunity, alongside and prior to docking, to complete a tank condition report (soundings). The report must be signed by the TA and the Contractor’s Dock Master. This report must be included in the shipyards final docking report.

- C.2 A docking report must be completed which indicates current tank condition, docking plan and block locations and be in accordance with the Documentation section of the General Notes.
- C.3 The TA must be afforded the opportunity to review the docking report prior to docking.
- C.4 The Contractor must demonstrate that all support locations are in accordance with the docking plan. The Contractor must ensure that the docking blocks align with the vessel's internal support structure.
- C.5 The Contractor must also ensure that all tank docking plugs are accessible and not obscured by the docking blocks.
- C.6 The Contractor must ensure that no transducers or any other underwater device are damaged or obscured by the docking blocks.
- C.7 The TA must be afforded the opportunity to inspect all arrangements carried out by the Contractor prior to flooding the dock.
- C.8 The Contractor must supply shore crews, tugs, divers and whatever facilities may be required for the safe and correct dry-docking and undocking of the vessel.
- C.9 Before the hull is washed and as soon as possible after the ship is docked and the dock is clear of water the Contractor must afford the opportunity for RO to inspect the Hull. The Contractor must afford the TA the opportunity to attend at the time of RO inspection.
- C.10 The Contractor must take the following measures as soon as practical after docking:
- i) All keel and bilge blocks must be inspected and wedged up if necessary to ensure good hull contact and minimize hull sagging during the dry-dock period.
 - ii) The entire hull (approximately 580 m²) must be pressure washed at minimum 5000 psi from the keel to the bulwarks, including the rudders and sea chests. Marine growth must be hand scraped prior to pressure washing; allow for 90 square meters of heavy marine growth to be hand scraped and disposed.
 - iii) Hull framing numbers must be marked on the hull every five frame spaces to facilitate a RO/TCM hull survey.
- C.11 The Contractor must allow for a total of 10 hours (non-continuous) of man lift services for the RO surveyor for inspection purposes.

- C.12 Upon the completion of pressure washing the hull and marking the hull frame spacing the contractor must afford the opportunity for RO to inspect the hull. The Contractor must afford the TA the opportunity to attend at the time of RO inspection.
- C.13 The Contractor must ensure that all docking plugs have been properly replaced and the TA been afforded the opportunity to view before any flooding procedures start.
- C.14 Prior to undocking, the Contractor must provide a tank condition report to be verified by TA in accordance with the Documentation section of the General Notes.
- C.15 Any changes in quantities or location of tank contents from the original tank condition report (soundings) must be noted and agreed upon as Satisfactory for Undocking by the TA and the Contractors Dock Master.
- C.16 The dock must not be flooded until the approval of the TA has been given.
- C.17 Flooding of the dock must proceed until the water is 12 inches below the level at which the ship will float. Flooding must then cease until the Contractor has completed an inspection of all underwater fittings and found all to be water tight. The Contractor must afford the TA the opportunity to conduct the same inspection prior to continuation of flooding. Upon confirmation of water tight integrity flooding will continue.

11.1.D Proof of Performance

D.1 Inspections

- D.1.1 Inspections must be completed as detailed in section 3.3.

D.2 Testing/Trials – Not Used

D.3 Certification

- D.3.1 The Contractor must afford RO the opportunity to conduct a survey of the hull below and above the water line for the purpose of receiving a credit for the vessel’s continuous survey. The TA must be informed and must be afforded the opportunity to attend with RO. An 8 hour notice is required.

- D.3.2 The TA is responsible to ensure that the Survey Record Book is signed off by RO.

D.4 Documentation (Reports/Drawings/Manuals)

- D.4.1 The Contractor must provide a Docking Report in accordance with the Documentation section of the General Notes.

D.4.2 The Contractor must provide Tank Soundings, before and after docking in accordance with the Documentation section of the General Notes.

D.5 **Training – Not Used**

11.2 HULL ULTRASONIC TESTING

11.2.A Identification

- A.1 The intent of this specification is to survey and map the vessels hull. The Contractor is to have an approved RO NDT service supplier onsite for 16 hours complete an ultrasonic hull thickness survey of the vessel.
- A.2 The Contractor is to quote on 16 hours for the NDT service supplier.
- A.3 Prior to commencing work there must be a meeting attended by the Contractor, TA, and NDT service supplier to review the drawings and areas of inspection. Hull or structural repairs identified thru the UTS testing are subject to PSPC work arising procedures.

11.2.B References

B.1 Equipment Data

- B.1.1 The technician must use and be familiar with digital instrumentation capable of the Double Echo method to measure plate thickness through existing paint coatings.

B.2 Drawings

- B.2.1 All Drawings are listed in the General Notes.

B.3 Regulations and Standards

The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

11.2.C Statement of Work

- C.1 The Contractor must supply an approved RO NDT service supplier to conduct ultrasonic hull thickness surveys of the hull. The technician must take hull thickness measurements as soon as possible after the ship has been docked, power washed, and temporary frame markings have been added. The Contractor to quote on having the technician available on-site for two (2) eight (8) hour day. Extra days or time to be prorated and handled thru PWGSC 1379 action. A report indicating the details and findings of the survey must be provided to the TA.

- C.2 The Contractor is responsible for the necessary surface preparation for the instrument used for the NDT Ultrasonic Survey.
- C.3 The Contractor must provide a man lift to with operator to facilitate the survey. The Contractor is to bid on supplying a man lift for 2 day during the Ultrasonic Survey.
- C.4 Any resulting hull repairs will be by 1379 action. Additional time requested by TA will be by 1379 action.

11.2.D Proof of Performance

D.1 Inspection Points

- D.1.1 Testing must be witnessed by the TA and RO representative.

D.2 Testing/Trials – Not Used

- D.2.1 Details of any tests or trials

D.3 Certification

- D.3.1 A copy must be provided of the calibration certificate for the instrument used.

D.4 Documentation

- D.4.1 Any test results which indicate wastage requiring plate replacement must be brought to the attention of the TA immediately by an Observation Report.
- D.4.2 The complete test results must be presented in electronic format. The final test report is to include location and reference to frame and centerline distance in millimeters, the thickness measured as well as the original thickness. The test results to be submitted to the TA prior to flooding the dock.

Training – Not Used

11.3 PAINTING OF SHIPS HULL BELOW WATERLINE

11.3.A Identification

- A.1 The intent of this specification is to renew the underwater hull coating system.

11.3.B References

B.1 Equipment Data

B.1.1 The existing underwater hull coating system consists of:

- i) Intershield 300 @5 mils
- ii) Intergard 263 @4 mils
- iii) Interspeed 640 @4 mils

B.2 Drawings & Documents

Drawing Number	Description
	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1

B.3 Regulations and Standards

B.3.1 As indicated in the Interspec document.

11.3.C Technical

C.1 The following precautions and preparations must be undertaken;

- C.1.1 Immediately after docking, hull openings must be securely plugged as may be necessary to prevent contamination of the area below and to avoid ingress of sand or other contaminants. Scuppers must be plugged as necessary and all appropriate measures taken to ensure that weather conditions or any other factors do not jeopardize the quality of the finished work. Water discharge must be directed away from ship side.
- C.1.2 The propellers, shafts, stern tubes, bow thruster, sonar, sounders, transducers, and all other equipment and fittings must be properly protected during all refit operations, to avoid damage from sandblasting or any other cause. Zincs must be removed from their pockets and all fasteners protected from damage. All davit wires and crane wires are to be completely wrapped to prevent entry of grit. The Contractor must supply all coverings.
- C.1.3 Before undocking the ship, all temporary protective materials and coatings must be removed to the approval of the TA.
- C.1.4 The approximate area of the underwater hull is: 330 m². The above water hull has been calculated separately at 250 m².
- C.1.5 The Contractor must prepare and paint damaged areas of the underwater hull in accordance with the Interspec Paint Specification. Quote a 30 SQ-M of 1SQ-M random areas of the hull. Allied paint to be feather back into the existing coating

- C.1.6 The Contractor must have the rudders painted as part of the underwater hull with an total surface area of 5m². The rudders are stainless steel and were not originally coated. The Contractor must sandblast the rudders using non-ferrous media when preparing them. After preparing the rudders, the rudders are to be painted with two coats of EcoShield or equivalent. Application of EcoShield must be completed in a climate controlled area following the EcoShield application guide and must be witnessed by the NACE inspector.
- a) Canada suggest procuring EcoShield from Jastram Technologies
 - b) EcoShield is made by subsea Industries.
- C.1.7 All internal surfaces of the seabays, sea chests, sea boxes and thruster tunnel must be painted as per the underwater hull with special attention to fully coating the internal surfaces of supply piping and sea suction stand (stub) pipes.
- C.1.8 The forward machinery space sea suction feeds the reverse osmosis water makers and must be painted separately with Interline 925 in accordance with the Paint Spec. The sea bay is located between frames 31 and 32 on the port side of the vessel.
- C.1.9 Paint procedure is as specified in the Interspec specification. All coatings must be applied in accordance with the manufacturer's instructions. Re-coat times must be adhered to.

11.3.D Proof of Performance

D.1 Inspections

- D.1.1 The Contractor must follow the quality control requirements identified in the Paint Specification and Product Data Sheets. All paint work preparation must be in accordance with manufacturer recommendations and printed reports must be provided. The TA must view the work prior to commencement of painting, and after each coating.
- D.1.2 The shipyard QA must obtain the latest information and advice on the Paint system from Mr. Keegan Gemmil, Account Executive, International Paint, 2435 Beta Avenue, Burnaby BC V5C 5N1, tel 604 940 4479, cel 604 315 4347, Keegan.Gemmill@akzonobel.com

D.2 Testing/Trials – Not Used

D.3 Certification -

- D.3.1 A copy of NACE inspector's certification must be provided.

D.4 **Documentation (Reports/Drawings/Manuals) – Not Used**

D.5 **Training – Not Used**

11.4 PAINTING OF HULL ABOVE WATERLINE

11.4.A Identification

A.1 The intent of this specification is to repair the coating system above the waterline including the inboards side of the bulwarks and to tie-coat this entire surface, renewing the CCG identification program.

11.4.B References

B.1 Equipment Data

B.1.1 The existing above water hull coating system consists of:

- i) Interstores Uniprimer – Aluminum (ISA600/A)
- ii) Interstores Uniprimer – Aluminum (ISA600/A)
- iii) Interthane 990

B.1.2 Reference documents

	Description	Date
Paint Spec.	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

B.2 Drawings & Documents

B.2.1 All Drawings are listed in the General Notes.

B.3 Regulations and Standards

B.3.1 As indicated in the Interspec document.

11.4.C Statement of Work

C.1 The following precautions and preparations must be undertaken;

- C.1.1 Immediately after docking, hull openings must be securely plugged as may be necessary to prevent contamination of the area below and to avoid ingress of sand or other contaminants. Scuppers must be plugged as necessary and all appropriate measures taken to ensure that weather conditions or any other factors do not jeopardize the quality of the finished work. Water discharge must be directed away from ship side.

- C.1.2 The propellers, shafts, stern tubes, bow thruster, sonar, sounders, transducers, and all other equipment and fittings must be properly protected during all refit operations, to avoid damage from sandblasting or any other cause. Zincs must be removed from their pockets and all fasteners protected from damage. All davit wires and crane wires are to be completely wrapped to prevent entry of grit. The Contractor must supply all coverings.
- C.1.3 Before undocking the ship, all temporary protective materials must be removed to the approval of the TA.
- C.1.4 All interference items must be removed for access and painted separately.
- C.1.5 The Upper Hull consists of the entire hull area from the waterline to the inboard surface of the bulwarks down to the interconnection with the deck coating system.
- C.1.6 The approximate area of the above water hull is: 250 m².
- C.1.7 The Contractor must prepare and paint damaged areas of the above water hull in accordance with the Interspec Paint Specification. Quote a 30 SQ-M of 1SQ-M random areas of the hull. Allied paint to be feather back into the existing coating
- C.1.8 The Contractor must apply two overall top coats (250 m²) of Interthane 990 – Ral3000 Flame Red (PHX59F/A) to the above water hull following the paint repairs.
- C.1.9 Identifying insignias, stripes, vessel's name, port of registry, load line, etc. must be given two coats of white paint as specified in the Interspec specification. All the identification markings must be painted; decals must not be used.
- C.1.10 The identifying stripe border and rope fairleads must be given two coats black paint as specified in the Interspec specification.
- C.1.11 Paint procedures for all painting is as specified in the Interspec specification including, All coatings must be applied in accordance with the manufacturer's instructions. Re-coat times must be adhered to.

11.4.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must follow the quality control requirements identified in the Paint Specification, including the hold points.
- D.1.2 All paint work preparation must be in accordance with manufacturer recommendations and under guidance of a NACE certified Inspector and printed reports must be provided. The inspector must view the work prior to commencement of painting, and after each

coating. The shipyard must contract the NACE Inspector from International Paint (contact Mr. Keegan Gemmil)

D.1.3 The NACE Inspector must obtain the latest information and advice on the Paint system from Mr. Keegan Gemmil, Account Executive, International Paint, 2435 Beta Avenue, Burnaby BC V5C 5N1, tel 604 940 4479, cel 604 315 4347, Keegan.Gemmill@akzonobel.com

D.2 **Testing/Trials – Not Used**

D.3 **Certification – Not Used**

D.4 **Documentation – Not Used**

D.4.1 The Contractor must prepare and submit paint reports to verify that coatings were applied in accordance with the Interspec Paint Specification –.

D.5 **Training – Not Used**

11.5 PAINTING OF DECK SURFACES

11.5.A Identification

A.1 The intent of this specification item is to renew the main deck coating system.

11.5.B References

B.1 Equipment Data

B.1.1 The existing deck coating system consists of:

B.2 Drawings

All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

11.5.C Statement of Work

- C.1 The Contractor must paint the main deck area as detailed in the separate Interspec Paint Specification.
- C.2 The approximate area of the main deck is:150 m2.
- C.3 The deck surface includes all horizontal surfaces of the deck plus all vertical surfaces to a height of 2 inches.
- C.4 Prior to painting all coatings and contamination must be removed from the deck surface. All corrosion must be removed. The deck surface must be taken down to bare metal. Surface preparation must be to the Interspec Paint Specification.
- C.5 The lights, fans and all openings and fittings must be properly protected during all refit operations, to avoid damage from sandblasting or any other cause. Before undocking the ship, all temporary protective materials and coatings must be removed.
- C.6 No sandblasting operations will be performed when there is a risk of mechanical, pneumatic or electrical components becoming contaminated by the ingress of abrasive materials. For this reason, every effort must be made by the contractor to ensure that all sandblasting work is completed before machinery disassembly. When this is not possible, the contractor must take the appropriate measures to ensure that all vulnerable machinery items are protected in an efficient and effective manner. All davit wires and crane wires are to be completely wrapped to prevent entry of grit. The Contractor must supply all coverings.
- C.7 Immediately after docking, hull openings must be securely plugged as may be necessary to prevent contamination of the area below and to avoid ingress of sand or other contaminants. The vessel’s fitted vent covers may be used by the Contractor. Scuppers must be plugged as necessary and all appropriate measures taken to ensure that weather conditions or any other factors do not jeopardize the quality of the finished work.

C.8 All coatings must be applied in accordance with the manufacturer's instructions. Re-coat times must be adhered to.

11.5.D Proof of Performance

D.1 Inspections

D.1.1 The Contractor must follow the quality control requirements identified in the Paint Specification and Product Data Sheets, including the hold points.

D.1.2 All paint work preparation must be in accordance with manufacturer recommendations and under guidance of a NACE certified Inspector and printed reports must be provided. The inspector must view the work prior to commencement of painting, and after each coating. The shipyard must contract the NACE Inspector from International Paint (contact Mr. Keegan Gemmil who will assign an inspector.)

D.1.3 The NACE Inspector must obtain the latest information and advice on the Paint system from Mr. Keegan Gemmil, Account Executive, International Paint, 2435 Beta Avenue, Burnaby BC V5C 5N1, tel 604 940 4479, cel 604 315 4347, Keegan.Gemmill@akzonobel.com

11.5.E Proof of Performance

D.1 Inspection Points – Not Used

D.2 Testing/Trials – Not Used

D.3 Certification -

D.3.1 A copy of NACE inspector's certification must be provided.

D.4 Documentation (Reports/Drawings/Manuals)

D.4.1 The Contractor must prepare and submit paint reports to verify that coatings were applied in accordance with the Interspec Paint Specification – Goddard Coating Specification

D.5 Training – Not Used

11.6 SEA BAYS (RO SURVEY)

11.6.A Identification

A.1 The Intent of this specification item is to prepare the sea bays for RO inspection and renew the fitted anodes.

11.6.B References

B.1 **Equipment Data – Not Used**

B.2 Reference documents

	Description	Date
Paint Spec.	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

B.3 **Drawings & Documents**

B.1.1 All Drawings are listed in the General Notes.

B.2 **Regulations and Standards**

B.2.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards	Interspec Paint Specification	Yes
Regulations	Canada Shipping Act 2001, Hull Regulations	No
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	

11.6.C Statement of Work

C.1 The hull must be docked so that shell grids are accessible for inspection and removal.

C.2 The Contractor must remove all 3 (three) sea inlet grates, which are upper sea suction, lower sea suction and forward sea suction. All holes in the grates must be mechanically cleaned to remove all marine growth. Contractor to quote on 20 liters of sea growth total and disposal, between the sea suction. Preparation, painting, re-installation, and securing of the grates must be included. Grates must be blasted and then primed and painted in accordance with the underwater hull coatings specification. New stainless steel nyloc fasteners must be used to secure the grates upon reinstallation.

C.3 The Contractor must remove, prepare, paint, re-install, and secure the bow thruster grates. Grates must be blasted and then primed and painted in accordance with the

underwater hull coatings specification. New stainless steel nyloc fasteners must be used to secure the grates upon reinstallation.

- C.4 The Contractor must remove all marine growth. All internal surfaces of the sea bay, sea boxes and thruster tunnel must be hydro blasted with fresh water, the remainder of debris must be removed using hand and powered tools. Contractor to quote on 500 liters of debris disposal.
- C.5 All anodes and fairing plates must be removed. Areas of weld in way of anode straps and fairing plates removed must be ground smooth before attachment / re-attachment of anodes or fairing plates and before repainting.
- C.6 Anode straps and fairing plates must be primed and painted in accordance with the underwater hull coatings specification. Prior to installation of anodes the Contractor must complete the coating application to areas behind the anode straps.
- C.7 After satisfactory inspection of the sea suction and bow thruster tunnel by RO and the TA the Contractor must supply and install new 316L stainless steel nyloc fasteners. Hardening up of any grates, guard bars, docking plugs, and manhole covers must be witnessed by the TA.

11.6.D Proof of Performance

D.1 Inspection Points

- D.1.1 The TA and RO inspector must inspect the sea bay, sea chests and sea boxes after cleaning. The Contractor is responsible for coordinating inspections by RO.
- D.1.2 The TA and RO inspector or delegate must inspect the sea bay coatings and zincs prior to installing sea inlet gratings or undocking.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 The Contractor's final report must include details of the anodes replaced, quantity, and location.

D.5 Training – Not Used

11.7 ANODES

11.7.A Identification

- A.1 The intent of this specification is to inspect and renew the vessels anodes.
- A.2 The following zincs must be replaced with new CFM, unless otherwise specified.

11.7.B References

B.1 Equipment Data

B.1.1 List of Anodes

TYPE	QUANTITY	Location	Note
MME 28AB	20	Hull	10 on each side – Aluminium – circular with hole for a M16 bolt.
MME 26AA	3	Sea bays	See 6094-25600-02 – Aluminium - Welded
MME 26AA	4	Bow Thruster Tunnel	2 on each side – Aluminium -Welded
39213	2	Bow Thruster	Nose cone - Aluminium

B.2 Drawings & Documents

Drawing Number	Description
6094-63300-01_B	Scheme of cathodic protection Sheet 5_5

B.3 Regulations and Standards

11.7.C Statement of Work

- C.1 The Contractor must replace all anodes.
- C.2 Recessed hull anodes, type MM 28AB, will be GSM.
- C.3 The Contractor must supply 20 of new M16 stainless steel fasteners of the appropriate length to secure the new recessed hull anodes. The original fasteners will be retained as property of Canada.
- C.4 The Contractor must clean and paint the anode recesses according to the Paint Spec underwater hull section.
- C.5 The two conical Bowthruster anodes, mounted by bolts on the thruster hubs, are GSM.
- C.6 The contractor must replace all other anodes type MM 26Aa for sea chests, sea bays and bow thruster tunnels as must be CFM.

- C.7 Prior to installation of new anodes all old zinc strap scabs must be removed and ground flush. Any disturbed or damaged area behind and around the anodes must be properly prepared and painted in accordance with the paint schedule.
- C.8 Immediately after welding on the new anodes, the slag, oxidation etc. is to be removed and all disturbed areas are to be treated in accordance with the paint schedule.
- C.9 The anodes must be covered with tape after installation to prevent them from becoming coated with paint during the hull painting process.
- C.10 The tape must be removed prior to undocking the vessel.

11.7.D Proof of Performance

D.1 Inspection Points

- D.1.1 The TA and RO inspector or delegate must inspect the sea bay, sea chests and sea boxes after cleaning. The Contractor is responsible for coordinating inspections by RO.
- D.1.2 The TA and RO inspector or delegate must inspect the sea bay coatings and zincs prior to replacement of the manhole cover and prior to re-installing sea inlet gratings or undocking.
- D.1.3 The TA must be afforded the opportunity to check that all anodes are secure and that the protective tape has been removed.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 The Contractor’s final report must include details of the anodes replaced, quantity, and location.

D.5 Training – Not Used

11.8 SEWAGE SLUDGE GREY WATER AND BLACK WATER TANK INSPECTIONS (RO SURVEY)

11.8.A Identification

- A.1 The intention of this specification is to inspect and survey the sewage sludge, the grey water and the black water tanks.
- A.2 The following tanks must be opened, certified safe for entry, and must be cleaned and prepared for survey.
- A.3 On completion of the work the tanks must be closed up with new CFM oil resistant nitrile (NBR) gaskets. The Contractor must remove and re-install with new gaskets all the tank covers.

11.8.B References

B.1 Equipment Data

B.1.1 Reference documents

	Description	Date
Paint Spec.	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

B.2 Drawings

- B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-89940-02	Tank Arrangement, Capacity Plan

B.3 Regulations and Standards

- B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		

Standards		
Regulations		
	Canada Shipping Act 2001	No
	Hull Inspection Regulations (C.R.C., C. 1432)	No

11.8.C Statement of Work

- C.1.1 The Contractor must open the manholes, pump dry, clean and dispose of any residue remaining in the Grey Water tank (#7a) The Contractor must also ventilate the tank and certify it safe for entry and safe passage to the sewage sludge and black water tanks for the duration of the work inside. Contractor to bid on disposal of 500 liter of grey water and 30 liters of sludge.
- C.1.2 The Contractor must open the manhole giving access to the sewage sludge tank (#6), pump dry, clean and dispose of the sludge remaining in the tank. Contractor to bid on disposal of 200 liters of sewage sludge. The Contractor must also clean and ventilate the tank and certify it safe for entry and safe passage to the black water tank for the duration of the work inside.
- C.1.3 The Contractor must open the manhole giving access to the black water tank (#7b), pump dry, clean and dispose of the liquids and solids remaining in the tank. Contractor to bid on disposal of 300 liters of black water. The Contractor must also clean and ventilate the tank and certify it safe for entry for the duration of the work inside. The estimated amount of solid wastes from the sewage sludge tank and the black water is 35 liters.
- C.1.4 The Contractor must clean the three tanks mentioned above by hand if a pressure wash system cannot safely be used. The contractor must quote on 200 liters of contaminated water disposal.
- C.1.5 The Contractor must remove all debris from the inside of the tanks and clean SSPC-1 standards.
- C.1.6 The Contractor must remove the suction pipe from all three tanks at the first flange. The pipes must be cleaned, inside and out, with a water pressure system with at least 5000 psi. The Contractor must inspect these pipes for corrosion and advise the TA if any defect is detected.
- C.1.7 The Contractor must install the three pipes with new Garlock Blue-Gard Style 3000 gaskets or equivalent.

- C.1.8 The Contractor must quote for the preparation and painting of 10 non-continuous internal areas of 0.2m by 0.2m in each of the sewage sludge tank and the black water tank . Paint procedure as per CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1.
- C.1.9 The Contractor must afford the opportunity for all tanks to be inspected by RO and TA.
- C.1.10 The Contractor must replace with new, all gaskets, nuts and washers from the three manholes opened. The nuts and washers must be of the same grade as those removed.

11.8.D Proof of Performance

D.1 Inspection Points

- D.1.2 The Contractor must advise the RO’s Surveyor and the TA when the tanks and their coatings are ready for inspection.
- D.1.3 The TA must be given sufficient notice to witness inspections as noted.
- D.1.4 The Contractor is responsible for coordinating all required inspections by RO.
- D.1.5 The Contractor must afford the TA the opportunity to inspect the tanks upon completion of testing, if required, and cleaning.
- D.1.6 After inspection the tanks must be closed up in good order using new CFM gaskets.
- D.1.7 The CFM gasket material must be nitrile rubber, suitable for use with oil sludge.
- D.1.8 The TA must be afforded the opportunity to witness the hardening up of the all manholes, and closures.

D.1 Testing/Trials – Not Used

D.2 Certification – Not Used

- D.2.1 Certificates in accordance with the Documentation section of the General Notes.

D.3 Documentation – Not Used

- D.3.1 Documentation in accordance with the Documentation section of the General Notes.

D.4 Training – Not Used

11.9 WASTE OIL AND BILGE WATER HOLDING TANK CLEANING AND INSPECTION (RO SURVEY)

11.9.A Identification

- A.1 The intention of this specification is to inspect and survey the Waste Oil and Bilge Water Holding tanks.
- A.2 The following tanks must be opened, certified safe for entry, and must be cleaned and prepared for survey.
- A.3 On completion of the work the tanks must be closed up with new CFM oil resistant nitrile (NBR) gaskets. The Contractor must remove and re-install with new gaskets all the tank covers.

11.9.B References

B.1 Equipment Data

B.1.1 Reference documents

	Description	Date
Paint Spec.	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

B.2 Drawings

B.1.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE	Number of Sheets
AF6102-89940-02	Tank Arrangement, Capacity Plan	1
AF6102-59300-04	Oily Waste System	1
AF6102-5200-01	Bilge Drainage And Dewatering System	1

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No
	Hull Inspection Regulations (C.R.C., C. 1432)	No

11.9.C Statement of Work

- C.1.1 The Contractor must open the manholes, pump dry, clean and dispose of any oil residue remaining in the Waste Oil Tank (#15) The Contractor must also ventilate the tank and certify it safe for entry for the duration of the work inside. Contractor to bid on disposal of 300 liter of waste oil and water.
- C.1.2 The Contractor must wash back the waste oil suction line with 200 liters of hot water minimum 50 degree Celsius and then blow clear with 70 psi compressed air. The Contract must remove the waste oil check suction check valve (V593124) to allow the back wash. The connection for the wash back and blow clear to be made after the waste oil transfer pump suction strainer. The strainer basket may be removed for this cleaning provided the strainer is cleaned manually before reinstalling. Contractor to include in their bid provisions to dispose of the 200 liters of wash water.
- C.1.3 The Contractor must open the manholes, pump dry, clean and dispose of any oily water residue remaining in the Bilge Water Holding Tank (#4) The Contractor must also ventilate the tank and certify it safe for entry for the duration of the work inside. Contractor to bid on disposal of 300 liter of oily bilge water.
- C.1.4 The Contractor must remove all debris from the inside of the tanks. The Contractor must quote on 20 liters of debris per tank disposal.
- C.1.5 The Contractor must quote for the preparation and painting of 10 non-continuous areas of 0.2m by 0.2m in each of the Oily Waste and Bilge Water Holding Tanks as per the Goddard Coating Spec.
- C.1.6 The Contractor must afford the opportunity for all tanks to be inspected by RO and TA.
- C.1.7 The Contractor must arrange for all RO inspections.

- C.1.8 The Contractor must replace with new, all gaskets, nuts and washers from the three manholes opened. The nuts and washers must be of the same grade as those removed.

11.9.D Proof of Performance

D.1 Inspection Points – Not Used

- D.1.1 The Contractor must advise the RO’s Surveyor and the TA when the tanks and their coatings are ready for inspection.
- D.1.2 The TA must be given sufficient notice to witness inspections as noted.
- D.1.3 The Contractor is responsible for coordinating all required inspections by RO.
- D.1.4 The Contractor must afford the TA the opportunity to inspect the tanks upon completion of testing, if required, and cleaning.
- D.1.5 After inspection the tanks must be closed up in good order using new CFM gaskets.
- D.1.6 The CFM gasket material must be nitrile rubber, suitable for use with oil sludge.
- D.1.7 The TA must be afforded the opportunity to witness the hardening up of the all manholes, closures and docking plugs.

D.2 Testing/Trials – Not Used

- D.2.1 Tanks must be hydrostatically tested.

D.3 Certification – Not Used

- D.3.1 Certificates accordance with the Documentation section of the General Notes.

D.4 Documentation – Not Used

D.5 Training – Not Used

11.10 FOREPEAK TANK INSPECTION (RO SURVEY)

11.10.A Identification

- A.1 The intention of this specification is to inspect and survey the void space below the Chain Locker and the void space below the Fore Peak Store.
- A.2 The following tanks must be opened, certified safe for entry, and must be cleaned and prepared for survey.

A.3 On completion of the work the tanks must be closed up with new CFM oil resistant nitrile (NBR) gaskets. The Contractor must remove and re-install with new gaskets all the tank covers.

11.10.B References

B.1 Equipment Data

B.1.1 Reference documents

	Description	Date
Paint Spec.	CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1	

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-89940-02	Tank Arrangement, Capacity Plan

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No
	Hull Inspection Regulations (C.R.C., C. 1432)	No

11.10.C Statement of Work

- C.1.1 The Contractor must open the manholes, pump dry, clean and dispose of any residue remaining in the Fore Peak Void Space. The Contractor must also ventilate the tank and certify it safe for entry and safe passage to the Fore Peak Void for the duration of the work inside. Contractor to bid on disposal of 50 liter of sea water and 20 liters of sludge.
- C.1.2 The Contractor must open the manhole giving access to the Chain Locker Void, pump dry, clean and dispose of the sludge remaining in the tank. Contractor to bid on disposal of 50 liters of sea water. The Contractor must also clean and ventilate the tank and certify it safe for entry and safe passage to the Chain Locker Void Space tank for the duration of the work inside.
- C.1.3 The Contractor must clean the tank mentioned above by hand if a pressure wash system cannot safely be used.
- C.1.4 The Contractor must remove all debris from the inside of the tanks and clean them to the approval of the TA or his/her designated person. The Contractor must quote on the disposal of 20 liters of debris disposal.
- C.1.5 The Contractor must quote for the preparation and painting of 10 random areas of 0.2m by 0.2m in each of the Fore Peak Void and Chain Locker Void as per the CCGS M Charles M.B. Coating Spec DD2018 09 07 2018 rev1.
- C.1.6 The Contractor must afford the opportunity for all tanks to be inspected by RO and TA.
- C.1.7 The Contractor must arrange for all RO inspections.
- C.1.8 The Contractor must replace with new, all gaskets, nuts and washers from the three manholes opened. The nuts and washers must be of the same grade as those removed.

11.10.D Proof of Performance

- D.1 Inspection Points
 - D.1.1 The Contractor must advise the RO's Surveyor and the TA when the tanks and their coatings are ready for inspection.
 - D.1.2 The TA must be given sufficient notice to witness inspections as noted.
 - D.1.3 The Contractor is responsible for coordinating all required inspections by RO.

- D.1.4 The Contractor must afford the TA the opportunity to inspect the tanks upon completion of testing, if required, and cleaning.
- D.1.5 After inspection the tanks must be closed up in good order using new CFM gaskets.
- D.1.6 The CFM gasket material must be nitrile rubber, suitable for use with oil sludge.
- D.1.7 The TA must be afforded the opportunity to witness the hardening up of the all manholes, closures and docking plugs.
- D.2 Testing/Trials – Not Used
 - D.2.1 Tanks must be hydrostatically tested.
- D.3 Certification – Not Used
 - D.3.1 Certificates accordance with the Documentation section of the General Notes.
- D.4 Documentation –
 - D.4.1 Documentation in accordance with the Documentation section of the General Notes.
- D.5 Training – Not Used

11.11 FRESH WATER TANK INSPECTION (RO SURVEY)

11.11.A Identification

- A.1 The intention of this specification is to inspect and survey the vessel’s fresh water tanks.
- A.2 The fresh water tanks must be opened up for inspection, cleaning, maintenance and RO inspection requirements.
- A.3 The existing liner is International Paint Interline 975P this product must be used for repairs.
- A.4 The work must meet Health Canada Guidelines for Canadian Drinking Water Quality: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2012-sum_guide-res_recom/index-eng.php

11.11.B References

B.1 Equipment Data

- B.1.1 The existing paint system is International Paint Interline 925

B.1.2 List of Tanks.

Description	Volume	Surface Area (m ²)	RO Field No.
Port FW Tank	3.214 m ³		
Starboard FW Tank	3.214 m ³		

Reference Documents	
7.A.12	Fleet Safety manual Section 7.A.12- Potable Water Quality
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php	Health Canada Guidelines for Canadian Drinking Water Quality
International Paint	CCGS M Charles Coating Spec DD2016 05 09 2016 rev1
Interline 975P	Application Guidelines Potable Water Tanks Interline 975P

B.1.2 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-89940-02	Tank Arrangement and Capacity plan
AF6102-53000-02	Sanitary Fresh Water system
AF6102-63100-01	Paint Schedule

B.1 Regulations and Standards

B.1.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

	Title	Included Yes/No
FSM Procedures		
7.A.12	Potable Water Quality	YES
Publications		
Standards		
	Health Canada Guidelines for Canadian Drinking Water Quality.	No
Regulations		
	Canada Shipping Act 2001, Safe Working Practices Regulations (C.R.C., c. 1467).	No

http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1467/page-1.html

http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1467/page-6.html#h-8

11.11.C Statement of Work

- C.1 The Contractor must drain and open the water tanks. The Contractor must vent tanks and certify they are safe for entry.
- C.2 The water must be removed from the tanks using the test cocks which are located in the bow thruster compartment. The water must be pumped out using the Contractors equipment. The shipboard freshwater pumps cannot be used for this purpose.
- C.3 The Contractor must pressure washed and wiped clean all tanks. The Contractor must allow for 100 Liters of liquid waste, not including the cleaning media used.
- C.4 The Contractor must clean all the internal tank suction. The striking plate under the sounding tube must be inspected. The Contractor must ensure that all vents, suction and filling lines are clear.
- C.5 The Contractor must take every precaution to ensure there is no solvent added to the applied paint, to avoid Ethylbenzene contamination.
- C.6 The Contractor must quote on preparation and repair of 2 m² total in 10 random areas, as per the Paint Spec.
- C.7 The Contractor must use the product recommended by the Paint Manufacturer Representative and adhere exactly to the application procedures stated by the Paint Manufacturer Representative. The use of thinners is not acceptable; all curing between coats and ventilation requirements must be adhered to. New hoses must be used for the application of paint in the Potable Fresh Water Tank. Hoses must not be flushed with thinner and then reused for the potable water tank. The work schedule for tank coating must provide drying times consistent with the paint manufacturer's recommendations for fresh water tanks.
- C.8 The Contractor must arrange for the cleaned tanks to be inspected to the approval of RO and the TA.
- C.9 The Contractor must close up both tanks after inspection by RO's and by the TA. New nitrile (or neoprene) gaskets must be used. The TA must witness the hardening up of all manholes, closures, and docking plugs.

11.11.D Proof of Performance

D.1 Inspection Points

- D.1.1 Once all work has been completed and the tank is cleaned of all debris and work by-products, the contractor arrange for inspection and survey of the potable water tank by RO and inspection by the TA.

D.2 **Testing/Trials**

- D.2.1 The Potable Water tanks and the ship's fresh water system must be super-chlorinated in accordance with the procedures laid out in the Coast Guard Fleet Safety Manual (FSM) procedure Potable Water Quality 7.A.12. On completion of super-chlorination the tanks must be drained and flushed twice before being returned to service. The Contractor must be responsible to dispose of all water used to treat the fresh water tanks, allowing for 3.25 m³ per fill for each of the 2 tanks, including de-chlorination of the super-chlorinated water.
- D.2.2 The Contractor must arrange for testing of potable water tank and system in accordance with the Annual Testing of Potable Water as specified in the Canada Drinking Water Guidelines as prescribed by Health Canada. To verify this, the following procedure must be followed for each tank:
- i) The tanks must be filled with fresh water, super-chlorinated, de-chlorinated and then drained in accordance with the CCG Fleet Safety manual (FSM) Potable Water Quality Guidelines contained in section 7.A.12 prior to filling for testing.
 - ii) The potable water distribution system must be super chlorinated as per FSM. The main charcoal media filter must be bypassed and locked out while system super chlorination takes place. Refer to AF6101-53000-02, Sanitary Fresh Water system.
 - iii) The tank must be filled with potable water to approximately fifty (50) percent of the working volume of the tank.
 - iv) The tank must be allowed to remain stagnant for forty eight (48) hours before samples are taken.
 - v) One (1) blank water sample must be collected from the freshwater supply line used to fill the tank.
 - vi) Two water samples must be taken from the water inside the tank.
 - vii) Samples from the distribution system must be taken in accordance with FSM.
 - viii) The water samples listed above must be sent to an accredited laboratory for analysis. The water samples must be tested for all the parameters identified in the FSM. Results must be provided immediately to the TA.

D.3 **Certification**

- D.3.1 The TA is responsible to ensure that the Survey Record Book is signed off by RO.

D.3.2 The Contractor must coordinate RO inspection.

D.4 **Documentation**

D.4.1 The Contractor must include all test reports in their final documentation. The Contractor must provide evidence of acceptable tank water quality; prior to acceptance of the potable tank refit work by the CCG. The super chlorination and testing must be completed near the end of the work period and documentation describing how the super chlorination was conducted must be included in the final documentation.

D.5 **Training – Not Used**

11.12 STORM VALVES AND SEA CONNECTIONS INSPECTION (RO SURVEY)

11.12.A Identification

A.1 The intent of this specification item is to remove and layout for inspection by RO the storm valves and sea connections.

11.12.B References

B.1 **Equipment Data**

B.2 List of Sea Water Valves: (Total 10)

ID #	Description	Location	Size mm
V256001	Main Isolation Valve (P)	Engine Room FWD	250
V256002	Main Isolation Valve (Stbd.)	Engine Room FWD	250
V256003	FWD Sea Chest Isolation Valve	Bow Thruster RM	100
V256007	Port Sea Chest Circulation Valve	Engine Room FWD	100
V256008	Stbd Sea Chest Circulation Valve	Engine Room FWD	100
V256010	Port Sea Chest Vent	Engine Room FWD	150
V256011	Stbd Sea Chest Vent	Engine Room FWD	150
V256012	FWD Sea Chest Vent Valve	Bow Thruster RM	65
V256013	P Sea Strainer outlet	Engine Room FWD	250
V256014	Stbd Sea Strainer outlet	Engine Room FWD	250

B.3 List of Storm Valves (Total 4)

ID #	Description	Location	Size
V526023	Fuel Oil Spill LCR O/B Discharge		50
V526029	HVAC/DK LCR O/B Discharge		50
V526031	Wet Gear RM O/B Discharge		50
V593091	Sewage Treatment Plant O/B Disc		50

B.4 List of Overboard Valves: (Total 13)

ID #	Description	Location	Size
V256032	P O/B Discharge	Engine Room	150
V256035	Stbd O/B Discharge	Engine Room	150
V256065	ACU O/B Discharge	Bow Thruster Compt.	65
V256114	Stbd ME Gear Box O/B Discharge	Engine Room	40
V256115	P ME Gear Box O/B Discharge	Engine Room	40
V256131	Cyclone Filter O/B Discharge	Engine Room	25
V520018	Bilge O/B	Engine Room	50
V520019	Bilge O/B	Engine Room	50
V520056	Bilge Eductor O/B	Engine Room	80
V593071	O/B Discharge		32
V530001	RO Watermaker O/B Discharge	Bow Thruster Compt.	15
V256090	ER stbd supply header vent	Engine Room	25
V555009	Drain line O/B	Bow Thruster Compt.	25

B.5 List of Valves to be fitted with galvanic isolation kits.

Identification number	Description	Location	Size (mm)
V256007	Port Sea Chest Circulation Valve	Engine Room FWD	100
V256008	Stbd Sea Chest Circulation Valve	Engine Room FWD	100
V256013	Port Sea Strainer outlet	Engine Room FWD	250
V256014	Stbd Sea Strainer outlet	Engine Room FWD	250
V256043	Port Main Engine exhaust	Steering Gear Compt.	65
V256045	Port Auxiliary generator exhaust	Steering Gear Compt	50
V256047	Stbd Auxiliary generator exhaust	Steering Gear Compt	50
V256049	Stbd Main Engine exhaust	Steering Gear Compt	65

V256018	Port Main Engine supply	Engine Room	200
V256022	Stbd Main Engine Supply	Engine Room	200
V256032	Port O/B Discharge	Engine Room	150
V256035	Stbd O/B Discharge	Engine Room	150
V256114	Stbd ME Gear Box O/B Discharge	Engine Room	40
V256115	Port ME Gear Box O/B Discharge	Engine Room	40
V256131	Cyclone Filter O/B Discharge	Engine Room	25
V520019	Bilge O/B	Engine Room	50
V520056	Bilge Eductor O/B Discharge	Engine Room	80

B.6 Drawings & Documents

B.6.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-25600-01	AS-BUILT COOLING WATER SYSTEM
AF6102-52600-01	AF SCUPPERS AND DRAINS
AF6102-55100-01	AS-BUILT COMPRESSED AIR SYSTEM.
AF6102-59300-02	AS-BUILT BLACK GREY WATER AND SANITARY FLUSHING SYSTEM

B.7 Regulations and Standards

B.7.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No

Publications		
Standards	Interspec Paint Specification	Yes
Regulations	Canada Shipping Act 2001, Hull Regulations	No
	RO's Register, Rules & Regulations for the Classification of Special Service Craft	No

11.12.C Statement of Work

- C.1 The Contractor must ensure, prior to the start of disassembly, that all precautions are taken to ensure that the reassembly and reinstallation of all system and equipment components will be as per original and in accordance with manufacturer's specifications.
- C.2 The Contractor must remove three electrical panels on the Port side of the engine room in order to access the valves in that location. The panels must be reinstalled and tested for equipment functionality following the reinstallation of the valves. Contractor to quote on the removal and reinstallation of 20 wires.
- C.3 The Contractor must visually inspect all removed valves and report by Conditions Report deficiencies as they are identified, to the TA and make recommendations for their repair or replacement.
- C.4 The Contractor must disassemble, clean, check valve stems for truth and condition of threads, layout components for TA inspection and prepare a Condition Report on all the valves.
- C.5 All discs and seats must be lapped and blued to prove true. The Contractor must quote on 2 blueing checks per valve.
- C.6 All steel globe valves of 4 inches and larger must be coated internally with Apexior No.3 or equivalent.
- C.7 All butterfly valve discs and seals must be inspected by TA.
- C.8 The Contractor must power tool clean, prior to reinstallation of the sea chest suction valves, the 10" suction elbows, pipes and strainers must be cleared of any mussels and debris.
- C.9 The Contractor must apply to these cleaned areas two coats of epoxy paint and one coat of Interspec 640 as per the Interspec.

- C.10 Prior to reassembly and installation, the Contractor must arrange the attending RO Surveyor and the TA the opportunity to visually inspect all valves as listed above.
- C.11 Following inspection, all original valves must be re-seated and reassembled using new packing and gaskets.
- C.12 All flange gaskets disturbed as a result of the valve servicing process must be renewed using new gasket material.
- C.13 Contractor must install isolation kits on all valves listed in table B6 during the reinstallation process. The isolation kits will be CFM.

11.12.D Proof of Performance

D.1 Inspection Points

- D.1.1 Following all valves servicing and prior to installation, the Contractor must afford the opportunity to RO and the TA to inspect all valves as listed above, both when disassembled and once reinstalled on the vessel.
- D.1.2 The Contractor is responsible for coordinating inspections by RO and must afford the TA to inspect the valves at the same time.

D.2 Testing/Trials

- D.2.1 The Contractor must operationally test and inspect all valves that were serviced and their connections during the flooding of the dock and during the sea-trials.

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 Prior to the close of contract, certification or other documentation must be submitted to the TA attesting to the quality of new materials and components such as packing, gaskets and valves.

D.5 Training – Not Used

11.13 ANCHOR CHAIN AND CHAIN LOCKER (RO SURVEY)

11.13.A Identification

A.1 The intent of this specification is to have the anchor, anchor chain, and chain locker prepared for survey by RO.

11.13.B References

B.1 **Equipment Data**

B.2 **Drawings**

B.2.1 All Drawings are listed in the General Notes.

B.3 **Regulations and Standards**

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications	Canada Shipping Act, 2001: Marine Machinery Regulations (SOR/90-264)	
	RO's Register, Rules & Regulations for the Classification of Special Service Craft Standard	
	ISO 9712:2012, International Standards for Qualification and Certification of NDT Personnel	
	ANSI/ASNT CP-189-2011, ASNT Standard for Qualification and Certification of NDT Personnel	

Standards	Interspec Paint Specification	Yes
Regulations		
	Canada Shipping Act 2001	No
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	

11.13.C Statement of Work

C.1 General

- C.1.1 The Contractor must clean and lay out the anchors and chains for RO Surveyor's inspection.
- C.1.2 The Contractor must accomplish the lowering and raising of the anchor, without the vessel's hydraulic power available for operating the winch.
- C.1.3 The Contractor must ensure prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all system and equipment are as per original and in accordance with manufacturer's specification.
- C.1.4 The Contractor must complete a thorough visual inspection of the anchor and chain for indications of excessive wear, wastage and other defects must be performed. All evidence of defects must be brought to the attention of the attending RO's Surveyor and TA.
- C.1.5 Areas of concern must be assessed in accordance with in this specification; required repairs must be actioned prior to the close of contract as unscheduled work.
- C.1.6 The Contractor must inspect the anchor eye and anchor shackles using liquid penetrant testing performed by a NDT LPT Level II certified Technician
- C.1.7 Any unplanned repair work required on the anchor or the chain will be negotiated using from PWGSC 1379
- C.1.8 Following completion of inspections, the Contractor must mark the anchor chain with stainless steel wire at each joining shackle based on the length, first shot of chain one wrap of stainless wire, 2nd shot of chain wrapped with 2 wraps of stainless wire ect.

Links adjacent to the joining shackle must be prepped and painted white in accordance with the Paint Representative's recommendations. The number of painted links each side of the joining shackle must correspond with the order number of the adjacent anchor side shot, for example shot 2 must have 2 shackles painted on either side of the joining shackle.

- C.1.9 The Contractor must arrange the chain locker for RO's Surveyor inspection. The Contractor must establish the confine space entry procedure prior to start the inspection.
- C.1.10 The Contractor must open the chain locker. The chain locker must be vented and certified for entry. The certificate of entry must be valid for each entry.
- C.1.11 The Contractor must pressure wash the chain locker with a minimum of 5000 psi. The Contractor must allow for 100 liters of liquid waste not including the cleaning media used and 10 Kg of sludge to dispose.
- C.1.12 The Contractor must clean all the internal chain locker suction to SSPC-1 standard.
- C.1.13 After the final approval of the chain locker by the RO's surveyor and the TA, the Contractor must close the manhole cover with a new gasket and new nuts of the same grade as those removed.
- C.1.14 The Contractor must, prior to undocking of the vessel, store the chain and anchor as per original.

11.13.D Proof of Performance

D.1 Inspection Points

- D.1.1 Inspections must include inspection by RO. The Contractor is responsible for scheduling RO attendance.
- D.1.2 The Contractor must arrange the attending RO Surveyor and the TA the opportunity to visually inspect the ranged anchor, anchor chain and the chain locker.

D.2 Testing/Trials

- D.2.1 The Contractor must afford the attending RO Surveyor and the TA the opportunity to witness the successful operation of anchor and anchor chain.

D.3 Certification

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.

D.4.2 Prior to the close of contract, certification or other documentation must be submitted to the TA attesting to the quality of new materials and parts such as shackles, links and other components replaced on the anchor and anchor chain assembly.

D.5 **Spares**

11.14 SEA GRATE MODIFICATION (RO SURVEY)

11.14.A Identification

A.1 The intent of this specification is to have the sea chest and grates modified as per the Lengkeek Vessel Engineering Inc. Document J16003-R02.

11.14.B References

B.1 Equipment Data

B.1.1 Equipment Details in statements or a table

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
J16003-S01_R0	Sea Chest Modification Details	1

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	

11.14.C Statement of Work

- C.1 The Contractor must modify the Sea Chest and Grates according to the Lengkeek Vessel Engineering Inc. document J16003-R02, Rev A. NOTE: the Contractor must be responsible for ensuring that final dimensions of parts are taken to fit the actual ship's dimensions. The drawing supplied is approval in concept but final dimensions for all parts must be verified from the vessel. Any difference in adapting the drawing to the vessel will be covered under PSPC work arising procedures.
- C.2 All new steel plates and shapes must be minimum ROs Grade 'A' unless otherwise noted.
- C.3 The Contractor must supply all material required, including any material required to complete the work of this specification item.
- C.4 All new steel work must be sandblasted and shop primed with a primer compatible with the vessel's existing paint system. On completion of all welding, all damaged paintwork must receive a sweep blast to remove any loose material.
- C.5 Upon completion of the prescribed repairs the Contractor must schedule the RO inspector for acceptance of the repairs and modifications prior to the application of the hull coating system. The TA must be afforded the opportunity to be present for this inspection.
- C.6 All new and disturbed metal resulting from the prescribed repairs must be prepared and coated in accordance with paint spec.

11.14.D Proof of Performance

- D.1 Inspection Points – Not Used
 - D.1.1 Any hold points or inspection requirements
- D.2 Testing/Trials – Not Used
 - D.2.1 Details of any tests or trials
- D.3 Certification – Not Used
 - D.3.1 Certificates in accordance with the Documentation section of the General Notes.
- D.4 Documentation – Not Used
 - D.4.1 Documentation in accordance with the Documentation section of the General Notes.
- D.5 Training – Not Used

11.15 TRANSOM EXHAUST RENEWALS (RO SURVEY)

11.15.A Identification

The intent of this specification item is for the Contractor to remove the existing after most section of the main engine exhaust, along with its adjoining transition piece to the transom and its penetration piece and fabricate and install a replacement, as per the drawings and MSPV SS Exhaust Spec 2017 04 19 provided.

11.15.B References

B.1 Equipment Data

B.2 Drawings

All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes
_____.

Drawing Number	DRAWING TITLE	Number of Sheets
J15073-M01-R4	M.E. Exhaust Outlets Sheet 1	
J15073-M01-R4	M.E. Exhaust Outlets Sheet 2	
J15073-S01-R0	Strip-Out	

B.3 Regulations and Standards

The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No

Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	

11.15.C Statement of Work

- C.1 The Contractor must refer to provided MSPV SS Exhaust Spec 2017 04 19 for the complete work specification.
- C.2 The Contractor must remove the exhaust blankets covering the main engine exhaust within the steering gear compartment and store the blankets in a safe, dry location for the duration of the work period.
- C.3 The Contractor must unbolt and remove all main engine exhaust pieces within the steering gear compartment which are necessary to access the exhaust ports.
- C.4 The Contractor must fabricate the new exhaust port inserts from GSM materials.
- C.5 The GSM material is:

C.6	Part No.	Quantity	Description	Dimensions
1		1	Pipe, 18" Dia., Sch. 10S	681mm* length
2		2	Pipe, 18" Dia., Sch. 10S	705mm length
3		2	Plate Flange, 5/8" Thk.	595mm O.D.
4		2	Plate Flange, 5/8" Thk.	680 mm O.D.
5		2	Pipe, 5" Dia., Sch. 10S	150mm length
6		2	Plate Flange, 5/8" Thk.	250mm O.D.
7		4	Plate, 3/16" Thk.	27mm x 150mm
8		2	Plate 3/16" Thk.	420mm x 827mm (512 I.D.)
9		4	Plate, 5/16" Thk.	415mm x 1040mm (662 O.D.)
10		2	Insert Ring, 5/16" Thk.	800mm O.D.
11		2	Plate Flange, 5/8" Thk.	680mm O.D.
12		2	Flap plate, 3/16" Thk.	Cut to drawing dimensions
13		2	Stiffener plate, 3/16" Thk.	Cut to drawing dimensions
14		4	Hinge plate, 3/16" Thk.	Cut to drawing dimensions
15		4	Exhaust Flap Tab plate, 5/16" Thk.	Cut to drawing dimensions
16		4	Transom Insert Stiffener, 3/16" Thk.	Cut to drawing dimensions
17		1	Pipe, 18" Dia., Sch. 10S	681mm* length

	1	RO stamped 4mm Grade A – 275 YS Steel Plating	2000mm x 3000mm
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Note: Dimensions with (*) have 20% more material (green material) than what is shown on the reference drawings for custom fabrication at shipyard

- C.7 The exhaust cooling pipes, nozzles and flanges are to be retained and reused in the new installation. Also the exhaust flaps are to be retained and reused. This includes one per exhaust port.
- C.8 The Contractor must remove the existing exhaust ports including the hull penetration and connecting flange.
- C.9 The Contractor must weld the new stainless transom pieces directly the transom plating.
- C.10 All welds must be to the approval of RO. The RO accepts CWB pre approved weld procedures. Any weld procedures not on the list of CWP pre approved will need to be approved by the RO prior to any work completed.
- C.11 The Contractor must reinstall the main engine exhaust pipes using new gasket material.
- C.12 The Contractor must reinstall all exhaust blankets following a test of the main engines to confirm that there are no exhaust leaks.

11.15.D Proof of Performance

D.1 Inspection Points –

All welds must be to the approval of RO.

D.2 Testing/Trials –

Main engines must be test run to inspect for exhaust leaks prior to reinstalling the exhaust blankets.

D.3 Certification –

Certificates in accordance with the Documentation section of the General Notes.

D.4 Documentation –

Documentation in accordance with the Documentation section of the General Notes.

11.16 TRANSDUCER INSTLATION AND NEW BLISTER

11.16.A Identification

- A.1 The intent of this specification must install a transducer blister on the hull to provide a mounting location for a new Airmar transducer and the existing EM log sensor. The transducer blister will provide a clean flow of water across the transducers and prevent damage in the event of log strikes.
- A.2 The Contractor must fabricate and install the transducer blister and install the transducers.

11.16.B References

B.1 Equipment Data

B.1.2 The following table lists the transducers that are currently installed, and the work to be carried out to each:

ID	Vendor	Model	Action
<i>A</i>	<i>Simrad</i>	<i>ES70</i>	<i>No Change</i>
<i>B</i>	<i>Sperry</i>	<i>EM-Log Sensor FNF III, Type 4874</i>	<i>Relocate to new Blister</i>

B.1 Drawings & Documents

B.1.3 The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-18-48-428-01	CCGS M. Charles M.B. Transducer Blister Installation

B.1.4 The following documents are to be considered as Reference Documents.

VENDOR	SENSOR	Document Number	TITLE
<i>Simrad</i>	<i>A</i> <i>Simrad ES70</i>	<i>346061</i>	<i>Operator Manual Simard ES70 Fish finding echo sounder</i>

VENDOR	SENSOR		Document Number	TITLE
<i>Sperry Marine</i>	<i>B</i>	<i>EM-Log Sensor FNF III, Type 4874</i>	<i>CCG 349429</i>	<i>Installation, Maintenance and Service Instructions 004874 Rev.A</i>
<i>Airmar</i>	<i>C</i>	<i>Airmar CM265 LH</i>	<i>N/A</i>	<i>Transducers Broadband / Chirp</i>

B.1 Regulations and Standards

B.1.5 The following Standards and Regulations apply to work carried out in this section. The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
	Interspec Paint Specification	Yes
Standards		
CSA CWB Standards W59	Canadian Standards Association - Welded Steel Construction (Metal Arc Welding)	No
IACS Rec47 SARQS	IACS Recommendation No 47 - Shipbuilding and Repair Quality Standard	No
CT-043-eq-eg-001-E	Canadian Coast Guard – Welding Specification	Yes
18-080-000-SG-003	Canadian Coast Guard – Paints and Coatings Standard	Yes
FC 08-2007	Canadian Coast Guard – Fleet Identity Color Standard	Yes
Regulations		
LR SSC	Lloyd’s Register of Shipping Rules and Regulations for the design and Construction of Special Service Craft, 2013	No
C.R.C., c. 1431	Transport Canada Hull Construction Regulations, 2014	No

B.1 Abbreviations

B.1.6 The following abbreviations are used throughout this specification:

ISO	International Standards Organization
MT	Weld inspection by Magnetic Particle Inspection
PQR	(Weld) Procedure Qualification Record
PT	Weld inspection by Dye Penetrant Inspection
RT	Weld inspection by Radiographic Inspection
UT	Weld inspection by Ultrasonic Inspection

11.16.C Statement of Work

C.1 General

- C.1.1 Transducers are extremely sensitive sensors. The Contractor must take all necessary precautions to prevent the transducers and their cables from all forms of damage, including mechanical, heat, and electromagnetic. All other cables, pipes, and equipment in way of work areas are to be protected from the same. The Contractor must remove all transducers during hot work.
- C.1.2 The Contractor must remove the existing transducer B and its existing transducer blister. The existing transducer B and the new transducer C must be mounted in the new transducer blister. Transducer A must remain unchanged. All Transducers are GSM.
- C.1.3 Any existing internal structure that has been damaged by the installation or removal of the transducers must be repaired by the Contractor as per the surrounding structure (note frames 25 and 26, ABS Grade A, thickness to match existing hull plate thickness).
- C.1.4 New material only must be used for the fabrication of the blister and any structural repairs.
- C.1.5 The Contractor must reinstall all any items that were temporarily stripped out for access and must return the affected areas to the condition in which they were found. It is the responsibility of the Contractor to repair any damage caused during construction.

C.2 Welding Requirements

- C.2.1 All welding and weld inspection must be in accordance with the CCG Welding Specification CT-043-eq-eg-001.
- C.2.2 For any item requiring the application of fusion welding for steel structures, the Contractor and all Sub-Contractors must be certified by the Canadian Welding Bureau to CSA W47.1 – latest edition, Division 1 or 2.

- C.2.3 For structural steels > 3 mm in thickness, welding must meet the requirements of CSA Standards W47.1 and W59, except as modified by the CCG Welding Specification CT-043-eq-eg-001.
- C.2.4 The Contractor must provide documentation to the TA clearly identifying compliance with the welding certification requirements specified herein and the CCG Welding Specification CT-043-eq-eg-001. Typical documents include but are not necessarily limited to: Letter of Validation, Welding Procedures, Welder Performance Qualification Cards, Inspection Personnel Qualification Cards, Inspection Reports, etc.
- C.2.5 The CCG Welding Specification is an owner's requirement. TCMS support both CSA Standards and RO Rules for welding. The IACS materials and welding working group ruled that CSA Standards for welding may be used.
- C.2.6 RO's accept welder performance and welding procedure testing to CSA Standards for steel and aluminum. To be accepted, Welding Procedure Specifications and supporting Data Sheets must be tested and have Procedure Qualification Records (PQR) meeting the technical intent of IACS W28.
- C.2.7 Welding Procedures must be pre-qualified by CWB, the contractor must use weld procedures supported by PQRs for joining steel, unless otherwise stated by the attending RO Surveyor, if the Surveyor states PQR's are not acceptable it will be corrected by PSPC work arising procedures.
- C.2.8 All fillet welding must be double continuous unless noted otherwise. All fillet welds are to be 6.4mm leg length (4.5mm throat thickness). Unless noted otherwise in the design drawings, all butt welds are to be full penetration.
- C.3 Weld Inspections
 - C.3.1 The Contractor must conduct weld inspections in accordance with the CCG Welding Specification CT-043-eq-eg-001.
 - C.3.2 All welds are to be subject to 100% visual inspection.
 - C.3.3 All full penetration butt and T-joint welds are to be subject to 5% MT/PT and 5% RT/UT.
 - C.3.4 All partial penetration butt and T-joint welds are to be subject to 5% MT/PT.
 - C.3.5 Welds are to be NDT tested by a certified person in accordance with the requirements of CSA CWB W59, CCG Welding Specification CT-043-eq-eg-001, and ISO 9712:2005 International Standards for NDT. In the event of any conflict between the

two requirements, CSA CWB W59 must take precedence. Copies of the NDT testing must be provided to the TA in accordance with the Documentation section of the General Notes. Any defects found are to be repaired at Contractor's expense.

C.4 Strip-Out

- C.4.1 The Contractor must completely remove transducer B with the full length of cable attached. Cables must be disconnected at their termination point. Care must be taken to ensure that the cables are not damaged in any way during removal. The existing stuffing box must be retained for reinstallation. Transducer B must be retained for reinstallation.
- C.4.2 The Contractor must strip out the existing transducer blister and mounting ring for transducer B.
- C.4.3 The mounting ring for transducer B must be retained for reinstallation if possible. If the mounting ring cannot be reused the Contractor must fabricate a new mounting ring in accordance with the installation documentation for transducer B. The existing mounting ring for transducer B is assumed to be the same size as the cut-out for the Sperry Speed log in the new blister.

C.5 Transducer Blister Installation

- C.5.1 The Contractor must fabricate and install the transducer blister in accordance with drawing AF6102-18-48-428-01.
- C.5.2 The Contractor must install watertight cable glands in the hull in accordance with the guidance design and the reference drawings. Cable Glands must be watertight and must be suitable for underwater through-hull applications. The cable glands must be sized appropriately for the cable that will pass through the gland. Cable glands must be installed where the cables pass through the cofferdam top plating.
- C.5.3 The Contractor must fabricate the transducer blister in accordance with the guidance drawing. The transducer blister must be fabricated from ABS Grade A (or equal) steel, and fully welded.
- C.5.4 The transducer blister must be of non-watertight construction, with air and drain holes provided in accordance with the guidance drawings. These openings are to allow the structure to flood and drain when the vessel is in the water.
- C.5.5 The blister has a vertical 19mm thick steel plate at the front to prevent logs, ropes and flotsam from becoming trapped by the blister. The leading edge of this must be ground smooth by the Contractor with a 19mm diameter rounded profile along the entire length.

- C.5.6 The Contractor must fit the leading edge of the blister with a 1-1/4" diameter schedule 80 pipe. The purpose of this pipe must be minimize flow separation (and consequently turbulent flow).
- C.5.7 The Contractor must grind all edges of the blister smooth in accordance with the guidance drawing.
- C.5.8 The Contractor must fabricate the transducer blister with a mounting ring for sensor B and the bolting and top plate arrangement for sensor C. The transducer mounting must be either fabricated by the Contractor, or purchased from the vendor. If fabricated by the Contractor, they are to be fabricated in accordance with the appropriate reference drawing.
- C.5.9 The Contractor must weld the transducer blister to the hull in accordance with the guidance drawing.
- C.5.10 The Contractor must install a new top plate and cover plate in accordance with the guidance drawing. This top plate must form a fully watertight enclosure.

C.6 Transducer Installation

- C.6.1 The Contractor must install the transducers in the new transducer blister in the locations specified on the guidance drawing. Mounting must be in accordance with the requirements of the reference documentation for the respective transducer. The transducer must be oriented correctly with the forward direction oriented towards the bow of the vessel.
- C.6.2 The Contractor must route the cables for transducers B and C to the terminating equipment as per the existing sensor cable routing and arrangement. Where possible, cables are to be run to the equipment in a single continuous run.
- C.6.3 The Contractor must provide the cable runs with service loops at both the transducer end and the terminating equipment.
- C.6.4 The Contractor must engage with the respective transducer vendors' Field Service Representatives to carry out commissioning and calibration of the transducers.

C.7 Painting

- C.7.1 All painting must be in accordance with Canadian Coast Guard Paints and Coatings Standard 18-080-000-SG-003. The specification of the paint must be confirmed with the Owner prior to application.
- C.7.2 The Contractor must paint the transducer blister and cofferdam in accordance with the CCG paint and hull coatings specification. All new material must be painted, and

any existing paint that is disturbed or damaged in any way during the work must be stripped and repaired in accordance with the CCG Paint and Hull coatings specification.

- C.7.3 All fixtures and adjacent surfaces must be properly protected during painting. All new surfaces must be thoroughly clean and dry and free of grease or oil before painting is commenced. All plates and shapes used in construction and all areas in way of new paint must have surface preparation performed according to the paint manufacturer's specifications to completely remove scale, rust, and other surface contaminants.
- C.7.4 The Contractor must take care when applying paint to the inside of angled members and other difficult areas to ensure full build-up of coatings is attained.
- C.7.5 Removal and disposal of all hazardous wastes from painting (residuals) must be in accordance with local and provincial environmental regulations.
- C.7.6 All new steel and welded areas must be painted prior to the installation of the transducers. All transducers installed at the time of painting are to be protected from paint. Transducers are not to be painted.
- C.7.7 The Contractor must apply primer coats to clean metal surfaces per the manufacturer's specifications. Primer must be uniform, free of pinholes and holidays, and compatible with specified coating systems. The method of application and all work must be performed in strict accordance with the manufacturer's instructions and as specified herein.

11.16.D Proof of Performance

D.1 Inspection points

- D.1.1 The Contractor must afford the TA an opportunity to witness all welding carried out during the installation of the new transducer blister. The contractor and the TA must agree on inspection points and schedule prior to the start of the work.
- D.1.2 The Contractor must carry out weld inspections in accordance with the CCG Welding Specification CT-043-eq-eg-001.

D.2 Testing/Trials

- D.2.1 The Contractor must ensure that all glands are leak free during the floating of the vessel.

D.3 Certification

- D.3.1 The Contractor must provide a copy of the class society material certificate for each plate used in accordance with the Documentation section of the General Notes.
- D.3.2 The Contractor must provide copies of all company or individual welding certificates indicating compliance with CSA regulations referenced. All certificates must be provided to the TA in accordance with the Documentation section of the General Notes.
- D.3.3 The Contractor must provide copies of the NDT technician's or company's certification in accordance with ISO 9712:2005 International Standards for NDT.
- D.3.4 Calibration certificates for all transducers affected by this project must be provided to the TA.
- D.4 Documentation
 - D.4.1 The Contractor must submit to the TA a report of all NDT test results in accordance with the Documentation section of the General Notes.
 - D.4.2 The Contractor must provide copies of all approved welding procedures in accordance with the Documentation section of the General Notes.
 - D.4.3 Drawing indicating location of all plate used with its corresponding mill certificate number in accordance with the Drawings section of the General Notes.
- D.5 Training – Not Used

12.0 PROPULSION AND MANEUVERING

12.1 SEA TRIALS

12.1.A Identification

- A.1 The intent of this specification is to trial the vessel prior to reacceptance.
- A.2 The Contractor must conduct dock trials and sea trials sufficient to test all equipment that has been overhauled or repaired during the docking or alongside. The contractor must allow for 4 hours alongside to conduct dock trials.

12.1.B References

B.1 **Equipment Data** - Not Used

B.2 **Drawings** –

B.2.1 All Drawings are listed in the General Notes

B.3 **Regulations and Standards**

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No
	Marine Machinery Regulations (SOR/90-264)	No
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	

12.1.C Statement of Work

C.1 The CCG will provide sufficient officers and crew to command and crew the vessel for doc trials and for sea trials.

C.2 The Contractor must provide sufficient trials technicians/vessel riders for a sea trial of not less than one (1) eight (8) hour day duration including not less than one (1) hour at 100% main propulsion load.

C.3 The Rolls Royce FSR must attend the sea trials to ensure the CPP system is functioning correctly and that the pitch to engine speed trim calibrations are correct.

C.4 The Jastram Engineering FSR must be made available for dock trials to ensure the steering systems are operating correctly before the commencement of Sea Trials. The Jastram FSR is not required for the at sea trials portion

C.5 The Contractor must quote on providing tug escort from the shipyard to a safe location for commencement of trials.

C.6 The Contractor must allow the crew to bunker the vessel by truck at the Contractors facility prior to commencing sea trials.

12.1.D Proof of Performance

D.1 Inspection Points

D.1.1 The ship will not depart on trials until the Chief Engineer and Captain are satisfied that it is in a condition for safe departure from the dock.

D.2 Testing/Trials

D.2.1 The Contractor must, under the direction of the Rolls Royce FSR test the CPP system for correct functionality as per the OEM manual.

D.2.2 The Contractor must, under the direction of the Rolls Royce FSR test the calibration of the all 6 control sticks from 0-100% in forward and astern

D.2.3 The Contractor must, under the direction of the Jastram FSR test the steering system as per the OEM manual and record the hard over to hard over time at 0 speed.

D.3 Certification – Not Used

D.3.1 Certificates in accordance with the Documentation section of the General Notes.

D.4 Documentation

D.4.1 The Contractor must provide readings taken during the trials and any FSR reports in the final documentation.

D.5 Training – Not Used

12.2 RUDDER AND RUDDER STOCK (RO SURVEY)

12.2.A Identification

- A.1 The intent of this specification is to inspect and survey the vessels rudders, rudder stock stocks and rudder bearings.
- A.2 The Contractor must unship the rudder and rudderstock for inspection and survey. The rudder must be hydrostatically tested and must be prepared for survey by the TA and RO and must be reinstalled with new CFM Celeron fairing plates.
- A.3 The work must be carried out in conjunction with the specification items for Painting of the Underwater Hull and any other interference work.
- A.4 The Contractor must be responsible for any damage resulting from insufficient care taken.

12.2.B References

B.1 Equipment Data

B.2 Drawings

- B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
AF6102-56100-02	AS-BUILT STEERING SYSTEM SCHEMATIC OF THE HYDRAULIC SYSTEM.
AF6102-56100-03	AF STEERING GEAR ROOM ARRANGEMENT.
AF6102-10000-11	AF Rudders Construction Plan 1
AF6102-10000-11	AF Rudders Construction Plan 2
	CCGS M Charles Coating Spec

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications	Jastram Steering System Installation and Service Manual	
Standards	Interspec Paint Specification	Yes
Regulations		
	Canada Shipping Act 2001	No
	RO's Register, Rules & Regulations for the Classification of Special Service Craft.	No

12.2.C Statement of Work

C.1 General

- C.1.1 The Contractor must ensure that the vessel is docked such that a minimum height of 1.3 meters is maintained between the keel of the vessel and the dry dock.
- C.1.2 The rudders reactive times must be measured prior to removing the rudder from the vessel. The tests must include hard over to hard over times.. The rudder reactive times must be measured following the reinstallation of the rudder. The times for the same tests must be equal to or less than those prior to removal and must be within Transport Canada Regulations.
- C.1.3 The Contractor must include all staging, crantage, screens, lighting and any other support services, equipment, paint and materials required.
- C.1.4 The Contractor must obtain and record all rudder bearing clearances prior to the removal of the rudder stocks. The measurements must be submitted to the TA and to RO as soon as possible and within three (3) days of docking.

C.1.5 The Contractor must mark all items on the rudders and associated equipment prior to disassembly. All identifying marks must be recorded and all marked items must be re-assembled to the same position from which they were disassembled.

C.1.6 The Contractor must inspect the condition of the pintle and bushings and afford the opportunity to RO and to the TA to inspect. Any deficiencies will be repaired by 1379 action.

C.2 **Removal of Rudder & Stock**

C.2.1 All rudder bearing clearances must be measured and recorded prior to removal of rudder stocks.

C.2.2 The two rudders and rudder stock assemblies must be disconnected, removed and laid out for RO's inspection.

C.2.3 The Contractor to bid on pressing out the rudder stocks.

C.2.4 The two rudders must be visually inspected and also pressure tested for defects and the findings recorded. On each rudder, the Contractor must remove the docking plug and must perform a pressure test of not more than 2 psi for 1 hour witnessed by RO and the TA. Recommendations for repairs must be made accordingly.

C.2.5 The rudder stocks must be visually inspected for defects, diameters measured and findings recorded. Recommendations for repairs must be made accordingly.

C.2.6 All rudder stock keyways must be inspected for defects using NDT LP Level II testing in full compliance with CAN/ONGC-48.9712. All findings must be recorded.

C.2.7 The top rudder bearings and bearing fasteners for both rudder stocks must be visually inspected for defects and findings recorded and submitted to RO and the TA.

C.2.8 The rudder carrier bearings for both rudder stocks must be visually inspected for defects and findings recorded and submitted to RO and the TA.

C.2.9 Following inspection, both rudder assemblies must be reassembled as per original and in accordance with manufacturer's specifications.

C.3 **Rudder Reinstallation**

C.3.1 The Contractor must manufacture new fairing plates out of Celeron Composite or Equivalent, the equivalent must have a low water absorption rate, for installation above the rudders.

- C.3.2 The Contractor must install the new fairing plates to act as insulation between the stainless steel rudders and steel hull.
- C.3.3 The Contractor is to bid on the requirement of chilling the rudder stocks with dry ice prior to reinstallation.
- C.3.4 The Contractor must re-install the rudders and reconnect all equipment and items removed during the removal of the rudders.

C.4 Skegs

- C.4.1 The Contractor must remove the Port and Starboard skegs docking plugs in attendance of the TA with the intent of inspecting the internal coating mixture in the skegs. The expectation is that the skegs will contain a white grease and the grease will be in acceptable condition that it can be left in place.
- C.4.2 Contractor must ensure all applicable safety precautions are taken to collect and contain any liquid or other filling mixture inside in the skegs.
- C.4.3 The Contractor must assure that the hardening up of the skeg plugs is witnessed by the TA.
- C.4.4 Any additional work generated by this inspection will be by PWGSC 1389 action.

C.5 Steering

- C.5.1 The Contractor must ensure that all steering values recorded prior to disassembly are achieved during assembly and that all electrical connections and otherwise are re-established as recorded.
- C.5.2 The Contractor must ensure that the tiller achieves a proper fit and that the tiller nut is hardened up in the presence of the TA.
- C.5.3 The Contractor must ensure that all autopilot and rudder feedback components are re-aligned to their original position.
- C.5.4 The Contractor must conduct operational testing of the steering system under full load to the approval of RO and the TA.

12.2.D Proof of Performance

D.1 Inspection Points

- D.1.1 Inspections must include surveys by RO. The Contractor is responsible for scheduling RO attendance. RO and TA must be afforded the opportunity to inspect all disassembled parts and any other tests or procedures the inspector wants to witness.

- D.1.2 The Contractor must obtain and record all rudder bearing clearances prior to the removal of the rudder stocks. The measurements must be submitted to the TA and to RO as soon as possible and within three (3) days of docking.
- D.1.3 The TA must be afforded the opportunity to witness all disassembled parts, fitting of the rudder stock taper, and hardening up of rudder plugs and skeg plugs..
- D.1.4 The Contractor must assure that pressure testing of the rudders and skegs is witnessed by RO and the TA is afforded the opportunity to witness.
- D.1.5 The TA must be afforded the opportunity to witness the removal of skeg fluid and reinstallation of skeg drain plugs.

D.2 Testing/Trials

- D.2.1 The rudder must be air pressure tested to 2.0 psi as described in the specification.
- D.2.2 The Contractor must conduct tests of the steering system to the approval of the TA and RO. The rudder must be shown to be free and clean and must smoothly through its entire range of motion.
- D.2.3 The Contactor must conduct trials to measure the rudder reactive times prior to removing the rudder from the vessel. The tests must include hard over to hard over times.
- D.2.4 The Contactor must conduct trials to measure the rudder reactive times following the reinstallation of the rudder. The times for the same tests must be equal to or less than those prior to removal and must be within Transport Canada Regulations.

D.3 Certification

- D.3.1 The TA is responsible to ensure that the Survey Record Book is signed off by RO.

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.
- D.4.2 The Contractor must provide a Quality Assurance (QA) report indicating that RO inspector has inspected all the parts signed off on the survey credit.

D.5 Spares – Not Used

12.3 PROPELLOR HUBS, SHAFT CLEARANCES AND SHAFT SEALS (RO SURVEY)

12.3.A Identification

- A.1 The intent of this specification is to remove both shafts for inspection by the RO as part of it’s 5 year survey renewal.
- A.2 The contractor Must open up the port and starboard shaft seals for RO survey, the contractor must use the Simplan FSR to conduct the disassembly and reassembly of the seals.
- A.3 The Contract must take the wear down readings for the port and stbd stern tube bearings, the intermediate bearings, and the aft spectacle frame bearings.

12.3.B References

B.1 Equipment Data

B.2 Drawings

- B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

Drawing Number	DRAWING TITLE
C185-12-02	Kamewa CP-A D Installation Manual (10Sooo239/49341-E)
C185-12-01	User Manual Kamewa CP-A D
C185	Simplan Seal Manual
6094-24300-01_1	Shaft Line arrangement Plan

B.3 Regulations and Standards

- B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards	Interspec Paint Specification	Yes
Regulations		
	Canada Shipping Act 2001	No

12.3.C Statement of Work

C.1 Propeller Shaft Seals

- C.1.1 The Contractor must ensure that, prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all the system and equipment will be as per original and in accordance with the manufacturers manual.
- C.1.2 The Contractor must release the inboard side of the port and starboard shaft seals, the contractor must protect the sealing surfaces of the shaft seals as described in the simplan seal manual.
- C.1.3 The Contract must subcontract the services of a FSR from Simplan Americas LLC for 3 8 hour days to dismantle the shaft seals, take the required measurements and reassemble the shaft seals after the RO survey. The Contractor must include all costs related to the simplex FSR in the bid proposal.

C.2 Propeller Shaft Clearances

- C.2.1 The Contractor must provide the services of an Rolls-Royce FSR for 10 8 hour days to provide oversite of all work being performed on the shafting systems. Final System Performances must be verified by the FSR. The FSR must have a good working knowledge of the specific shafting systems installed on the CCGS M Charles.

a) The Contact for FSR is Mr. Shawn Evans, shawn.evans@rolls-royce.com 1-709-748-7636

- C.2.2 The Contractor must remove the propeller rope guards from the aft stern tube bosses on both sides. This must include the removal of the Spurs Rope Cutters.
- C.2.3 The Contractor must label and mark the shaft grounding system fitted to the shafts. This system must be disconnected and removed from the shaft line. This must include the removal of the bushes and brush holders as space will be required for the removal of the shaft seal.
- C.2.4 The Contractor must label and mark the shaft speed measuring system fitted to the shafts. The system must be disconnected and removed from the shaft line. This must include the proximity sensors for the speed signal. The Contractor must measure the distance between the proximity sensors to the electrical pic-ups. This distance must be recorded and provided to the TA.
- C.2.5 The Contractor must clean the shafts of all corrosion and all debris after the removal of items to facilitate the removal of the SKF Coupling.
- C.2.6 The Contractor must follow the disassembly procedures provided in the SKF Installation manual for the removal of the shaft coupling. Care must be taken to ensure that all necessary measurements are recorded to ensure that the coupling is re-installed in the correct position and provided with the correct pressure upon re-installation.
- C.2.7 The coupling must be slid aft to allow for the disconnection of the inner tube of the CPP system.
- C.2.8 The Contractor must follow the disassembly procedure provided in the Rolls Royce Shaft Installation manual to disconnect the inner tubes of the CPP systems. Every effort must be made to recover the oil that will drain from the systems at this point. The oil must be disposed of ashore and disposal certificates must be presented to the TA proving that the oil was disposed of in accordance with Federal, Provincial and municipal regulations. Oil spilled into the bilges must be cleaned-up at the Contractor's expense.
- C.2.9 The Contractors must remove the shafts aft and care must be taken to avoid damaging the intermediate and aft bearing surfaces as well as the propeller blades by providing sufficient support when the propeller shafts clear the individual bearing surfaces.
- C.2.10 The Contractor must remove the SKF couplings and sling them out of the way once the shafts have been withdrawn the required distance to allow for the removal of the shaft couplings.

C.3 Propeller Hubs and Blade removal

- C.3.1 The Contractor must bid on having the Rolls Royce mechanical FSR on site for 10 8 hour days to complete the mechanical work and the Rolls Royce controls FSR on site for 2 8 hour days including the 1 day for the sea trials
- C.3.2 The Contractor must remove 1 blade from each propeller hub and its associated hardware for the inspection by the attending RO's surveyor. The propeller blades must be removed under the direction of the Rolls Royce FSR. The Contractor must dispose of all oil that is drained from the propeller hubs in accordance with federal and provincial regulations.
- C.3.3 The Contractor must allow for the RO's surveyor and the TA to witness the inspection of the propeller blade that has been removed and the palm.
- C.3.4 The Contractor must flush the oil from both hubs and replace it with new Contractor supplied Mobil 600XP 68. Contractor must bid on supplying 400 litres of Mobil 600XP 68 and disposing of the same quantity of used oil.
- C.3.5 The Contractor must sub contract to Rolls-Royce Canada to supply a controls engineer field service representative to calibrate the CPP position feedback unit.
- C.3.6 The Contractor must reinstall the propeller blades of each propeller hub with a new O-ring and in accordance with the directions in the manual and the guidance of the FSR.
- C.3.7 The Contractor must carry out NDT for all 8 (eight) propeller blades on Port and STBD propellers. Roots of all 8 blades and blade to boss securing arrangements must be inspected by a certified NDT Level II inspector using Dye Penetrant, Magnetic Particle or Ultrasound inspection technique to determine if there are any surface cracks. The Contractor must provide the attending RO's surveyor, TA and IA the opportunity to witness the test to obtain credit.

C.4 **Propeller Shaft Installations**

- C.4.1 The Contractor must reinstall the shaft couplings on the shafts and then proceed to reconnect the shaft lines as per the installation manual, while exercising care to ensure that the shaft line bearings are not damaged during the insertion of the shafts back into the vessel.
- C.4.2 The Contractor must protect the inner tube threaded ends of each shaft line from damage as they form part of the mechanical seal for the hydraulic system.
- C.4.3 The Contractor must assemble the inner tubes and connect the shafts as per the installation instructions in the manual.

- C.4.4 The Contractor must re-install the SKF coupling after the inner tubes of the shaft system have been reconnected and torqued. The Contractor must verify the position of the SKF coupling in relation to the measurements taken and recoded prior to the removal of the SKF coupling. Installation must be as per the supplied SKF Manual.
- C.4.5 The Contractor must reinstall the shaft grounding systems as per the manual and must reconnect the system as per the documentation recorded prior to disassembly.
- C.4.6 The Contractor must reinstall the speed measuring system and must ensure that all proximity sensors are adjusted to the correct distance from the shafting based on the recorded measurements prior to disassembly.
- C.4.7 The Contractor must reinstall the aft propeller hub seals to the aft liners and once the propeller shafts are refitted into the vessel the Contractor must re-install the rope guards on each aft stern frame.
- C.4.8 The Contractor must refill the CPP system with new Contractor supplied oil (400 liters of Mobil 600XP 68 or equivalent). The Contractor must follow the instructions in the installation manual ensuring that all air is bled from the system and must set to work the system, ensuring that system pressures are normal and that the propeller blades rotate in the ahead and astern directions as required.

12.3.D Proof of Performance

D.1 Inspection Points

- D.1.1 Inspections must include surveys by RO. The Contractor is responsible for scheduling RO attendance. RO must be given the opportunity to inspect all disassembled parts and any other tests or procedures the inspector wants to witness.
- D.1.2 The TA must be afforded the opportunity to witness all disassembled parts, and the fitting of the new parts.
- D.1.3 The Contractor must take the bearing clearance readings in the presence of the attending RO's surveyor and must afford the TA the opportunity to witness the taking of these readings. Readings must be taken within 48 hours of docking the vessel.
- D.1.4 The Contractor must clean and inspect the PORT and STBD shafts for any defects. These must be noted and provided to the attending RO's surveyor and the TA and IA. Shaft diameter measurements must be taken at the front and back of each bearing surface and the measurement must be taken in four places at each location. Measurements must be recorded and provided to the TA and IA.

- D.1.5 The Contractor must inspect the PORT and STBD stern tube bearings, the intermediate bearings and the AFT Bracket Bearings. All finding must be recorded and provided to the TA and IA.
- D.1.6 The Contractor must remove the aft seals between the aft liner and the propeller hub flange. This area must be inspected by a certified NDT Level II inspector using Magnetic Particle or Ultrasound inspection technique to determine if the there are any surface cracks in propeller shaft flange area.
- D.1.7 The Contractor must inspect the liners of the propeller shafts for any anomalies and proper sealing at of the liners at all ends.
- D.1.8 The Contractor must provide the attending RO's surveyor the opportunity to witness the internals of propeller hubs and the removed blade of each shaft line. Where required by the FSR, the Contractor must take and record readings and provide these to the TA and the IA.

D.1.9

D.2 Testing/Trials

- D.2.1 The Contractor must develop a test and trials plan that will test all aspects of the propeller shafting systems. The test and trials plan must be submitted to the IA and TA prior to the docking of the vessel.
- D.2.2 The Contractor must notify the IA upon completion of the work in this specification item and must afford the IA the opportunity to witness all completed work prior the undocking of the vessel.
- D.2.3 The Contractor must conduct operational pressure tests in the dry dock to validate there are no leaks in the propeller hubs, the proper movement of the propeller blades, and that the correct pitch angles are displayed on the instrumentation. Sea trials must be conducted to test the CPP systems through their full range of adjustments for pitch and power transmission from the gearboxes to the controllable pitch propellers and that all pressures and temperatures are normal.
- D.2.4 The Contractor must validate the shaft seals water tightness during a dock trial where the ship's crew will rotate the propellers at full speed (2100 engine RPM), with the objective of finding any water leaks and overheating.
- D.2.5 The Contractor must complete a sea trial with 100% engine load for one hour to verify that all systems operate within the equipment manufacturer's standards.

D.2.6

D.3 **Certification**

D.4 **Documentation**

D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.

D.4.2 The Contractor must provide a Quality Assurance (QA) report.

D.4.3 The Contractor must prepare and submit a report to the TA of all work done, all measurements taken and all “AS LEFT” measurements for the SKF Couplings, the shaft seals and shaft bearing clearances before the end of the contract in accordance with Section 2.11.

12.4 BOW THRUSTER GEAR OIL AND SEAL CHANGE

12.4.A Identification

A.1 The contractor must change the bow thruster gear oil and the propeller shaft seals.

12.4.B References

B.1 Equipment Data

B.1.1 ABT-Trac PKK 24 Hydraulic Bow thruster

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
35989_b	Hydraulic Thruster (PKK 24 TRAC (24)	

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets

these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
	Canada Shipping Act, 2001;	
Standards		
Regulations	ROs SSC 2009 ROs Register Special Service Craft	

12.4.C Statement of Work

- C.1 The Contractor must ensure that all applicable safety precautions including equipment lock outs and tag outs are implemented prior to the start of work.
- C.2 The Contractor must ensure that, prior to the start of disassembly, precautions are taken to ensure the reassembly and reinstallation of all system and equipment will be as per original and in accordance with manufacturer’s specification.
- C.3 The Contractor must report, by email, all deficiencies as they are identified to the TA and make recommendations for their remedial action.
- C.4 The Contractor must remove the bow thruster grates to access the thruster unit.
- C.5 The Contractor must notify the TA when the oil will be drained from the bow thruster unit such that the TA can take an oil sample for analysis mid-stream through the draining process. The oil must be drained into a clean container to allow for the examination of the oil condition by the TA. The Contractor must quote on disposal of 100 liters of oil.
- C.6 The Contractor must follow the TRAC shaft seal change procedure manual to change the oil and seals. The oil and seals are GSM.
- C.7 Following the completion of all disassembly, and prior to reassembly, the Contractor must afford the TA the opportunity to inspect all disassembled components.

12.4.D Proof of Performance

D.1 The Contractor must conduct a sea trial where the thruster will be used with maximum thrust for a period of five minutes in each direction. The operational level of the oil header tank is to be recorded before trials and monitored during all trials.

13.0 POWER GENERATION SYSTEMS

13.1 NOT USED

14.0 POWER DISTRIBUTION SYSTEMS

14.1 NOT USED

15.0 AUXILIARY SYSTEMS

15.1 FUEL BUNKER LINE

15.1.A Identification

A.1 The intent of this spec item is to have the fuel bunker line cut and flanged in two places above the main engine to facilitate the future cleaning of the Port Main Engine seawater cooler.

15.1.B References

B.1 Drawings

B.1.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets

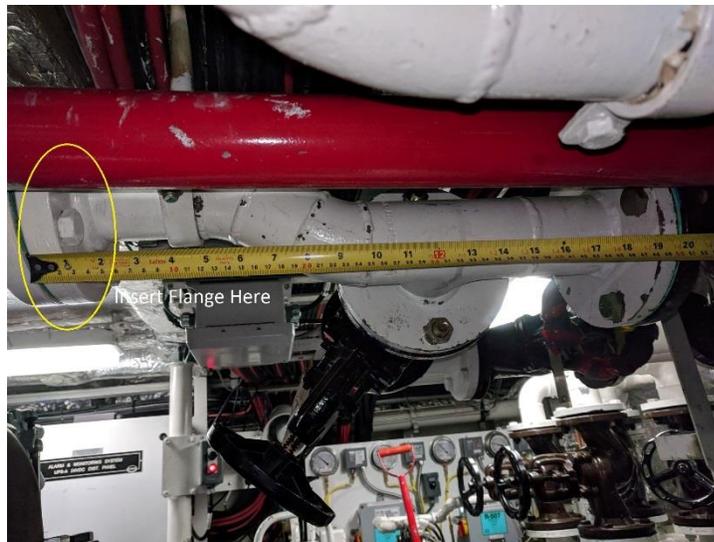
B.2 Regulations and Standards

B.2.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		

15.1.C Statement of Work

- C.1 The fuel bunker line is 2” carbon steel pipe and the location of the pipe is above the Port Main Engine Forward.
- C.2 The Contractor must cut the fuel bunker line in two places and reinstalling with ANSI flanges. The Picture below is from the CCGS Goddard showing where the flange must be installed



- C.3 The Contractor must install the flanges with nitrile gaskets.
- C.4 The final installation must be to the approval of RO.

15.1.D Proof of Performance

- D.1 Inspection Points
 - D.1.1 Welding and installation to be witnessed by RO and TA>
- D.2 Testing/Trials
 - D.2.1 All sub-assemblies and piping systems that have been modified, constructed, or repaired must be tested by the Contractor hydrostatically to 1.5 times the system's working pressure for 3 minutes and proven tight to the satisfaction of the TA.
 - a) Working Pressure of the system is 90PSI
 - D.2.2 Clean Fresh water or system fluid must be used when testing the systems hydrostatically. They Hydrostatic test will be conducted on the bench before the piping is painted. Failure to correct any leakage is unacceptable.
 - D.2.3 Deleted from Specification September 28th 2018
 - D.2.4 Tests with fluids subject to freezing must not be conducted during freezing weather.
 - D.2.5 For operating tests clear fresh water must be used. Failure to correct leakage or meet system operating conditions as a minimum must be cause for rejection.
 - D.2.6 Where pumps have suctions from tanks or compartments, the operating test must demonstrate the ability of the system to remove the service liquid down to the level of the open end of the suction pipe, or to another level relative to the suction pipe when so specified for a particular system.
 - D.2.7 All of the system pressure and operating tests must be completed before the system trials.
- D.3 Certification – Not Used
- D.4 Documentation – Not Used
- D.5 Training – Not Used

15.2 FUEL TANK VENT LINE ISOLATION FLANGES

15.2.A Identification

- A.1 The intent of this specification is to modify the existing fuel tank cascade type vent system so that individual isolation of each tank can be achieved.

15.2.B References

B.1 Equipment Data

B.1.1 Equipment Details in statements or a table

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
C15-49-002-02.pdf Rev.1	R1 Installation Drawing	
6094-50000-02_D	Air Pipes and Sounding Diagram	

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
	Canada Shipping Act, 2001;	
Standards		
Regulations	ROs SSC 2009 ROs Register Special Service Craft	

15.2.C Statement of Work

- C.1 The Contractor must complete all work as per c15-49-002-02 R1_Installation drawing
- C.2 Fuel oil tank #1 (storage tank), 2 and 3 (service tanks) are vented through a common 3"ND line which also act as an overflow to tank #9 (storage / overflow).
- C.3 The 3 vent lines are accessible on the Port forward section of the main deck between frames 24 and 25. At this location the Contractor must split the vent lines in 3 places and install ANSI class125/150 flanges.
- C.4 The Contractor must install 12 flanges total.
- C.5 The fuel tanks must be gas-freed prior to the vent lines being cut.
- C.6 All residual fuel in the tanks is to be pumped out and disposed of. Contractor to bid on the removal and disposal of 10m3 of MDO.
- C.7 The final installation of flanges must be to the approval of RO.
- C.8 The Contractor must supply blanks to be fitted into the flanges for the purpose of pressure testing the tanks.

15.2.D Proof of Performance

- D.1 Inspection Points – Not Used
 - D.1.1 Installation of flanges to be witnessed by RO and TA.
 - D.1.2 Hydrostatic testing of tanks to be witnessed by RO and TA
- D.2 Testing/Trials – Not Used
 - D.2.1 The Contractor must hydrostatic test the fuel tanks following the installation of the flanges. Blanks are to be installed in the flanges for the purpose of testing each tank separately.
- D.3 Certification – Not Used
- D.4 Documentation – Not Used
- D.5 Training – Not Use

16.0 DOMESTIC SYSTEMS

16.1 FLOORING REPAIR

16.1.A Identification

- A.1 The intent of this inspection is to have the linoleum floor removed from the common areas and hallways, substrate repaired and a new marine industrial floor installed.
- A.2 The contractor must install a new continuous flooring surface designed and sufficient for a marine industrial application. Baseboards appropriate to the application must be included in the installation.

16.1.B References

B.1 Equipment Data

B.2 Drawings

B.3 All Drawings are listed in the General Notes.

B.4 Regulations and Standards

- B.4.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No

16.1.C Statement of Work

C.1 General

- C.1.1 The contractor must remove and dispose of all flooring material from the following areas in a manner that conforms to all relevant health and safety regulation.
- C.1.2 For estimating purposes the Contractor must quote of the following floored areas to be removed and recovered:
 - Main Deck Hall and Common Area: 29 m2
 - Lower Deck Hall 14 m2
- C.1.3 The contractor must install a new flooring surface over the substrate to seal the scree and provide a decking surface suitable for a marine industrial application and to the approval of the TA.
- C.1.4 The CCG recommends the use of Tarkett IQ Granit or equivalent and prefers the light grey color.
- C.1.5 The Contractor must move the fridge in the ships mess to replace the flooring. The fridge will be emptied by the CCG prior to the work period. The fridge is unable to be removed from the space so it will be required to be moved out of the way while they do that section of flooring and put back to complete the rest. The Contractor must cut the new floor into the the countertop next to the fridge as it is not removable. The mess tables and chairs will be removed by the ships crew prior to the work period.
- C.1.6 The Contractor must repair the subfloor if it is found to be damaged after removing existing floor. Any repairs to the subfloor will be done through PSCP work arising procedures.

16.1.D Proof of Performance

D.1 Inspection Points

- D.1.1 The new deck surface must be flat and smooth.
- D.1.2 The new deck surface must be continuous and present no tripping hazards.
- D.1.3 The materials used must not present any health hazards to the passengers and crew of the vessel. The materials must be to Health Canada Regulations.
- D.1.4 The surface must seal the substrate so that no moisture can enter through it or around it into the substrate.
- D.1.5 The new materials must be suitable for use in a marine industrial environment.

D.2 Testing/Trials – Not Used

D.3 **Certification – Not Used**

D.4 **Documentation**

D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.

D.5 **Spares – Not Used**

17.0 DECK EQUIPMENT

17.1 LIFE RAFTS ANNUAL INSPECTION

17.1.A Identification

A.1 The intent of this specification is to have the 16 person life rafts annual inspection completed, and the 4 person life raft 5 year inspection completed.

17.1.B References

B.1 Equipment Data

16 person Port Side Bridge deck. Serial# XDC 1FC49B111 Date of Manufacture 02/2011

16 person Starboard side bridge deck. Serial# XDC 0FC35B111 Date of Manufacture 02/2011

4 person SAR aft bridge deck. Serial# XCD 7FF72C212 Date of Manufacture 03/2012

B.2 Drawings

B.3 All Drawings are listed in the General Notes.

B.4 Regulations and Standards

B.4.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No

Publications		
Standards		
Regulations		
	Canada Shipping Act 2001	No

17.1.C Statement of Work

C.1 General

- C.1.1 The Contractor must remove the life rafts and their hydrostatic releases from their stowed positions on the vessel and transport them via commercial bonded carrier to and from a sub-contractor’s premises for servicing / inspection.
- C.1.2 The Contractor must sub-contract the inspection and recertification of life rafts to an Approved RO’s Register service facility that meets Original Equipment Manufacturer (OEM) certification.
- C.1.3 The Contractor must return life rafts and their hydrostatic releases to the stowed position on the vessel prior to the undocking of the vessel.
- C.1.4 The Contractor must provide life raft certificates to TA prior to the undocking of the vessel.

17.1.D Proof of Performance

D.1 Inspection Points – Not Used

D.2 Testing/Trials

- D.2.1 The Inspection and testing must be completed as per RO requirements.

D.3 Certification

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.

- D.4.2 The Contractor must provide all test certificates, and endorsement of safe operation required by RO for certification to the TA, prior to the undocking of the vessel.
- D.4.3 The Contractor must provide a list of the work that was performed on each life raft.
- D.5 **Spares – Not Used**

17.2 CAR BOAT HOOK ANNUAL INSPECTION

17.2.A Identification

- A.1 The intent of this specification is to have two CAR boat hook’s annual inspection completed. One hook is for the FRC and the other for the Rescue Boat.

17.2.B References

B.1 Equipment Data

- B.1.2 CAR boat hooks.

B.1 Drawings

- B.1.3 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets

B.1 Regulations and Standards

- B.1.4 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

17.2.C Statement of Work

C.1 General

- C.1.1 The Contractor must remove two CAR boat hooks from each their positions.
 - a) One CAR hook is located on the Rescue Boat Davit
 - b) One Car Hook is located on the 7.5m RHIB and will be removed and provided to the contractor on arrival at contractor facility
- C.1.2 The Contractor must inspect and recertify CAR hooks to an approved RO's Register service facility that meets Original Equipment Manufacturer (OEM) certification.
- C.1.3 CCG recommends Contractor contact:
 - Survitec/DBC
 - 1689 Cliveden Ave, Delta, BC V3M 6V5
 - 604 278-3221
- C.1.4 The Contractor must return boat hooks to their respective positions on the vessel prior to the undocking of the vessel.
- C.1.5 The Contractor must provide inspection certificates to TA prior to the undocking of the vessel.

17.2.D Proof of Performance

D.1 Inspection Points – Not Used

- D.1.2 CAR hooks must be back in place prior to end of contract.

D.1 Testing/Trials – Not Used

D.2 Certification

- D.1.3 Contractor to supply inspection certificate from approved RO service facility that meets Original Equipment Manufacturer (OEM) certification.

D.1 Documentation – Not Used

D.2 Training – Not Used

17.3 ALLIED CRANE MAINTENANCE

17.3.A Identification

- A.1 The intent of this specification is to complete the 4-year maintenance as per the manufacturer's recommendations on the Allied Crane.

17.3.B References

B.1 Equipment Data

B.1.1 Allied Crane Model TB10-23

B.1.2 Safe working Load @ 20' 8" boom extension (boat handling mode) 7000 lbs.

B.1.3 Powered by Engine driven hydraulics @ 3000psi.

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
C185-17-06	Marine Crane Model TB10-23 Manual.pdf	

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
	Canada Shipping Act, 2001;	
Standards		
Regulations	ROs SSC 2009 ROs Register Special Service Craft	

17.3.C Statement of Work

- C.1 The must remove all flexible hoses found on the crane and inside the pedestal. The Contractor must replace all the hoses with new hoses rated for 3000 PSI and must be made of SAE 100/R12 grade with smooth cover or equivalent. The hose replacement will be done through PSPC Work arising procedures. The Contractor must supply the CCG with a complete 2nd set of hoses as spare parts prior to the contract ends.
- C.2 The Contractor must remove the swing drives from the crane and complete the oil change as per the manual section 6.3.6.3 and reinstall after oil change has been completed.
- C.3 The Contractor must allow the TA to take an oil sample of the oil removed from the swing drives as it is being drained.
- C.4 The Contractor must remove the power head, and inspect all load pins and sheaves as per the manual section 6.4.6.2. The load pins must be inspected by the TA on removal.
- C.5 The Contractor must replace the oil in the CT Winch as per section 6.4.6.4. The contractor must allow the TA to take oil samples as the oil is being drained from the winch assembly, and the brake housing.
- C.6 Replace boom wear bushings
- C.7 The Contractor must complete an Swing Bearing Wear check as per section 6.4.6.1 of the manual. This will require the use of an overhead crane. The accommodation is in the way of completing the test with the boom pointing forward; in this case, the boom must be rotated to either side of the accommodation and the average between the measurements on the port and stbd taken.
- C.8 The Contractor must hire a profession engineer to witness the load testing of the crane after all work is completed, the crane must be tested at its max SWL.

17.3.D Proof of Performance

- D.1 Inspection Points
 - D.1.1 The Contractor must allow the TA to witness the load pins
 - D.1.2 The Contractor must allow the TA to take an oil sample of both swing drives
 - D.1.3 The Contractor must allow the TA to take an oil sample of the CT winch gear and brake assembly.

D.1.4 The Contractor must provide the TA the opportunity to witness the swing bearing check

D.1.5 The Contractor must provide the TA and the RO the opportunity to witness the load test.

D.2 Documentation

D.2.1 The Contractor must provide the TA with a document showing all work complete and measurements taken.

17.4 LIFEBOAT DAVIT 5 YEAR SURVEY (RO SURVEY)

17.4.A Identification

A.1 The intent of this specification is to perform work required for survey renewal of the rescue boat davit

17.4.B References

B.1 Equipment Data

B.1.1 Welin-Lamby A frame pivot Davit Type PIV 1.0A

B.1.2 1000kg SWL

B.2 Drawings

B.2.1 All Drawings are listed in the General Notes. The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes .

Drawing Number	DRAWING TITLE	Number of Sheets
C185-17-18	Rescue boat Davit Technical Manual Type PIV 1.0A	

B.3 Regulations and Standards

B.3.1 The following Standards and Regulations apply to work carried out in this section; The Contractor must ensure all work completed in this section meets

these Standards and Regulations as well as any other pertinent Federal/Territorial Regulation or Standard:

FSSM Procedures	Title	Included Yes/No
Publications		
	Canada Shipping Act, 2001;	
Standards		
Regulations	ROs SSC 2009 ROs Register Special Service Craft	

17.4.C Statement of Work

C.1 The Contractor Must sub contract the inspection of the work to a qualified person to perform the work on the rescue boat davit as per RO requirements. Canada suggests two contractors that could be used for the work.

a) Welin Lambie LTD, Tim McCarty, V.P. North America Operations
tim.mccarty@welinlambie.com

b) Survitec DBC, Juan Pablo Diaz, Lifeboat Service Manager,
juanpablo.diaz@survitecgroup.com, 1 954 842 1557

C.1.2 The Contractor must remove the CAR hook and inspect and recertify as per section 17.2

C.1.3 The Contractor must completely remove the main wire for inspection as per the OEM manual. Any deficiencies will be dealt with through the work arising procedures.

C.1.4 The Contractor must remove the main load pin and Sheave for inspection.

C.1.5 The Contractor must replace the Sheave with a new GSM sheave.

C.1.6 The Contractor must supply an approved RO NDT service supplier for 1 day to test the load pin, and all the welds where the Davit is connected to the deck.

C.1.7 The Contractor must replace all the hydraulic hoses with new CFM hydraulic hoses

a) The Hoses must have all stainless steel fittings

b) The Hose must be SAE 100/R12 grade with smooth cover

- c) All fittings must be wrapped in a protective coating such as Petro-Tape after they have been installed.
- C.1.8 The Contractor must remove the inspection cover of the gearbox and provide the TA the opportunity to witness the condition of the gears.
- C.1.9 The Contractor must Change the oil with GSM supplied gear oil. The Contractor must quote on 20L oil disposal.
- C.1.10 The Contractor must change the Hydraulic Oil (200L of Mobile Spartan ec220), replace the hydraulic filter and clean and inspect the hydraulic pickup pre screen. To fully change the oil the accumulator must be discharged prior to draining the oil, section 4.3.3 in the manual outlines the discharge procedure. The contractor must quote on disposal of 200L of oil.
- C.1.11 The Contractor must Inspect the Roller Freewheel as per section 4.1.4 of the manual.
- C.1.12 The Contractor must inspect the Centrifugal brake as per section 4.1.5 of the manual.
- C.1.13 The Contractor must replace the brake linings on the centrifugal brake with the GSM linings.
- C.1.14 The Contractor must Remove the electric motor and inspect the centrifugal clutch as per section 4.1.6 of the manual.
- C.1.15 The Contractor must replace the clutch shoe linings with the GSM linings.
- C.1.16 The Contractor must remove the paint around the footings of the davit down to bare metal so that the RO Approved NDT specialist can check the welds for cracking. Any deficiencies must be immediately reported to the TA in person, by email, or telephone.
- C.1.17 The Contractor must paint the exposed areas as per the INterspec after the NDT testing has been completed.
- C.1.18 The Contractor must subcontract the service of a Certified professional engineer to load test the davit after all work has been completed. The Contractor must allow the TA and RO to be present during the load testing. The Contractor must load test the Davit to 125% of SWL (1250KG test load).

17.4.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must allow the TA to witness all inspections outlined in the statement of work.

- D.1.2 The Contractor must provide a document outlining all work done to the TA at the time of load testing so that it can be presented to the RO Inspector.
 - D.1.3 The Contractor must allow the TA to witness the NDT testing of the load pin, and the welds at the davit base.
 - D.1.4 The Contractor must allow the TA and RO to witness the load test at 125% of the SWL.
- D.2 Documentation
- D.2.1 The Contractor must provide a report of all work that was conducted to the TA at the close of the contract

19.0 CONTROL SYSTEMS

19.1 NOT USED