

CCGS CAPT. JACQUES CARTIER Dry Docking Spring 2022

April 27 - May 11, 2022

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Revision 1.0

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G1.0 GENERAL

G 1.0 GENERAL NOTES

G 1.1 Identification

G 1.1.1 Identification

G 1.1.1.1 These General Notes describe the CCG requirements applicable to all accompanying Technical Specifications.

G 1.1.2 Vessel Details

Name:	CCGS Captain Jacques Cartier
Official No.:	842730
IMO No.:	9781839
Type:	Fisheries Science Research Vessel
Ice Class:	PC 7
Year Built:	2019
Notation	100A1, Fisheries Science Research Vessel, Ice Class (PC 7), LMC, UMS, NAV1 IBS
Port of Registry	Ottawa
Flag of Registry	Canada
Owner	Department of Fisheries and Oceans
Builder	Seaspan – Vancouver Shipyards
Hull Number	190
Date In Service	30 November 2019
Gross Tonnage	2,672
Net Tonnage	801
Length Overall (MLD)	63.39 m
Breadth Overall	16.034 m
Design Displacement	3,259 MT
Deadweight	792.8 MT
Propulsion	3 x Caterpillar 3512C 12-cylinder 1630kW diesel electric with 1 Indar 2250kW electric motor driving a 3.8m fixed pitch propeller. One bow thruster fitted.

G 1.1.3 Equipment

G 1.1.3.1 Not Used.

G 1.2 References

G 1.2.1 Regulations

G 1.2.1.1 All regulations, standards, publications, and procedures listed below must be used as reference. The Contractor will ensure all work completed in the specification is done to all pertinent federal and provincial regulations and standards. CCG procedures must be used as a guide if no other regulation takes precedence. As a fully classed vessel, all work must be done to the standards of the American Bureau of Shipping.

G 1.2.1.2 In the following table the last column indicates if the document will be supplied to the Contractor by CCG or if it must be procured by the Contractor. “N/A” means that the document is not relevant to this specification.

FSM Procedures	Title	Supplied by
FSM	Fleet Safety Manual (Latest Edition) including: 7.A.12 Potable Water Quality 7.B.2 Fall Protection 7.B.3 Entry Into Confined spaces 7.B.4 Hotwork 7.B.5 Lockout and Tagout 7.B.6 Electrical Safety – Working on Energised Electrical Conductors or Circuit Parts 7.C.4 Towing Operations 10.A.7 Contractor Safety and Security	CCG
Publications		
TP 127	Ships Electrical Standards	Contractor
TP 14231	Marine Occupational Health and Safety Program	Contractor
TP 9912	Standard for Inspection of Tackle on Large Fishing Vessels	Contractor
IEEE 45	Institute of Electrical and Electronics Engineers, Recommended Practice for Electrical Installations on Shipboard	Contractor
Other Documents		
EKME#3049715v5	CCG Welding Specification-eng (Apr 2020)	CCG
191-631.00-001	OFSV 190 Coatings and Surface Treatment Schedule	CCG

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S62-12-17	Wartsila Fixed Pitch Propeller Installation Operation and Maintenance Manual	CCG
PROP95SL024	Wärtsilä Service Letter - Possible accelerated bearing wear issue WCS-01 material	CCG
S62-12-01	Becker Marine System Rudder Instruction Manual_[OFSV000322]	CCG
S62-11-16	Cathelco Marine Impressed Current Cathodic Protection C-Shield ICCP System Installation and Instruction Manual_Rev 3_2015_[OFSV000271]	CCG
20200403 – COVID-19-NSOP-511	Minimum Screening Process for Coast Guard Personnel Accessing a Contractors Facility During an Infectious Disease Outbreak such as COVID-19	CCG

Standards		
CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures Division 2 Certification (Including Annex W)	Contractor
CSA W59	Welded Steel Construction – Metal Arc Welding	Contractor
18-080-000-SG-001	Welding of Ferrous Materials	Contractor
ISO 9712:2005	International Standards for NDT	Contractor
ISO 8501-1:2007	Preparation of steel substrates before application of paints and related products	Contractor
ISO 10816-1:1995	Mechanical vibration -- Evaluation of machine vibration by measurements on non-rotating parts -- Part 1: General guidelines	Contractor
NEMA 250-2003	Enclosures for Electrical Equipment (1000 Volts Maximum)	Contractor
SSPC	Society for Protective Coatings	Contractor
IACS No.47	Shipbuilding and Repair Quality Standard	Contractor
70-000-000EU-JA-001 (formerly DGTE-69)	CCG Specification for Installation of Shipboard Electronic Equipment (2nd Edition March 2000, revised Jul 2003)	CCG
ANSI/TIA-568-C.2	Balanced Twisted-Pair Telecommunication Cabling and Components Standard	Contractor
API STD. 598	Valve Inspection and Testing, 2016	Contractor
Regulations		
ABS	Marine Vessel Rules (2021)	Contractor
CSA 2001	Canada Shipping Act 2001	Contractor

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C.R.C., C. 1432	Hull Inspection Regulations	Contractor
C.R.C., c. 1436	Life Saving Equipment Regulations	Contractor
SOR-2016-43	Potable Water on Board Trains, Vessels, Aircraft and Buses Regulations	Contractor
SOR-2017-14	Vessel Fire Safety Regulations	Contractor
SOR/90-264	Marine Machinery Regulations	Contractor
MOHS	Maritime Occupational Health and Safety	Contractor
CLC	Canada Labour Code (R.S.C., 1985, c. L-2)	Contractor
WorkSafe BC	Occupational Health and Safety (OHS) Regulations	Contractor
SOLAS 1974	SOLAS 1974 as amended, Regulation II-2/3.4 & II-2/9	Contractor
Load Lines	1966/1988 - International Convention on Load Lines, 1966, as Amended by the Protocol of 1988	Contractor
IMO MSC. 402(96)	IMO Resolution, reg. maintenance, thorough examination, operational testing, overhaul and repair of Lifeboats including free-fall lifeboats, Rescue boats and fast rescue boats, launching appliances and release gears	Contractor
R.S.C., 1985, c. L-2	Canada Labour Code	Contractor

G 1.2.2 Guidance Drawings

G 1.2.2.1 The following Drawings must be considered as Guidance Drawings as defined in the Drawings section of the General Notes. Once listed, a drawing name is not repeated in this list – see specific specification section.

Drawing Number	DRAWING TITLE
R-4.46582	Rudder Anode Drawing
S62-10-56	Trim and Stability Booklet
191-074.00-001	Welding Schedule
191-077.00-001	Fire Control and Safety Plan
191-077.00-003	Fire Zone Drawing
191-085.00-004	Docking Plan
191-085.00-008	Hull Penetrations Plan
191-101.00-010	Profile and Decks (Aft Zone)
191-114.10-001	Rudder Head Box Structure Details
191-151.00-001	Deckhouse Structure
S62-151.00-002	Storm Window Box Install
191-163.10-001	Sea Bays and Sea Chests Arrangements
191-201.10-001	Machinery Arrangement
191-201.20-001	Equipment Removal Routes
190-235.10-510	Electric Propulsion System Cable Diagram

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191-243.10-011	Wartsila Propeller Drawing
191-256.10-001	Sea Water Cooling System Diagram
191-301.00-314	Electrical Equipment Arrangement
191-304.00-003	OFSV Cable Schedule
191-304.00-541	Cable Node Plan
191-324.10-235	Electrical System One Line Diagram
191-501.00-001	Material Standard for Pipes, Valves and Fittings
191-521.00-001	Firemain System Diagram
191-533.10-002	Domestic Fresh Water System Diagram
191-541.10-001	Fuel Oil Fill and Transfer System Diagram
S62-541.10-002	Internal Fuel Transfer Meter Installation
191-562.00-001	Rudder and Stock Arrangement
191-568.10-003	Bow Thruster Arrangement
191-583.20-001	Lifesaving Equipment Plan
191-601.00-001	General Arrangement
191-602.00-001	Hull Designation and Markings
191-633.00-001	Cathodic Protection
S62-190-633.20-510	Cathodic Protection Impressed Current Cable Diagram
191-635.00-002	Insulation Details Booklet
191-672.10-001	Working Deck Arrangement
191-801.00-001	Tank capacity plan

G 1.2.3 Tanks

G 1.2.3.1 Listed are the tanks found on board the CCGS Capt. Jacques Cartier with their Location by frame number and capacity (Where available). These must be used as reference only and will not supersede any specification.

No.	Tank Designation	Location	Volume (m ³)
WATER BALLAST TANKS			
1	WB_FP.C	01 DECK	13.1
2	WB_2.P	01 DECK	38.8
3	WB_2.S	01 DECK	38.8
4	WB_3.P	01 DECK	46.6
5	WB_3.C	01 DECK	36.6
6	WB_3.S	01 DECK	44.0
7	WB_STAB.C	MAIN DECK	80.1
8	WB_4.P	01 DECK	31.5
9	WB_4.S	MAIN DECK	31.5
FUEL OIL STORAGE TANKS			

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10	FO_1.P	MAIN DECK	28.6
11	FO_1.S	MAIN DECK	28.6
12	FO_2.P	MAIN DECK	59.7
13	FO_2.S	MAIN DECK	61.8
14	FO_3.P	MAIN DECK	13.3
15	FO_3.S	MAIN DECK	18.7
16	FO_4.P	MAIN DECK	64.4
17	FO_4.S	MAIN DECK	64.4
18	FO_DAY.P	MAIN DECK	9.7
19	FO_DAY.S	MAIN DECK	9.7
20	FO_SETT.C	MAIN DECK	19.3
	MISC FUEL OIL TANK		
21	FO_OVER.S	MAIN DECK	3.2
	FRESH WATER TANKS		
22	FW.P	01 DECK	22.5
23	FW.S	01 DECK	22.5
	VOID SPACE		
24	VOID_1.C	01 DECK	22.2
25	VOID_2.C	01 DECK	57.1
26	VOID_4.C	MAIN DECK	55.1
27	VOID_5.C	MAIN DECK	36.9
28P & 28S	VOID_6.C	MAIN DECK	89.5
29	VOID_7.C	MAIN DECK	118.4
30P & 30S	VOID_8.C	MAIN DECK	22.2
	MISCELLANEOUS TANKS		
31	OW.P	01 DECK	19.8
32	SLUDGE.S	MAIN DECK	19.8
33	SEABAY.P	01 DECK	18.7
34	SS.P	EXHAUST CASING TOP	4.1
35	GW.S	WHEELHOUSE TOP	4.1
	PERMANENT BALLAST TANKS		
36	VOID_2.S		3.5
37	VOID_8.S		4.9
38	VOID_9.S		1.8

G 1.2.4 Abbreviations

ABS	American Bureau of Shipping, the RO for the CCGS Capt. Jacques Cartier
ACM	Asbestos Containing Material
CA	Contract Authority (PSPC)
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
EDS	Entertainment Distribution System
FSSM or FSM	Fleet Safety Manual (CCG)
FSR	Manufacturer’s Field Service Representative
FTP	Fire Test Procedures Code
GSM	Government Supplied Material and/or equipment
HC	Health Canada
IACS	International Association of Classification Societies
ICS	Integrated Communications Systems
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
LAN	Local Area Network
MSDS	Material Safety Data Sheet
NDT	Non Destructive Testing
OEM	Original Equipment Manufacturer
OHS	Occupational Health and Safety
PSPC	Public Services and Procurement Canada
RO	IACS societies that are Recognized Organization as defined by the Canada Shipping Act 2001, Part 4, policy on authorized classification societies.
SSMS	Safety & Security Management System
SOLAS	Safety Of Life At Sea Convention
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
WCB	WorkSafe British Columbia

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:

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- a) the word "install" means that the Contractor must connect mechanically and electrically and provide the labour and materiel to complete the installation;
- b) the word "reinstall" means a piece of equipment that the Contractor has effected repairs on and must be returned/installed in its original location and be mechanically and electrically connected. The Contractor must provide the labour and materiel to complete the reinstallation;
- c) the word "remove" means that the Contractor must provide all labour 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 labour 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 labour 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 labour and material to put together, piece by piece, the equipment, machinery or system on completion of examination or repair;
- j) the words "PSPC Work Arising" means the Procedures for Design Change or Unscheduled Work, as defined in the 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 labour 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 labour 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 labour 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.
- r) The words "Close-up Survey" mean a survey where the details of structural components are within the close visual inspection range of the Surveyor, i.e., normally within reach of hand.

G 1.4 Safety Management Systems (SMS)

G 1.4.1 The Contractor and all subcontractors 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, crew mess facilities, or galley. The Contractor must provide the necessary amenities as required for their personnel.

G 1.4.2 Contractor must be compliant with all safety management systems applicable to completing work aboard CCG vessels & on GC owned premises, where applicable.

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- G 1.4.3** Contractor must include with their bids the name of their Safety Manager or Supervisor who will ensure that these requirements for workplace safety are met. The person responsible for this role must be available on site on a full time basis throughout the contracting period.
- G 1.4.4** In addition to contractor's internal SMS and applicable provincial or federal regulations, CCG Fleet Safety Manual (CCG/5737) and BIO Shore Based Safety Manual (CCG/6026) may apply. Contractor must adapt their safety management system to ensure the highest applicable standard applies for any given task.
- G 1.4.5** In the event of redundant certificates, forms or checklists between multiple SMS, Contractor and CGTA must approve a common document to be used throughout the contracting period. The approved document must satisfy the requirements of all applicable safety management systems.
- G 1.4.6** Safe Work Certificates must clearly state the type of work permitted and must be renewed as required by regulations. A copy of each certificate must be clearly displayed near the work site, a copy must be provided to the CGTA (or designate), and the original must be maintained by Contractor's Safety Manager.
- G 1.4.7** Contractor is responsible to provide an onsite Rescue team during all Confined Space or Work Aloft work and activities. This Rescue team must be made available for use by CGTA, Lloyd's and any other regulatory inspectors during times when access is required to these spaces for inspection purposes. For CG and other inspectors, the rescue team will be required to meet all criteria as set out in the CG Fleet Safety Manual.

G 1.5 Hazardous Materials

- G 1.5.1** The Contractor must provide the TA with Material Safety Data Sheets (MSDS) for all Contractor and subcontractor supplied WHIMS controlled products. MSDS sheets must be the formats requested in the Documentation section of the General Notes.
- G 1.5.2** All MSDS sheets must be maintained in accordance with OHS procedures.
- G 1.5.3** The TA will provide the Contractor with access to MSDS for all known controlled products on the ship for all specified work items, upon request.
- G 1.5.4** ASBESTOS: CCGS Captain Jacques Cartier is free of Asbestos Containing Materials (ACM). All contractor supply materials must contain 0.00% ACM.
- G 1.5.5** LEAD: With exception to the underwater hull, CCGS Captain Jacques Cartier is free of lead containing coatings. Lead dust is possible in areas surrounding wear bearings. All contractor supply materials must contain 0.00% lead unless required for direct replacement of originally fitted materials.

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G 1.5.6 Contactor must include an allowance of \$10,000.00 for the services of a qualified Environmental Hazardous Material Subcontractor to test for unidentified Hazardous Materials such as Lead or Asbestos as required.

G 1.5.6.1 Contractor must identify areas of concern to CGTA and PSPC for approval prior to commencement of testing.

G 1.5.6.2 Final cost will be adjusted upon invoice via the PSPC 1379 process.

G 1.5.7 All areas found to have coatings containing Hazardous Materials must be remediated by qualified personnel prior to the commencement of any scheduled or unscheduled work. Any remediation required will be negotiated via the PSPC 1379 process.

G 1.5.8 The term “disturbed” as it relates to this section, is defined as any action that may produce dust, debris, or smoke.

G 1.6 Confined Spaces

G 1.6.1 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 must be provided to the TA in accordance with the Documentation section of the General Notes.

G 1.6.2 In the event the vessel is under Care and Custody of CCG, the issuance of confined space entry certificates must be in accordance with FSM requirements. The Contractor must conduct space testing and must issue their own confined space entry certificates and hot work permits for the contracted work.

G 1.6.3 For other work outside the Contract, the Chief Engineer will issue permits under the requirements of the Fleet safety Manual (FSM) section 10.A.7 Contractor Safety and Security (ship in CCG custody), and the FSM sections 7.B.3 and 7.B.4 for Entry into Confined Spaces and Hotwork.

G 1.6.4 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 1.7 Fire Protection

G 1.7.1 The Contractor must ensure protection against fire 24 hours/day and 7 days/week throughout the contract period.

G 1.7.2 The Contractor must ensure the isolation, removal, installation and reactivation of the shipboard fire detection and suppression systems or any components thereof, is

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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.

G 1.7.3 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.

G 1.7.4 The ships portable fire extinguishers are only to be used in the event of an emergency and not for any hot work tools. Any that are used must be refilled and recertified by an authorized fire equipment service company that has marine experience.

G 1.7.5 The vessel has fixed firefighting systems fitted. In the event that the Contractor wishes to isolate, deactivate, or temporarily remove any part of the systems, the work must be performed by a qualified technician from an OEM authorized fire equipment service company that has marine experience. Any system worked on must be reactivated by the qualified technician. A signed and dated original copy of the certificate must be delivered according to the Documentation section of the General Notes. All spaces must be fully operational prior to resumption of custody by CCG.

G 1.7.6 The vessel is fitted with a Autronica Autoprime Interactive Fire Detection System with detector heads throughout the vessel. This system must remain active for the duration of contract period. In the event that any system component is disturbed by the Contractor to facilitate contract work, the Contractor must:

G 1.7.6.1 Recertify the system using a technician certified to work on systems from this manufacturer.

G 1.7.6.2 Provide a copy of the Technician's certificate in accordance with the Documentation section of the General Notes.

G 1.7.6.3 Provide a copy of the system's recertification in accordance with the Documentation section of the General Notes.

G 1.8 Security

G 1.8.1 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.

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G 1.8.2 The Contractor must provide Security log books which must be signed during every set of rounds in the following spaces:

G 1.8.2.1 Bridge;

G 1.8.2.2 Bow Thruster Compartment;

G 1.8.2.3 Main Machinery Space;

G 1.8.2.4 Propulsion Motor Space;

G 1.8.2.5 VFD Compartment;

G 1.8.2.6 Steering Gear Compartment

G 1.9 **COVID-19**

G 1.9.1 Contractor must comply with screening requirements described in CCG COVID-19 Incident Specific Standard Operating Procedures 06 – Process for Non-CCG Persons Accessing a CCG Facility/Vessel and 07 – Screening and Temperature Verification and 19 – COVID-19 Testing Procedure for Access to CCG Facilities.

G 1.9.2 As of October 15, 2021, bidders for contracts that will require supplier personnel to access federal government workplaces must submit a certification proving they meet the vaccine requirement as a condition of the bid. Bids that do not include the certification will not be considered. Additional details on this requirement may be found at: <https://buyandsell.gc.ca/covid-19-vaccination-requirement-for-supplier-personnel>.

G 1.10 **Hot Work**

G 1.10.1 The Contractor must, as a minimum, ensure the following items are followed when conducting hot work while in their care and custody:

G 1.10.1.1 The compartment(s) affected must be certified gas free by a qualified person. 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. With the ship in care and custody of the CCG, the posted certificates must be issued by the Chief Engineer.

G 1.10.1.2 With the ship in care and custody of the CCG, the issuance of Hot Work Permits must be in accordance with FSM requirements. The Contractor must issue their own hotwork permits for the contracted work.

G 1.10.1.3 The Contractor must remove from the vicinity all portable combustible materials within 2m of hot work;

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G 1.10.1.4 The Contractor must use protective material must be used to prevent the spread of sparks, protecting electrical cables and other services;

G 1.10.1.5 The Contractor must provide fire sentries 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 1.10.1.2 Any hot work carried out onboard the vessel during the contract period must be conducted in accordance with the FSM.

G 1.10.2 Contractor Welding Requirements

G 1.10.2.1 All welding must be done in accordance with the requirements of the document CCG Welding Specification, EKME#3049715v5. The requirements include:

a) Certification Requirements for Steel Structures

i) All welding contractors must be certified by the Canadian Welding Bureau (CWB) to Canadian Standards Association (CSA) Standard W47.1 -2019, Division 1 or 2. The contractor must meet all of the requirements of Annex M – Qualification of Welding Personnel and Procedures for Marine Applications.

b) Certification Requirements for Stainless Steel Structures

i) All welding contractors must be certified by the Canadian Welding Bureau (CWB) to CSA Standard W47.1 -2019, Division 1 or 2. The contractor must meet all of the requirements of Annex K – Qualification of Welding Personnel and Procedures for Stainless Steel Materials.

c) Certification Requirements for Aluminum Structures

i) All welding contractors must be certified by the CWB to CSA Standard W47.2-11 (R2015), Division 1 or 2.

d) Scope of Certification

i) The scope of certification filed with the CWB as required by CSA Standards W47.1-2019 and W47.2-11 (R2015) must include all welding work performed under the requirements of the CCG vessel specifications and statements of work.

ii) Pipe used as hollow structural section material such as pillars, masts, supports, handrails, etc., must not be excluded from any company's scope of certification.

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e) Validation Certificates

- i) Company welding certification validation certificates are required for each contractor and subcontractor facility where welding work will take place. Scope of certification indicated on the validation certificates must include all welding work performed under the requirements of the CCG vessel specifications and statements of work.

f) Welding Procedures

- i) All welding procedure specifications and/or welding procedure data sheets must be qualified by procedure qualification testing and reviewed and approved by the CWB prior to use.
- ii) Welding procedures must be tested to the requirements of Annex M of CSA Standard W47.1-2019 for all steel welding work, Annex K of CSA Standard W47.1-2019 for all stainless steel welding work and to the requirements of CSA Standard W47.2-11 (R2015) for all aluminum welding work.
- g) All Contractors must submit their welding personnel qualification records and approved welding procedures to the TA prior to commencing any welding work. All welding procedures, including welding procedure specifications and welding procedure data sheets, must include an indication of acceptance by the Contractor (by signature, seal or other appropriate means) and a stamp of acceptance by the CWB.

G 1.10.2.2 Weld Design must be to the Rules of a Classification Society that is an approved Recognized Organization by Transport Canada Marine Safety and Security. Unless otherwise approved by the Delegated Representative, the following conditions must be met:

- i) All groove welds in butt joints must be full penetration; and,
- ii) All corner joints must be full penetration groove welds combined with single continuous fillet weld.

G 1.10.2.3 A weld design schedule must be submitted to the TA and ABS in drawing form for review prior to commencing any welding work

G 1.11 Work Aloft

G 1.11.1.1 Any work aloft onboard the vessel during the maintenance/refit period must be conducted in accordance with the FSM. Notices must be placed to prevent operation of Radars while personnel are working aloft on the mast or on the wheelhouse top.

G 1.12 Electrical Equipment

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- G 1.12.1.1 In the event the vessel is in the care and custody of the CCG, the Lock Out/Tag Out procedure of the FSM must be followed. For each circuit worked on by the Contractor, locks and locking devices must be applied by both the Contractor and by the CCG.
- G 1.12.1.2 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 1.12.1.3 Any lock-out requirements onboard the vessel during the contract period must be conducted in accordance with the safety management system.
- G 1.12.1.4 The TA must be notified of all such ongoing work.
- G 1.12.1.5 All electrical installations or renewals must be in accordance with the following Marine Standards:
- i) TP 127 – Ship Safety Electrical Standards
 - ii) IEEE Standard 45 – Recommended Practice for Electrical Installation on Shipboard.

G 1.13 Piping

- G 1.13.1 All materials used for potable water systems must be suitable for that use and for the intended pressure and temperatures.
- G 1.13.2 All piping must be compliant with drawing 191-501.00-001 – Material Standard for Pipes, Valves and Fittings.
- G 1.13.3 The Contractor must ensure that new pipe joint methods are compatible with existing vessel methods and equipment. Specialized tools required for pipe connections must be supplied to the CCGS Capt. Jacques Cartier if the equipment does not already exist on board.

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- G 1.13.4 Transition joints between old and new piping must exceed the strength of the original piping.
- G 1.13.5 Piping to be well supported at regular intervals and supported such that no rattling of pipes occur during use or when shut off.
- G 1.13.6 The Contractor must maintain fire ratings accordingly as piping transitions through fire zones.
- G 1.13.7 Thermal insulation must be fitted on all piping of the following systems: hot water heating, hot potable water, uncontaminated seawater, refrigeration piping, fresh water cooling (where the surface temperature exceeds 50 °C), and hydraulic piping exposed to ambient conditions.
- G 1.13.8 The Contractor must insulate all pipes or fittings which pass through insulated bulkheads, decks, or tanks to the same standard for a distance of at least 0.45 meters from the insulated side of bulkhead, deck, or tank.
- G 1.13.9 All pipe insulation and penetrations must be intended for use on ships and in compliance with SOLAS and the FTP Code. All pipe insulation must be a minimum ½” W.T. Armaflex “Class O” or equivalent.

G 1.14 Coatings

- G 1.14.1.1 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 the Coatings and Surface Treatment Schedule.
- G 1.14.1.2 All coatings must be completed as per 191-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule, along with the most recent OEM Specifications. In case of conflict the OEM Specification takes precedence.

G 1.15 Contractor Furnished Materials (CFM) and Tools

- G 1.15.1.1 All CFM must be type approved or certified for the intended purpose by a TC approved RO or have prior written approval from ABS that it is not required.
- G 1.15.1.2 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 1.15.1.3 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.

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G 1.15.1.4 The Contractor must provide all equipment, devices, tools and machinery such as craneage, staging, scaffolding, hoarding, and rigging necessary for the completion of the work in this specification.

G 1.15.1.5 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 1.16 Government Supplied Materials (GSM) & Tools

G 1.16.1.1 All tools are Contractor supplied unless otherwise stated in the technical specifications.

G 1.16.1.2 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 1.16.1.3 Any **GSM** not specifically stated in the Technical Specification must be received by the Contractor and stored in accordance with the Equipment Storage section of this specification. These activities must be covered by the PSPC 1379 Work Arising, Procedures for Design Change or Additional Work.

G 1.17 Storage

G 1.17.1.1 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 1.17.1.2 All equipment and items must be stored in such a manner so as to be easily accessible for inspection. No items may be stored directly on floors.

G 1.18 Regulatory Inspections and/or Class Surveys

G 1.18.1.1 The Contractor must contact, coordinate, schedule, and be completely prepared for all regulatory inspections and surveys by the applicable authority: i.e. ABS, HC, Environment Canada, or others as indicated by individual specifications.

- i) The Contractor must include all IACS certification of CFM equipment such as valves. Canada will be responsible for IACS certification for GSM equipment.

G 1.18.1.2 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.

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- G 1.18.1.3 The Contractor must not substitute inspection by the TA for the required regulatory inspections.
- G 1.18.1.4 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 1.18.1.5 Fees associated with ABS, HC, Environment Canada, or any other Inspection required by the specification will be invoiced directly to CCG unless otherwise indicated in a specific specification item. The Contractor must arrange for inspections as specified in the specification. The Contractor has the responsibility to ensure that inspections are scheduled in an efficient manner, i.e. with the minimum number of site visits. The Contractor must coordinate with the TA when scheduling inspections.
Note: For this refit we do not require inspection by HC or Environment Canada.

G 1.19 Contractor Inspections

- G 1.19.1.1 The Contractor must provide 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 1.19.1.2 The Contractor must take a before photograph of conditions prior to removing any items. These photographs must be in accordance with the Documentation section of the General note, named according to the specification section that resulted in removing those items.
- G 1.19.1.3 Prior to the close out of any item under this specification, the Contractor must provide 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 photographs, documents, reports, and trials in relation to the item being closed out as completed

G 1.20 Restricted Areas

- G 1.20.1.1 The Contractor must not enter the following areas except to perform work as required by the specifications: all cabins, offices, workshops, Engineers' office, Wheelhouse, Control Room, all washrooms, Galley, Mess Rooms, Lounge areas and any other areas restricted by signage.

G 1.20.2 The Contractor must give the TA 24 hours advance notice prior to working in any accommodation areas or office spaces. This will allow CCG adequate time to move personnel and secure the areas.

G 1.21 Smoking in the Work Space

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G 1.21.1.1 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, subcontractors, including the employees of any subcontractors.

G 1.22 Recording of Work in Progress

G 1.22.1.1 The TA may record any work in progress using various means including, but not limited to photography and video, digital or film.

G 1.23 Access for Maintenance, Installation, and Removal.

G 1.23.1.1 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 1.23.1.2 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 1.23.1.3 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 Coatings and Surface Treatment Schedule.

G 1.23.1.4 Manufacturer's recommended removal clearances must be allowed for.

G 1.23.1.5 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 1.23.2 Assembly of Components

G 1.23.2.1 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 1.23.2.2 Covers, cowlings and components damaged by the Contractor must be replaced with a new CFM cover, cawling, or component.

G 1.23.2.3 Where torque specifications are not provided by the manufacturer, standard SAE nut and bolt torques must be used.

G 1.23.3 Protection of Equipment

- G 1.23.3.1 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 1.23.3.2 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 1.23.3.3 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 1.23.3.4 Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance must be returned to As Delivered condition by the Contractor.
- G 1.23.3.5 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 1.23.3.6 The Contractor must obtain and follow instructions from its subcontractor for any special protection required for their equipment during the project work. Such instructions must be made available to the TA.
- G 1.23.3.7 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 1.23.3.8 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 1.24 Documentation

- G 1.24.1 Documentation is identified as a deliverable in the specification items requesting them.

G 1.24.2 Data Book

- G 1.24.2.1 The Contractor must provide all documentation generated as a result of specified deliverables, in electronic format, as part of the Contractors QA program. All documentation must be provided to the TA, in two copies, each on a separate flash drive, in accordance with the formats described in this specification item.

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G 1.24.2.2 All copies of documents generated as a result of specified deliverables will be referred to as the “Data Book”.

G 1.24.2.3 Any documentation, media, and reports, that are the result of Additional Work, are also to be included as part of the Data Book.

G 1.24.3 File Naming

G 1.24.3.1 File naming must be in the following format: *Specification#.# – Date (yyyy-mm-dd) – File Name Describing Information*. For Example: “G1.0 – 2013-12-01 – Details of file naming.pdf”.

G 1.24.4 E-mails

G 1.24.4.1 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: ***F1782-20C186 – DATA BOOK – 2020-11-30 – G1.0 General Notes*** . Files sent by e-mail must also be included in the “Data Book”.

G 1.24.5 File Formatting

G 1.24.5.1 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 1.24.5.2 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 must be provided as part of the Data Book.

G 1.24.6 Photographs

G 1.24.6.1 All photographs 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 1.24.7 Measurements, Calibrations, and Readings.

G 1.24.7.1 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 1.24.7.2 Recorded dimensions must be to a precision of three decimal places (unless otherwise stated) in the measuring system currently in use on the vessel.

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G 1.24.7.3 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 must be provided as part of the Data Book under any specification where measurements are required.

G 1.24.8 Test Inspection Records and Certificates

- G 1.24.8.1 Test Inspection Records and Certificates are identified as a deliverable in the individual specification item requesting them.
- G 1.24.8.2 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 1.24.8.3 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 1.24.8.4 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 ABS, the TA, the Contractor and where necessary by the subcontractors 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 1.25 Drawings

- G 1.25.1 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 must be drawings.
- G 1.25.2 The Contractor must have on staff or through a subcontractor a person qualified and experienced in the use of AutoCAD who will create or modify drawings that result from the work.
- G 1.25.3 The Contractor must comply with the Canadian Coast Guard National CAD Standards titled "*Computer Aided Design (CAD) using AUTOCAD*" provided.
- G 1.25.4 Drawing media 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 USB stick. A printed copy of the Readme file must accompany each storage device. Deliverables must be labeled As-Fitted drawings for those drawings that have been approved and finalized.
- G 1.25.5 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 1.25.6 The Contractor must prepare all the working drawings necessary for the project requirements and modernization work.

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G 1.25.7 The Contractor must furnish all drawings required by sub-contractors, trades and other consultants.

G 1.25.8 Schematic drawings of systems must include all pertinent system information, including sizes, dimensions, labeling, equipment locations, and all information relating to system fittings.

G 1.25.9 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 1.25.10 Guidance Drawings

G 1.25.10.1 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 must 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 1.25.10.2 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 1.25.10.3 Specification deviations must be documented using an Observation Report.

G 1.25.11 As Fitted Drawings

G 1.25.11.1 The As-Fitted Drawings are identified as a deliverable in the specification item requesting them.

G 1.25.11.2 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.

G 1.25.11.3 Any plotted drawings must be on standard ANSI paper sizes.

G 1.25.11.4 Marked up drawings must 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;

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

G 1.26 Manuals

G 1.26.1 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 must be manuals.

G 1.26.2 General

G 1.26.2.1 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 Capt. Jacques Cartier;
- b) Equipment Identification;
- c) Equipment Manufacturer;
- d) Date.

G 1.26.2.2 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 1.26.2.3 A master index must be provided at the beginning of each binder indicating all items included in each section.

G 1.26.2.4 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 1.26.2.5 A copy of the final reviewed and approved As-Fitted drawing(s) must be provided within the maintenance manual.

G 1.26.2.6 One (1) electronic copy of each manual must be provided in accordance with the Data Book section of this specification.

G 1.26.2.7 Two (2) paper copies of manuals and data sheets must be supplied in English for all Contractor Furnished Equipment items.

G 1.26.3 Operation Manuals – As-Fitted

G 1.26.3.1 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 1.26.3.2 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 1.26.4 Maintenance Manuals – As-Fitted

G 1.26.4.1 Maintenance manuals must include:

- a) Manufacturer's maintenance instructions for each item of the equipment requiring maintenance activity;
- b) Instructions must 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 1.27 Identification

G 1.27.1 Nameplates

G 1.27.1.1 Nameplates are identified as a deliverable in the individual specification item requesting them.

G 1.27.1.2 All nameplates must be in English, except where required in English and French by TCM, or ABS, for reasons of emergency operation.

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G 1.27.1.3 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 1.27.1.4 The type of nameplates must suit the location in the vessel as specified below:

G 1.27.1.5 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:
 - Safe Working Loads,
 - Warning/Caution labels,
 - Circuit Breakers with shunt trips requiring completion of remote circuits prior to being operated,
 - Equipment with multiple power sources,
 - Circuit breaks having a potential power source connected to both sides
 - Indication of any other potentially hazardous condition.

G 1.27.1.6 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 1.27.2 Wire Labelling

- G 1.27.2.1 Wire Labelling is identified as a deliverable in the individual specification item requesting them.
- G 1.27.2.2 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 1.27.2.3 All wiring in panels specified to be labelled must be labeled with the Cable Number and their conductor # unless otherwise specified in equipment installation drawings.

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 labour 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, crange, 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 1.2 BERTHING

- S 1.2.1 The berthing and mooring facilities must be suitable for a vessel of this size in local weather, river, sea, lifting, and docking conditions. Fenders must be supplied by the Contractor to prevent the vessel from contacting the wharf in local weather, river, lifting, and docking conditions.
- S 1.2.2 The Contractor is 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 1.2.3 The length of the dock must be a minimum of 90% of the keel length of the vessel.
- S 1.2.4 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 1.3 MOORING LINES

- S 1.3.1 The Contractor must provide the labour 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.

S 1.4 GANGWAYS

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- S 1.4.1 The Contractor must supply all labour 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 1.4.2 Any movement of the gangway required by the Contractor is the responsibility of the Contractor.
- S 1.4.3 The Contractor must provide gangways in accordance with regulatory, Provincial Worker's Compensation, and Canada Labour laws and regulations. A minimum of two (2) gangways must be provided.

S 1.5 ELECTRICAL POWER

- S 1.5.1 The Vessel's shore power cables and associated plug connections 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 1.5.2 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. Photographs must be taken of general condition and close-ups of existing damage. All photographs and documents must be provided to the TA in accordance with the Documentation section of the General Notes.
- S 1.5.3 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 1.5.4 The temporary power system must be fed 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 1.5.5 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.

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- S 1.5.6 The Contractor must supply shore power service providing 600 Volt Alternating Current, 60 hertz, 3 Phase, 800 Ampere electrical power, for the duration of the contract.
- S 1.5.7 The Contractor must supply a price quote per kilowatt-hour for electrical power for the duration of the work period based on an estimated 100,000 kWh usage, with a power factor of 0.95. 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 via PSPC 1379 Work Arising procedure.

S 1.6 ACCOMMODATION/MACHINERY AREA DECK PROTECTION

- S 1.6.1 Masonite 1/4" must be fitted to all access alleyways throughout the ship as indicated by the Chief Engineer and/or Chief Officer. All edges and joints must be taped with Construction Grade Sheathing Tape to prevent the ingress of dirt, etc. Contractor must quote on supplying and installing 100 m² of Masonite, along with a unit price per square metre for adjustment purposes.
- S 1.6.2 Protective wall coverings (“Ram board” or equivalent) must be supplied and applied with non-marking tape to all bulkhead panels in all areas where deck protection is required, extending from deck to 1m above deck level. Contractor must quote on supplying and installing 200m² of bulkhead protection, along with a unit price per square metre for adjustment purposes.
- S 1.6.3 All deck and bulkhead coverings must be installed within 2 days of contract commencement. All edges and joints are must be securely taped down. Any coverings damaged by Contractor's personnel must be replaced at the Contractor’s expense. Weekly inspection of covering must be made with CGTA (or designate) representative present and all areas of loose covering must be secured with new tape.
- S 1.6.4 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 must be applied according to manufacturer’s specifications.
- S 1.6.5 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 onboard and around the vessel to facilitate specified work.

S 1.8 POTABLE WATER SUPPLY

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- S 1.8.1 Potable fresh and sanitary water at 550kPa (80psi) constant pressure must be connected to ship's systems, complete with pressure regulator and shut-off valves. Potable water supply must be capable of providing up to 15m³/hr peak flow. CCG estimates consumption to average 6 m³/day throughout the refit period. Contractor must supply and connect a water meter to the ship's inlet line. Contractor must quote a unit rate for PWGSC 1379 adjustments, and include all connection / disconnection costs in bid price.
- S 1.8.2 Contractor must make arrangements to prevent the potable water supply piping/hoses are protected against freezing. Prior to connection aboard, contractor must provide a recent (within 3 months) certificate of potable water quality in their bid package. The water must be supplied from an approved municipal drinking water supply system that has been certified safe for consumption. (Reference CCG FSSM 7A12 Potable Water Quality paragraphs 3.3 Shore Supply, 3.6 Disinfection and 3.7 Potable Water Testing and Reporting).

S 1.9 FIRE MAIN CHARGING

- S 1.9.1 The Contractor must supply a separate and continuous uninterrupted water supply through isolation valves, via a calibrated pressure regulator and calibrated flow meter, to the ship's fire main system. Supply pressure must be at 80 to 110 psig and supplied through a 2-inch diameter hose. Pressure must be maintained at all times.
- S 1.9.2 The Contractor must read the water meter at the beginning of the contract period and again at the end. The readings must be taken in the presence of the TA and must be used to calculate the total water usage from this connection.
- S 1.9.3 Provisions must be made by the Contractor to ensure that the water supply does not freeze during cold weather. The Contractor must inform the TA and security staff of the location of shut-off valve(s).
- S 1.9.4 The Contractor must supply a price quote per cubic meter of water. Final price for this item must be determined at the end of the contract once the meter has been read.

S 1.10 BLACK WATER SERVICES

- S 1.10.1 The Contractor must dispose of the vessel's black water from the sewage system on an as needed basis. For bid purposes, sewage plant has a capacity of 8000L and waste will be produced at approximately 3000L/day.
- S 1.10.2 The Contractor must supply disposal certificates for all black water removed from the vessel and the disposal certificates must clearly indicate the quantity removed.

S 1.11 GARBAGE REMOVAL

- S 1.11.1 The Contractor must provide a garbage container or dumpster of 6 cubic meters located adjacent to the vessel. Garbage must be removed from the vessel daily including week-ends and holidays. Ship's personnel will comply with any recycling programs that the Contractor has in place, provided the appropriate containers are made available.
- S 1.11.2 The Contractor must supply a green bin for food waste. The green bin must also be emptied daily.

S 1.12 CRANAGE

- S 1.12.1 Contractor must provide the general services of a crane, including an operator and a rigger, for the support of the vessel's day-to-day activities, i.e. the moving of stores to and from the vessel and the Contractor's facilities ashore, while the vessel is in the dry-dock. The Contractor must provide this service for a total 40 hours over the duration of the contract. The actual total will be adjusted as required by PSPC 1379 action.

S 1.13 WORKSITE INSPECTIONS

- S 1.13.1 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 must be removed/secured prior to the Contractor assuming Care and Custody of the Vessel.
- S 1.13.2 The Contractor's Quality Assurance Representative must take 250 digital photographs of each area showing the outfit therein. Each photograph must be dated and named as to the location on the vessel and that it represents As-Delivered conditions. These photographs must be in the format; as well as named, in accordance with the Documentation section of the General Notes. A Copy of these

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photos must be provided to the TA within 48 hours of the start of contract on a memory stick.

- S 1.13.3 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 1.13.4 Upon completion of the contract, the Contractor must return the vessel to the As-Delivered state of cleanliness.
- S 1.13.5 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 1.13.6 Copies of all photographs, documentation, and inspection sign off sheets must be provided in accordance with the Documentation section of the General Notes.

S 1.14 PROJECT FACILITIES

- S 1.14.1 The Contractor must provide two reserved parking spots as near as practical to the vessel while drydocked. Parking spaces are for the exclusive use of Government Personnel. These spaces must be available 24-7 from one week prior to the work commencing to one week after vessel acceptance.

S 1.15 CONTRACTOR'S ACCESS TO VESSEL FACILITIES

- S 1.15.1 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.

10.0 SAFETY AND SECURITY

10.1.A Not Used

11.0 HULL AND RELATED STRUCTURES

11.1 DOCKING AND UNDOCKING

11.1.A Identification

- A.1 The intent of this specification it is to conduct docking and undocking activities for the purpose of completing work to underwater components of the vessel, as described throughout this specification.

11.1.B References

B.1 Equipment Data – Not Used

B.2 Drawings and Documents

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

B.3 Regulations and Standards

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

11.1.C Statement of Work

- C.1 Prior to docking, Contractor must work in conjunction with the ship's crew, 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. These soundings must be repeated prior to re-floating. All data must match pre-docking conditions unless authorized by CGTA. ***ITP**
- 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. ***ITP**
- C.3 The TA must be afforded the opportunity to review the docking report prior to docking. ***ITP**
- C.4 The vessel must be docked with the Drop Keel in the maintenance position or must be permitted to be moved up into the maintenance position once on the blocks. The Contractor must attach Safety Chain Connections to the 2 bolted steel structures installed on the drop keel top plate. When the drop keel is in the maintenance position, they are connected through a steel chain to structures in the trunk top to ensure safety to personnel working under the drop keel.

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- C.5 The hull must be docked so that shell grids are accessible for inspection.
- C.6 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. ***ITP**
- C.7 The Contractor must ensure that all tank docking plugs are accessible and not obscured by the docking blocks.
- C.8 The Contractor must ensure that no transducers, the drop keel, or any other underwater device are damaged or obscured by the docking blocks.
- C.9 The TA must be afforded the opportunity to inspect all arrangements carried out by the Contractor prior to flooding the dock. 4 hours of notice must be given to the TA for this inspection. ***ITP**
- C.10 The Contractor must inform the Chief Engineer of the vessel when electrical generation on board the vessel is to be discontinued. ***ITP**
- C.11 The Contractor must supply shore crews, line handlers on the vessel, tugs, divers and whatever facilities may be required for the safe and correct dry-docking and undocking of the vessel.
- C.12 The Contractor must take the following measures as soon as practical after docking:
- a) 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. ***ITP**
 - b) The entire hull must be pressure washed at minimum 3000 psi from the keel to the bulwarks, including the rudder, drop keel, and the drop keel trunk. **Only the underwater portion of the drop keel and drop keel trunk must be cleaned.** All transducers must be cleaned and inspected by the TA prior to undocking. Marine growth must be hand scraped prior to pressure washing; The Contractor must dispose of estimated 50 square meters of heavy marine growth to be hand scraped. Adjustments to this will be via PSPC 1379 Work Arising Procedure. ***ITP**
- C.13 The Contractor must provide a total of 12 hours (non-continuous) of man lift services, with operator, for CGTA (or designate) inspection purposes. Actual usage must be tracked for adjustment via PSPC 1379 Work Arising Procedure if necessary.
- C.14 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. ***ITP**
- C.15 Prior to undocking, the Contractor must provide a tank condition report, to be verified by CGTA in accordance with the Documentation section of the General Notes. ***ITP**

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- C.16 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.17 The dock must not be flooded without written approval from CGTA. ***ITP**
- C.18 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 watertight. The Contractor must provide the TA the opportunity to conduct the same inspection prior to continuation of flooding. Upon confirmation of watertight integrity flooding will continue. ***ITP**
- C.19 The Contractor must be responsible for all such services as may be required for the safe and proper departure of the vessel from the dry dock.
- C.20 The vessel must then be removed from dry-dock by the Contractor and secured alongside at an agreed upon location. The Contractor must allow a minimum of two days (48 hours) after completion of all work at this location with Contractor supplied shore power to allow ship's personnel to run up all vessel systems and ensure proper operation. The Contractor must supply and maintain a suitable Gangway at the alongside facility.

11.1.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must consult with the ABS to determine any required inspections. The Contractor is responsible for scheduling all ABS inspections. ***ITP**
- D.1.2 The Contractor must provide ABS the opportunity to conduct a survey of the hull below and above the water line. The TA must be informed and must be afforded the opportunity to attend with ABS. ***ITP**

D.2 Testing/Trials – Not Used

D.3 Certification

- D.3.1 The CE is responsible to ensure that the Survey Record Book is signed off by ABS. ***ITP**

D.4 Documentation

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

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- D.4.2 The Contractor must provide Tank Soundings, before and after docking as described in paragraph 11.1.C.1, in accordance with the Documentation section of the General Notes. ***ITP**

- D.4.3 The Contractor must provide disposal certificates where applicable for marine growth and contaminated water. ***ITP**

11.2 HULL ANODES

11.2.A Identification

- A.1 The intent of this specification is to inspect the cathodic protection anodes on the vessel, and renew as necessary.

11.2.B References

B.1 Equipment Data

- B.1.1 The Contractor must quote on the supply and renewal of the following anodes, and provide a unit cost for each:
- i) 4 – Martyr CMZ03SZ on the Rudder flaps
 - ii) 8 – Martyr CM812SZ on Drop Keel Trunk (Up To WL)
 - iii) 4 – Martyr CMZ03SZ in the Seachest
 - iv) 3 – Martyr CMZ03SZ in the Seabay
 - v) 10 – Martyr CM812SZ on the ship’s hull

B.2 Drawings and Documents

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

B.3 Regulations and Standards

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

11.2.C Statement of Work

- C.1 The Contractor must inspect all hull anodes. Any anodes that are depleted beyond 70% must be replaced. Severely depleted anodes may need to be replaced with a larger size. Supply of anodes must be CFM and actuals will be addressed via PSPC 1379 Work Arising procedure. ***ITP**
- C.2 The Contractor must remove depleted anodes and fairing plates. All weld scabs and gouges caused by removal of existing anodes must be repaired by welding over and grinding flush.
- C.3 New anode straps and fairing plates must be primed and painted in accordance with the 191-631.00-001 OFSV 190 Coatings and Surface Treatment Schedule. Prior to the

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installation of anodes, the Contractor must complete the coating application to areas behind the anode straps.

- C.4 The Contractor must install all anodes as per drawing 191-633.00-001 Cathodic Protection and R-4.46582 Rudder Anode Drawing. Note, there are no anodes fitted to the blade of the rudder. It is protected by the ICCP system through a grounding cable connecting to the hull.
- C.5 The Contractor must inspect the anodes inside the structure of the drop keel. The Contractor must provide the TA with information of their size and attachment type (bolted or welded). If the drop keel anodes require replacement, it must be brought to the attention of the TA by the Contractor. Replacement of drop keel anodes must be CFM and will be addressed via PSPC 1379 Work Arising procedure. ***ITP**

11.2.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must provide the TA the opportunity to visually inspect the condition of the anodes before removal. ***ITP**

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation – Not Used

12.0 PROPULSION AND MANEUVERING

12.1 PROPULSION SHAFT BEARING RENEWAL

12.1.A Identification

- A.1 The intent of this specification is to replace the forward and aft propulsion shaft stern tube bearings with GSM Thordon Bearings and to blast and coat the stern tubes.

12.1.B References

B.1 Equipment Data

- B.1.1 For equipment identification, refer to drawing 191-243.10-004, sheet 1.

B.2 Drawings

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

B.3 Regulations and Standards

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

12.1.C Statement of Work

- C.1 The Contractor must thoroughly clean and inspect the stern tube seal components in situ. Any deficiencies found during the inspection must be reported to the TA. Any necessary repairs and parts required will be addressed via PSPC 1379 Work arising procedures. ***ITP**
- C.2 Prior to shaft removal, Contractor must measure the shaft position using CCG supplied poker gauge. Contractor must also complete top and bottom clearance measurements of the aft end of the aft stern bearing using feeler gauges. Results of these measurements must be recorded and delivered to CGTA. ***ITP**
- C.3 Contractor must release the ship's rudder to make way for propulsion shaft removal. This process is detailed in specification 12.2 - Rudder Removal & Bearing Inspection. ***ITP**
- C.4 Contractor must remove the propulsion shaft from the vessel. Contractor must refer to Wartsila documentation to determine the best procedure for removal and reinstallation. ***ITP**

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- C.5 The Contractor must thoroughly inspect the forward and aft stern tubes for signs of calcareous layers forming on the propulsion shaft liners as per the Wärtsilä Service Letter – “Possible accelerated bearing wear issue WCS-01”. A report must be provided, including photos covering all areas of the bearing raceway. Photos must show sufficient detail to display any defects that may be identified by close visual inspection. ***ITP**
- C.6 Contractor must remove the forward and aft stern tube bearings from the vessel. These bearings must be returned to CCG for further analysis. ***ITP**
- C.7 While the shaft is removed, the Contractor must blast and clean the inside of the stern tube. Surface preparation must be done to SSPC–SP5 requirements with a 4-6 mil/100–150 microns profile. Once the blasting and cleaning has been completed, the CGTA and NACE inspector will inspect the inside of the stern tube. ***ITP**
- C.8 The Contractor shall then coat the stern tube with Blue Seal Marine Coating in color grey. The approximate surface area to be blasted and coated is 17.5m². All coatings must be applied as per manufacturer’s recommendations. Base coat, and first and second top coat must be inspected by NACE. ***ITP**
- C.9 Contractor must install new GSM Thordon Bearings to the forward and aft stern tube bearing locations.

12.1.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must consult with the ABS to determine any required inspections. The Contractor is responsible for scheduling all ABS inspections. TA to be informed of any required ABS inspections. ***ITP**
- D.1.2 Prior to any disassembly, Contractor must measure and report on the stern bearing clearances to determine the amount of wear. These measurements must be retained to ensure proper fit upon reassembly. ***ITP**
- D.1.3 All surface preparation and coating must follow the Coatings and Surface Treatment Schedule and manufacturer’s requirements. ***ITP**

D.2 Testing/Trials

- D.2.1 After the vessel is afloat, dockside trials must be completed at low RPM to ensure proper operation before proceeding to sea trials. ***ITP**
- D.2.2 Sea trials must be completed with shaft operating at 100% RPM for a continuous period of four hours. During these trials, bearings will be monitored for overheating and any abnormal noise. ***ITP**

D.3 Certification

- D.3.1 The Contractor is responsible to ensure that the Survey Record Book is signed off by ABS. ***ITP**

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 endorsement of safe operation required by ABS for certification to the TA prior to the conclusion of the contract. ***ITP**
- D.4.3 The Contractor must provide readings taken in the final documentation. ***ITP**
- D.4.4 The Contractor must provide an inspection report for the stern seal. The Contractor must detail all findings of the inspection and the condition of components in the inspection report. The Contractor must supply a PDF electronic copy of the inspection report to the TA in accordance with the General Notes. ***ITP**

12.2 RUDDER REMOVAL & BEARING INSPECTION

- A.1 The intent of this specification is to remove the ship's rudder as necessary to perform propulsion shaft bearing renewals.
- A.2 The intent of this specification is to measure and report on the rudder bearing clearances to ascertain the amount of wear.
- A.3 These measurements must be completed on the first day of refit, prior to removing the rudder for shaft bearing renewal as described in sections below. ***ITP**

12.2.B References

B.1 Equipment Data

- B.1.1 Rudder:
 - i) Manufacturer: Becker Marine Systems
 - ii) Model: HRC-C-2500/380K/3
 - iii) BMS NO.: 10544-01
 - iv) Weight: Trunk 1700 kg, Stock 2500 kg, Blade 6000 kg

B.2 Drawings

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

B.3 Regulations and Standards

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

12.2.C Statement of Work

- C.1 The Contractor must thoroughly clean and inspect the rudder bearing components in situ. Any necessary repairs and parts required on completion of the survey will be via PSPC 1379 work arising procedure. ***ITP**
- C.2 The Contractor must measure the bearing clearances as per manufacturers recommendations detailed in the S62-12-01_Becker Marine System Rudder Instruction Manual [OFSV000322]. ***ITP**
 - C.2.1 Neck Bearing:

- a) The neck bearing clearance can be measured by a measuring device with magnet frame. The magnet frame must be fixed on the side of the ship's skeg and the pointer has to touch the side of the rudder's gear box. The rudder blade must be pushed to each side and the corresponding measuring values must be read and reported. The difference of both readings is the clearance of the neck bearing.
- b) The clearance of the neck bearing is between 1.5 and 2.0 mm at the time of delivery. A clearance of max. 4.0 mm is acceptable. At clearances above 4.0 mm there is a risk for opening of the seal rings under hard manoeuvring conditions.

C.2.2 Flap Bearings:

- a) The upper and lower flap bearing clearances can be measured in the same mode as for the neck bearing. In this case the magnet frame must be fixed on the side of the blade and the flap has to be pushed to each side.
- b) The clearance of the flap bearing is between 0.3 and 0.6 mm at the time of delivery. A clearance of max. 3.0 mm is acceptable. At clearances above 3.0 mm there is a risk for opening of the seal rings under hard manoeuvring conditions

C.3 The Contractor must remove the ship's rudder from the vessel, as required to remove the propulsion shaft per work scope 12.1 - Propulsion Shaft Bearing Renewal. ***ITP**

C.4 While the rudder is removed, all bearing surfaces must be inspected for abnormal wear. ***ITP**

C.5 The carrier bearing grease passages must be inspected and serviced as necessary to ensure grease is properly distributed and ejected via the correct discharge vents. Contractor must assume 24 hours labor for the inspection and repairs to the bearing grease passages, to be adjusted via PSPC 1379. ***ITP**

C.6 Upon completion of shaft reinstallation and rudder bearing services described above, the rudder must be reinstalled to the vessel.

C.7 The rudder carrier bearing must be filled with 360kg EP2 grease, in accordance with OEM documentation.

12.2.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must consult with the ABS to determine any required inspections. The Contractor is responsible for scheduling all ABS inspections. TA must be informed of any required ABS inspections. ***ITP**

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- D.1.2 Grease passages must be inspected and proven functional as described in section 12.2C.5 above. ***ITP**

D.2 Testing/Trials

- D.2.1 Upon reinstallation to the vessel, rudder grease passages must be proven clear. Grease must be demonstrated to exit through the discharge port as new grease is pumped into the bearing. ***ITP**
- D.2.2 Sea trials must be completed to verify rudder operation under load conditions. Rudder Hard Over to Hard Over (HO-HO) time must be verified against original certification and approved by ABS. ***ITP**

D.3 Certification

- D.3.1 The Contractor is responsible to ensure that the Survey Record Book is signed off by ABS. ***ITP**

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 endorsement of safe operation required by ABS for certification to the TA prior to the conclusion of the contract. ***ITP**
- D.4.3 The Contractor must provide readings taken in the final documentation. ***ITP**
- D.4.4 The Contractor must provide an inspection report for the rudder bearings. The Contractor must detail all findings of the inspection and the condition of components in the inspection report. The Contractor must supply a PDF electronic copy of the inspection report to the TA in accordance with the General Notes. ***ITP**

12.3 PROPELLER INSPECTION & MAINTENANCE

12.3.A Identification

- A.1 The intent of this specification is to have the propulsion propeller polished while the vessel is docked.

12.3.B References

B.1 Equipment Data

- B.1.1 Propulsion propeller:
- i) Manufacturer: Wartsila
 - ii) Model: PAAF288226/- Single, fixed pitch, 5 blade
 - iii) Part Number: PAAF288226/-
 - iv) Diameter: 3,800 mm
 - v) Serial Number: BB0 1504565

B.2 Drawings and Documents

- B.2.1 OFSV001216 – Wartsila Corporation – Main Propeller and Shafting Installation and Planning Instructions
- B.2.2 OFSV001217 – Wartsila Corporation – Main Propeller and Shafting Operation and Maintenance Manual
- B.2.3 OFSV000296 – Wartsila – ECOSAFE Water Lubricated Tailshaft Bearings Design & Procedures Manual DPM-01

B.3 Regulations and Standards

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

12.3.C Statement of Work

- C.1 Contractor must bid on 16 hours of grinding and truing of the propeller to remove any signs of scoring or scratching. Actual hours spent on this service must be tracked for adjustment via PSPC 1379 process.
- C.2 The Contractor must polish the propulsion propeller, while remaining on the shaft, with Scotch-brite discs or equal to the extent required to remove all marine growth.

Propeller material must not be removed by this work. Contractor to bid on 8 hours of polishing the propulsion propeller.

- C.3 After cleaning, the Contractor must dye-penetrant test the propulsion propeller for cracks. This work must be done by a technician qualified to Canadian General Standards Board (CGSB) Standard CAN/CGSB-48.9712-2014 (Qualification and Certification of Non-Destructive Testing Personnel). ***ITP**
- C.4 Any additional repair or defects will be addressed via PSPC 1379 Work Arising procedure.

12.3.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must consult with the ABS to determine any required inspections. The Contractor is responsible for scheduling all ABS inspections. TA to be informed of any required ABS inspections. ***ITP**
- D.1.2 The Contractor must provide the TA and ABS the opportunity to visually inspect the propeller from the dock bottom when the ship is docked both before and after power washing. ***ITP**
- D.1.3 The Contractor must provide the TA the opportunity to witness the NDT inspection. ***ITP**

D.2 Testing/Trials

- D.2.1 NDT inspection of the propeller roots must be completed before the ship is undocked. ***ITP**

D.3 Certification

- D.3.1 The Contractor must provide CCG with a copy of the certification of the NDT technician. ***ITP**

D.4 Documentation

- D.4.1 Documentation in accordance with the general notes.
- D.4.2 The Contractor must provide a written report in digital format detailing the work completed and any defect founds during the work. The Contractor must provide any photographs taken in this report. ***ITP**

13.0 POWER GENERATION SYSTEMS

13.1 **NOT USED**

14.0 POWER DISTRIBUTION SYSTEMS

14.1 **NOT USED**

15.0 AUXILIARY SYSTEMS

15.1 MARINE GROWTH PREVENTION SYSTEM INSTALLATION

15.1.A Identification

- A.1 The intent of this work scope is to complete installation and commissioning of a GSM Marine Growth Prevention System (MGPS).
- A.2 The MGPS system is currently on order and anticipated to arrive prior to the refit period, however delays are possible. Work on this spec item must not commence until approval is granted by the CGTA.
- A.3 The inclusion of this spec item is solely based on the delivery of all the required components. In the event that the GSM are not received in time, this spec item will be cancelled in its entirety.

15.1.B References

B.1 Equipment Data

- B.1.1 CCG is actively soliciting procurements for this MGPS system at the time of specification publication. Technical data and documentation will be provided upon award of the MGPS procurement contract.

B.2 Drawings and Documents

- B.2.1 191-601.00-001 General Arrangement
- B.2.2 191-201.20-001 Equipment Removal Routes
- B.2.3 191-201.10-001 Machinery Arrangement
- B.2.4 191-163.10-001 Sea Bays and Sea Chests Arrangements
- B.2.5 191-256.10-001 Sea Water Cooling System Diagram
- B.2.6 191-633.00-001 Cathodic Protection
- B.2.7 191-501.00-001 Material Standard for Pipes, Valves and Fittings
- B.2.8 191-074.00-001 Welding Schedule
- B.2.9 191-631.00-001 OFSV Coatings and Surface Treatment Schedule
- B.2.10 191-301.00-314 Electrical Equipment Arrangement
- B.2.11 191-324.10-235 Electrical System One Line Diagram

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B.2.12 190-304.00-540 Main Cable Tray Drawing Rev10

B.2.13 191-304.00-541 Cable Node Plan

B.2.14 191-304.00-003 OFSV Cable Schedule

B.2.15 191-635.00-002 Insulation Details Booklet

B.2.16 TP127 Shipboard Electrical Standards

B.2.17 CCG Welding Specifications, EKME #3049715v4

B.3 **Regulations and Standards**

B.3.1 As described in General Notes.

15.1.C **Statement of Work**

C.1.1 The Contractor must retrofit the GSM MGPS in the sea water intake located in the area of frames 48-55 (ref to dwg # 191-201.10-001 Machinery Arrangement and dwg # 191-163.10-001 Sea Bays and Sea Chests Arrangements).

C.2 The service life of sacrificial zinc-anodes fitted in P/S sea chest and sea bay must not be compromised by this retrofit (ref. dwg # 191-633.00-001 Cathodic Protection).

C.3 The Contractor must follow the provided construction drawings and procedures when making this modification. However, the on-site representative of antifouling system OEM may take a decision to deviate from the drawings, if interference items are identified inside of sea chest or sea bay areas which would prevent normal operation of antifouling anodes. Also, the antifouling system OEM may decide to fit additional electrodes in the sea bay. In such case, the Contractor must red-line the construction drawings in order to reflect the as-fitted configuration. ***ITP**

C.4 All modified piping and structure elements must be recoated to the same specification as the ship's hull, per 191-631.00-001.

C.5 The Contractor must hire an on-site Factory Service Representative of antifouling system OEM in order to determine exact location of electrodes and control panel for the period of shipyard works on antifouling system installation and for commissioning of the system.

C.6 The Control Panel must be connected to one of the 220V AC distribution panels P206S, P205P, P211S located nearby either below 2nd Deck or on the 2nd Deck (ref. dwg # 191-301.00-314 Electrical Equipment Arrangement and 191-324.10-235 Electrical System One Line Diagram) at the choice of Contractor.

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- C.6.1 The Contractor must make use of existing Power & Control Cable Trays and Multi Cable Transits (MCT), taking the best route as practicable (ref. to dwg #190-304.00-540 Main Cable Tray Drawing Rev10 and # 191-304.00-541 Cable Node Plan).
- C.7 To prevent data losses due to Electromagnetic Interference (EMI), power cables must not be installed in the same cable tray or conduit as signal (data) cables.
 - C.7.1 New cables must be clearly labelled using aluminum or stainless steel cable tags for interior with mechanically applied lettering (i.e., printer, embossed, etc.). Tags must be securely fixed to cables with bare stainless steel bands. Hand writing is not acceptable. Any aluminum alloy is acceptable as long as it is a corrosion resistant metal. All installed cables must be tagged as close as possible to each end. Cable designations must be the same as on the OFSV drawings or OEM's drawings, and be consistent with as-built tagging system as per dwg # 191-304.00-003 OFSV Cable Schedule.
- C.8 All conductors must be labeled at termination points (exception: color coded OEM supplied wire harnesses). Individual conductors must be labeled with white sleeving, or by other permanent means, with mechanically applied lettering (i.e., printer, etc.) The markings must be neat and legible. Conductors designations must be formatted to match existing cabling, per OFSV drawing 191-304.00-003 OFSV Cable Schedule or OEM's drawing. Hand writing is not acceptable.
- C.9 Only pressure type terminal connectors may be used, such as solderless crimped compression type cable lugs, or screw type terminals designed so screws do not bear directly onto the cable.
- C.10 Cable glands must be metal and provide a method for grounding the cable screen. The glands must be checked to ensure they are grounded to the enclosure.
- C.11 Cables must be secured to cable trays using Stainless Steel wire ties, in accordance with TP127. Integrity of all watertight or fire-retarding bulkheads must be maintained by properly closing MCTs to ABS approval.
- C.12 All electrical cables between fitted electrodes and Control Panel must be adequately protected with protective pipes or otherwise in order to prevent their inadvertent damage during routine maintenance tasks of adjacent systems.

15.1.D Interferences:

- D.1 Pipes, structural elements and cable trays
- D.2 Floor panels and bulkheads

15.1.E Proof of Performance

E.1 Inspection Points

- E.1.1 All welding must be inspected by TA and ABS to ensure compliance. ***ITP**
- E.1.2 All MCT cable penetrations through watertight or fire-retarding boundaries must be inspected by ABS to ensure compliance. ***ITP**

E.2 Testing/Trials

- E.2.1 The installed MGPS system must be inspected and tested to the satisfaction of OEM prior to floating the vessel. ***ITP**
- E.2.2 Final testing and certification of the MGPS must be completed in water during sea trials. ***ITP**

E.3 Certification

- E.3.1 The MGPS must be commissioned and certified by OEM. ***ITP**

E.4 Documentation

- E.4.1 As-fitted construction drawing of the “sea chest box” , interference items modification and antifouling system electrodes installation. ***ITP**
- E.4.2 Updated drawing # 191-163.10-001 Sea Bays and Sea Chests Arrangements showing “sea chest box” fitted to Dk Trunk. ***ITP**
- E.4.3 Updated dwg # 191-301.00-314 Electrical Equipment Arrangement showing location of antifouling system control panel. ***ITP**
- E.4.4 Updated dwg # 191-324.10-235 Electrical System One Line Diagram showing power connection of antifouling system. ***ITP**
- E.4.5 Updated dwg # 191-304.00-003 OFSV Cable Schedule showing newly installed cables. ***ITP**

15.2 SEAWATER PIPING SERVICE

15.2.A Identification

- A.1 The intent of this specification item is to service of the seawater piping system, as required to ensure the new Marine Growth Prevention System is given optimum starting conditions upon commissioning.
- A.2 All piping systems must be inspected via borescope for signs of corrosion, growth buildup, or failure of galvanic isolation kits. A recording of this inspection must be provided to CCG. *ITP

15.2.B Reference

B.1 **Equipment Data**

- B.1.1 List of valves to be replaced:

Compt.	Part Number	Valve Tag	Description	System	Corrective Action
3A27	VLV00298 change to VLV11894	256.10- V0030	BUTTERFLY V/V, LUG TYPE, SEA CHEST RETURN (P)	SW Cooling	Cu-Ni to CS transition with lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00298 change to VLV11894	256.10- V0031	BUTTERFLY V/V, LUG TYPE, SEA CHEST RETURN (S)	SW Cooling	Cu-Ni to CS transition with lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.

B.2 **Drawings and Documents**

- B.2.1 191-256.10-001 - Sea Water Cooling System Diagram.pdf
- B.2.2 191-536.20-001 - Fresh Water Cooling System Diagram.pdf
- B.2.3 191-601.00-001 - General Arrangement.pdf

B.3 **Regulations and Standards**

- B.3.1 All Regulations and Standards are listed in the General Notes. The Contractor must ensure all work completed in this section meets these Regulations and Standards as well as any other pertinent Federal/Territorial Regulation.

15.2.C Statement of Work

- C.1 The Contractor must clean and borescope the seawater cooling systems. The systems included are: *ITP
- C.1.1 All (3) Gensets

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C.1.2 Machinery

C.1.3 Machinery space

C.1.4 Bow thruster circuit

C.2 **Valve Replacement**

C.2.1 The Contractor must replace all valves listed in B.1 Equipment Data with new GSM valves.

C.2.2 The Contractor must visually inspect each removed valve and report any deficiencies as they are identified to the TA. ***ITP**

C.2.3 TA must be given the opportunity to view the condition of all valve discs and seals on each of the removed valves. ***ITP**

C.2.4 The Contractor must install isolation kits across all flanges of dissimilar metals.

C.2.5 All flange gaskets that are disturbed as a result of the valve servicing process must be renewed using new gasket material. New flange gasket material to be CFM.

C.3 **Cleaning**

C.3.1 Contractor must complete a full chemical flush of all CuNi piping systems, including sea bays, as required to fully remove all marine growth and kill any remaining spores.

C.3.2 Contractor must clean the Port sea chest using high pressure water in order to fully remove all marine growth and any remaining spores. The sea chest grates are non-removable therefore the sea chest must be entered through a manhole cover in the engine room.

C.3.3 Contractor must clean the Reverse Osmosis & Scientific Water sea chests using high pressure water in order to fully remove all marine growth and any remaining spores.

C.3.4 Contractor must remove system components as necessary to allow temporary installation of equipment required to inject and capture flushing fluids.

C.3.5 All waste fluids generated from this process must be disposed of off-site in accordance with applicable environmental requirements. Estimated 40 cubic metres (40,000L) waste will be generated through the flushing process. Contractor must provide a unit cost per cubic metre (1,000L) for adjustment purposes.

C.4 **Pipe Inspection**

C.4.1 After a complete flushing of all systems, the contractor must complete borescope recording of all pipes cleaned, and provide a report on areas of concern with regards

to corrosion, pitting and discoloration. Contractor must complete borescope video inspection of the following sections of CuNi sea water piping: ***ITP**

- a) Diesel Generator Discharge
- b) Sea Water Inlet to Forward Cooler
- c) Sea Water Outlet from Coolers
- d) Bow Thruster Inlet to Cooler
- e) Bow Thruster Overboard
- f) Fire Main Pump Discharge

C.4.2 Piping must be inspected for sludge or slime buildup, corrosion pitting, lack of passivation, and signs of erosion. ***ITP**

C.4.3 Pipe inspections must be done in the presence of the TA. All pipe inspections must be recorded at HD resolution and delivered to CCG. ***ITP**

C.4.4 Any pipe components determined to require replacement must be handled via PSPC 1379 work arising procedure.

15.2.D Proof of Performance

D.1 Inspection Points

D.1.1 The Contractor must consult with the ABS to determine any required inspections. TA to be informed of any required ABS inspections. ***ITP**

D.1.2 The Contractor must provide CGTA opportunity to inspect all disassembled piping. ***ITP**

D.2 Testing/Trials

D.2.1 Not Used

D.3 Certification

D.3.1 Not Used

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 list of all materials used. ***ITP**

16.0 DOMESTIC SYSTEMS

16.1 **NOT USED**

17.0 DECK EQUIPMENT

17.1 **NOT USED**

18.0 VESSEL COMMUNICATIONS AND NAVIGATION

18.1 **NOT USED**

19.0 INTEGRATED CONTROL SYSTEMS

19.1 **NOT USED**

20.0 SCIENCE, OCEANOGRAPHIC, AND HYDROGRAPHIC EQUIPMENT

20.1 **NOT USED**

21.0 CONTROL SYSTEMS

21.1 **NOT USED**