

CCGS SIR JOHN FRANKLIN Dry Docking 2021

Specification No:
F1782-210014

Prepared by:

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

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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 SIR JOHN FRANKLIN
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 Keel Laid	07 August 2015
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 are to 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 are to 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
S62-190-631.00-001_OFSV 190	OFSV 190 Coatings and Surface Treatment Schedule	CCG
S62-10-30	Survitec Zodiac Liferaft Owner's Manual_2014	CCG

S62-12-17	Wartsila Fixed Pitch Propeller Installation Operation and Maintenance Manual	CCG
CCG/6016	CCG Fleet – Federal Identity Program Guide	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
S62-14-20	Techsol Switchboard System General Operations Manual [OFSV001148]	CCG
S62-14-19	Techsol Switchboard Corner Cabinets Project Installation Manual, Complement [OFSV001138]	CCG
P14-8401-SB	Techsol Breaker Torque Settings	CCG
S62-14-02	ABB Arc Guard System TVOC-2 Installation and maintenance guide_[OFSV001144]	CCG
	Shutdown Procedure for Franklin UPS units when isolating a Switchboard	CCG
S062-VLINK	Vesselink Antenna Pedestal Adapter	CCG
S062-TVRO	ST-24 Pole Mount	CCG
132816	OPERATION AND INSTALLATION FOR SEA TEL MODEL ST24 SATELLITE TV RECEIVE-ONLY ANTENNA	CCG
84464-IETM	VesselINK Install Guide Rev C	CCG
S62-11-16	Cathelco Marine Impressed Current Cathodic Protection C-Shield ICCP System Installation and Instruction Manual_Rev 3_2015_[OFSV000271]	CCG
	MODEL FR4-6 SPEC	CCG
S62-12-05jj	Ingeteam Ingedrive LV400 User Manual Ch10 Power Hardware_2014_[OFSV001241]	CCG
Interspec	CCG Sir John Franklin tech coating spec 2021 DD	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
	Ingedrive – Internal fiber optics connectors renewal procedure	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
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	Contractor

	including free-fall lifeboats, Rescue boats and fast rescue boats, launching appliances and release gears	
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 are to 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
S62-190-077	Fire Control and Safety Plan
S62-190-077.00-003	Fire Zone Drawing
S62-190-085.00-004	Docking Plan
S62-190-085.00-008	Hull Penetrations Plan
S62-190-101.00-010	Profile and Decks (Aft Zone)
S62-190-114.10-001	Rudder Head Box Structure Details
S62-190-151.00-001	Deckhouse Structure
S62-151.00-002	Storm Window Box Install
S62-190-201.10-001	Machinery Arrangement
S62-190-201.20-001	Equipment Removal Routes
190-235.10-510	Electric Propulsion System Cable Diagram
S62-190-243.10-011	Wartsila Propeller Drawing
S62-190-256.10-001	SW Cooling System Diagram
S62-190-324.10-235	Electrical System One Line Diagram
S62-190-501.00-001	Material Standard for Pipes, Valves and Fittings
S62-190-521.00-001	Firemain System Diagram
S62-190-533.10-002	Domestic Fresh Water System Diagram
S62-190-541.10-001	Fuel Oil Fill and Transfer System Diagram
S62-541.10-002	Internal Fuel Transfer Meter Installation
S62-190-562.00-001	Rudder and Stock Arrangement
S62-190-568.10-003	Bow Thruster Arrangement
S62-190-583.20-001	Lifesaving Equipment Plan
S62-190-601.00-001	General Arrangement
S62-190-602.00-001	Hull Designation and Markings
S62-190-633.00-001	Cathodic Protection
S62-190-633.20-510	Cathodic Protection Impressed Current Cable Diagram
S62-190-672.10-001	Working Deck Arrangement
S62-190-801.00-001	Tank capacity plan
WM894-002	SIR JOHN FRANKLIN CCTV CAMERAS

WM894-003_01	SIR JOHN FRANKLIN TVRO LAYOUT
WM894-003_02	SIR JOHN FRANKLIN TVRO CABLE SCHEDULE
WM894-004	SIR JOHN FRANKLIN VESSELINK LAYOUT
VSY-100-451	Brackets and Tripping Brackets
20-140-132-01	Working Deck Structural Modifications R1

G 1.2.3 Tanks

G 1.2.3.1 Listed are the tanks found on board the CCGS Sir John Franklin with their Location by frame number and capacity (Where available). These are to 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			
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
	CAPACITY OF 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
	CAPACITY OF 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 Sir John Franklin
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:

- 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 is to 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, material 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 Miscellaneous Information

G 1.4.1 Occupational Health and Safety

- G 1.4.1.1 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 by specification item S 1.6.
- G 1.4.1.2 When the Contractor has Care and Custody of the vessel, the Contractor's Safety Management System, must be in effect and must be in accordance with the applicable OHS regulations and procedures.
- G 1.4.1.3 When the Contractor works on the vessel while in the Care and Custody of the Canadian Coast Guard, the Safety Management System of CCG must be followed.
 - i) The Contractor and the Contractor's employees, including any subcontractors must attend a safety orientation meeting of the vessel prior to the commencement of any work in order to familiarize the Contractor's employees with ship specific hazards and permit systems for work protocols as well as procedures for Security, Hazard Prevention, Hazard Intervention and Pre-Job Safety Assessments. The Contractor will have access to an uncontrolled copy of the Fleet Safety Manual (FSM).
 - ii) The Contractor must comply with the FSM and shipboard work instructions, in addition to the applicable Canada Labour Code regulations, while performing work involving the following;

- Hot Work;
- Work Aloft;
- Confined Space Entry;
- Gas Freeing for Entry and Hot Work;
- Lock Out/Tag Out;
- Pre-Job Safety Assessments

- iii) For the purpose of the Lock Out/Tag Out procedure the Contractor must supply locks and locking devices for the Contractor's employees in addition to those provided by the Chief Engineer for the ship's crew.
- iv) 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 for the Contractor's and subcontractors employees as required.

G 1.4.1.4 The Contractor must identify a specified person who is responsible for the safety management of the work site. The Safety Manager must insure that daily safety rounds are carried out and that safety issues are identified and safety precautions are maintained.

G 1.4.1.5 Areas that pose a hazard as a result of the specification work are to be secured and clearly identified by the Contractor with signage to advise and protect all personnel from the hazard in accordance with applicable regulations.

G 1.4.1.6 The Contractor must follow the Covid-19 requirements set out in the document 20200403 – COVID-19-NSOP-511.

G 1.4.1.7 The Contractor must present all Covid-19 related requirements to the CGG to be implemented by the TA and applicable CG Staff.

G 1.4.2 Lead Paint and Paint Coatings

G 1.4.2.1 The Contractor must not use lead based paints.

G 1.4.2.2 CCG ships have been painted with lead based paints in the past and as a result some of the Contractor's processes such as grinding, welding and burning may release this lead from the coatings. The CCG will provide copies of all available lead testing results.

G 1.4.2.3 All painting must be done as per S62-190-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule and the Interspec Paint Specification. In case of conflict the Interspec Paint Specification takes precedence.

G 1.4.3 Asbestos Containing Materials (ACM)

- G 1.4.3.1 The Contractor must use insulation that contains 0% ACM.
- G 1.4.3.2 The Contractor will be supplied the most recent copy of the vessel's Inventory Of Hazardous Materials, by CCG prior to Assumption of Custody.
- G 1.4.3.3 Handling of any asbestos containing materials must be performed by trained personnel and/or a company certified in the removal of asbestos in accordance with Federal, Provincial and Municipal regulations.
- G 1.4.3.4 The Contractor must provide the TA with disposal certificates for all asbestos containing material removed from the vessel indicating that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.
- G 1.4.3.5 The vessel maintains an Inventory Of Hazardous Materials under ABS's Register which states in Part A.1A Summary of Asbestos Status: Material Declarations confirms that no asbestos has been used in the construction of this vessel. The Contractor must provide an "Observation Report (OR)" with reference to any concerns or intentions in regards to asbestos containing materials not already specified. Any approved work resulting from the OR will follow the Additional Work Procedures.

G 1.4.4 Confined Spaces

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

G 1.4.5 Hot Work

G 1.4.5.1 The Contractor must, as a minimum, ensure the following items are followed when conducting hot work while in their care and custody:

- a) The compartment(s) affected must be certified gas free by a qualified person. 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.
- b) 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.
- c) The Contractor must remove from the vicinity all portable combustible materials within 2m of hot work;
- d) The Contractor must use protective material must be used to prevent the spread of sparks, protecting electrical cables and other services;
- e) 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 1.4.5.2 Any hot work carried out onboard the vessel during the contract period must be conducted in accordance with the FSM.

G 1.4.6 Contractor Welding Requirements

G 1.4.6.1 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.

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 1.4.6.2 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 1.4.6.3 A weld design schedule must be submitted to the TA and ABS in drawing form for review prior to commencing any welding work

G 1.4.7 Work Aloft

G 1.4.7.1 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 1.4.8 Electrical Equipment

G 1.4.8.1 With the ship in 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 1.4.8.2 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 1.4.8.3 Any lock-out requirements onboard the vessel during the contract period must be conducted in accordance with the safety management system.

G 1.4.8.4 The TA must be notified of all such ongoing work.

G 1.4.8.5 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 1.4.9 Workplace Hazardous Materials Information System (WHIMS)

- G 1.4.9.1 The Contractor must provide the TA with Material Safety Data Sheets (MSDS) for all Contractor and subcontractor supplied WHIMS controlled products. MSDS sheets are to be the formats requested in the Documentation section of the General Notes.
- G 1.4.9.2 All MSDS sheets must be maintained in accordance with OHS procedures.
- G 1.4.9.3 The TA will provide the Contractor with access to MSD sheets for all controlled products on the ship for all specified work items on request.

G 1.4.10 Smoking in the Work Space

- G 1.4.10.1 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 1.4.11 Touch-up / Disturbed Paint

- G 1.4.11.1 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 1.4.12 Contractor Furnished Materials (CFM) and Tools

- G 1.4.12.1 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 1.4.12.2 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 1.4.12.3 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.
- G 1.4.12.4 The Contractor must provide all equipment, devices, tools and machinery such as crane, staging, scaffolding, hoarding, and rigging necessary for the completion of the work in this specification.

- G 1.4.12.5 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 1.4.13 Government Supplied Materials (GSM) & Tools

- G 1.4.13.1 All tools are Contractor supplied unless otherwise stated in the technical specifications.
- G 1.4.13.2 Where tools are supplied by the TA they must be returned by the Contractor in the same condition as when they were borrowed. Borrowed tools must be inventoried and signed for by the Contractor on receipt and return to the TA.
- G 1.4.13.3 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 are to be covered by the PSPC 1379 Work Arising, Procedures for Design Change or Additional Work.

G 1.4.14 Storage

- G 1.4.14.1 Equipment (i.e. covers, cowling and other items that may need to be removed and stored) must be stored in accordance with the equipment manufacturer's or equipment vendor's specific storage instructions. The Contractor must make these instructions available to the TA.
- G 1.4.14.2 All equipment and items must be stored in such a manner so as to be easily accessible for inspection. No items are to be stored directly on floors.

G 1.4.15 Regulatory Inspections and/or Class Surveys

- G 1.4.15.1 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 1.4.15.2 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.
- G 1.4.15.3 The Contractor must not substitute inspection by the TA for the required regulatory inspections.

G 1.4.15.4 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 1.4.15.5 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 1.4.16 Contractor Inspections

G 1.4.16.1 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 1.4.16.2 The Contractor must take a before photograph of conditions prior to removing any items. These photographs are to be in accordance with the Documentation section of the General note, named according to the specification section that resulted in removing those items.

G 1.4.16.3 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 1.4.17 Restricted Areas

G 1.4.17.1 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 1.4.17.2 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 1.4.18 Contractor Inspections

- G 1.4.18.1 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 1.4.18.2 The Contractor must take a before photograph of conditions prior to removing any items. These photographs are to be in accordance with the Documentation section of the General note, named according to the specification section that resulted in removing those items.
- G 1.4.18.3 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 1.4.19 Recording of Work in Progress

- G 1.4.19.1 The TA may record any work in progress using various means including, but not limited to photography and video, digital or film.

G 1.4.20 Access for Maintenance, Installation, and Removal.

- G 1.4.20.1 The layout of newly installed machinery and equipment must be designed and constructed to permit ready access for routine maintenance, operational checks and operational inspections without disturbance of other machinery, equipment or structure.
- G 1.4.20.2 The Contractor must determine best routes for installing and removing equipment. All lifting points currently fitted on the ship must be treated as uncertified, and must be certified before use by the Contractor.
- G 1.4.20.3 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 1.4.20.4 Manufacturer's recommended removal clearances must be allowed for.
- G 1.4.20.5 After equipment installation and/or removal the Contractor must make good all equipment relocations, blemishes, and penetrations and must return the affected areas of the ship to the As-Delivered working condition.

G 1.4.21 Assembly of Components

- G 1.4.21.1 The Contractor must ensure that during installation of specified equipment, that parts and assembled equipment are cleaned of smudges, spatter or excess solder,

weld metal and metal chips or any other foreign material which might detract from the intended operation, function, or appearance of the equipment. (This would include any particles that could loosen or become dislodged during the normal expected life of the equipment). All corrosive material must be removed. This cleaning must take place before the parts are assembled into the equipment.

G 1.4.21.2 Covers, cowlings and components damaged by the Contractor must be replaced with a new CFM cover, cowling, or component.

G 1.4.21.3 Where torque specifications are not provided by the manufacturer, standard SAE nut and bolt torques must be used.

G 1.4.22 Protection of Equipment

G 1.4.22.1 The Contractor must take measures to ensure that surfaces and components of equipment installed on the vessel are protected against damage, soiling, and contamination as a result of contracted work.

G 1.4.22.2 All electrical and electronic equipment and components must be protected during the contract against physical damage, internal damage, and by the effects of adverse temperatures or other environmental conditions.

G 1.4.22.3 The Contractor must protect equipment that could be damaged as a result of movement of materials and equipment nearby. The Contractor must also protect equipment from nearby sources of contamination including but not limited to burning, welding, grinding and painting.

G 1.4.22.4 Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance must be returned to As Delivered condition by the Contractor.

G 1.4.22.5 All openings in machinery and/or systems prior to connections being made must be kept covered by suitable inserts or covers at all times.

G 1.4.22.6 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 1.4.22.7 Physical protection including but not limited to plastic sheets, fireproof covers, heavy weight material covers, wood plugs, wood encasements and heaters must be used as required.

G 1.4.22.8 The Contractor must protect the vessel from the possibility of vermin infestation (insect/mammal/bird). If an infestation does occur during the contract period the Contractor must bear all costs to ensure the vessel is made vermin free before the vessel's departure and contract completion.

G 1.5 Documentation

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

G 1.5.2 Data Book

G 1.5.2.1 The Contractor must provide all documentation generated as a result of specified deliverables, in 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.

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

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

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

G 1.5.3 File Naming

G 1.5.3.1 File naming must be in the following format: *Specification#.# – Date (yyyy-mm-dd) – File Name Describing Information*. For Example: “G1.0 – 2013-12-01 – Details of file naming.pdf”.

G 1.5.4 E-mails

G 1.5.4.1 Any files sent to the CA/TA by e-mail must be named as per the “File Naming” section of this specification. All files that are e-mailed must have in the subject name: “Contract# - DATA BOOK – Date – Specification #”. For Example: ***F1782-20C186 – DATA BOOK – 2020-11-30 – G1.0 General Notes*** . Files sent by e-mail must also be included in the “Data Book”.

G 1.5.5 File Formatting

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

G 1.5.5.2 All reports, test results, certificates, or raw data obtained by the Contractor in electronic format must be converted to unprotected Adobe PDF formatted files and

named according to the “File Naming” section of this specification. Both the original and the converted copy are to be provided as part of the Data Book.

G 1.5.6 Photographs

- G 1.5.6.1 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 1.5.7 Measurements, Calibrations, and Readings.

- G 1.5.7.1 All measurements, calibrations and readings recorded, must be signed by the person taking the measurements, dated and scanned into electronic format as part of the Data Book.
- G 1.5.7.2 Recorded dimensions must be to a precision of three decimal places (unless otherwise stated) in the measuring system currently in use on the vessel.
- G 1.5.7.3 The Contractor must provide to the TA current and valid calibration certificates for all instrumentation used in the Test and Trials Plan showing that the instruments have been calibrated in accordance with the manufacturer’s instructions. These copies are to be provided as part of the Data Book under any specification where measurements are required.

G 1.5.8 Test Inspection Records and Certificates

- G 1.5.8.1 Test Inspection Records and Certificates are identified as a deliverable in the individual specification item requesting them.
- G 1.5.8.2 Test Inspection Records and Certificates must be included as a separate section in the DATA BOOK and indexed/arranged in numeric order by specification number.
- G 1.5.8.3 The Contractor is responsible for maintaining a complete and accurate record of all tests and trials conducted on the vessel and on each piece of equipment. Prior to the commencement of a trial, all relevant documentation and associated test sheets, including shop test data, must be complete and attached to the trials agenda.
- G 1.5.8.4 All tests and trials data must be legible both in hard copy and electronic format. If necessary, handwritten records may require transcription into electronic format in order to be acceptable. The original must be signed by 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 1.6 Drawings

- G 1.6.1 This section, to be referred to as the Drawings section of the General Notes, is intended to be used as reference for the minimum standards when specified deliverables are to be drawings.
- G 1.6.2 The Contractor must have on staff or through a subcontractor a person qualified and experienced in the use of AutoCAD who will create or modify drawings that result from the work.
- G 1.6.3 The Contractor must comply with the Canadian Coast Guard National CAD Standards titled “*Computer Aided Design (CAD) using AUTOCAD*” provided.
- G 1.6.4 Drawing disks must be clearly labeled with the Contract Number, file names and drawing numbers. If a complete listing exceeds the label size, a “readme.txt” file in ASCII format must be provided with each disk. A printed copy of the Readme file must accompany each disk. Disks must be labeled As-Fitted drawings for those drawings that have been approved and finalized.
- G 1.6.5 Final As-Fitted prints/plots must not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.). Drawings containing mark-ups must be revised and re-printed/plotted.
- G 1.6.6 The Contractor must prepare all the working drawings necessary for the project requirements and modernization work.
- G 1.6.7 The Contractor must furnish all drawings required by sub-contractors, trades and other consultants.
- G 1.6.8 Schematic drawings of systems must include all pertinent system information, including sizes, dimensions, labeling, equipment locations, and all information relating to system fittings.
- G 1.6.9 The Contractor must have in place a complete system of documenting and controlling all drawing revisions affected by the work of this project. Drawing numbering system and titles must match the original drawings for clarity and include a revision number with date.

G 1.6.10 Guidance Drawings

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

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

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

G 1.6.11 As Fitted Drawings

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

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

a) Two (2) electronic copies of the latest revision of each As-Fitted drawing.

G 1.6.11.3 Any plotted drawings must be on standard ANSI paper sizes.

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

a) DXF format;

b) TIFF format;

c) PDF format.

G 1.7 Manuals

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

G 1.7.2 General

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

a) CCGS Sir John Franklin;

b) Equipment Identification;

c) Equipment Manufacturer;

d) Date.

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

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

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

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

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

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

G 1.7.3 Operation Manuals – As-Fitted

G 1.7.3.1 Operation manuals must include the following items:

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

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

- a) System level diagrams describing the overall scheme of the software/hardware system;
- b) The functional specifications, which must describe in detail the functional capabilities of the system and each software components; and

- c) Project specific program listings including all comments describing the details of the code functions.

G 1.7.4 Maintenance Manuals – As-Fitted

G 1.7.4.1 Maintenance manuals are to include:

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

G 1.8 Identification

G 1.8.1 Nameplates

G 1.8.1.1 Nameplates are identified as a deliverable in the individual specification item requesting them.

G 1.8.1.2 All nameplates must be in English, except where required in English and French by TCM, or ABS, for reasons of emergency operation.

G 1.8.1.3 Lettering must be clear and concise with the minimum use of abbreviations. Primary information must be given in larger size lettering than secondary information.

G 1.8.1.4 The type of nameplates must suit the location in the vessel as specified below:

G 1.8.1.5 Plastic:

- a) Laminated plastic nameplates, black with white core engraved through to the center core, must be provided for all devices located on the exterior surfaces of switchboards, MCC's, or local control panels. Nameplates must be secured to the equipment with machine screws.
- b) New nameplates to be fitted on the existing equipment must be consistent in size and lettering with those already fitted or those being replaced.

- c) Nameplates indicating feeder circuits must identify each circuit by name and number and the fuse size or trip element rating.
- d) The Following Labels must be of laminated plastic, red with white core engraved through to the center core:

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 1.8.1.6 Engraved on Metal:

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

G 1.8.2 Wire Labelling

- G 1.8.2.1 Wire Labelling is identified as a deliverable in the individual specification item requesting them.
- G 1.8.2.2 All permanently installed cables must be tagged with the circuit designation at all points of connection and on both sides of bulkheads, decks, etc. Tags must be of metal compatible with the armor or cable sheathing. Both ends of the tags must be strapped to the cable with compatible metal strap after all painting has been completed. Straps must pass through holes in the tags so that tags are positively secured. Strap ends must be permanently folded and crimped. Adhesives of any kind will not be acceptable.
- G 1.8.2.3 All wiring in panels specified to be labelled must be labeled with the Cable Number and their conductor # unless otherwise specified in equipment installation drawings.

G 1.9 Piping

- G 1.9.1 All materials used for potable water systems are to be suitable for that use and for the intended pressure and temperatures.
- G 1.9.2 All piping to be as per the Material Standard for Pipes, Valves and Fittings.
- G 1.9.3 The Contractor must ensure that new pipe joint methods are compatible with existing vessel methods and equipment. Specialized tools required for pipe connections are to be supplied to the CCGS Sir John Franklin if the equipment does not already exist on board.
- G 1.9.4 Transition joints between old and new piping are to exceed the strength of the original piping.
- G 1.9.5 Piping to be well supported at regular intervals and supported such that no rattling of pipes occur during use or when shut off.
- G 1.9.6 The Contractor must maintain fire ratings accordingly as piping transitions through fire zones.
- G 1.9.7 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 1.9.8 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 1.9.9 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.

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, craneage, 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 TOWING TO CONTRACTOR'S FACILITY

- S 1.2.1 The Contractor must assume custody of the vessel at the Victoria Coast Guard Base at 25 Huron Street, Victoria, British Columbia.
- S 1.2.2 The Contractor must tow the vessel from the Coast Guard Base to the Contractor's facility.
- S 1.2.3 The Contractor is responsible for all aspects of the towing operation. There will be no CCG personnel on board during the tow.
- S 1.2.4 CCG personnel will lock the propeller in position before the Contractor assumes custody of the vessel. While under tow, the propeller will be locked in position.
- S 1.2.5 All towing must be in accordance with the Canadian Coast Guard Fleet Safety Manual 7.C.4 Towing Operations.
- S 1.2.6 The Contractor must provide all lines and securing arrangements necessary to tow the vessel and secure it at the Contractor's facility.

S 1.3 BERTHING

- S 1.3.1 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 1.3.2 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 sufficient clearance under the vessel to ensure the vessel does not touch bottom.
- S 1.3.3 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 1.3.4 The berthing and mooring facilities must be suitable for a vessel of this size in local weather / tide / sea conditions. Fenders must be supplied by the Contractor to prevent the vessel from contacting the wharf in said local conditions.
- S 1.3.5 The length of the dock must be a minimum of 90% of the keel length of the vessel.

- S 1.3.6 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 1.4 MOORING LINES

- S 1.4.1 The Contractor must provide the labour required to secure the vessel alongside the facilities.
- S 1.4.2 The Contractor must provide CFM mooring lines while vessel is secured alongside the Contractor's facilities.

S 1.5 GANGWAYS

- S 1.5.1 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 1.5.2 Any movement of the gangway required by the Contractor is the responsibility of the Contractor.
- S 1.5.3 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 1.6 ELECTRICAL POWER

- S 1.6.1 The Vessel's shore power cable and associated plug connection may be used by the Contractor. However, the Contractor is responsible to replace the entire length of cable with an equal quality, size, and length of cable should the shore power cable be damaged during the contract period. Damage to the shore power cable also includes damage to the plug-in connections which must be replaced if damaged. Splicing any section of the cable is not acceptable.
- S 1.6.2 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 1.6.3 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 1.6.4 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 1.6.5 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.
- S 1.6.6 The Contractor must supply two cables each providing 600 Volt Alternating Current, 60 hertz, 3 Phase, 400 Ampere electrical power, through the vessel's shore power system, for the duration of the contract.
- S 1.6.7 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. The final price for this item shall be determined at the end of the contract once the meter has been read. The final power consumption total shall be adjusted up or down via PSPC 1379 Work Arising procedure.

S 1.7 ACCOMMODATION/MACHINERY AREA DECK PROTECTION

- S 1.7.1 The Contractor must supply and install ¼" hard board deck covering protection on all accommodation decks. Hard board edges and joints must be taped and damaged protection must be repaired within 24 hours of receiving damage.
- S 1.7.2 The Contractor must protect decks in machinery spaces from damage to structure and coating systems during the process of specified work. Damage to the coating systems or structure of machinery spaces decks must be repaired by the Contractor. Any coatings must be applied according to manufacturer's specifications.
- S 1.7.3 Removal and storage of components that may be subject to damage during the work period, such as deck plates, grating, etc. is the responsibility of the Contractor.

S 1.8 HEATING

- S 1.8.1 The Contractor must supply the heating onboard and around the vessel to facilitate specified work.

S 1.9 POTABLE WATER SUPPLY

- S 1.9.1 The Contractor must supply potable water to re-fill the vessel's potable water tanks to the same soundings as when the vessel entered the dry dock.

- S 1.9.2 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 3.2 Shore Supply, 3.6 Potable Water Testing.

S 1.10 FIRE MAIN CHARGING

- S 1.10.1 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 1.10.2 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 1.10.3 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 1.10.4 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 1.11 BLACK WATER SERVICES

- S 1.11.1 The Contractor must dispose of, utilizing a vacuum truck, an estimated 10 cubic meters of black water, and CFM wash water, from the vessel's sewage system. The Contractor must flush the system with the CFM wash water.
- S 1.11.2 The Contractor must supply disposal certificates for all black water removed from the vessel and the disposal certificates shall clearly indicate the quantity removed.

S 1.11.3 GARBAGE REMOVAL

- S 1.11.4 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 1.11.5 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 are to 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 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 photos must be provided to the TA within 48 hours of the start of contract on a memory stick, CD, or DVD.
- 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 FIRE PROTECTION

- S 1.14.1 The Contractor must ensure protection against fire 24 hours/day and 7 days/week throughout the contract period.
- S 1.14.2 The Contractor must ensure the isolation, removal, installation and reactivation of the shipboard fire detection and suppression systems or any components thereof, is performed by a qualified technician. When the shipboard fire detection or fire suppression system is deactivated or disabled by the Contractor during the contract

period, the system must be recertified by a qualified technician prior to the end of the work period, as fully functional. A signed and dated original copy of the certificate must be delivered according to the Documentation section of the General Notes.

- S 1.14.3 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.
- S 1.14.4 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.
- S 1.14.5 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.
- S 1.14.6 The vessel is fitted with a Autronica Autoprime Interactive Fire Detection System with detector heads throughout the vessel. The system will be shut down 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:
- i) Recertify the system using a technician certified to work on systems from this manufacturer.
 - ii) Provide a copy of the Technician's certificate in accordance with the Documentation section of the General Notes.
 - iii) Provide a copy of the system's recertification in accordance with the Documentation section of the General Notes.

S 1.15 PROJECT FACILITIES

- S 1.15.1 The Contractor must provide 1 secure office space. The space must have 1 desk for the TA and delegates. The space is for the exclusive use of Government personnel, must be within suitable distance to rest rooms, and must be environmentally controlled. The space must be available from one week prior to the work commencing to two weeks after vessel acceptance.

- S 1.15.2 Each desk must include a minimum of 2 chairs; and have a minimum of 2 electrical plugin sockets per desk.
- S 1.15.3 There must be a telephone that has a direct outside telephone line. The cost of long distance telephone calls must be directly billed to CCG. Cellular services are not acceptable.
- S 1.15.4 Each desk must be provided with a wired Ethernet LAN connection, or wireless connection, with direct internet access. The Contractor must supply a broadband high speed internet service to this connection.
- S 1.15.5 The Contractor must provide 4 reserved parking spots adjacent to building with offices specified. Parking spaces are for the exclusive use of Government Personnel; 3 spots for the TA and 1 for the CA and are to be available 24-7 from one week prior to the work commencing to one week after vessel acceptance.

S 1.16 PORTABLE TOILETS

- S 1.16.1 The Contractor must provide at least one portable toilet on the well deck of the ship or on the dock adjacent to one of the gangways. The Contractor must service and empty the toilets regularly during the refit period. The toilet or toilets must include a hand sanitation station and will be for the convenience of shipyard and CCG staff.

S 1.17 CONTRACTOR'S ACCESS TO VESSEL FACILITIES

- S 1.17.1 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.

S 1.18 SECURITY

- S 1.18.1 The Contractor must provide security for the vessel during quiet hours at the Contractor's facility. Security rounds must be conducted at minimum every 4 hours during quiet hours 7 days a week including holidays during the entire work period.
- S 1.18.2 The Contractor must provide Security log books which must be signed during every set of rounds in the following spaces:
- 1) Bridge;
 - 2) Bow Thruster Compartment;
 - 3) Main Machinery Space;
 - 4) Propulsion Motor Space;
 - 5) VFD Compartment;

6) Steering gear Compartment.

10.0 SAFETY AND SECURITY

10.1 LIFERAFTS ANNUAL INSPECTION

10.1.A Identification

- A.1 The intent of this specification is to have the annual inspections and service completed on all 4 of the vessel's liferafts.

10.1.B Reference

B.1 Equipment Data

B.1.1 2 x 37 Person Davit Launched Liferafts

- i) Manufacturer: Survitec Group
- ii) Model: CCG 37 DL PA RND
- iii) Part Number: X0953
- iv) Weight: 290 kg
- v) Emergency Packs: TC A
- vi) Date of Manufacture: November 2014
- vii) Serial Numbers: XDC6FS27K415 & XDC6FS28K415

B.1.2 1 x 37 Person Throw Overboard Type Liferaft

- i) Manufacturer: Survitec Group
- ii) Model: CCG 37TO SR PA 1PL/1BL
- iii) Part Number: Z0949
- iv) Weight: 312 kg
- v) Emergency Pack: TC A
- vi) Date of Manufacture: November 2014
- vii) Serial Number: XDC6FS29K415

B.1.3 1 x 10 Person Throw Overboard Type Liferaft

- i) Manufacturer: Survitec Group

- ii) Model: SurvitecZodiac MK IV TO
- iii) Part Number: 90859002
- iv) Emergency Pack: B
- v) Date of Manufacture: February 2021
- vi) Serial Number: 5085910205894

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.

10.1.C Statement of Work

- C.1 The Contractor must subcontract the inspection and recertification of the liferafts to an Approved ABS service facility that meets the requirements of the Original Equipment Manufacturer (OEM) certification.
- C.2 The Contractor must arrange for transportation of the liferafts via commercial bonded carrier to and from the subcontractor's premises for servicing / inspection.
- C.3 The Contractor must remove the liferafts and their hydrostatic releases from their stowed positions on the vessel and load them for transportation.
- C.4 The Contractor must return the liferafts and their hydrostatic releases to the vessel prior to the conclusion of the work period.
- C.5 The Contractor must place the liferafts and their hydrostatic releases into their stowed positions on the vessel.
- C.6 The Contractor must provide the TA with 24 hours advance notice before delivery of the liferafts to the vessel.

10.1.D Proof of Performance

D.1 Inspection Points – Not Used

D.2 Testing/Trials

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

D.3 Certification

- D.3.1 The Contractor must provide the liferaft certificates to the TA prior to the conclusion of the contract.

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.
- D.4.2 The Contractor must provide all test certificates, and endorsement of safe operation required by ABS for certification to the TA prior to the conclusion of the contract.
- D.4.3 The Contractor must provide a list of the work that was performed on each liferaft to the TA.

10.2 MACHINERY VENTILATION SERVICE

10.2.A Identification

- A.1 The Contractor must overhaul two of the Engine Room ventilation fan/motor assemblies in accordance with regulatory requirements and manufacturer's specifications.
- A.2 The Contractor must show the fan/motor assemblies to ABS when the overhaul is complete for the purpose of receiving a survey credit as part of the vessel's continuous survey system.

10.2.B Reference

B.1 Equipment Data

B.1.1 Axial Supply Fan - Engine Room

- i) Manufacturer: Daltec Process Fans
- ii) Model: DVA
- iii) Part Number: DVA 32-21-1780 FB ARRT 4
- iv) Weight: 658 kg
- v) Airflow: 33165 m³/h at 850 Pa

B.1.2 Motors

- i) Manufacturer: WEG
- ii) Model: W22 - NEMA PREMIUM EFFICIENCY
- iii) Part Number: CT025604W2N280B01S
- iv) Weight: 176 kg
- v) TEAO Frame-Pole: 284/6T – 4
- vi) Power: 16.55 kW at 1780 RPM
- vii) Tag: Aft Motor: 514.10A0601 / VS-1-01-06.1, Center Motor: 514.10A0602 / VS-1-01-06.2

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.

10.2.C Statement of Work

- C.1 The Contractor must service the aft and center Machinery Ventilation Fan Motors as detailed in this specification and per manufacturer's recommendations.
- C.2 The Contractor must remove the aft and center two silencers and the two fan/motor assemblies from Compartment 1A38. The fans are located on the main deck and extend to the 01 deck. The fans are accessed from the ER Port Side 2nd deck. To remove the fan, the silencers must be removed first, followed by the fan/motor assembly. The diffusers, fans/motors, and associated shrouding need to be removed through the damper/cover access, port side 01 deck (near the FRC).

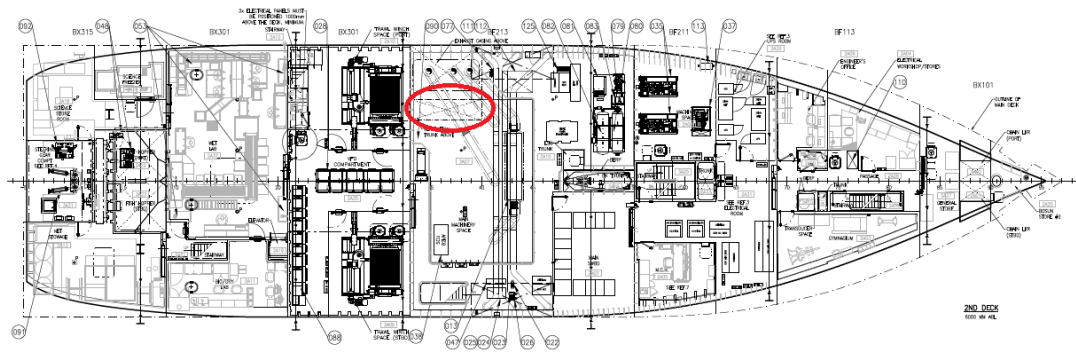


Figure 1: ER Fan Location

- C.3 The Contractor must blast both removed fan shroudings to white metal.
- C.4 After blasting, the Contractor must fully paint both removed fan shroudings. All painting must be as per paint manufacturer's recommendations and the Coatings and Surface Treatment Schedule.
- C.5 The Contractor must install appropriate grease fittings (inlet and vent for each bearing) in the motors as per manufacturer's instructions. The grease fittings must be extended through the fan shrouding as such to be accessible by ship's crew for maintenance.
- C.6 The Contractor must open, clean, and inspect the interior of both fan/motor assemblies either onboard the vessel or at the Contractor's facility in accordance with the

manufacturer's recommendations. The Contractor must indicate the location where the fan/motor assemblies will be serviced in their quote.

- C.7 The Contractor must layout both fan/motor assemblies in a way that accommodates cleaning, inspecting, repairing, and surveying.
- C.8 The Contractor must replace the motor bearings with CFM OEM bearings of the same size, type, and of equal or better quality in accordance with the manufacturer's specification.
- C.9 The Contractor must electrically test the motors. Testing must be done to manufacturer's specifications and must include a minimum of a voltage stress test, a winding resistance test, a PI test, and a surge test. When measuring the winding insulation resistance, each phase must be insulated and tested separately.
- C.10 Following the completion of the insulation resistance test the Contractor must identify any coil or winding damage. The Contractor must repair all coil or winding damage. The Contractor must prepare the windings in accordance with manufacturer's specifications to eliminate any possible grounding between phases. Any required repairs are to be via PSPC 1379 Work Arising Procedure.
- C.11 The Contractor must arrange for ABS to survey both fan/motor assemblies when they are ready for, but not before, reassembly. The Contractor must provide the TA the opportunity to witness the survey.
- C.12 After servicing, the Contractor must fully reinstall all of the removed components.
- C.13 The Contractor must demonstrate the successful function of the fan/motor assemblies to the TA.
- C.14 The Contractor must provide an overhaul report for both fan/motor assemblies at the time of testing and trials to the TA.

10.2.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must consult with ABS to determine any required inspections. TA to be informed of any required ABS inspections.
- D.1.2 The Contractor must provide the TA and ABS the opportunity to inspect both fan/motor assemblies for the purpose of receiving a survey credit under the vessel's continuous survey.
- D.1.3 The Contractor must provide the TA the opportunity to attend ABS surveys during the inspection of the fan/motor assemblies and during the testing.

D.2 Testing/Trials

- D.2.1 After re-installation, the Contractor must test the fans for proper operation and correct rotation.

D.3 Certification

- D.3.1 The Contractor must provide the TA with all certificates generated in the rebuild, inspection, and testing of two fan/motor assemblies in accordance with the General Notes.
- D.3.2 The Contractor is responsible for ensuring that ABS has approved all aspects of the overhaul. ABS sign-off of regulatory items inspected will be the responsibility of CCG, specifically the CE.

D.4 Documentation

- D.4.1 The Contractor must provide an overhaul report for the two fan/motor assemblies. The Contractor must detail all findings of the inspection and insulation readings, all component replacements, and the condition of all components of the fan/motor assemblies in the overhaul report. The Contractor must supply a PDF electronic copy of the overhaul and inspection report to the TA before the close of the contract.

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 conducting an underwater hull survey by ABS and other work specified.
- A.2 The vessel must be docked at the Contractor's facility, and the vessel hull must be surveyed by the TA and by ABS. On completion of all related work, the vessel must be undocked and secured alongside at the Contractor's facility.

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 The Contractor must provide the ship's crew the opportunity, alongside and prior to docking, to complete a tank condition report (soundings). The report must be signed by the TA and the Contractor's Dock Master. This report must be included in the shipyards final docking report.
- C.2 A docking report must be completed which indicates current tank condition, docking plan and block locations and be in accordance with the Documentation section of the General Notes.
- C.3 The TA must be afforded the opportunity to review the docking report prior to docking.
- C.4 The 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.

- C.5 The hull must be docked so that shell grids are accessible for inspection and removal.
- 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.
- 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.
- C.10 The Contractor must inform the Chief Engineer of the vessel when electrical generation on board the vessel is to be discontinued.
- 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.
 - 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. 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 50 square meters of heavy marine growth to be hand scraped. Adjustments to this will be via PSPC 1379 Work Arising Procedure.
 - c) Hull framing numbers must be marked on each side of the hull, every five frame spaces, to facilitate a ABS hull survey.
- C.13 The Contractor must provide a total of 12 hours (non-continuous) of man lift services, with operator, for the ABS surveyor for inspection purposes. This number will be adjusted via PSPC 1379 Work Arising Procedure if necessary.
- C.14 Upon the completion of pressure washing the hull, and marking the hull frame spacing, the Contractor must co-ordinate for ABS to inspect the hull. The Contractor must provide the TA the opportunity to attend at the time of ABS inspection.

- C.15 The Contractor must ensure that all docking plugs have been properly replaced and the TA been afforded the opportunity to view before any flooding procedures start.
- C.16 Prior to undocking, the Contractor must provide a tank condition report to be verified by TA in accordance with the Documentation section of the General Notes.
- C.17 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.18 The dock must not be flooded until the approval of the TA has been given.
- C.19 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.
- C.20 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.21 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.
- 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.

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.

D.4 Documentation

- D.4.1 The Contractor must provide a Docking Report in accordance with the Documentation section of the General Notes.
- D.4.2 The Contractor must provide Tank Soundings, before and after docking in accordance with the Documentation section of the General Notes.
- D.4.3 The Contractor shall provide disposal certificates where applicable for marine growth and contaminated water.

11.2 HULL ANODES

11.2.A Identification

- A.1 The intent of this specification is to renew the cathodic protection anodes on the vessel.

11.2.B References

B.1 Equipment Data

- B.1.1 The Contractor must quote on the supply and renewal of the following anodes:

- 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

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 replace all anodes as per existing or equivalent. Any anodes that are severely depleted must be brought to the attention of the TA by the Contractor. Severely depleted anodes may need to be replaced with a larger size. Supply of larger anodes must be CFM and will be addressed via PSPC 1379 Work Arising procedure.
- C.2 The Contractor must remove existing anodes. All anodes and fairing plates must be removed. The Contractor must remove all weld scabs and gouges caused by removal of existing anodes by welding over and grinding flush.
- C.3 Anode straps and fairing plates must be primed and painted in accordance with the Coatings and Surface Treatment Schedule. Prior to the 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 S62-190-633.00-001_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.
- C.6 The Contractor must protect all anodes from paint overspray until underwater paintwork is complete.

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.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation – Not Used

11.3 SEA INLET SURVEY

11.3.A Identification

- A.1 The intent of this specification item is to prepare the sea inlets for ABS inspection.
- A.2 All openings to the sea must be examined internally and externally by the ABS Surveyor.

11.3.B References

B.1 Equipment Data

- B.1.1 List of Sea Inlets:

Compt.	Type	Location	Frame
5A06	Sea Chest	Port Side	53-55
5A14	Sea Bay	Port Side	52-55
5A19	Drop Keel Trunk Cutout	Starboard Side Drop Keel Trunk	48-50
5A15	Live Catch/Domestic FW Sea Chest	Port Side Transducer Compartment	69
5A15	Scientific SW Sea Chest	Port Side Transducer Compartment	70

- B.1.2 Note, both Live Catch/Domestic FW Sea Chest and Scientific SW Sea Chest are 200mm, sch 160 steel pipe that is welded to the hull. At the inlet of these “sea chests” are strainer plates that are secured with M8 flat head screws.

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.

11.3.C Statement of Work

- C.1 The Contractor must provide the TA and the ABS the opportunity to inspect all sea inlets for the purpose of receiving a survey credit under the vessel’s continuous survey.
- C.2 The hull must be docked so that shell grids are accessible for inspection and removal.
- C.3 The Contractor must remove all sea inlet and strainer plates. All openings in the plates must be mechanically cleaned to remove all marine growth. Preparation, painting, re-installation, and securing of the grates must be included. Grates must be blasted and

then primed and painted in accordance with the Coatings and Surface Treatment Schedule.

- C.4 The Contractor must remove the bow thruster grates. All openings in the grates must be mechanically cleaned to remove all marine growth. Preparation, painting, re-installation, and securing of the grates must be included. Grates must be blasted and then primed and painted in accordance with the Coatings and Surface Treatment Schedule.
- C.5 The Contractor must remove all marine growth from the sea inlets and the bow thruster tunnel. All internal surfaces of the sea bay, sea chests, drop keel trunk, and thruster tunnel must be hydro blasted with a minimum 3000 PSI fresh water, the remainder of debris must be removed using hand scraping and powered tools. Contractor to quote on 1000 liters of debris disposal. TA must be given the opportunity to view the condition of the sea inlets and the bow thruster tunnel before cleaning.
- C.6 After satisfactory inspection of the sea inlets and bow thruster tunnel by the ABS Surveyor and the TA, the Contractor must reinstall and secure the grates. The Contractor must supply and install new 316L stainless steel nyloc fasteners for securing the grates. In addition grates are to be tack welded in place. Hardening up of any grates, guard bars, docking plugs, and manhole covers must be witnessed by the TA.

11.3.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.
- D.1.2 The TA must inspect the sea bay and sea chests before cleaning.
- D.1.3 The TA and ABS Surveyor must inspect the sea bay and sea chests after cleaning.
- D.1.4 The TA and ABS Surveyor must inspect the sea bay coatings and anodes prior to installing sea inlet gratings and before undocking.
- D.1.5 The Contractor must conduct weld inspections and NDT in accordance with the CCG Welding Specification. Any defects found are to be repaired at Contractor's expense.

D.2 Testing/Trials

- D.2.1 The Contractor must ensure that all glands are leak free during the floating of the vessel. The Contractor will pause the floating of the vessel just before it comes off the blocks for 15 minutes while the glands are witnessed by the TA for leaks.

D.3 Documentation

Copies of the NDT testing must be provided to the TA in accordance with the Documentation section of the General Notes.

11.4 SHIP SIDE VALVES SURVEY

11.4.A Identification

- A.1 The intent of this specification item is to remove and layout for inspection by ABS all overboard ship side valves.
- A.2 All overboard discharge valves must be examined internally and externally by the ABS Surveyor for the purpose of receiving a survey credit as part of the vessel's continuous survey system.

11.4.B Reference

B.1 Equipment Data

- B.1.1 List of Overboard Valves:

Compt.	Valve Tag	Type	System	Frame
3A27	256.10-V0015	6" - BUTTERFLY V/V, LUG TYPE, OVERBOARD	SEA WATER COOLING SYSTEM, MAIN	42
3A27	256.10-V0026	6" - BUTTERFLY V/V, LUG TYPE, OVERBOARD	SEA WATER COOLING SYSTEM, MAIN	59
3A27	256.10-V0048	2-1/2" - BUTTERFLY V/V, LUG TYPE, OVERBOARD	SEA WATER COOLING SYSTEM, MAIN	42
2A27	256.10-V0059	2" - BUTTERFLY V/V, LUG TYPE, TO OVERBOARD	SEA WATER COOLING SYSTEM, MAIN	86
3A27	506.00-V0072	4" - GATE V/V, OBD VALVE FOR SEWAGE TREATMENT PLANT	OVERFLOWS, AIR ESCAPES AND SOUNDING TUBES - GENERAL	40
2A16	521.00-V0034	2" - GATE V/V, OVERBOARD DRAIN	FIREMAIN/FLUSHING (SW) SYSTEM	2
2A08	522.10-V0001	1-1/2" - SDNR, ANGLE V/V, HI-FOG BYPASS OVERBOARD DISCHARGE	SEA WATER SPRINKLER SYSTEM	61
2A04	524.00-V0039	1-1/2" - SDNR GLOBE V/V, SCIENTIFIC SW OVERBOARD DISCHARGE	AUXILIARY SEA WATER SYSTEM - GENERAL	77
2A37	524.00-V0050	2" - SDNR GLOBE V/V, SCIENTIFIC SW OVERBOARD DISCHARGE	AUXILIARY SEA WATER SYSTEM - GENERAL	10
3A03	528.10-V0001	3" - GATE V/V, GALLEY OVERBOARD SHELL VALVE	BLACK AND GREY WATER SYSTEM	60

3A23	528.10-V0014	4" - GATE V/V, BLACK AND GREY OVERBOARD SHELL VALVE	BLACK AND GREY WATER SYSTEM	59
2A10	529.10-V0064	3" - BUTTERFLY V/V, LUG TYPE, BILGE PUMP #2 OVD V/V	BALLAST SYSTEM	25
3A27	529.10-V0072	3" - BUTTERFLY V/V, LUG TYPE, BILGE PUMP OUTLET OBD V/V	BALLAST SYSTEM	47
2A18	529.10-V0074	3" - SDNR GLOBE V/V, LUG TYPE, EDUCTOR OUTLET	BALLAST SYSTEM	2
2A37	529.10-V0075	3" - GATE V/V, WET LAB DEWATERING OBD V/V	BALLAST SYSTEM	21
2A37	529.10-V0076	3" - GATE V/V, WET LAB DEWATERING OBD V/V	BALLAST SYSTEM	21
2A37	529.10-V0077	3" - GATE V/V, WET LAB DEWATERING OBD V/V	BALLAST SYSTEM	10
2A37	529.10-V0078	3" - GATE V/V, WET LAB DEWATERING OBD V/V	BALLAST SYSTEM	10
2A08	529.10-V0080	4" - BUTTERFLY V/V, LUG TYPE, BALLAST WATER TREATMENT SYSTEM OBD V/V	BALLAST SYSTEM	59
2A27	529.10-V0111	3" - SDNR GLOBE V/V, EDUCTOR OUTLET	BALLAST SYSTEM	86
2A04	533.10-V0045	1" - SDNR GLOBE V/V, FW AND BRINE OVERBOARD DISCHARGE SHELL	DOMESTIC FRESH WATER SYSTEM	77
1A36	591.20-V0003	1" - SDNR GLOBE V/V, CHILLER OVERBOARD DISCHARGE	LIVE CATCH SEA WATER RETENTION SYSTEM	36
1A36	591.20-V0024	1-1/2" - SDNR GLOBE V/V, BACKFLUSH OVERBOARD	LIVE CATCH SEA WATER RETENTION SYSTEM	36
3A27	593.10-V0010	1" - SDNR GLOBE V/V, SEPARATOR OW RECIRCULATION OVERBOARD	OILY WATER SYSTEM	46

B.1.2 Emergency Fire Pump Non-return Valve:

Compt.	Type	System	Frame
3A25	3" – SDNR GLOBE V/V, FIRE PUMP OUTLET VALVE, FIRE SAFE	FIREMAIN SYSTEM	60

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.

11.4.C Statement of Work

- C.1 The Contractor must provide the TA and the ABS the opportunity to inspect all overboard ship side valves for the purpose of receiving a survey credit under the vessel's continuous survey.
- C.2 The Contractor must perform the work in this specification in conjunction with the work in 11.5 Seawater Piping Service.
- C.3 Existing fasteners to the shell plating can be reused unless the ABS Surveyor requires their replacement. All fastenings to the shell plating that the ABS Surveyor requires to be replaced must be renewed by the Contractor. All new fasteners will be CFM via PSPC 1379 Work Arising Procedure.
- C.4 The Contractor must disassemble the emergency fire pump non-return valve to enable the ABS surveyor to examine it both internally and externally.
- C.5 The Contractor must ensure, prior to the start of disassembly, that all precautions are taken to ensure that the reassembly and reinstallation of all system and equipment components will be as per original and in accordance with manufacturer's specifications.
- C.6 The Contractor must visually inspect all removed valves and report any deficiencies as they are identified, to the TA and make recommendations for their repair or replacement. Any required repairs or replacements of valves will be CFM via PSPC 1379 Work Arising Procedure.
- C.7 The Contractor must replace all 1" and 1-1/2" overboard valves with new GSM valves. These GSM valves are 522.10-V0001, 524.00-V0039, 533.10-V0045, 591.20-V0003, 591.20-V0024, and 593.10-V0010.
- C.8 The Contractor must replace valves 256.10-V0015, 256.10-V0002, 256.10-V0048, and 256.10-V0059 with new GSM valves. See 11.5 Seawater Piping Service for additional information.
- C.9 The Contractor must rebuild all valves listed in B.1 Equipment Data that are not being replaced as per this specification and manufacturer's recommendations.
- C.10 The Contractor must disassemble, clean, and inspect valve stems for true and condition of threads. Components must be laid out for TA inspection.

- C.11 The Contractor must lap and blue all valve discs and seats to prove true. The Contractor must quote on 2 blueing checks per valve.
- C.12 TA must be given the opportunity to view the condition of all butterfly valve discs and seals.
- C.13 Prior to reassembly and installation, the Contractor must provide the ABS Surveyor and the TA the opportunity to visually inspect all valves as listed in Equipment Data.
- C.14 Following inspection, all original valves must be re-seated and reassembled using new packing and gaskets. New packing and gaskets to be CFM.
- C.15 Upon reassembly the Contractor must individually bench test all valves according to API Standard 598, Valve Inspection and Testing to determine if there is any leakage. If any leaks are detected the Contractor must re-seat the valve and test again.
- C.16 All flange gaskets that are disturbed as a result of the valve servicing process must be renewed using new gasket material. New flange gaskets to be CFM. The Contractor must replace gaskets with original material and thickness or equal.

11.4.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.
- D.1.2 The Contractor must afford the opportunity to ABS and the TA to inspect all valves, both when disassembled and once reinstalled on the vessel.

D.2 Testing/Trials

- D.2.1 The Contractor must provide the ABS Surveyor and the TA the opportunity to witness valve pressure testing.
- D.2.2 The Contractor must operationally test and inspect all valves that were serviced and their connections during the flooding of the dock and during the sea-trials.

D.3 Certification

- D.3.1 The Contractor is responsible for ensuring that the ABS has approved all aspects of the valve overhaul. ABS sign-off of regulatory items inspected will be the responsibility of the CE.

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.

11.5 SEAWATER PIPING SERVICE

11.5.A Identification

- A.1 The intent of this specification item is to perform the recommended service of the seawater piping system as was done on the sister vessel, the CCGS Capt. Jacques Cartier.
- A.2 The purpose of this service is to mitigate issues that contributed to piping and valve failures.
- A.3 All identified valves are to be removed and replaced, galvanic protection isolation kits are to be installed where identified, orifice plates to be replaced and relocated. All associated piping to be inspected.

11.5.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	VLV00301 change to VLV10541	256.10- V0005	BUTTERFLY V/V, WAFER TYPE, FROM SEABAY	SW Cooling	Cu-Ni to CS transition with butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00300 change to VLV11896	256.10- V0015	BUTTERFLY V/V, LUG TYPE, OVERBOARD	SW Cooling	Cu-Ni to CS transition with butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0016	BUTTERFLY V/V, WAFER TYPE, FROM SEABAY	SW Cooling	Cu-Ni to CS transition with butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0017	BUTTERFLY V/V, WAFER TYPE, FROM SEABAY	SW Cooling	Cu-Ni to CS transition with butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0018	BUTTERFLY V/V, WAFER TYPE, TO AUX. SW PUMP #1	SW Cooling	Bronze, connected to Cu-Ni. No isolation kits required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0019	BUTTERFLY V/V, WAFER TYPE, TO AUX. SW PUMP #2	SW Cooling	Bronze, connected to Cu-Ni. No isolation kits required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0022	BUTTERFLY V/V, WAFER TYPE, TO MACHINERY COOLING H/X	SW Cooling	Titanium stub end on HX, with CS backing flange connected to bronze wafer/Cu-Ni pipe. Isolation required. Replace valve with Bray series 22/23.

3A27	VLV00299 change to VLV10539	256.10- V0023	BUTTERFLY V/V, WAFER TYPE, TO MACHINERY COOLING H/X	SW Cooling	Titanium stub end on HX, with CS backing flange connected to bronze wafer/Cu-Ni pipe. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0024	BUTTERFLY V/V, WAFER TYPE, FROM MACHINERY COOLING H/X	SW Cooling	Titanium stub end on HX, with CS backing flange connected to bronze wafer/Cu-Ni pipe. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00299 change to VLV10539	256.10- V0025	BUTTERFLY V/V, LUG TYPE, FROM MACHINERY COOLING H/X	SW Cooling	Titanium stub end on HX, with CS backing flange connected to bronze wafer/Cu-Ni pipe. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00300 change to VLV11896	256.10- V0026	BUTTERFLY V/V, LUG TYPE, OVERBOARD	SW Cooling	Cu-Ni to CS transition with lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00301 change to VLV10541	256.10- V0029	BUTTERFLY V/V, WAFER TYPE, TO SEABAY	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- 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.
3A27	VLV00505	256.10- V0043	BUTTERFLY V/V, WAFER TYPE, MAIN MACH SPACE SCU COOLER	SW Cooling	Cu-Ni to CS transition with lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00503 change to VLV11892	256.10- V0048	BUTTERFLY V/V, LUG TYPE, OVERBOARD	SW Cooling	Cu-Ni to carbon steel transition with bronze lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.
2A27	VLV00600 change to VLV11891	256.10- V0059	BUTTERFLY V/V, LUG TYPE, TO OVERBOARD	SW Cooling	Cu-Ni to carbon steel transition with bronze lugged butterfly valve. Isolation required. Replace valve with Bray series 22/23.
3A27	VLV00237	521.00- V0028	BUTTERFLY V/V, LUG TYPE, SEA BAY VALVE , MAIN FIRE PUMP	Fire Main	No isolation kits required. Replace valve.
3A27	VLV00519	521.00- V0042	SDNR GLOBE V/V, FIRE PUMP OUTLET	Fire Main	No isolation kits required. Replace valve.
3A25	VLV00519	521.00- V0043	SDNR GLOBE V/V, FIRE PUMP OUTLET	Fire Main	No isolation kits required. Replace valve.
3A27	VLV00518	521.00- V0044	BUTTERFLY V/V, WAFER TYPE, FIRE PUMP INLET	Fire Main	No isolation kits required. Replace valve.
3A25	VLV00237	521.00- V0045	BUTTERFLY V/V, LUG TYPE, FIRE PUMP SEA CHEST INLET, EMERGENCY FIRE PUMP	Fire Main	No isolation kits required. Replace valve.

3A25	VLV00297	521.00-V0046	BUTTERFLY V/V, WAFER TYPE, FIRE PUMP INLET	Fire Main	No isolation kits required. Replace valve.
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Note: Overboard valves 256.10-V0015, 256.10-V002, 256.10-V0048, and 256.10-V0059 are listed in both 11.4 and 11.5.

B.1.1 List of Orifice Plates:

Compt.	Part Number	Valve Tag	Description	System	Corrective Action
3A27	VLV00557	256.10-V0054	ORIFICE PLATE, TO MACHINERY COOLING H/X	SW Cooling	Stainless plate within Cu-Ni flange set. 4" orifice plates to be removed and consolidated to a 6" orifice plate. Install with Isolation kits.
3A27	VLV00557	256.10-V0055	ORIFICE PLATE, TO MACHINERY COOLING H/X	SW Cooling	Stainless plate within Cu-Ni flange set. 4" orifice plates to be removed and consolidated to a 6" orifice plate. Install with Isolation kits.
3A27	VLV00555	256.10-V0056	ORIFICE PLATE	SW Cooling	Stainless plate within Cu-Ni flange set. Orifice plate relocated to chiller compartment OHD. To Bow thruster piping. Install with isolation kit.

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.

11.5.C Statement of Work

C.1 The Contractor must ensure, prior to the start of disassembly, that all precautions are taken to ensure that the reassembly and reinstallation of all system and equipment components will be as per original and in accordance with manufacturer's specifications.

C.2 The Contractor must perform the work in this specification in conjunction with the work in 11.4 Ship Side Valves Survey.

C.1 Valve Replacement

C.1.1 The Contractor must replace all valves listed in B.1 Equipment Data with new GSM valves.

- C.1.2 The Contractor must visually inspect all removed valves and report any deficiencies as they are identified, to the TA.
- C.1.3 TA must be given the opportunity to view the condition of all valve discs and seals on the removed valves.
- C.1.4 The Contractor must individually bench test all valves according to API Standard 598, Valve Inspection and Testing to determine if there is any leakage. If any leaks are detected, the Contractor must re-seat the valve and test again.
- C.1.5 The Contractor must install isolation kits across all flanges of dissimilar metals. Isolation kits to be GSM. There are 18 valves identified as requiring isolation kits.
- C.1.6 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.2 Orifice Plate Relocation and Replacement

- C.2.1 The Contractor must remove, replace, and relocate orifice plates as identified in Equipment Data.
- C.2.2 The Contractor must remove the two 4" Orifice plates at the heat exchanger inlets as shown in Figure 2.



Figure 2: Orifice Plates at Heat Exchanger Inlet

- C.2.3 The Contractor must supply a new 6" Orifice plate fabricated from 316 Stainless Steel. New 6" Orifice plate to be installed in horizontal flange set before the forward bulkhead on mezzanine level. Orifice plate must be installed with isolation kit and gaskets.



Figure 3: New Orifice Plate Location

- C.2.4 The Contractor must remove the Bow Thruster Orifice plate currently installed one flange prior to the inlet isolation valve as shown in Figure 4. The Contractor must check and confirm isolation kits are installed at HX inlet and outlet. If isolation kits are not present, new isolation kits to be CFM via PSPC 1379 work arising procedure.

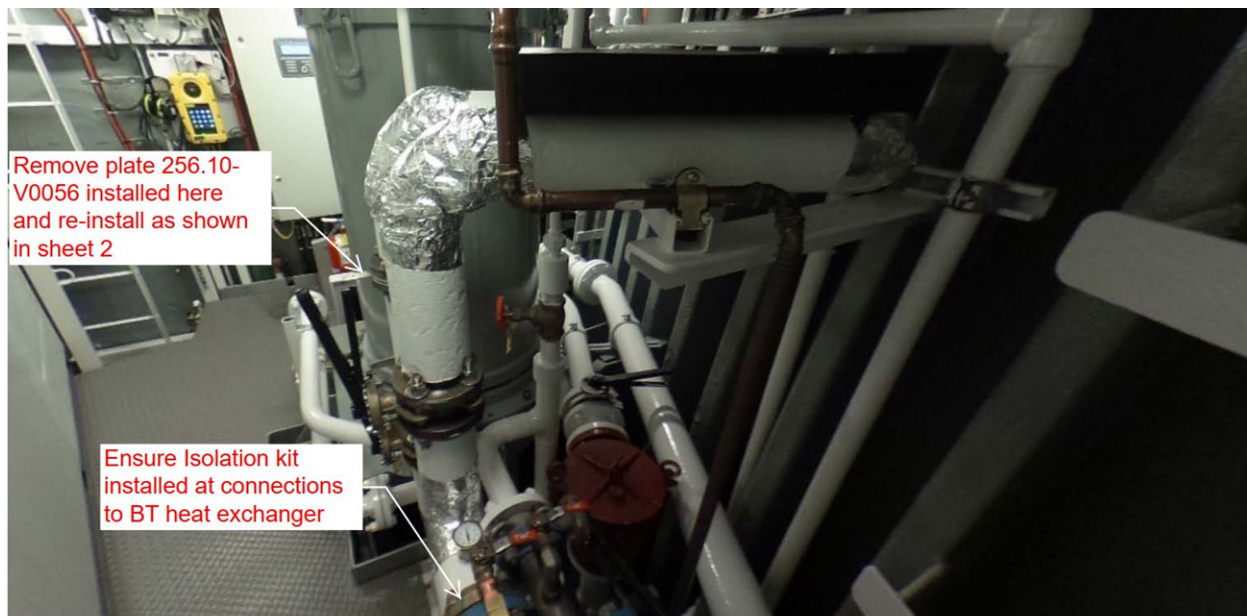


Figure 4: Looking Aft in Bow Thruster Compartment

C.2.5 The Contractor must re-install Bow Thruster Orifice plate in the location shown in Figure 5. Orifice plate must be installed with gaskets and bolt isolation kits.

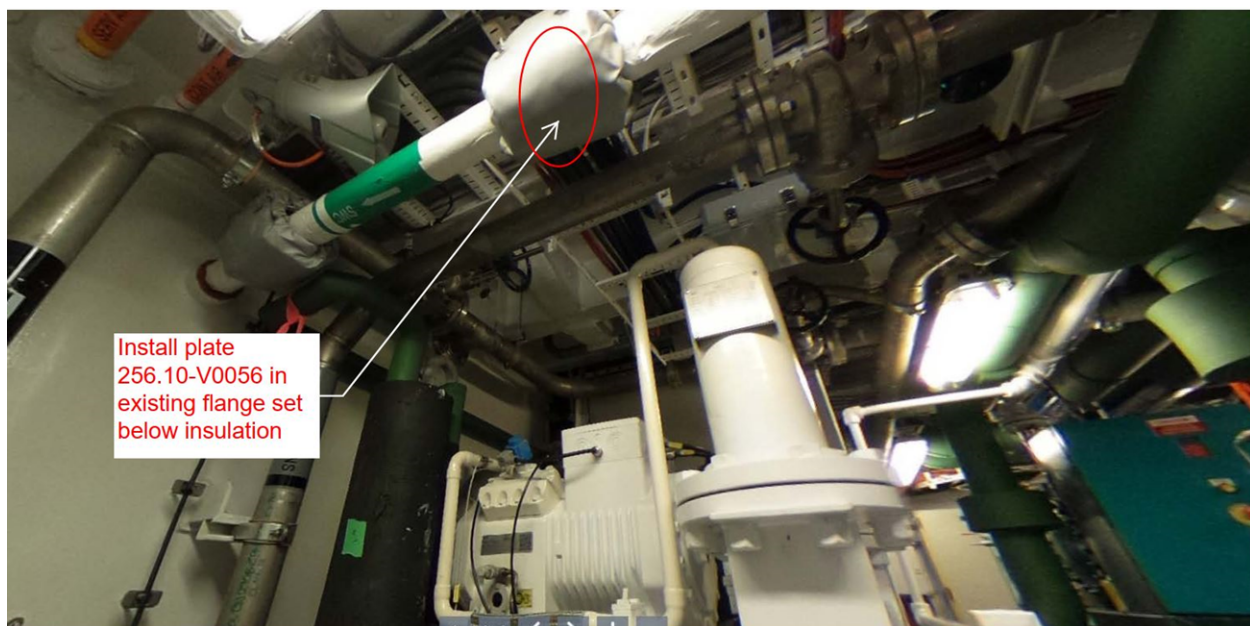


Figure 5: 2A08 Machinery Space – Chiller Compartment – Looking into deck head / forward bulkhead from outboard side of refrigeration skid

C.3 Pipe Inspection

C.3.1 After the valves in 11.4 and 11.5 are removed for servicing or replacement the sea water piping components need to be inspected for TA approval.

C.3.1 The Contractor must inspect the following sections of CuNi sea water piping:

- i) Diesel Generator Discharge
 - ii) Sea Water Inlet to Forward Cooler
 - iii) Sea Water Outlet from Coolers
 - iv) Bow Thruster Inlet to Cooler
 - v) Bow Thruster Overboard
 - vi) Fire Main Pump Discharge
- C.3.2 Piping must be visually inspected for sludge or slime buildup, corrosion pitting, lack of passivation, and signs of erosion.
- C.3.3 Pipe inspections must be done in the presence of the TA.
- C.3.4 Any pipe components determined to require replacement are to be handled via PSPC 1379 work arising procedure.

11.5.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.
- D.1.2 The Contractor must afford the opportunity to the TA to inspect all valves once reinstalled on the vessel.
- D.1.3 The Contractor must afford the opportunity to inspect all disassembled piping.

D.2 Testing/Trials

- D.2.1 The Contractor must provide the ABS Surveyor and the TA the opportunity to witness valve pressure testing.
- D.2.2 The Contractor must operationally test and inspect all valves that were installed and their connections during the flooding of the dock and during the sea-trials.

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 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.

11.6 PAINTING AND HOARDING REQUIREMENTS

11.6.A Identification

- A.1.1 The Canadian Coast Guard will contract directly with its AkzoNobel contact as its technical inspector for all coating system work. CCG will use Mr. Dillon Olsen, Technical Sales Representative, AkzoNobel, or his staff, as its technical representative to ensure QA on behalf of Canada. Inspection by the AkzoNobel NACE Paint inspector will be **GSM**. AkzoNobel will be given full authority by The Canadian Coast Guard to perform technical inspections. Contact:

Mr. Dillon Olsen, Technical Sales Representative, AkzoNobel
cell 604-366-9871
Dillon.Olsen@akzonobel.com

- A.1.2 The Contractor must have its own NACE Paint inspector to ensure their own QA. This must be CFM.
- A.1.3 The Contractor must present AkzoNobel and the TA with a coating schedule and must update AkzoNobel and the TA of any changes to this schedule.
- A.1.4 The Contractor must hoard the vessel to ensure they meet the coating requirements as laid out in S62-190-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule, Interspec Paint Specification, and related technical data sheets. The Interspec Paint Specification is provided to the Contractor by Canada and the Contractor must obtain the technical data sheets from AkzoNobel.

11.6.B References

B.1 Equipment Data

- B.1.1 The Contractor will be provided with the Coatings and Surface Treatment Schedule and the Interspec Paint Specification.

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.

11.6.C Statement of Work

C.1 Paint Representative:

- C.1.1 The Contractor must allow the AkzoNobel technical inspector full access to the vessel during any working hours and the AkzoNobel technical inspector will report directly to the TA.
- C.1.2 The Contractor must provide the AkzoNobel technical inspector a complete coating schedule at the start of the docking and must inform them of any changes.
- C.1.3 Prior to painting, the Contractor must plug scuppers as necessary and all appropriate measures must be taken to ensure that the quality of the finished work is not jeopardized by weather conditions or any other factors. Water discharge must be directed away from the ship's side. All plugs must be removed prior to return to service.

C.2 Hoarding of Hull and other Areas:

- C.2.1 The Contractor must hoard the vessel hull to ensure they meet the coating requirements as laid out in S62-190-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule and the Interspec Paint Specification.. The Contractor is advised that inclement weather must be anticipated during the Work Period and the Contractor must include the cost of hoarding the hull in its bid.
- C.2.2 The Contractor must provide a schedule and plan for hoarding, including how they will allow access for any hull repairs or machinery renewals.
- C.2.3 The Contractor must hoard the areas around temporary hull openings, that are made for equipment removals and installations, so as to protect the new equipment while it is being skidded into the ship.
- C.2.4 Canada will not pay for any additional hoarding or repairs to the hoarding unless at least one of the following conditions is recorded at the Environment and Climate Change Canada buoy or land station closest to the Contractor's work site:
 - i) Temperatures fall below -5.0 degrees Celsius for more than 72 consecutive hours; or
 - ii) The accumulation of more than 40.0 centimetres of snow; or
 - iii) Steady winds over 45.0 km/h; or
 - iv) Wind gusts over 75.0 km/h.
- C.2.5 The data from the Environment and Climate Change Canada buoy or land station closest to the Contractor's work site must be used for measuring and verifying the parameters above as well as to provide the recorded environmental conditions.

- C.2.6 The location of the Environment Canada buoy or land stations can be found at http://weather.gc.ca/marine/weatherConditions-currentConditions_e.html?mapID=02&siteID=16200&stationID=WHC.
- C.2.7 The conversion rates identified in the Environment and Climate Change Canada Weather and Meteorology Glossary available at <http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=B8CD636F-1&def=show0FA7E4EE1> will be used in the event that any of the recorded data needs to be converted to the measurement units used in the parameters above.

C.3 Coatings:

- C.3.1 All coatings identified in S62-190-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule, the Interspec Paint Specification, and all ancillary materials must be CFM unless specifically noted otherwise.
- C.3.2 All coatings must be in suitable condition for application. They must be stored, prepared and applied in strict accordance with procedures and methods as recommended by the manufacturer. They must not be time expired or subject to any other form of deterioration. The paint inspector must approve all materials immediately prior to their application.
- C.3.3 The Contractor must utilize the latest version of the product data sheets for any coatings called for in the Interspec Paint Specification.
- C.3.4 The Contractor must protect all fixtures and adjacent surfaces during painting and, upon completion of work, any over-spray or paint spots must be removed.
- C.3.5 The Contractor must ensure all surfaces to be painted are thoroughly clean, dry and free of grease or oil before painting is commenced. All plates and shapes used in construction and all areas in way of new paint must have surface preparation performed according to the Interspec Paint Specification to completely remove scale, rust, and other surface contaminants.
- C.3.6 The Contractor must paint all new steel work and weld affected areas to match the as per the Interspec Paint Specification.
- C.3.7 Removal and disposal of all hazardous wastes from surface prep and painting (residuals) must be in accordance with local and provincial environmental specific regulations.

11.6.D Proof of Performance

D.1 Inspection Points

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

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation (Reports/Drawings/Manuals)

- D.4.1 AkzoNobel will provide the TA with paint inspection reports and underwater coating certificates.
- D.4.2 AkzoNobel will copy the paint inspection reports and the underwater coating certificates to the Contractor.

11.7 PAINTING OF SHIPS HULL BELOW WATERLINE

11.7.A Identification

- A.1.1 The Canadian Coast Guard will contract directly with its AkzoNobel contact as its technical inspector for all coating system work. AkzoNobel will be given full authority by the Canadian Coast Guard to perform technical inspections. Contact:

Mr. Dillon Olsen, Technical Sales Representative, AkzoNobel
cell 604-366-9871
Dillon.Olsen@akzonobel.com

- A.1.2 The Contractor must complete painting of the underwater hull as detailed in S62-190-631.00-001_OFSV 190 Coatings and Surface Treatment Schedule and the Interspec Paint Specification.

11.7.B References

B.1 Equipment Data

- B.1.1 The underwater hull surface includes the hull from keel to 300 mm above the waterline, rudder, sea chests, sea bays, thruster tubes, drop keel, and the drop keel trunk. The underwater hull must be prepped and painted as detailed in the Interspec Paint Specification.
- B.1.2 Existing underwater hull coating system for all exterior hull surfaces (immersed), rudder, drop keel truck, and sea chests (except for sea chests for intakes of Reverse Osmosis [RO] unit, live catch, and scientific sea water) consists of:
- i) 150µm Min DFT Intershield 803 Grey
 - ii) 150µm Min DFT Intershield 803 Red
 - iii) 100µm Min DFT Intergard 263 Light Grey
 - iv) 100µm Min DFT Interspeed 640 Black
 - v) 100µm Min DFT Interspeed 640 Red/Blue – Inside the drop keel trunk the colour of the final coat of antifouling is blue. All other areas the final coat antifouling colour is red.
- B.1.3 Existing underwater coating system for sea chests for intakes of RO Unit (domestic fresh water), live catch, and scientific sea water consists of:
- i) 150µm Min DFT Interline 850 White

- ii) 150µm Min DFT Interline 850 White

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.

11.7.C Statement of Work

- C.1 The Contractor must paint the underwater hull as detailed in the Coatings and Surface Treatment Schedule, the Interspec Paint Specification, and the technical data sheets for the specified products. The Contractor must obtain the product technical data sheets. Where there is any deviation, the product technical data sheets will take precedence.
- C.2 The Contractor must paint all exterior hull surfaces (immersed). Contractor must bid on 2,140 m² of underwater hull surfaces. Contractor must bid on 20 m² of underwater surfaces for the sea chests for intakes of RO Unit (domestic fresh water), live catch, and scientific sea water.
- C.3 The AkzoNobel representative will be referred to as the Technical Inspector (TI) for this specification. Where specified for inspection by the TI, the Contractor must provide AkzoNobel representative an opportunity to inspect on behalf of Canada.
- C.4 The Contractor, TA, and TI, will conduct a survey of the hull on completion of pressure washing to identify areas where hull coating repair is required. Any changes in specified areas below will be covered through the additional work procedures.
- C.5 The Contractor must prepare all surfaces to be painted and must apply all coatings in accordance with procedures and methods as recommended by the manufacturer. Re-coat times must be adhered to.
- C.6 Immediately following the pressure washing of the hull, it must be thoroughly inspected by the TA, the TI, and the Contractor to evaluate the extent of work to be carried out on the coatings. The TI, TA, and the Contractor must agree upon the areas to be treated prior to the work commencing. The requirement for pressure washing of the hull, protecting fittings, and plugging of openings is covered in the Docking / Undocking section of the specification.
- C.7 The Contractor must quote on 400 m² of random areas of the underwater hull to be prepared, feathered into solid paint, and painted. The Contractor must identify the areas

to be painted after pressure washing to the TA. The TA together with the Contractor will determine the actual area to be painted. Paint to be prepared and feathered as per the Interspec Paint Specification.

- C.8 The Contractor must coat the entire underwater hull surface with Anti-fouling Interspec 640 by either one coat @ 100µm DFT or two coats @ 50µm DFT each. Colour for anti-fouling must be similar to existing (Red/Blue).

11.7.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must follow the quality control requirements identified in the Coatings and Surface Treatment Schedule, the the Interspec Paint Specification, and Product Data Sheets, including the hold points.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 AkzoNobel will provide the TA with paint inspection reports and underwater coating certificates.
- D.4.2 AkzoNobel will copy the paint inspection reports and the underwater coating certificates to the Contractor.

11.8 CHANGE LOAD LINE MARKS

11.8.A Identification

- A.1 The intent of this specification is to remove the L – R on the Load Line Markings (Plimsol Mark) and replace with A – B to indicate the vessel is now classed by ABS as stated in the ABS rules.

11.8.B References

B.1 Equipment Data

- B.1.1 The vessel was built to Lloyd's Register of Shipping regulations and was originally classed as such. It therefore was marked L – R.

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.

11.8.C Statement of Work

C.1 Hot Work

- C.1.1 The Contractor must include and maintain a fire watch in each space adjacent to any hot work, in accordance with General Notes.
- C.1.2 The Contractor must strip out any insulation in way of hot work.
- C.1.3 The Contractor must grind off the L – R markings on the Port and Starboard side of the vessel. The markings are located between Frames 47 and 48.
- C.1.4 The Contractor must fabricate and install the A – B on both the Port and Starboard side of the vessel.
- C.1.5 Letters must be block style and fabricated from 8 mm plate. Letters must be 115mm tall and 75mm wide. Markings must be in accordance with the International Load lines Convention and ABS requirements and done in the presence of the ABS surveyor.
- C.1.6 Following installation of the new markings, the Contractor must insulate the areas affected by the hot work to at least the same standard as the existing arrangement.

- C.1.7 Insulation must be installed per manufacturer's recommendations.

C.2 Painting

- C.2.1 The Contractor must paint the areas affected by the installation and removal of the markings.
- C.2.2 The Contractor must paint the new letters as per the Load line & Plimsoll mark shown in the Coatings and Surface Treatment Schedule.
- C.2.3 Painting must be as per paint manufacturer's recommendations and Coatings and Surface Treatment Schedule.

11.8.D Proof of Performance

D.1 Inspection Points

- D.1.1 Contractor must consult with the ABS to determine any required inspections. TA to be informed of any required ABS inspections.
- D.1.2 The Contractor must provide the ABS surveyor and the TA an opportunity to witness the installation of the new Load Line Markings. The Contractor and the TA must agree on inspection points and schedule prior to the start of the work.
- D.1.1 The Contractor must follow the quality control requirements identified in the Coatings and Surface Treatment Schedule and Product Data Sheets, including the hold points.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation – Not Used

11.9 PAINT CANADA WORDMARK

11.9.A Identification

- A.1 The intent of this specification is to paint the Canada wordmark on the starboard side of the superstructure to replace the one removed during the installation of a new cabin window.

11.9.B References

B.1 Equipment Data – Not used.

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.

11.9.C Statement of Work

- C.1 The Contractor must paint a new Canada wordmark to replace the one that was removed when a new cabin window was added between Frame 46 and 47 on the 02 Level.
- C.2 The Canada wordmark must be painted in accordance with the CCG Fleet – Federal Identity Program Guide for a vessel with a length in metres between 50 and 69.99. The wordmark must be painted in black. A machine cut decal must be used as a stencil. Stencil to be CFM.
- C.3 The Canada wordmark must be located between Frame 42 and 49 on the starboard side, approximately 400 mm above the deck plate on the 02 Level.
- C.4 Painting must be as per paint manufacturer's recommendations and the Coatings and Surface Treatment Schedule.

11.9.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must follow the quality control requirements identified in the Coatings and Surface Treatment Schedule and Product Data Sheets, including the hold points.

D.1.2 Contractor to confirm location of the Canada wordmark with TA before starting to paint.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation – Not Used

11.10 TRAWL DECK MODIFICATION

11.10.A Identification

- A.1 The intent of this specification is to reconfigure the trawling arrangement to change the alignment of the trawl warps (trawl lines) to increase the downward force on the ice davit sheave when surface fishing.
- A.2 The angle between the intermediate blocks (guide sheaves) and the ice davit sheave is too shallow to produce the necessary downward force on the sheave causing the trawl warp to lift from the sheave completely.
- A.3 The port and starboard trawl warps (trawl lines) will be rerouted through new roller fairleads instead of the Intermediate Trawl Blocks.

11.10.B Reference

B.1 Equipment Data

- B.1.1 The current trawling arrangement consists of a winch and three sheaves on both port and starboard. The cable run for the trawl warps is as follows: Winch → Trawl turning sheave → Trawl intermediate sheave → Ice davit sheave → Trawl door → Net. This arrangement is shown on the as-built drawing S62-190-672.10-001_Working Deck Arrangement.
- B.1.2 The Davit arm and associated arrangement was designed to operate with a line load of 32 Tonnes.
- B.1.3 Ice Davit
 - i) Manufacturer: Hawboldt Industries
 - ii) Model: ICD45-P/S
 - iii) Part Number: F400480
 - iv) Capacity: 32 Tonne SWL
 - v) Tag Numbers: 672.10-A0008 & 672.10-A0009
- B.1.4 Ice Davit Trawl Block Assembly
 - i) Manufacturer: Hawboldt Industries
 - ii) Part Number: 34-00123-012
- B.1.5 Intermediate Trawl Block Assembly

- i) Manufacturer: Hawboldt Industries
- ii) Part Number: 34-00123-011

B.1.6 Turning and Intermediate Sheaves

- i) Manufacturer: Hawboldt Industries
- ii) Part Number: F400505

B.1.7 New GSM Roller Fairleads

- i) Manufacturer: Smith-Berger
- ii) Model: FR4-6
- iii) SWL: 40 MT
- iv) Weight (each): 440 kg

B.2 Drawings and Documents

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

Drawing Number	DRAWING TITLE
20-140-132-01	Working Deck Structural Modifications R1
VSYS-100-451	Brackets and Tripping Brackets
	MODEL FR4-6 SPEC

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.

11.10.C Statement of Work**C.1 General**

- C.1.1 Prior to the Contractor taking custody of the vessel, CCG will remove the port and starboard warps from the Intermediate Blocks.
- C.1.2 The Contractor must include and maintain a fire watch in each space adjacent to any hot work, in accordance with General Notes.

- C.1.3 Following completion of this specification and after taking custody of the vessel, CCG will rig the port and starboard warps to pass through the new roller fairleads and the ice davit trawl block.



Figure 6: Existing Trawl Warp Configuration Starboard



Figure 7: Existing Trawl Warp Configuration Port

C.2 Strip-Out

- C.2.1 The Contractor must remove the port and starboard Intermediate Blocks and return to CCG for use as spares.
- C.2.2 The Contractor must strip-out the starboard pillar on Frame 6 and the diagonal section of the starboard deck on the 01 Level between Frame 4 and Frame 11 as shown on the Guidance Drawing.



Figure 8: 01 Level Starboard

C.3 Installation

- C.3.1 All new steel required for this installation to be CFM.
- C.3.2 All welding must be in compliance with the CCG Welding Specifications and ABS rules.
- C.3.3 The Contractor must install the new port and starboard GSM roller fairleads on the 01 Level at Frame 17 as shown on the Guidance Drawings. The Contractor must fully weld both GSM roller fairleads to the supporting structure.
- C.3.4 The Contractor must supply, fabricate, and install the new supporting structure for the roller fairleads as shown on the Guidance Drawings. The Contractor must consult with the TA before cutting steel to confirm the height and location of the roller fairleads. The intention is for the trawl warp to pass directly through the middle of the roller fairleads when the ice davit is in the outboard position.



Figure 9: New Trawl Warp Alignment

- C.3.5 The Contractor must supply, fabricate, and install the new starboard deck structure as shown on the Guidance Drawings.
- C.3.6 No modification to the electrical cabling in the deckhead is expected. Any change required to the cable routing will be addressed via PSPC 1379 work arising procedure.

C.4 Painting

- C.4.1 The Contractor must paint the areas of the deck affected by the strip-out and installation.
- C.4.2 The Contractor must fully paint the modified structure and all new structure.
- C.4.3 All painting must be as per paint manufacturer's recommendations and the Coatings and Surface Treatment Schedule.

11.10.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.
- D.1.2 The Contractor must conduct weld inspections and NDT in accordance with the CCG Welding Specification. Any defects found are to be repaired at Contractor's expense.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 Copies of the NDT testing must be provided to the TA in accordance with the Documentation section of the General Notes.
- D.4.2 Copies of the welding personnel qualification records and approved welding procedures must be submitted to the TA in accordance with the General Notes.

11.11 INSTALL INSULATION IN GALLEY VOID SPACE

11.11.A Identification

- A.1 The intent of this specification is to install insulation on the deck head of the void space located outboard of the Galley. The purpose of the insulation is to dampen the noise transfer from the galley fan located in the void space to the cabins above.

11.11.B Reference

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.

11.11.C Statement of Work

- C.1 The Contractor must supply and install acoustic insulation on the deck head in the void space located between the galley and the port side shell.
- C.2 Insulation must be acoustic polyimide foam or equal to avoid the possibility of airborne fiberglass or Rockwool particles in the galley area.
- C.3 Insulation must be intended for use on ships and in compliance with SOLAS and the FTP Code and certified as a Fire-Restricting Material. All material must be approved by ABS for the purpose.
- C.4 Insulation must be installed and secured per manufacturer's recommendations.
- C.5 The Contractor must install all mounting pins required for securing the insulation. Note, there are currently no mounting pins installed in this area. It is recommended that the Contractor avoid pin welding and associated hot work by installing the securing pins with an industrial anchoring epoxy. Epoxy must be suitable for the intended use and in compliance with regulations.
- C.6 The Contractor must bid on two layers of insulation covering a 22 m² area. One layer must be a minimum of 25mm polyimide unfaced foam board and one layer must be a minimum of 25mm perforated acoustic foam board. All seams must be taped with lagging paste or as per manufacturer's recommendations.

11.11.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must confirm location and installation method with the TA before starting installation.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 The Contractor must provide product data sheets and valid type approval certificates for all material used.

11.12 STORM WINDOW STORAGE BOX INSTALL

11.12.A Identification

- A.1 The main intent of this specification is to remove the existing Storm Window (Window Shutters) storage box on the 04 Level and to lift and install the new Storm Window storage box into position on the 03 Level.

11.12.B References

B.1 Equipment Data

- B.1.1 Existing Storm Window Box
- i) Material: FRP Composite
 - ii) Dimensions: 2.54m long x 1.04m wide x 1.24 high
- B.1.2 New GSM Storm Window Box
- i) Material: Aluminum
 - ii) Dimensions: 2.36m long x 1.14m wide x 1.35 high
 - iii) Weight: 295 kg

B.2 Drawings

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

Drawing Number	DRAWING TITLE
S62-151.00-002	Storm Window Box Install

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.

11.12.C Statement of Work

- C.1 Prior to the Contractor taking custody of the vessel, CCG will remove the window shutters from the Existing Storm Window Storage Box and safely store them.

Following the completion of the installation and after taking custody of the vessel, CCG will place the window shutters into the New Storm Window Storage Box.

- C.2 The Contractor must strip out and dispose of the Existing Storm Window Storage Box using provincially applicable environmental regulations.



Figure 10: Existing Storm Window Storage Box

- C.3 The Contractor must remove bridge ceiling panels and any insulation in way of hot work. Contractor must re-install ceiling panels and insulation prior to the end of the docking.
- C.4 The Contractor must include and maintain a fire watch in each space adjacent to any hot work, in accordance with General Notes.
- C.5 The Contractor must remove the 6 existing threaded studs that secured the Existing Storm Window Storage Box to the deck, see Figure 11. The Contractor must repair and grind flush to the surrounding surface the area of the removed studs. The Contractor to bid on 1.0 m² of deck repairs and painting.



Figure 11: Existing Storm Window Storage Box Mounting

- C.6 The Contractor must lift the new GSM Storm Window Storage Box up to the Port side of the 03 Level under the stairs to the 04 Level. The GSM Storm Window Storage Box will arrive with the vessel, secured on the aft deck.



Figure 12: New GSM Storm Window Storage Box



Figure 13: New Storm Window Box Install Location

- C.7 The Contractor must fabricate and install seating for the new Storm Window Storage Box as shown on the Guidance drawing. Exact location of seating to be determined in consultation with the TA.
- C.8 The Contractor must supply and install a gasket between the new Storm Window Storage Box and the new CFM seating to prevent galvanic action. Gaskets must be 3mm Neoprene or equal.
- C.9 The Contractor must securely fasten the new Storm Window Storage Box to prevent movement at sea. Contractor must supply and install 316L stainless steel nyloc fasteners for securing the new Storm Window Storage Box. Bolts must be arranged to facilitate easy removal.
- C.10 The Contractor must paint the deck areas affected by the removal and installation of the Storm Window Storage Boxes.
- C.11 The Contractor must fully paint the new seating as per the surrounding deck.
- C.12 All painting must be as per paint manufacturer's recommendations and the Coatings and Surface Treatment Schedule.

11.12.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must conduct weld inspections and NDT in accordance with the CCG Welding Specification. Any defects found are to be repaired at Contractor's expense.

D.2 Testing/Trials – Not Used

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 Copies of the NDT testing must be provided to the TA in accordance with the Documentation section of the General Notes.

12.0 PROPULSION AND MANEUVERING

12.1 RUDDER BEARING CLEARANCES

- A.1 The intent of this specification is to measure and report on the rudder bearing clearances to ascertain the amount of wear as required by ABS.
- A.2 These measurements are to provide an estimate of the bearing wear, by comparison to previous measurements.

12.1.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.

12.1.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.
- 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].
 - 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 are to 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

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 must be informed of any required ABS inspections.

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.

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.
- D.4.3 The Contractor must provide readings taken in the final documentation.
- 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.

12.2 STERN BEARING CLEARANCE

12.2.A Identification

- A.1 The intent of this specification is to measure and report on the stern bearing clearances to ascertain the amount of wear as required by ABS.
- A.2 These measurements are to provide an estimate of the bearing wear, by comparison to previous measurements.

12.2.B References

B.1 Equipment Data

- B.1.1 Stern seal:
 - i) Manufacturer: Wärtsilä Norway AS
 - ii) Model: WFS1R-P TYPE INBOARD SEAL

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 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 1397 Work arising procedures.
- C.2 The Contractor must thoroughly inspect for signs of calcareous layers forming on the propulsion shaft liners as per the Wärtsilä Service Letter - Possible accelerated bearing wear issue WCS-01 material.
- C.3 The Contractor must take measurements of the shaft position using a Poker Gauge immediately aft of the aft sterntube bearing under the rope guard.

- C.4 The Contractor must take measurements of the top and bottom clearance at the aft end of the aft sterntube bearing using feeler gauges.

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 to be informed of any required ABS inspections.

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.

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.
- D.4.3 The Contractor must provide readings taken in the final documentation.
- 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.

12.3 PROPELLER INSPECTION & MAINTENANCE

12.3.A Identification

- A.1 The intent of this specification is to have the propulsion propeller and the bow thruster 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.1.2 Bow thruster propeller:
- i) Manufacturer: Wartsila
 - ii) Model: FT150H tunnel thruster, fixed pitch, 4 blade, stainless steel
 - iii) Part Number: PAAW018724
 - iv) Serial Number: SP/01759 418955-R LRBB01504505

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.

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.
- 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 The Contractor must polish the bow thruster propeller 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 bow thruster propeller.
- C.4 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).
- C.5 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.
- 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 and after power washing.
- D.1.3 The Contractor must provide the TA the opportunity to inspect the propellers after the removal of marine growth.
- D.1.4 The Contractor must provide the TA the opportunity to witness the NDT inspection.

D.2 Testing/Trials

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

D.3 Certification

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

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.

12.4 VARIABLE FREQUENCY DRIVE REPAIR

12.4.A Identification

- A.1 The intent of this specification is to have the starboard propulsion Variable Frequency Drive (VFD) repaired and returned to service.
- A.2 The CCGS Sir John Franklin experienced a VFD failure and fire. The damage from the electrical fire has rendered the starboard drive unusable and the American Bureau of Shipping (ABS) has put a stop sail order until the drive is repaired.

12.4.B References

B.1 Equipment Data

- B.1.1 Variable Frequency Drives:
 - i) Manufacturer: Ingeteam Power Technology S.A.
 - ii) Model: Ingedrive-LV-400-Frequency Converter
 - iii) Part Number: LV4F-31-89WA-360+Z
 - iv) Weight: 3650 kg
 - v) Tag Number: 235.10-E2002
- B.1.2 Switch Disconnect
 - i) Manufacturer: Eaton Corporation
 - ii) Model: INX 16B3-16F
 - iii) Part Number: 000012561714
 - iv) Rating: 1000V, 1600A, 3 Pole, 50/60Hz

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.

12.4.C Statement of Work

- C.1 The Contractor must subcontract the repair and commissioning of the starboard Ingeteam LV-400 VFD to an OEM authorized service provider or FSR.

Ingeteam Power Technology S.A.
Parque Tecnológico de Bizkaia
Edificio 110, Zamudio, Vizcaya
Baesain, Spain, 48179
Phone: +34 944 30 9699
Email: ingedrive.support@ingetteam.com
ingedrive.repairs@ingetteam.com

- C.2 The Contractor must strip-out all material damaged in the fire. This includes, but is not limited to, damaged wires, wire ducting, and conduits.
- C.3 Prior to the start of this Contract, CCG hired a company experienced in clearing and restoration of fire damaged electrical systems to fully clean all of the starboard VFD cabinets including all internal components to remove all traces of soot and atomized metallic material.
- C.4 The Contractor must inspect the VFD cabinets to ensure they no longer have any residue, or other signs of smoke or fire. Signs of smoke or fire include, but are not limited to, any charred or burnt remains, soot residue, yellow acid residue, discolouration of materials, odour, and pits or rust in metal due to corrosion. Contractor to bid on 20 hours of cleaning. Any additional cleaning required will be via PSPC 1379 Work Arising procedure.
- C.5 In cases where, on the advice of the FSR, cleaning is impossible to guarantee the complete removal of metallic material and therefore has the potential to act as path to short circuits, those components must be replaced. All additional replaced components are to be CFM via PSPC 1379 Work Arising Procedure.
- C.6 The Contractor must ensure all repairs and replacements as recommended by the manufacturer are completed on the Ingeteam LV-400 VFD. Additional repairs or defects will be addressed via PSPC 1379 Work Arising procedure.
- C.7 The Contractor must install and fully connect all VFD components on the GSM material list. Only the electrical components shown on the GSM material list will be supplied. Any additional electrical components or material required must be CFM and will be addressed via PSPC 1379 Work Arising procedure.
- C.8 The Contractor must install and fully connect a new GSM Switch Disconnecter in the starboard VFD cabinet.



Figure 14: Failed Switch Disconnecter in Stbd VFD Cabinet +03.1

- C.9 The Contractor must rebuild the BPM Module (Right Hand Side Semistack) in the starboard VFD Cabinet +02.1 by replacing parts with new GSM parts. The parts that must be renewed include all: IGBTs, drivers, snubber capacitors, and LEM current transducers. All damaged cabling and fiber optic connectors must be replaced with new. The BPM Module must be rebuilt by the OEM or their authorized designate under FSR supervision.

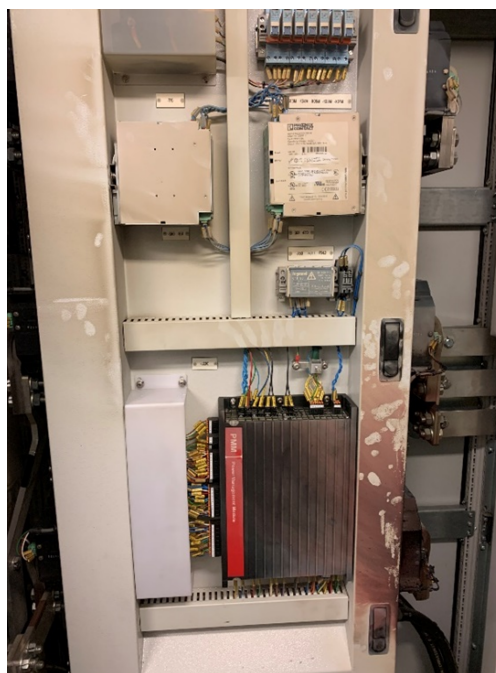


Figure 15: BPM Module in Stbd VFD Cabinet +02.1

- C.10 The Contractor must replace all damaged power and signal cables in VFD cabinets +03.1 and +02.1. All cabling must be as per the design drawings. All cabling to be provided by the Contractor unless listed as GSM. The Contractor to bid on the replacement of 100 meters of cable. Any additional cable required to be via PSPC 1379 Work Arising procedure.
- C.11 Contractor must megger test all electrical cables in the starboard VFD cabinets and those cables that connect the starboard VFD cabinets to the propulsion motor. Any cabling found to have compromised insulation must be replaced by the Contractor via PSPC 1379 Work Arising procedure.
- C.12 All electrical cabling must be shielded where required by electrical codes or manufacturers recommendations. Power cables are to be tri-cab marine SHF-1 or equal. Equal to be approved by TA or FSR and recorded as equal in cabling replacement.
- C.13 The Contractor must replace all damaged wire ducting and conduits. Wire ducting and conduits to be CFM and must be as per original design. Contractor to quote on replacing 4 meters of various dimension and length of conduit. Equal conduit to be approved by TA or FSR and be recorded as equal.



Figure 16: Stbd VFD Cabinet +02.1

- C.14 The Contractor must provide an overhaul report for the Ingeteam LV-400 VFD at the time of testing and trials to the TA.

- C.15 The Contractor must conduct a functionality test and break in procedure for the Ingeteam LV-400 VFD in accordance with the manufacturer's specifications once the repair is complete.
- C.16 The Contractor must commission and trial the VFD to satisfaction of the ABS surveyor and the TA. The commissioning and trials must be done by the FSR with the ABS surveyor in attendance.
- C.17 Subject to Operations, harbour and sea trials must be performed by the Contractor to confirm normal operating condition of all three drives (Port and Stbd propulsion VFD and Bow Thruster VFD).
- C.18 The Ingeteam LV-400 VFD must pass all manufacturer recommended tests and trials.

12.4.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.
- D.1.2 The Contractor must consult ships crew before locking out or unlocking any circuits or systems.
- D.1.3 The ship will not depart on trials until the Ingeteam LV-400 VFD is in a condition for safe departure from the dock such as the repairs have been accepted by the ABS surveyor, FSR, and the TA.

D.2 Testing/Trials

- D.2.1 The Contractor must, under the direction of the FSR, test the Ingeteam LV-400 VFD for correct functionality as per OEM manuals and recommendations, and the advice of the FSR.
- D.2.2 The Contractor must Meggar test all electrical circuits in the starboard VFD and those connecting the VFD to the propulsion motor.
- D.2.3 The FSR must attend the ship for one full day for set-up and trials alongside.
- D.2.4 The Contractor must provide the opportunity for the TA and ABS to witness all testing.
- D.2.5 The harbour trials must include:
 - a) Precharging the DC bus;

- b) Firing the Grid Side Converter;
- c) Firing the Motor Side Converter and spinning the motor as fast as allowable while vessel being tied up alongside.

D.2.6 The sea trials must include:

- a) Endurance run of VFD until temperatures inside the units are stabilized;
- b) Sequence testing of switching between different control modes including PORT, DUAL, and STBD;
- c) Trip testing of a single VFD while running in DUAL mode;
- d) Crash stop and Ahead/Astern tests with both PORT and STBD VFD.

D.3 Certification

- D.3.1 The Contractor must provide the TA with a valid letter of authorization from the OEM of the company that will be assigned to repair the Ingeteam LV-400 VFD on award of the contract.
- D.3.2 The Contractor is responsible for ensuring that ABS has approved all aspects of the repair.

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 including a complete list of optical cables that were repaired and/or replaced.
- D.4.3 The Contractor must provide all test certificates, and endorsement of safe operation required by ABS for certification to the TA prior to the conclusion of the contract.
- D.4.4 The Contractor must provide readings taken during the trials and any FSR reports in the final documentation.
- D.4.5 The Contractor must provide an overhaul report for the Ingeteam LV-400 VFD. The Contractor must detail the Ingeteam LV-400 VFD test results and all deficiencies and additional parts required in the overhaul report. 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
- D.4.6 The Contractor must supply a PDF electronic copy of the overhaul report to the TA at the request of the TA in accordance with the General Notes.

13.0 POWER GENERATION SYSTEMS

13.1 NOT USED

14.0 POWER DISTRIBUTION SYSTEMS

14.1 SWITCHBOARD MAINTENANCE

14.1.A Identification

- A.1 The intent of this specification is to inspect the electrical terminal connections tightness on the vessels critical systems.
- A.2 The purpose of this inspection is to prevent electrical equipment failure and heat damage to electrical conductors due to loose electrical terminal connections.
- A.3 The Contractor must allow ABS to witness the service for the purpose of receiving a survey credit as part of the vessel's continuous survey system.

14.1.B References

B.1 Equipment Data

- B.1.1 600V Main Switchboard Port – Distribution Panel #1
 - i) Manufacturer: Techsol Marine
 - ii) Model: P611P
 - iii) Tag Number: 324.10-E1004
 - iv) Capacity/Rating: 600VAC, 3PH, 3W, 400A, 40kAIC, 42 POLES
 - v) Location: 3A27 MAIN MACH. SPACE
- B.1.2 600V Main Switchboard Starboard – Distribution Panel #2
 - i) Manufacturer: Techsol Marine
 - ii) Model: P611S
 - iii) Tag Number: 324.10-E1005
 - iv) Capacity/Rating: 600VAC, 3PH, 3W, 400A, 40kAIC, 42 POLES
 - v) Location: 3A27 MAIN MACH. SPACE
- B.1.3 600V Emergency Switchboard
 - i) Manufacturer: Techsol Marine
 - ii) Model: SB50

- iii) Tag Number: 324.80-E3001
- iv) Rating: 600VAC, 3PH, 3W
- v) Location: 2A07 MAIN SWICHBOARD

B.1.4 230V Emergency Switchboard

- i) Manufacturer: Techsol Marine
- ii) Model: SB60
- iii) 324.80-E3003
- iv) Rating: 230V, 3PH
- v) Location: 1A38 EMERGENCY GENERATOR ROOM

B.1.5 120V Emergency Switchboard

- i) Manufacturer: Techsol Marine
- ii) Model: SB70
- iii) 324.90-E3001
- iv) Rating: 120V, 3PH
- v) Location: 1A38 EMERGENCY GENERATOR ROOM

B.1.6 Arc Monitor

- i) Manufacturer: ABB Canada
- ii) Model: TVOC-2-48
- iii) Part Number: 1SFA664001R1002

B.2 Drawings and Documents**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.

14.1.C Statement of Work

- C.1 The Contractor must perform inspection and maintenance of the critical systems Switchboards listed in the Equipment Data as per manufacturer specifications and CCG TECHNICAL BULLETIN 2021-02.
- C.2 The Contractor must perform an inspection of the of electrical terminal connections tightness on the critical systems Switchboards listed in the Equipment Data as per CCG TECHNICAL BULLETIN 2021-02.
- C.3 The inspections and maintenance must be carried out by certified electrical contractors.
- C.4 Any deficiencies found during the test must be reported to the TA and will be addressed via PSPC 1397 Work arising procedures.
- C.5 The Contractor must generate a report of all findings in accordance with the Documentation section of the General Notes. The report must include as a minimum the following:
 - a) Detailed outline of work performed including any additional work;
 - b) Electrical readings for before starting work and after completing work on all electrical equipment;
 - c) Pictures of findings with detailed description and before and after pictures for before starting work and after completing work.
- C.6 The Contractor must inspect the Switchboards using the methods listed below:
 - a) Tightness inspection using a calibrated torque-wrench in accordance with manufacturer's published data and CCG TECHNICAL BULLETIN 2021-02 (IEEE Standard 45-1998, Table 7-2). Small size screw-type terminals may be checked with a standard or dynamometric type of screwdriver. Caution must be exercised against over-tightening which can lead to thread stripping and thus damaging the connector or eventual breaking of wire at the connection. Torque values are shown in document P14-8401-SB Techsol Breaker Torque Settings;
 - b) Visual inspection of bus-bar connections for the alignment of markings left on bolt heads and nuts by permanent marker;
 - c) Visual inspection of terminal connections for shearing, discolouration, oxidation or excessive heat build-up;
 - d) Visual inspection of cabling for signs of chaffing or excessive heat build-up.
- C.7 The Contractor must carefully manipulate the wire/terminal connections to check for movement or crackling of the assembly.

- C.8 Any damage found on the device must be replaced or the wire cut back to fresh raw copper. Parts and repairs will be via PSPC 1397 Work arising procedures. All new small size screw-type terminal connections must use Class approved cage clamp or spring cage-style terminal blocks.
- C.9 The Contractor must clean all bus bars using a dry cloth and a vacuum to remove all dust and debris. Any foreign substance, arcing, or carbonizing must be cleaned off with hand scraping and an electrical contact cleaner. No harsh chemicals are to be used that could damage the tin coating. Removed material must be disposed of using provincially applicable environmental regulations.
- C.10 In addition to the work listed above the Contractor must perform the following work specific to each item listed below:
- C.10.1 600V Main SWBD (Note: HVAC will be offline)
- i) EMAX Breakers to be removed, inspected, cleaned, and greased (if required) as per manufacturer (ABB Canada) specifications and CCG TECHNICAL BULLETIN 2021-02;
 - ii) All distribution breakers must be tightened to torque values as per manufacturer (ABB Canada) specifications and CCG TECHNICAL BULLETIN 2021-02;
 - iii) The Arc Monitor must be tested by following the steps on page 46 of the document S62-14-02 ABB Arc Guard System TVOC-2 Installation and maintenance guide_[OFSV001144]. The Contractor must connect the trip contacts to a test breaker and expose the detectors to a camera flash for 0.5 ms. Arc Monitor testing must be conducted by an OEM (ABB Canada) representative or an OEM approved Contractor.
- C.10.2 600V Emergency SWBD (Note: Hi-Fog will be out of service for the duration of the service, Emergency Generator must be put into local and operator panel turned to off position)
- i) Any cracked PT's in the control section must be replaced. Replacement PTs are to be GSM from supply on board ship.
- C.10.3 230V Emergency SWBD (Note: Watertight doors can only be operated manually for the duration of this service, 230V UPS will run on load to maintain internet network)
- i) All distribution breakers must be tightened to torque values as per manufacturer (ABB Canada) specifications and CCG TECHNICAL BULLETIN 2021-02.
- C.10.4 120V Emergency SWBD (Note: Emergency lighting will be offline for the duration of this service, normal lighting will remain)

- i) All distribution breakers must be tightened to torque values as per manufacturer (ABB Canada) specifications and CCG TECHNICAL BULLETIN 2021-02.
- C.11 The Contractor must ensure only one of the 600V Main or 600V Emergency switchboards are shut down at a time to maintain lighting and systems that are feed from both boards.
- C.12 The Contractor must follow the procedure for switchboard shutdown as described in the document: Shutdown Procedure for Franklin UPS units when isolating a Switchboard.
- C.13 Contractor must provide ship's crew with sufficient warning before shutting down switchboards so they can turn off computers and shut down servers to mitigate any issues caused by power loss.
- C.14 The Contractor must ensure all electrical all systems are returned to a functional state at the end of the service.

14.1.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.
- D.1.2 Prior to the close out of any item under this specification, the Contractor must provide the TA or the ship's Electrical Officer the opportunity to verify the work has been completed in accordance with the specification.

D.2 Testing/Trials

- D.2.1 The Contractor must perform an infrared switchboard survey after repairs are complete to identify any hot points. Any hot points are to be addressed via PSPC 1379 work arising procedures if necessary.

D.3 Certification – Not Used

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.
- D.4.2 The CE is responsible to ensure that the Survey Record Book is signed off by ABS.

- D.4.3 The Contractor must supply the TA with a digital copy of a report detailing the work undertaken, defects, repairs made and measurements and readings taken within 48 hours of completing the survey.
- D.4.4 The Contractor must provide a Quality Assurance (QA) report indicating that all disturbed parts of the work have been inspected by the Contractor's QA department. The Contractor must ensure all equipment has been restored to the condition it was prior to testing.

15.0 AUXILIARY SYSTEMS

15.1 INTERNAL FUEL TRANSFER METER INSTALLATION

15.1.A Identification

- A.1 The intent of this specification is to have an internal fuel transfer meter installed. This flow meter is to provide a method of confirming flow quantities during internal fuel transfers and bunkering operations.
- A.2 The Contractor must purchase, install, and test a new fuel transfer meter including all required components for a functional system.

15.1.B References

B.1 Equipment Data

B.2 Fuel Transfer Pumps (2)

- i) Manufacturer: Pompe Garbarino S.p.A.
- ii) Model: Garbarino IN 150
- iii) Type: Rotary Gear fitted with integral relief valves;
- iv) Capacity: 10 m³/hr at 400 kPa;
- v) Power: 4.5 kW.

B.2 Drawings and Documents

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

Drawing Number	DRAWING TITLE
S62-541.10-002	S62-541.10-002 Internal Fuel Transfer Meter Installation
Number	DOCUMENT TITLE

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.

15.1.C Statement of Work

- C.1 The Contractor must supply and install a flow meter complete with isolation valves and bypass on the common line from the fuel transfer pump outlet/bunkering inlet to the manifold. See Guidance Drawing.
- C.2 The fuel transfer meter system must be capable of maintaining a flow of fuel oil of 60 m³/hr at 6.9 BAR of pressure.
- C.3 The Contractor must supply all components of the fuel transfer meter system. All components must be new and unused and of current manufacture. They must be of commercial marine quality, in full compliance with the specifications and suitable for the intended use.
- C.4 The Contractor must supply a totalizer, and positive displacement (turbine style) flow meter with a digital display, as well as all associated components as recommended by the manufacturer. They must be capable of measuring flow rates from 0 to 65m³/hr. Installation must include a fine mesh strainer on the inlet of the flow meter.
- C.5 The flow meter and isolation valves must be ABS certified or type approved for the intended purpose.
- C.6 The Contractor must install the new fuel transfer meter system in the Main Machinery Space on the discharge line. See Figure 17 and Figure 18. The fuel transfer meter system can be installed anywhere on the indicated discharge line, but there must be sufficient room to access the isolation valves and service the strainer and flow meter.



Figure 17: Pipe to Discharge Manifold

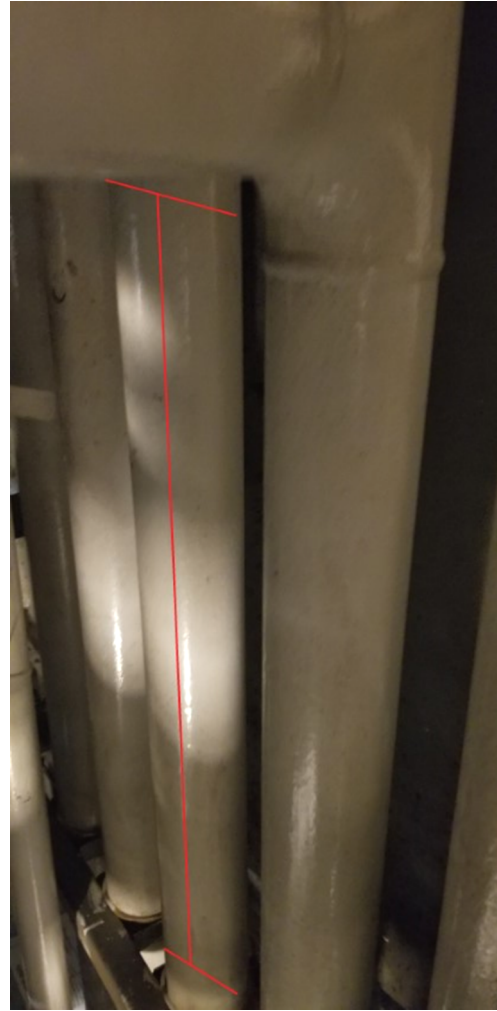


Figure 18: Under Deck Pipe Run:

- C.7 The Contractor must mount the digital display locally in the area of the new fuel transfer meter system. It must be mounted in a position that is easily readable from the bunker manifold. See Figure 19 for potential location.

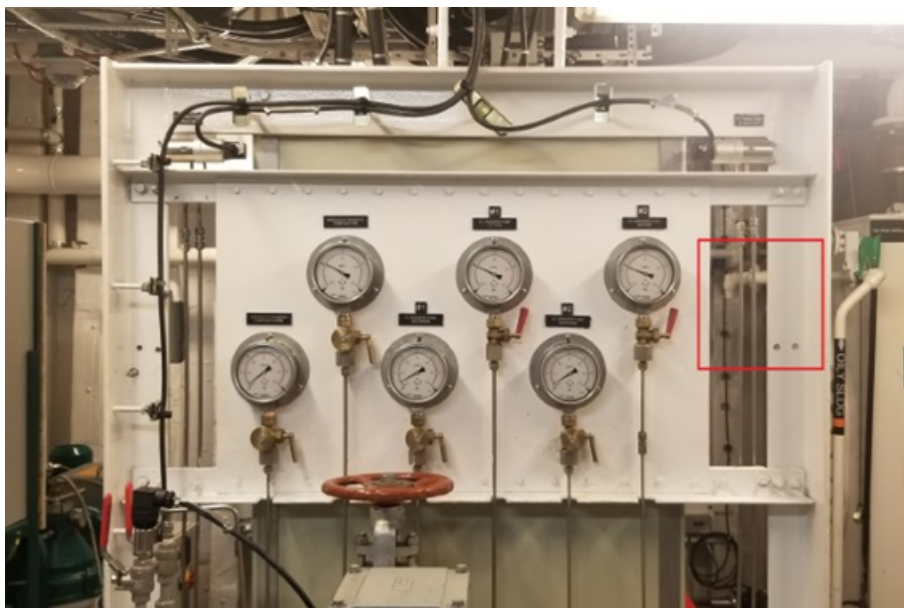


Figure 19: Potential Display Mounting Location

- C.8 The fuel transfer meter system must be fully supported and secured in place. Any required seating or brackets are to be CFM and must be prepped and painted in accordance with the Coatings and Surface Treatment Schedule.
- C.9 The Contractor must connect all connections of the new fuel transfer meter system to the existing piping systems. Existing piping sizes:
- i) Fuel transfer pump outlet: 3"
 - ii) Bunkering inlet: 3"
- C.10 The Contractor must individually bench test all valves according to API Standard 598, Valve Inspection and Testing to determine if there is any leakage. If any leaks are detected, the Contractor must re-seat the valve and test again.
- C.11 All piping and associated valves and fittings must be as per the vessel's pipe standards, shown in 190-501.00-001 Material Standard for Pipes, Valves and Fittings.
- C.12 All piping must be suitable supported.
- C.13 The Contractor must fully paint the new piping and its supporting structure.
- C.14 All painting must be as per paint manufacturer's recommendations and the Coatings and Surface Treatment Schedule.

15.1.D Proof of Performance

D.1 Inspection Points

- D.1.1 The Contractor must conduct weld inspections and NDT in accordance with the CCG Welding Specification. Any defects found are to be repaired at Contractor's expense.
- D.1.2 The Contractor must demonstrate to the TA, before acceptance, the function of the Internal Fuel Oil Transfer system.

D.2 Testing/Trials – Not Used

- D.2.1 All new and modified piping to be pressure tested to a minimum of 1.5 times 6.9 BAR for 30 minutes. New piping must be pressure tested prior to installation in the vessel. All pressure tests are to be witnessed by the TA.

D.3 Certification

- D.3.1 ABS certification to be supplied by the Contractor.

D.4 Documentation

- D.4.1 Documentation must be in accordance with the Documentation section of the General Notes.
- D.4.2 Copies of the NDT testing must be provided to the TA in accordance with the Documentation section of the General Notes.
- D.4.3 The Contractor must provide a record of all electro-mechanical checks in Microsoft Excel 2010 (.xlsx) format.
- D.4.4 The Contractor must provide product data sheets and valid type approval certificates for all material used.
- D.4.5 The Contractor must provide a list of all materials used.

16.0 DOMESTIC SYSTEMS

16.1 NOT USED

17.0 DECK EQUIPMENT

17.1 NOT USED

18.0 VESSEL COMMUNICATIONS AND NAVIGATION

18.1 UPDATE CCTV CAMERAS

18.1.A Identification

- A.1 The Contractor must install seven (7) new CCTV cameras and cabling.
- A.2 The Contractor must relocate one (1) CCTV camera and cabling within the Ocean Winch Compartment.

18.1.B References

B.1 Equipment Data

- B.1.1 Annex 1 – Update CCTV Cameras GSM

B.2 Drawings

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

Drawing Number	DRAWING TITLE
WM894-002	SIR JOHN FRANKLIN CCTV CAMERAS
Number	DOCUMENT TITLE

B.3 Regulations and Standards

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

	Title	Provided by:
Standards		
IEEE 45	Recommended Practices for Installations on Shipboard	Contractor
TP 127E	Ships Electrical Standards (2018)	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
Regulations		
CSA 2001	Canada Shipping Act 2001	Contractor
	Canada Labour Code (R.S.C., 1985, c. L-2)	Contractor
WorkSafe BC.	Occupational Health and Safety (OHS) Regulation	Contractor
MOHS	Maritime Occupational Health and Safety	Contractor

18.1.C Statement of Work

- C.1 The Contractor must remove the currently fitted Pelco PTZ camera currently fit in the Ocean Winch Compartment, as shown in Figure 20.
- C.2 The Contractor must install the camera removed in C.1 in the location in the Ocean Winch Compartment indicated in Figure 21. The camera must provide the view indicated in Appendix 2.
- C.3 The Contractor must re-route the network and power cables from the existing camera mounting location to the new mounting location. If cable length is determined to be insufficient, cables are to be replaced via PSPC 1379 work arising procedure.
- C.4 The Contractor must install stud welded cable supports in order to route the cables from their new location, to the existing support runs. The cables must be installed in accordance with TP 127E Ships Electrical Standards.
- C.5 The Contractor must install a new GSM camera power supply in server/sonar room 1A30. The Contractor must confirm the exact placement of the power supply with the TA prior to installation.
- C.6 The Contractor must install new GSM cameras in the locations listed on WM894-002.
 - C.6.1 The Contractor must confirm the exact placement of the cameras with the TA prior to installation.
 - C.6.2 The Contractor must install the cameras to provide the camera views indicated in Appendix 2 – Required Camera Views.
 - C.6.3 The Contractor must provide and install CFM mounting plates for the cameras in order to achieve the required camera views. The mounting plates must be painted with an outdoor marine rated white paint.

- C.7 The Contractor must install, terminate and label the camera network and power cables as per reference document WM894-002_01. The fixed cameras do not require power cables.
- C.7.1 The Contractor must install all outdoor cable connections in watertight junction boxes.
- C.7.2 The Contractor must install the main mast camera junction box within the main mast. A patch cable must be installed between the junction box and camera.
- C.7.3 The mast camera cables must route through the main mast transit and through the interior of the mast.
- C.7.4 The Contractor must install wiring and cabling in accordance with:
- a) The best standards practice of 70-000-000EU-JA-001 formerly DGTE-69
 - b) TP127 E - Ships Electrical Standards
 - c) IEEE Publication 45-2002 – Recommended Practices for Installations on Shipboard
- C.8 The Contractor must supply all required mounting hardware. All CFM mounting hardware must be stainless steel.
- C.9 The Contractor must identify all cables with metal labels that are in accordance with reference document WM894-002 and the wire labelling section of the General Notes.

18.1.D Proof of Performance

D.1 Deliverables

- D.1.1 Not used.

D.2 Inspection Points

- D.2.1 The Contractor must afford the TA the opportunity to inspect the CCTV camera system during the work period.

D.3 Testing/Trials

- D.3.1 The Contractor must test all new network cables to referenced standard ANSI/TIA-568-C.2 with a Fluke DSX-8000 cable certification tester or equivalent. The Contractor must provide CCG successful test reports for each cable. Any cable deficiencies reported by the certification tester must be rectified by the Contractor.

D.4 Certification – Not Used**D.5 Documentation**

D.5.1 The Contractor must redline document WM894-002 to reflect the as built configuration.

Annex 1 – UPDATE CCTV CAMERAS GSM

Equipment Description – GSM	Part Number	Quantity
PTZ Camera		2
Fixed Camera		5
PTZ Camera Mounting Bracket		2
24VAC Power Supply	ALTV244UL	1
Bergen CAT6A S/FTP Shipboard Cable	BC-10-021	500 meters
CAT6A RJ45 Connectors		
CAT6A M12 Connectors		
16AWG 2C Shipboard Power Cable	BVA-1602	100 meters

Appendix 1 – Figures



Figure 20: Existing Camera Ocean Winch Compartment

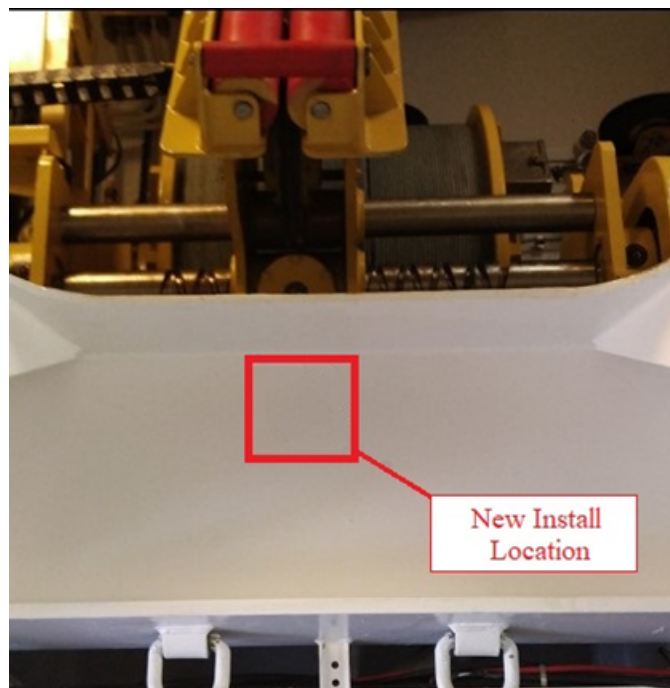


Figure 21: New Camera Location Ocean Winch Compartment

Appendix 2 – Required Camera Views



Figure 22: View 1 – FRC Davit



Figure 23: View 2 – Lifeboat



Figure 24: View 3 – Ocean Winch Compartment

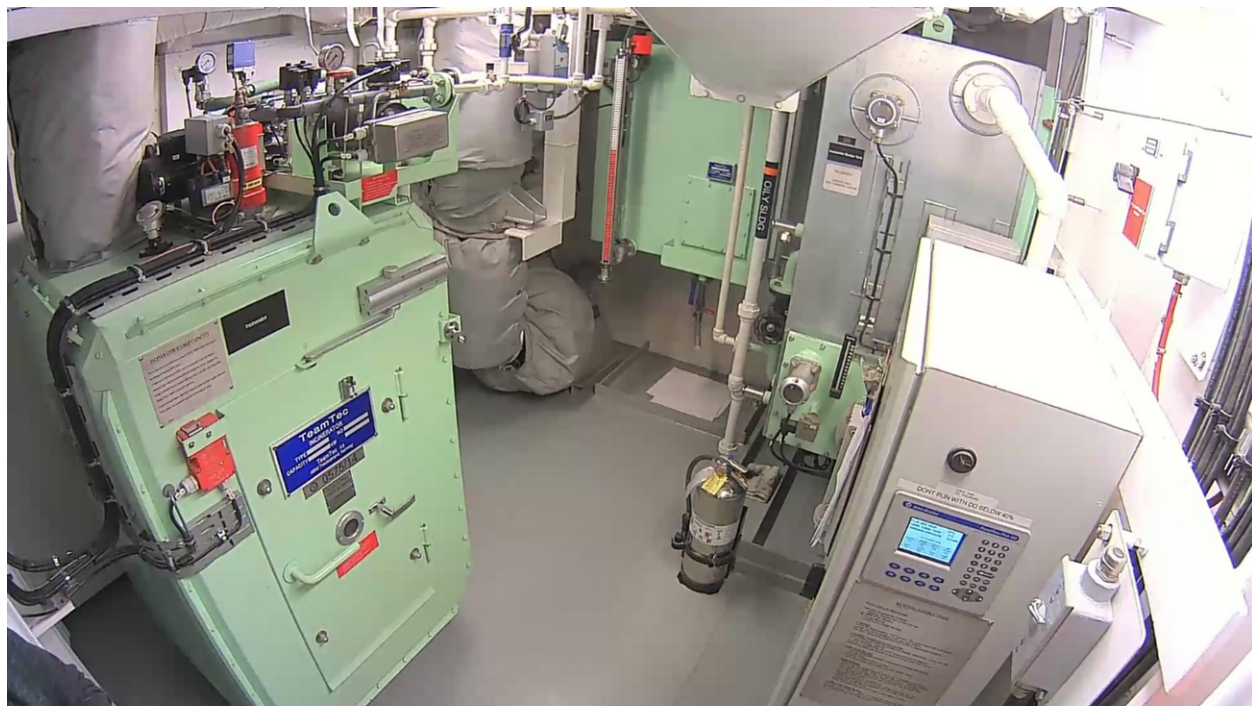


Figure 25: View 4 – Incinerator Room

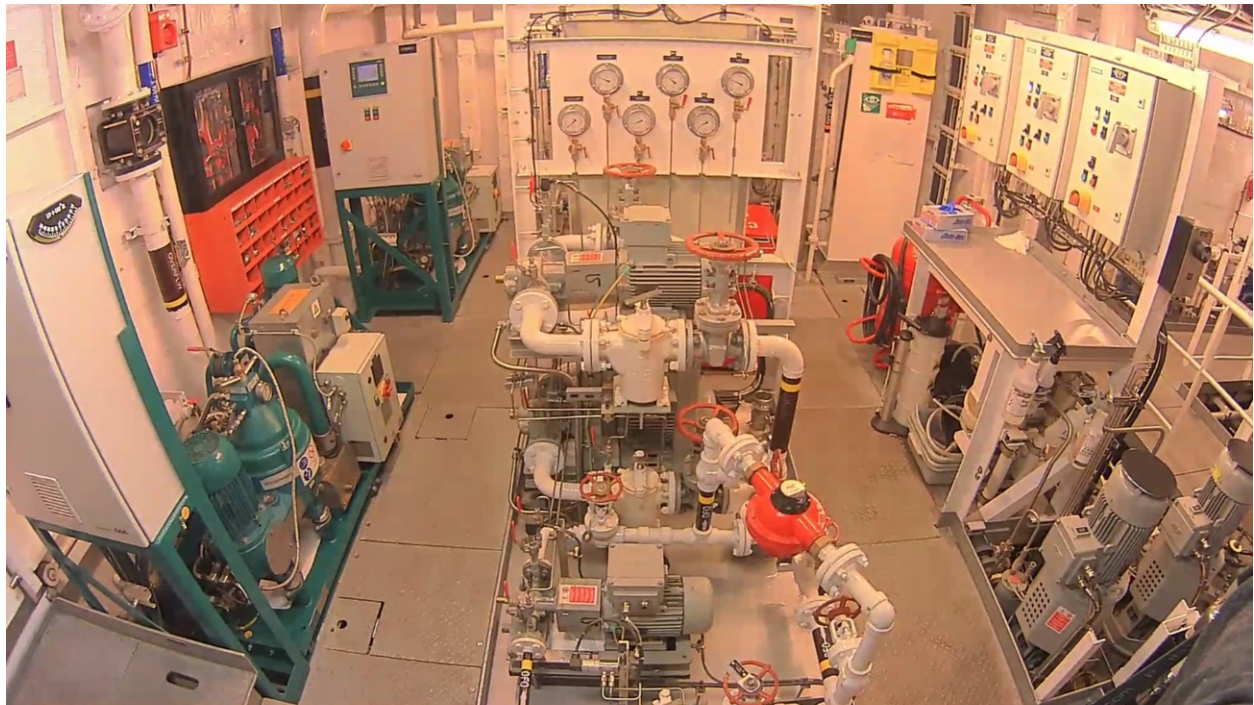


Figure 26: View 5 – Fuel Purifier and Transfer Area

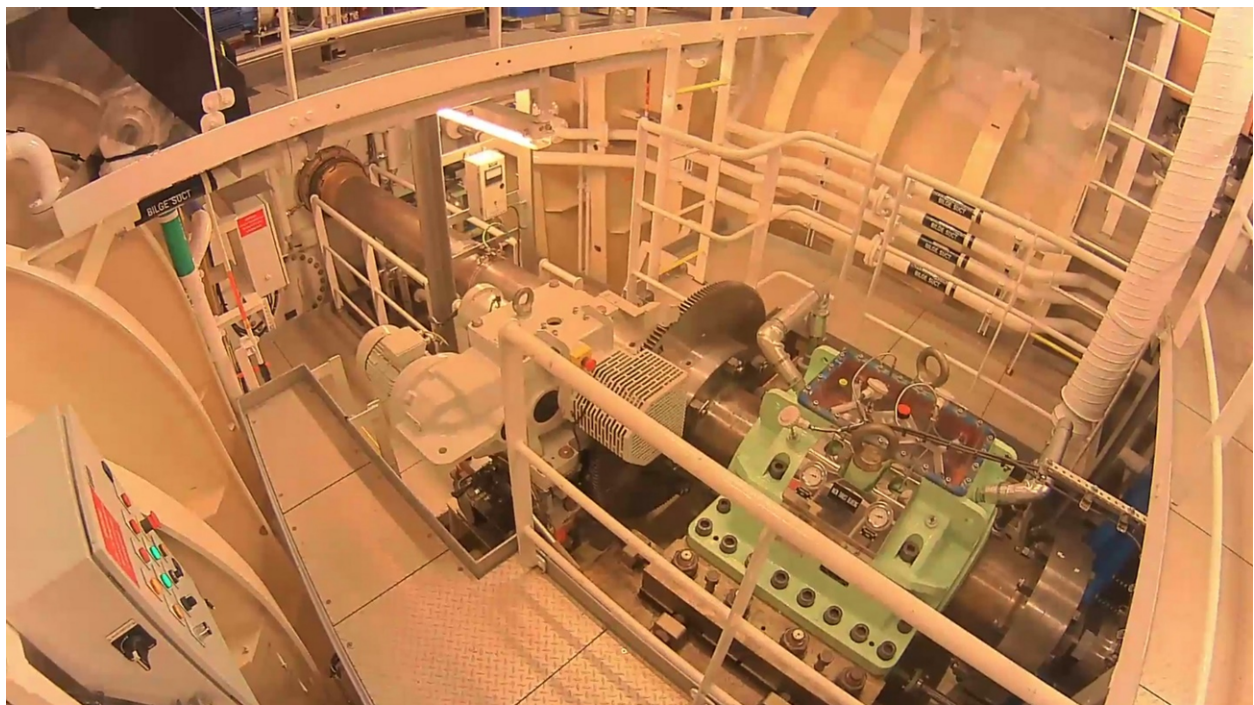


Figure 27: View 6 – Propulsion Motor Room Angle 1

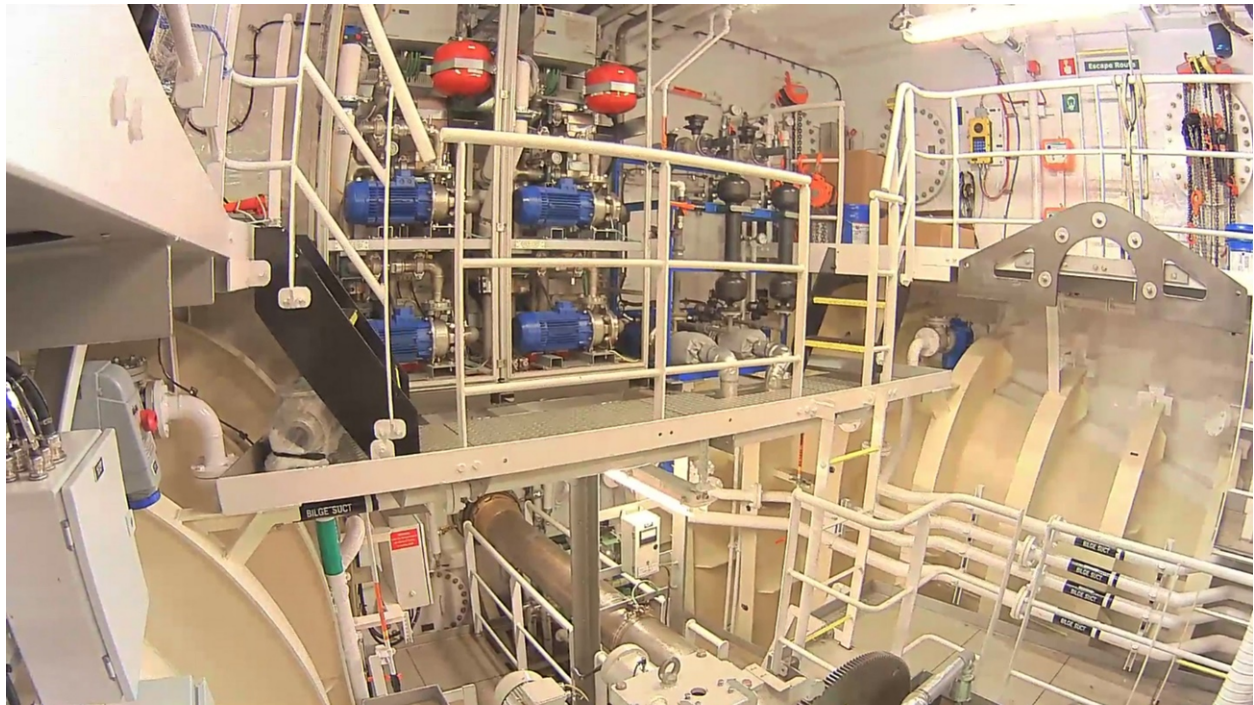


Figure 28: View 7 – Propulsion Motor Room Angle 2

18.2 INSTALLATION OF TVRO AND VESSELINK SYSTEMS

18.2.A Identification

- A.1 The Contractor must remove the existing FleetBroadband 500 system, including antenna and terminal.
- A.2 The Contractor must install a new Television Receive Only (TVRO) System, including antenna, controller and cabling.
- A.3 The Contractor must install a new Thales VesseLink satellite communication system.

18.2.B References

B.1 Equipment Data

- B.1.1 Annex 1 – Installation of TVRO and VesseLink Systems GSM

B.2 Drawings

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

Drawing Number	DRAWING TITLE
WM894-003_01	SIR JOHN FRANKLIN TVRO LAYOUT
WM894-003_02	SIR JOHN FRANKLIN TVRO CABLE SCHEDULE
WM894-004	SIR JOHN FRANKLIN VESSELINK LAYOUT
Number	DOCUMENT TITLE
S062-VLINK	Vesselink Antenna Pedestal Adapter
S062-TVRO	ST-24 Pole Mount
132816	OPERATION AND INSTALLATION FOR SEA TEL MODEL ST24 SATELLITE TV RECEIVE-ONLY ANTENNA
84464-IETM	VesselLINK Install Guide Rev C

B.3 Regulations and Standards

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

	Title	Provided by:
Standards		
IEEE 45	Recommended Practices for Installations on Shipboard	Contractor
TP 127E	Ships Electrical Standards (2018)	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
Regulations		
CSA 2001	Canada Shipping Act 2001	Contractor
	Canada Labour Code (R.S.C., 1985, c. L-2)	Contractor
WorkSafe BC.	Occupational Health and Safety (OHS) Regulation	Contractor
MOHS	Maritime Occupational Health and Safety	Contractor

18.2.C Statement of Work

VesseLink System

- C.1 The Contractor must remove the currently fitted FleetBroadband 500 antenna fitted on the wheelhouse top, as shown in Figure 29. The Contractor must leave retain the antenna cable in an operable state, for reconnection later in this specification.
- C.2 The Contractor must remove the currently fitted FleetBroadband 500 terminal and handset from the wheelhouse GMDSS console. The Contractor must leave retain the antenna, power, network and phone cables in an operable state, for reconnection later in this specification.
- C.3 The Contractor must fabricate the VesseLink antenna pedestal adapter mount as per reference drawing S062-VLINK. This mount must be painted with a marine grade white paint to match the fit and finish of the existing pedestal the FleetBroadband antenna was removed from in C.1.
- C.4 The Contractor must install the VesseLink antenna pedestal adapter mount on the existing pedestal the FleetBroadband antenna was removed from in C.1.
- C.5 The Contractor must install a GSM VesseLink antenna on the pedestal adapter mount and connect the antenna to the antenna cable the FleetBroadband 500 was removed from in C.1. No re-termination is required. The Contractor must cover the antenna connector in waterproof resin tape.
- C.6 The Contractor must install the Thales VesseLink terminal in the location the FleetBroadband 500 terminal was removed from in C.2. The Contractor must connect the existing antenna, power, network and phone cables to the new terminal.

- C.7 The Contractor must install the Thales SureLink handset in the location the FleetBroadband 500 handset was removed from in C.2.

Television Receive Only (TVRO) System

- C.8 The Contractor must fabricate the ST-24 Pole Mount as per reference drawing S062-TVRO. This mount must be painted with a marine grade white paint.
- C.9 The Contractor must install the ST-24 Pole Mount on the port side of the Gantry top, in the location indicated in Figure 31. The Contractor must fasten the Pole Mount to the ships rails using the GSM mounting clamps.
- C.10 The Contractor must install the ST-24 antenna on the ST-24 Pole Mount.
- C.10.1 The Contractor must remove the ST-24 controller unit from inside the antenna, prior to installation of the antenna.
- C.10.2 The Contractor must remove any shipping restraints from inside the antenna, prior to installation of the antenna.
- C.11 The Contractor must install the ST-24 Controller in the VSCS rack in the Server/Sonar room, using the GSM rack mounting plate. The Contractor must confirm exact rack position with the TA prior to installation.
- C.12 The Contractor must install the GSM Picom Multiswitch in the VSCS rack in the Server/Sonar room. The Contractor must confirm exact rack position with the TA prior to installation.
- C.13 The Contractor must install, terminate, and connect the TVRO system cables as per cable schedule WM894-003_02.
- C.13.1 The ST-24 antenna cables must route through the trawl deck cable pipe indicated in Figure 30 in order to mechanically protect the cables. If there is insufficient room in the pipe, the Contractor must install a new CFM cable pipe alongside the existing. New cable pipe to be installed via PWGSC 1379 work arising procedure.
- C.13.2 The Contractor must run the lounge and cabin ends of the distribution down the bulkhead into a CFM flush mount F-connector plate.
- C.13.3 All cable and connectors are to be GSM.
- C.13.4 The Contractor must install wiring and cabling in accordance with the following:
- a) The best standards practice of 70-000-000EU-JA-001 formerly DGTE-69
 - b) TP127 E - Ships Electrical Standards

c) IEEE Publication 45-2002 – Recommended Practices for Installations on Shipboard

- C.14 The Contractor must supply all required mounting hardware for included in Annex 1. All Contractor supplies mounting hardware must be stainless steel.
- C.15 The manufacturer's installation manuals and instructions shall be the governing guides ensuring a satisfactory installation.
- C.16 The Contractor must identify all cables with metal labels that are in accordance with drawing WM894-003_02 and the wire labelling section of the General Notes.

18.2.D Proof of Performance

D.1 Deliverables – Not Used

D.2 Inspection Points

D.2.1 The Contractor must afford the TA the opportunity to inspect the TVRO system during the work period.

D.2.2 All work may be subject to witness by the TA, Chief Engineer or delegate.

D.3 Testing/Trials – Not Used

D.4 Certification – Not Used

D.5 Documentation

D.5.1 The Contractor must redline documents WM894-003_01, WM894-003_02 and WM893-004 to document the as built configuration.

D.6 Equipment Disposal

D.6.1 The FleetBroadband 500 antenna, terminal and handset removed in this specification must be returned to the TA upon removal from the vessel.

D.6.2 The Contractor is responsible for properly disposing of all other materials from the work.

Annex 1 – INSTALLATION OF TVRO AND VESSELINK SYSTEMS GSM

Equipment Description – GSM	Part Number	Quantity
SEATEL TV RECEIVE ONLY SYSTEM	ST-24	1
PICOM MACOM MULTISWITCH	2X16	1
RG-11 ST-24 Antenna Cable	7731SB RG-11	400'
RG-6 Distribution Cable	Belden 1694SB	400'
Belden 18AWG 2C for 12VDC and NMEA data	88760	25'
RG-6 Connectors		6
RG-11 Connectors		10
Thales VesseLink Kit	VF350BM	1
Thales SureLink Handset	SureLink	1
ST-24 Rack Mounting Plate		1
Pole Mounting Clamps	Sinclair CLAMP005	3

Appendix 1 – Figures



Figure 29: Existing Antenna

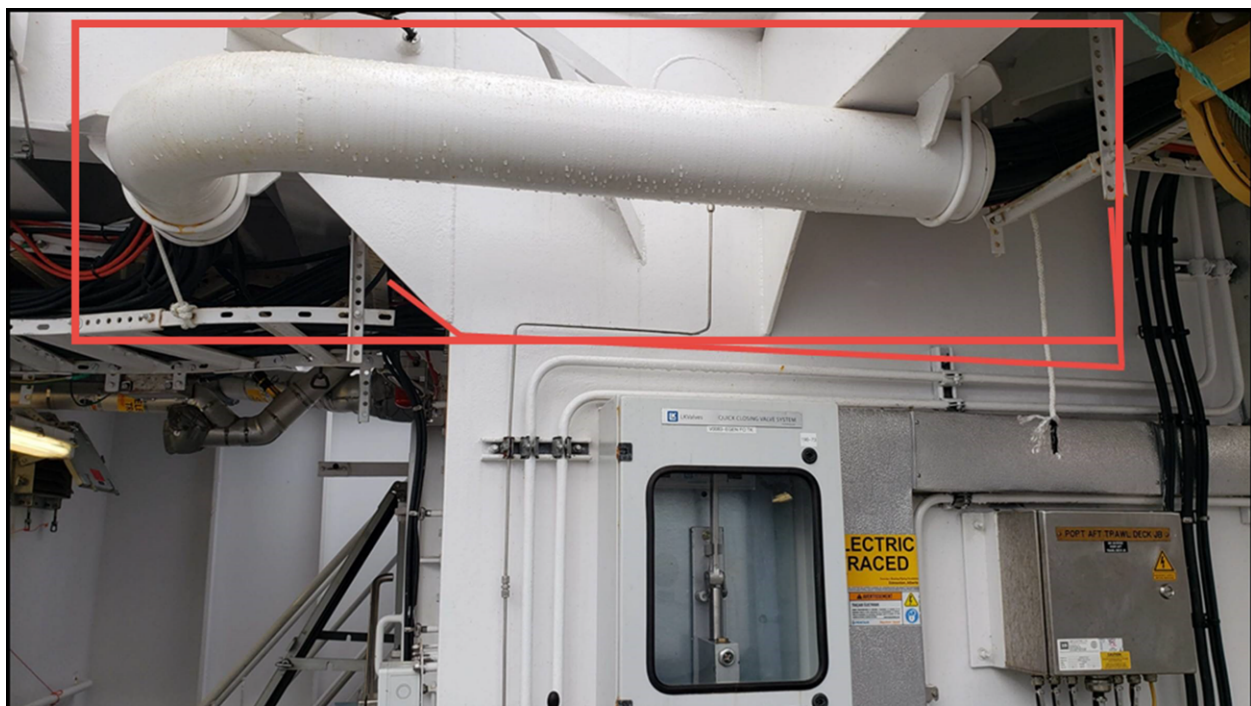


Figure 30: Trawl Deck Cable Pipe

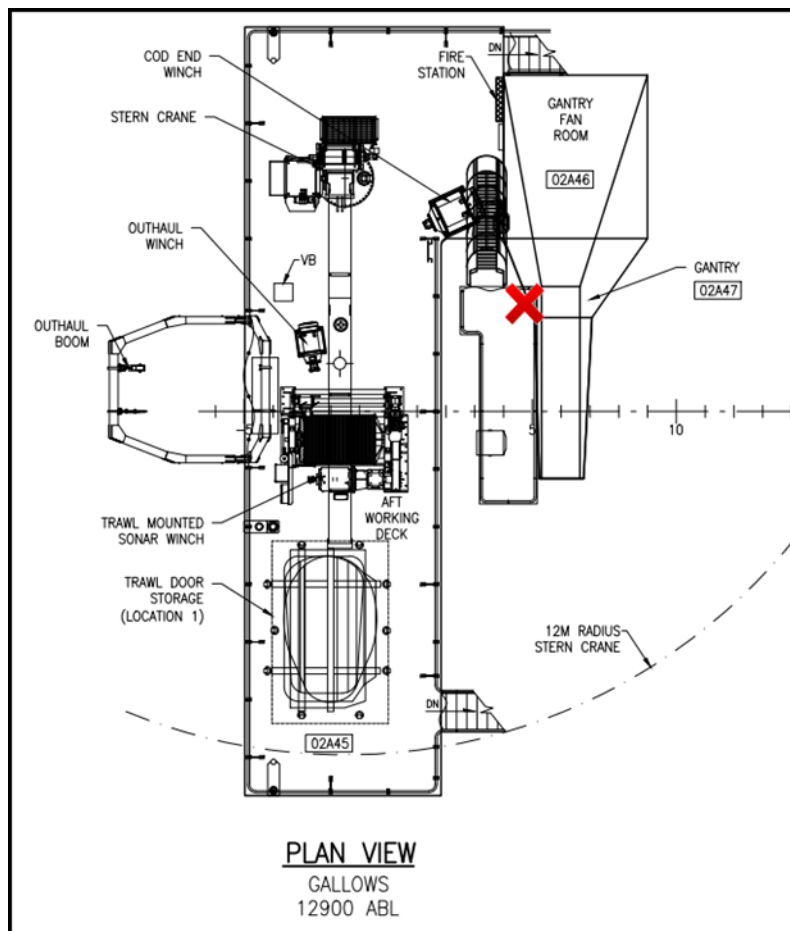


Figure 31: ST-24 Pole Mount Location

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