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**SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

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Title - Sujet CCGS Samuel Risley	
Solicitation No. - N° de l'invitation F2599-195017/A	Amendment No. - N° modif. 003
Client Reference No. - N° de référence du client F2599-195017	Date 2019-06-13
GETS Reference No. - N° de référence de SEAG PW-\$\$MD-040-27341	
File No. - N° de dossier 040md.F2599-195017	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2019-07-03	Time Zone Fuseau horaire Eastern Daylight Saving Time EDT
F.O.B. - F.A.B.	
Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Abbas, Haitham	Buyer Id - Id de l'acheteur 040md
Telephone No. - N° de téléphone (873) 469-4678 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: CCGS Samuel Risley Canadian Coast Guard 28 Waubeek Street Parry Sound, ON P2A 1B9	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
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Signature	Date

Amendment 003 is raised to address Bidders questions and amend the solicitation:

Q006: Can CANADA please provide CM706-010-IN – CCGS Samuel Risley GMDSS Interconnection (1 of 1) in order to proceed with estimate?

A006: Please see the new attachment “706010in1.zip” that has been added to the solicitation

Q007: In item 11.1 para 11.1.C.4 it states to renew by welding 86 draft marks and 2 stern thruster marks. In item 11.2 para 11.2.C.14.1 it states to renew 40 draft marks with new weld. In item 11.3 para 11.3.C .14.1 it states to renew 40 draft marks with new weld. Would this work be all covered under para 11.1.C.4 and should not be bid on in item 11.2, & 11.3?

A007: Please see the Updated Annex A that's attached to this amendment.

Q008: In item 16.1 para 16.1.C.4 it states to replace the cement and steel substrate to allow for the proper adhesion of a new DEX-O-Tex coating. Please clarify if this means that we are to cut the deck out and put in a new insert, or just prep the steel deck for the new cement to properly adhere to it.?

A008: No, does not involve cutting and renewing of deck plate. Steel substrate refers to the coating that goes on top of the raw steel plate that bonds the steel to the cement. We want to remove all existing top coatings (concrete, substrates) down to bare steel and then replace with the Dex-O-Tex system.

Q009: For bidding purposes and due to the stringent requirements of applying the Inerta paint coating, will it be necessary to hoard/enclose the vessel's hull with a heated shelter for Item 11?

A009: Enclosing of hull with heated shelter to meet requirements for applying Inerta paint coating is not mandatory. All requirements when it comes to quality and the process of painting must be strictly followed. It will be at Contractor's discretion to determine if enclosure required to meet those specifications.

The original Annex A has been deleted and replaced with the one attached to this document. The changes are all within section 11. Some changes were to address questions and Section 11.5 has been removed as it is no longer needed.

ANNEX A

CCGS Samuel Risley 2019 DRYDOCK

Specification No. 896.18

May 28 ,2019

Prepared by:
Marine Engineering
Integrated Technical Services
Canadian Coast Guard
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G 1.0 **GENERAL NOTES**

G 1.1 **Vessel Particulars**

Name:	CCGS Samuel Risley
Type:	Type 1050 Medium Endurance Multitasked Vessel, Ice Class 1A Super/ Arctic Class 2
Propulsion:	Twin rudder, direct drive diesel, twin screw, controllable- pitch shrouded propellers, Tunnel Type CPP Bow thruster and Tunnel Type CPP Stern thruster.
Year Built:	1985
Principal Dimensions:	
Length:	69.73 meters
Breadth, molded:	13.7 meters
Loaded Draft:	5.817 meters
Tonnage, displ:	2935 tonnes

G 1.2 **References**

The latest edition, at the time of contract signing, of all Acts, regulations, standards, publications, and procedures listed below are to be used as reference. The Contractor must ensure all work completed in the specification are done to all pertinent federal and territorial regulations and standards. CCG procedures are to be used as a guide if no other regulation takes precedence.

Publications	Title
CCG 5737	Fleet Safety Manual
TP 127	Ships Electrical Standards, 05/2018
NFPA 306 2014	Standard for the Control of Gas Hazards on Vessels
TP 3669	Standards for Navigating Appliances and Equipment
TP 11469	Guide to Structural Fire Protection
TP 14231	Marine Occupational Health and Safety Program
TP 14612	Procedures for Approval of Life-saving Appliances and Fire Safety Systems, Equipment and Products
IEEE 45-2002	Institute of Electrical and Electronics Engineers, Recommended Practice for Electrical Installations on Shipboard
70-000-000-EU-JA-001	Specification for the Installation of Shipboard Electronic Equipment
IEC 60533	Electrical and Electronic installations in ships – Electromagnetic Compatibility
EPS Report 1/RA/2	Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems - Environment Canada
NFPA 10	Standard for portable fire extinguishers
18-080-000-SG-003 (formerly DFO/5884 - TP 12445E)	Paints And Coatings Standard

Standards	Title
CCG	CCG CAD using AutoCAD http://intra.coast-guard.ca/folios/00922/docs/ccgststden.zip
CCG	Canadian Coast Guard Specification for Electronic Technical Data Deliverables CA-014-000-NU-TD-001
CCG	Colour Coding Standard for Piping Systems 30-000-000-ES-TE-001
CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures Division 2 Certification
CSA W47.2	Certification of Companies for Fusion Welding of Aluminum
CSA W59	Welded Steel Construction – Metal Arc Welding
CSA W59.2	Welded Aluminum Construction
CSA W178.2	Certification of Welding Inspectors
ISO 9712:2005	International Standards for NDT
CT-043-EQ-EG-001-E	Welding Specification, August 2017 http://intra.coast-guard.ca/folios/00922/docs/WeldingSpecification-eng.pdf
SSPC	The Society for Protective Coatings
ISO 8501-1:2007	Preparation of steel substrates before application of paints and related products
ISO 10816-1:1995	Mechanical vibration -- Evaluation of machine vibration by measurements on non-rotating parts -- Part 1: General guidelines
ASME Y14.100	American Society of Mechanical Engineers Y14.100 - 2017 Engineering Drawing Practices - Nov. 14, 2017

Regulations	Title
MOHS	Maritime Occupational Health and Safety
CSA	Canada Shipping Act, 2001
Machinery Regs.	Marine Machinery Regulations (SOR/90-264)

Vessel Fire Safety Regs.	Vessel Fire Safety Regulations (SOR/2017-14)
Hull Regs.	Hull Inspection Regulations (C.R.C., C. 1432)
Canada Labour Code	Canada Labour Code (R.S.C., 1985, c. L-2)
Federal Halocarbon Regulations	Federal Halocarbon Regulations, 2003 (SOR/2003-289).

G 1.3 Abbreviations

ABS	American Bureau of Shipping
CA	Contract Authority (PSPC)
CCG	Canadian Coast Guard
CLC	Canada Labour Code
CSM	Contractor Supplied Material
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
DFO	Department of Fisheries and Oceans
FSM	Fleet Safety Manual (CCG)
FSR	Field Service Representative
GSM	Government Supplied Materials
HC	Health Canada
IEEE	Institute of Electrical and Electronic Engineers
LOA	Length Over All
MOHS	Maritime Occupational Health and Safety
NDT	Non Destructive Testing
OEM	Original Equipment Manufacturer
OHS	Occupational Health and Safety
PSPC	Public Services and Procurement Canada
RO	Registered Organization as defined by Canada Shipping Act
SDS	Safety Data Sheet
SSMS	Safety & Security Management System
TBS	Treasury Board of Canada Secretariat
TCMS	Transport Canada Marine Safety
TA	Technical Authority – Owner’s Representative (CCG)
WHMIS	Workplace Hazardous Material Information System

G 1.4 Occupational Health and Safety

G 1.4.1 The Contractor and all sub-contractors must follow Occupational Health and Safety (OHS) procedures in accordance with applicable federal and provincial OHS regulations ensuring that Contractor activities are carried out in a safe manner and do not endanger the safety of any personnel.

G 1.4.2 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 sub-contractors employees as required.

G 1.5 Access to Worksite

G 1.5.1 The Contractor must ensure the TA and CG staff has unrestricted access to the worksite at all times during the contract period.

G 1.6 Workplace Hazardous Materials Information System (WHMIS)

G 1.6.1 The Contractor must provide the TA with Safety Data Sheets (SDS) for all Contractor supplied WHMIS controlled products.

G 1.6.2 The TA will provide the Contractor with access to SDS sheets for all controlled products on the ship for all specified work items.

G 1.7 Smoking in the Work Space

G 1.7.1 The Contractor must ensure compliance with the Non- Smokers' Health Act. The Contractor must ensure that every employer, and any person acting on behalf of an employer, must ensure that persons refrain from smoking in any work space under the control of the employer. The Contractor must ensure that there is absolutely no smoking onboard the vessel.

G 1.8 Clean and Hazard Free Worksite

G 1.8.1 Before the Contractor starts any work on the vessel the Contractor's Quality Assurance Representative and the TA must walk through each space and area where work is to take place, including access and removal routes and areas adjacent to those where the work is to be done as a result of this specification. The Contractor's Quality Assurance Representative must take digital pictures of each area showing the outfit therein and download the photos in JPG format onto a CD or DVD. Each picture must be dated and labeled as to the location on the vessel. Copies of this CD or DVD are to be provided to the TA for reference purposes within 48 hours of the start of the contract.

- G 1.8.2 The Contractor, during the work period, must maintain those areas of the vessel which Contractor personnel use to access areas where work is to be undertaken, in a clean condition, free from debris and remove garbage daily.
- G 1.8.3 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 Canada Labour Code requirements.
- G 1.8.4 Upon completion of this contract, the Contractor must be responsible for the removal of all garbage generated from the work of this specification and for returning the vessel to the state of cleanliness in which the vessel was at the start of the contract period.
- G 1.8.5 Once all known work and final clean-up has been completed the Contractor's QA Representative and the TA must perform a 'walk through' of the vessel to view all areas where work was performed by the Contractor. Any deficiencies or damage noted must be recorded and compared to the photos and if deemed to have been caused by the Contractor as a result of the work the damage must be repaired by the Contractor at no cost to the Coast Guard.

G 1.9 Fire Protection

- G 1.9.1 The Contractor must ensure the isolation, removal and installation of fire detection and suppression systems or any components thereof, is performed by a qualified technician. When the fire detection or fire suppression system is deactivated or disabled by the Contractor during the contract, the system(s) must be recertified by a qualified technician as fully functional. A signed and dated original copy of the certificate must be delivered to the TA before the end of the contract.
- G 1.9.2 The Contractor must notify the TA and obtain written approval from the TA prior to disturbing, removing, isolating, deactivating / disabling or locking out any part of the fire detection or suppression systems, including heat and smoke sensors.
- G 1.9.3 The Contractor must ensure protection against fire at all times including when working on the ship's fire detection and / or suppression system(s). This may be accomplished as suggested below and only with the written permission of the TA:
- Disabling only one portion of a system at a time;
 - By maintaining system function using spares while work is in progress;
 - Other means acceptable to and approved by the TA.
- G 1.9.4 The Contractor must note that failure to take the necessary precautions while performing work on the vessel's fire suppression system(s) could result in the accidental discharge of the fire suppression agent(s). The Contractor must recharge

and certify at his cost, container(s) or systems that are discharged as a result of such work.

G 1.10 Touch-up / Disturbed Paint

G 1.10.1 Unless stated otherwise the Contractor must supply and apply two coats of marine primer compatible with the vessel's existing coating system to all new and/or disturbed metal surfaces.

G 1.10.2 The Contractor must prepare all new and disturbed steelwork to the paint manufacturer's standards prior to painting.

G 1.11 CCG Employees and Others on the Vessel

G 1.11.1 CCG / DFO employees and other personnel such as manufacturer's representatives and/or TCMS or Class surveyors may carry-out other work including work items not included in this specification, onboard the vessel during this work period. Every effort will be made by the TA to ensure this work and the associated inspections and/or surveys do not interfere with the Contractor's work. The Contractor will not be responsible for coordinating the related inspections or payment of inspection fees for this work unless otherwise specified.

G 1.12 Regulatory Inspections and/or Class Surveys

G 1.12.1 The Contractor must contact, coordinate and schedule all regulatory inspections and/or class surveys by the applicable authority: i.e. TCMS, ABS, HC, Environment Canada or others as required by the specification.

G 1.12.2 Any documentation generated by the above inspections and/or surveys to show that the inspections and/or surveys were conducted (i.e. original signed and dated certificates) must be provided to the TA.

G 1.12.3 The Contractor must not substitute inspection by the TA for the required regulatory inspections or class surveys.

G 1.12.4 The Contractor must provide timely advance notification (minimum of 24 hours) of scheduled regulatory inspections and/or class surveys to the TA so they may witness the inspection.

G 1.13 Test Results and Data Book

G 1.13.1 The Contractor must develop a Test and Trials Plan which must include as a minimum, all tests and trials stated in the specification. This plan must be provided for TA review 1 week prior to the originally scheduled Tests and Trials commencement.

- G 1.13.2 All tests, measurements, calibrations and readings must be recorded, signed by the person taking the measurements, dated and provided in report format both in hard copy and electronic format, to the TA.
- G 1.13.3 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 1.13.4 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.
- G 1.13.5 Hard copy reports must be bound in standard 3-ring binders, type written on letter size paper and indexed by specification number. Electronic copies must be in unprotected Adobe PDF format and provide on CD-ROM media. The Contractor must provide 2 hard copies and 1 electronic copy of all reports.
- G 1.13.6 All documentation from the contract period must be inserted in a data book and delivered to the TA on completion of the contract.

G 1.14 Contractor Supplied Materials and Tools

- G 1.14.1 The Contractor must ensure all materials are new and unused.
- G 1.14.2 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 1.14.3 Where no particular item is specified or where substitution must be made, the TA must approve the substituted item in writing. The Contractor must provide information about materials used, certificate of grade and quality of various materials to the TA prior to use.
- G 1.14.4 The Contractor must provide all equipment, devices, tools and machinery such as cranes, staging, scaffolding and rigging necessary for the completion of the work in this specification.
- G 1.14.5 The Contractor must provide waste disposal services for any oil, oily waste or other hazardous or controlled waste generated by the work of this specification. The Contractor must provide waste disposal certificates for all of the above generated waste and the disposal certificates must indicate that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.

G 1.15 Restricted Areas

G 1.15.1 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 1.15.2 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 1.16 Contractor Inspections and Protection of Equipment and the Worksite

G 1.16.1 The Contractor must coordinate an inspection with the TA on the condition and location of items to be removed prior to carrying out the specified work or to gain access to a location to carry out the work.

G 1.16.2 Any damage incurred as a result of the Contractor's work and that is attributable to the Contractor's work performance must be repaired by the Contractor at his expense. Materials used in any replacement or repairs must meet the criteria for Contractor supplied material noted above in section Contractor Supplied Materials and Tools.

G 1.16.3 The Contractor must protect all equipment and surrounding areas from damage. Work areas are to be protected from the ingress of water, welding and blasting grit etc. Temporary covers to work areas must be installed.

G 1.16.4 The Contractor must protect the vessel from the possibility of vermin infestation (insect/mammal). 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 1.17 Recording of Work in Progress

G 1.17.1 The TA may record any work in progress using various means including, but not limited to photography and video, digital or film.

G 1.18 List of Confined Spaces

G 1.18.1 The Contractor may request a list of the vessel's identified confined spaces at the Pre-Refit meeting.

G 1.19 Lead Paint and Paint Coatings

G 1.19.1 The Contractor must not use lead based paints.

G 1.19.2 CG 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 Contractor must ensure that coatings in the affected work areas are tested for lead content and that the work is performed in accordance with applicable Federal and Provincial regulations.

G 1.19.3 The Contractor must provide HC product approval for underwater hull surface paints controlled by HC and the Pest Management Regulatory Agency.

G 1.20 Asbestos Containing Materials

G 1.20.1 The Contractor must not use any asbestos containing materials.

G 1.20.2 Handling of any asbestos containing materials must be performed by personnel trained and certified in the removal of asbestos in accordance with Federal, Provincial and Municipal regulations in effect and in accordance with the Fleet Safety and Security Manual. 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 1.21 Removed Materials and Equipment

G 1.21.1 All removed equipment as a result of this specification must remain the property of the Coast Guard unless otherwise instructed in the specification sections.

G 1.22 Work Aloft

G 1.22.1 Any work aloft onboard the vessel during the maintenance/refit period must be conducted in accordance with the Safety Management System in effect. Radars must be locked out to prevent operation while personnel are working aloft on the mast or on the wheelhouse top.

G 1.23 Assembly of Components

G 1.23.1 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. All components must be assembled in accordance with original manufacturer's specifications and recommendations.

G 1.23.2 Covers, cowlings and components damaged by the Contractor must be replaced with new CSM covers, cowlings, or components.

G 1.23.3 Where torque specifications are not provided by the manufacturer, the applicable SAE, ANSI, or BS1083 nut and bolt standard torque must be used.

G 1.24 Storage and Protection of Equipment

G 1.24.1 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 1.24.2 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 1.24.3 The Contractor must take precautions 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 1.24.4 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 1.24.5 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, media (sand) blasting, grinding and painting.

G 1.24.6 Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance must be returned to As-Delivered condition by the Contractor.

G 1.24.7 All openings in machinery and/or systems must be kept covered by fitted solid inserts or covers prior to connections being made.

G 1.24.8 The Contractor must obtain and follow instructions from its sub-Contractors for any special protection required for their equipment during the project work. Such instructions must be made available to the TA.

G 1.24.9 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 1.25 Halocarbon containing Systems

G 1.25.1 All work conducted on Halocarbon containing systems, must be in accordance with the Federal Halocarbon Regulations, 2003 (SOR/2003-289).

G 1.26 Hot Work

G 1.26.1 All hot work must be carried out in accordance with OHS, MOHS and the FSM 7.B.4.

G 1.27 Welding Certification

G 1.27.1 For any work requiring the application of fusion welding for steel structures the Contractor and/or the sub-contractor welders must be certified by the Canadian Welding Bureau in accordance with CSA Standards W47.1-03, latest revision – Certification of Companies for Fusion Welding of Steel Division 2 Certification as a minimum. Current copies of certification (including those of the welders) must be provided to the TA.

G 1.28 Electrical Installations

G 1.28.1 All electrical installations and repairs must be carried out in accordance with the latest revisions of Transport Canada Marine Safety Electrical Standard TP127E and IEEE Standard 45 Recommended Practice for Electrical Installation on Ships.

G 1.29 Potable Water

G 1.29.1 Any time a Potable Water tank, fill or vent lines are opened, worked on, disconnected, exposed to workspaces, painted, cleaned, entered the following cleaning procedures must take place by the Contractor.

G 1.29.2 The Contractor must use CCG Standards for Potable Water Quality located in Section 7.F.12 of the FSM when commissioning all potable waters tanks affected by Contractor work.

G 1.29.3 The tank surfaces must be cleaned of all debris and sludge and wiped dry. All debris and sludge must be disposed of ashore by the Contractor. The Contractor must bid on removing one cubic meter of water/debris from the tanks.

G 1.29.4 The Contractor must coat all disturbed paint or paint renewal sections with Potable Water Tank paint Interline 925 using manufacturer's recommendations for preparation and application.

G 1.29.5 The potable water tanks must not be sealed and filled with any liquid until the coating cure time has elapsed. Failure of the Contractor to ensure that tank coatings have fully

cured and are no longer off gassing remains the Contractor sole responsibility. Coating specifications from the manufacturer for mixing and application must be strictly adhered to. Any resulting contamination to the potable water system or damage to the existing tank coatings will be repaired at the Contractors expense.

- G 1.29.6 The Contractor must replace all tank access cover gaskets with new 1/8 inch thick fiber reinforced neoprene gaskets suitable for potable water service.
- G 1.29.7 Potable water tanks must be filled with hyper-chlorinated potable water for a period of 24 hours. The hyper-chlorinated water will have a free chlorine content of 50 ppm (part per million). The Contractor must certify to the TA that the water used for the disinfection meets these requirements. If the Contractor uses calcium hypochlorite to produce the hyper-chlorinated potable water, the water will be filtered to remove all calcium before it is introduced into the potable water tanks.
- G 1.29.8 Following the 24 hour disinfection period, the Contractor must drain and flush the potable water tanks to attain the following readings for the potable water:

Free Chlorine	0.2 and 0.4 ppm;		
E. Coli	0 per 100ml	Nitrate/Nitrite	45 mg/L
Total coliform	0 per 100ml	Mercury	0.001 mg/L
Turbidity	1 NTU	Selenium	0.01 mg/L
Antimony	0.006 mg/L	Uranium	0.02 mg/L
Barium	1.0 mg/L	Benzene	0.005 mg/L
Boron	5.0 mg/L	Xylenes	0.3 mg/L
Cadmium	0.005 mg/L	Flouride	1.5 mg/L
Chromium	0.05 mg/L	Lead	0.01mg/L
Copper	1.0 mg/L	Sodium	200 mg/L
Iron	0.3 mg/L	Zinc	5 mg/L

Manganese	0.05 mg/L	Ethylbenzene	0.00024 mg/L
pH	6.5-8.5 pH units	Toluene	0.024 mg/L
Colour	15 TCU	Sulphahtes	500 mg/L
TDS	500 mg/L	Chloride	250 mg/L

- G 1.29.9 These readings must be verified by an independent laboratory that is provincially licensed to perform these tests on potable water. Copies of all final test results must be presented to the TA.
- G 1.29.10 The Contractor must flush the water tanks until the free chlorine content of the water in the tanks drops to an acceptable level of no more than a maximum of 5 PPM.
- G 1.29.11 The Contractor must dispose of all hyper-chlorinated water in accordance with Federal, Provincial, and Municipal Regulations in effect. All disposal certificates must be provided to the TA.
- G 1.29.12 The Contractor must re-fill all potable water tanks to their initial tank soundings prior to undocking the vessel using a certified potable water source.

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 be responsible for the re-establishment of services if the vessel is moved during the work period.
- S 1.1.2 Each of the services noted below must be separately priced in the Contractor's submitted bid.
- S 1.1.3 The Contractor must be responsible for supplying 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 1.1.4 All staging, crange, screens, lighting and any other support services, equipment and materials necessary to carry out the work identified in these specifications must be Contractor supplied.

S 1.2 BERTHING

- S 1.2.1** The berthing and mooring facilities must be suitable for a vessel of this size in local weather / tide / sea conditions. Fenders must be supplied by the Contractor to prevent the vessel from contacting the wharf in local weather / tide / sea conditions.
- S 1.2.2** The length of the dock must be a minimum of 90% of the length of the vessel (LOA).
- S 1.2.3** During the contract period, when the ship is not in the dry dock, the ship must be berthed at the Contractor's wharf at a safe and secure location with a minimum clearance of 1 meters under the vessel at extreme low tide to ensure the vessel will not touch bottom.
- S 1.2.4** The Contractor must be responsible for all movements of the vessel, including berthing and mooring of the vessel for the contract period and arrangements and costs for line handlers, tugs and pilots.
- S 1.3** **MOORING LINES**
- S 1.3.1** The Contractor must be responsible for providing the necessary mooring lines and labour required to secure the vessel alongside the facilities. Ship's mooring lines are not to be used.
- S 1.4** **GANGWAYS**
- S 1.4.1** Contractor must supply the labour and services required for the installation and removal of two gangways, complete with handrails, safety nets and lighting for the duration of the contract. The Contractor must be required to supply and maintain the gangways.
- S 1.4.2** Any movement of the gangways required by the Contractor will be at the expense of the Contractor.
- S 1.4.3** Gangways must be at separate locations to facilitate fire evacuation.
- S 1.5** **TELEPHONE SERVICE**
- S 1.5.1** Contractor must supply and connect 1 telephone line to the internal communications center of the ship. The phone line(s) must be disconnected at the end of the contract.
- S 1.5.2** One telephone line provided must be maintained 24 hours a day to ensure communications with outside lines at all times. The Contractor must provide a telephone book of the local areas as well as a list of emergency numbers. Cellular phones are not acceptable.
- S 1.5.3** Any long distance charges made on this line must be to the CCG account.

S 1.5.4 Any Contractor's plant telephones are to be in addition to the above.

S 1.6 **ELECTRICAL POWER**

S 1.6.1 The Contractor must be responsible for supplying 600 Volt Alternating Current, 60 Hertz, 3 Phase, 200 Ampere service electrical power for the duration of the contract.

S 1.6.2 The Contractor must be responsible for supplying and connecting the necessary shore cable to the ship's shore power connection.

S 1.6.3 The Contractor must be responsible for ensuring that the correct phase rotation on a 3 – phase system is established prior to energizing the ship's distribution system. 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 Contractor must supply all power to the vessel through Contractor supplied kilowatt-hour meters. The Contractor must read the kilowatt-hour meter at the following times in the presence of the TA:

S 1.6.5 When the connection is first made;

S 1.6.6 When the care and custody of the vessel becomes that of the contractor;

S 1.6.7 When the crew return and care and custody of the vessel becomes that of Coast Guard; and,

S 1.6.8 When the vessel is disconnected from the contractor's power supply.

S 1.6.9 The Contractor must provide a calibration certificate for the kilowatt-hour meter.

S 1.6.10 The Contractor must supply a price quote per kilowatt-hour for electrical power for the duration of the contract period.

S 1.6.11 Final price for this item must be determined at the end of the contract and crown will pay for the power consumption while the vessel is not in the care and custody of the contractor using PSPC 1379 action.

S 1.7 **POTABLE WATER SUPPLY**

S 1.7.1 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 1.7.2 The water must be supplied from an approved municipal drinking water supply system that has been certified safe for consumption. (Reference CCG FSM 7A12 Potable Water Quality) reference section G 1.29.

S 1.8 **FIRE MAIN CHARGING SERVICE**

S 1.8.1 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. Pressure must be maintained at all times.

S 1.8.2 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 TI and must be used to calculate the total water usage from this connection.

S 1.8.3 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 1.8.4 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 1.9 **VESSEL SECURITY**

S 1.9.1 This work is going to take place with the vessel “out of commission” and therefore in the care, control and custody of the Contractor. The Contractor must provide for the safety and security of the vessel while it is under contract. The Contractor remains liable for all damage and theft while the vessel is in its care and custody. There is no requirement to have personnel living aboard.

S 1.10 **PARKING AT CONTRACTOR’S FACILITY**

S 1.10.1 The Contractor must provide 3 parking spaces for the exclusive use of the TA and project team for the duration of the contract period.

S 1.11 **PROJECT FACILITIES**

S 1.11.1 The Contractor must provide furnished, private and secure office space for the use of the TA and CCG personnel during the contract period. The office space must be located adjacent to the dry dock and vessel. The Contractor must provide commercial quality furnishings for three persons.

The Contractor must supply and provide internet connections for three computers and one telephone land-line and telephone. Any long distance charges made on this

line must be to the CCG account; total must be covered under PSPC 1379 action. The internet connections must be direct and not through the Contractor's security network.

S 1.11.2 The Contractor must supply clean toilet and wash-up facilities for the use of the TA and CA within the same building or contiguous to the same building for the duration of the work period.

S 1.12 **TEMPORARY DECK COVERINGS**

S 1.12.1 A temporary deck covering of new material is to be installed as soon as possible and before the work begins on the vessel.

S 1.12.2 To protect the alleyway flooring the Contractor must supply and install 158 m² - 3 mm MDF or Masonite sheeting over all deck surfaces on the Main, Boat, Focsle and Bridge decks, including the Engine Control Room, the Mess room, and Galley. The Wheelhouse carpet must be covered in 3mm MDF or Masonite sheet.

S 1.12.3 All seams and edge joints must be taped to secure the coverings and prevent ingress of dirt.

S 1.12.4 In the wheelhouse the sheet to sheet joints must be taped. The MDF must not be taped to the carpet.

S 1.12.5 Upon completion of the dry-docking/refit, the Contractor must remove and dispose of all the protective coverings installed. Any tape residue must be removed from the decks by the Contractor.

S 1.13 **BLACK AND GREY WATER SERVICES**

S 1.13.1 The black and grey water system must be put out of service prior for the contract duration.

S 1.13.2 The Contractor and Contractor's employees must not have access to the vessel's washrooms and crew mess facilities. The Contractor must provide the necessary amenities for the Contractor's and sub-Contractors employees as required.

S 1.13.3 The Contractor must pump ashore the contents of the black water treatment plant. Following the removal of the treatment plant contents the Contractor must open up the plant and hose down (with fresh water) and pump ashore residuals to leave the treatment plant free of any solids. The treatment plant holds approximately 6 cubic meters of black water. The treatment plant is a Hamworthy Supertrident ST4 and

require 3 chambers to be pumped and flushed – main collection, centre hopper and the recirculation/discharge tanks.

S 2.0 DOCKING AND UNDOCKING

S 2.1 IDENTIFICATION

S 2.1.1 The Contractor must dock the vessel, carry out the work identified in this specification and then undock the vessel. The Contractor must discuss with the TA any comments, concerns or observations they may have regarding the effect of work on the vessel's stability or carrying capacity. Additionally any work item that, in the opinion of the Contractor may pose a vessel structural integrity problem is to be brought to the attention of the TA. The Contractor must advise the TI and TA of the details of any major changes in the distribution of weights on the vessel, while the vessel is in dry-dock.

S 2.2 REFERENCES

S 2.2.1 Drawings:

S30102dp1- Docking Plan

S 2.2.2 Documentation:

Samuel Risley Tank Sounding Tables
Samuel Risley Intact Stability Book
Samuel Risley Damaged Stability Book

S 2.3 STATEMENT OF WORK

S 2.3.1 The Contractor must supply all labour, materials, equipment, tug services and facilities to dock and undock the vessel.

S 2.3.2 The Contractor must provide labour and services for the handling of the vessel's mooring lines and tug assistance to perform the docking and undocking of the vessel and any other vessel movements required during the contract period.

S 2.4 DOCKING

S 2.4.1 The Contractor must prepare blocks and shoring to maintain the alignment of the vessel's hull and machinery throughout the docking period.

S 2.4.2 The Contractor must refer to the docking plan for dry docking of vessel.

S 2.4.3 The Contractor must record all tank soundings, draft, trim and list of the vessel, and perform the stability calculations for the docking of the vessel. Completed stability

calculations must be forwarded to the TA two business days prior to docking the vessel.

S 2.4.4 The vessel must be docked so that all docking plugs, transducers, anodes and sea inlet grids and keel coolers are clear and accessible. A minimum clearance of 1.5 meters must be available below the keel. If any hull fittings are covered, the Contractor must provide all labour and materials and make alternative arrangements to drain tanks and/or move blocks to complete the specified work.

S 2.4.5 The Contractor must provide a ground cable between the vessel and the dock while the vessel is docked as per Ship Safety Bulletin 06/1989.

S 2.5 **UNDOCKING**

S 2.5.1 The Contractor must ensure that all shipside openings, including valves, drain and docking plugs are secure before flooding the dry dock.

S 2.5.2 During the undocking of the vessel, the Contractor must have sufficient personnel on hand such that all ship side valves can be inspected for leaks. Once sufficient water depth has been obtained, all submerged valves must be opened, and verified that no bonnets, flanges or valve packings are leaking. Any leaks must be rectified by the Contractor at the Contractor's expense prior to the close of the contract.

S 2.5.3 The Contractor must ensure all tanks are filled to the soundings recorded prior to docking. The Contractor must perform the necessary stability calculations for undocking the vessel taking into account any weight distribution changes as a result of the work of these specifications. The calculations must be forwarded to the TA 24 hours prior to undocking.

S 2.5.4 Prior to undocking, the TA must be given the opportunity to transfer fuel from a double bottom tank to the Day tank and emergency generator tank using the shipboard system.

S 2.5.5 The Contractor must supply, install and remove upon completion, any necessary fittings and lugs required to carry out the work in this specification. Where lugs and/or fittings are installed and removed, the welds must be ground flush with the hull. Any damaged and/or disturbed paint work must be treated in accordance with the paint manufacturer's requirements.

S 2.5.6 The Contractor must supply all labour necessary to handle the ship's lines during the undocking process.

S 2.5.7 The Contractor is responsible for supplying the services of tugs to ensure that the vessel is undocked in a safe manner and not damaged during the procedure.

S 2.6 **PROOF OF PERFORMANCE**

S 2.6.1 The Contractor, in the presence of the TA, must verify that all work on the hull is complete, all docking plugs and hull openings are secure and the vessel is ready to be undocked.

S 2.6.2 The Contractor must provide the initial tank soundings and stability calculations prior to the docking of the vessel.

S 2.6.3 The Contractor must provide the stability calculations and soundings prior to undocking the vessel.

S 2.6.4 The above requirements must be provided in accordance with the Test and Trials Plan.

10.0 SAFETY AND SECURITY – Not Used

11.0 HULL AND RELATED STRUCTURES

11.1 UNDERWATER HULL INSPECTION

11.1.A Identification

11.1.A.1 The Contractor must clean the underwater hull area within 24 hour of docking the vessel and must do a survey of the shell plating with the TA and the attending ABS Surveyor within 72 hours of docking the vessel. This inspection must identify areas of the underwater and above water hull that must be grit blasted and have new hull coatings applied. The Contractor must repair any butt and seam welds identified during the hull inspection.

11.1.B References

11.1.B.1 Drawings:

S30109mil – Shell Expansion

11.1.B.2 Documentation:

Canada Shipping Act 2001 (Latest Version)

11.1.B.3 The total underwater hull area of the vessel is approximately 1650 sq. meters.

11.1.C Statement of Work

11.1.C.1 The Contractor must supply all necessary staging and man lifts for the work of this specification, including inspections by ABS Surveyor and the TA.

11.1.C.2 Underwater Hull Cleaning

11.1.C.2.1 The Contractor must water blast the entire underwater hull surface of the vessel to the deep water load line within 24 hours of docking the vessel. The water blast pressure must be a minimum of 3000 psi / maximum 6000 psi. The Contractor must remove all marine growth, including slime, from the underwater hull surface of the vessel.

11.1.C.3 Underwater Hull Inspection

11.1.C.3.1 The Contractor, together with the TA and the attending ABS Surveyor, must inspect the cleaned underwater hull area of the vessel.

- 11.1.C.3.2 The Contractor must mark up a copy of the shell expansion plan with any identified areas of butts and seam welds requiring repair.
- 11.1.C.3.3 The Contractor must repair by gouging and re-welding the hull welds identified during the inspection. The Contractor must submit in the bid a price a per meter cost for preparation and repair of the hull seams and butts welds and must bid on a total of 40 meters. Pricing to be adjusted up or down by 1379.
- 11.1.C.3.4 The Contractor must grit blast any weld seam clear of all hull coatings to bare metal to a distance of 80 mm on either side of the weld. The Contractor must gouge the affected weld area to a depth of 6 mm and must re-weld the seam areas with multiple passes finishing the weld off with a cap pass.
- 11.1.C.3.5 The Contractor must supply the welding procedure for the seams and butts welding 24 hours prior to welding being completed. Reference must be made to CCG Welding Specifications.
- 11.1.C.3.6 The finished weld profile must be between 2 mm to 3mm above the adjoining plate, but in no place more than 3 mm above.
- 11.1.C.3.7 The Contractor will supply the welding procedure for the seams and butts welding. The welding procedure will include flux core wire welding of appropriate grades for the hull plate. The hull plate in this region is Lloyd's Grade E, and varies between 36 mm and 38.5 mm.
- 11.1.C.3.8 Welds must be inspected for conformity by the attending ABS surveyor for acceptance prior to the application of the hull coatings.
- 11.1.C.3.9 All welds that fail to meet ABS approval must be re-welded at the Contractor's expense and are subject to final ABS approval.
- 11.1.C.4 Hull Marking Renewals
- 11.1.C.4.1 The Contractor will use 309L stainless steel flux core electrode wire or better with CO₂/Argon gas shield to outline all hull markings identified in this specification to a 5 mm profile above the surface. The hull plate in this region is Lloyd's Grade E, and varies between 36 mm and 38.5 mm.
- 11.1.C.4.2 The Contractor will complete the marking renewals prior to the hull coating application.
- 11.1.C.4.3 Tank frame markings will be recoated with the hull coating system.
- 11.1.C.4.4 The contractor to bid on the following;

- Renewing a total combination of 86 draft marks and tank frame markings with new welding;
- Two stern thruster symbols to be weld marked;

11.1.D Proof of Performance

- 11.1.D.1 Prior to any hull coating, the Contractor must have the welding repairs inspected and approved by ABS.
- 11.1.D.2 The Contractor must provide a Quality Assurance (QA) report indicating that all areas as defined in this specification have been inspected by the Contractor's QA Department and all areas of defects established by this survey have been identified for remedial action. This report shall be included in the Data Book reference section G 1.13.
- 11.1.D.3 The Contractor must include in the final report the details of the seam and butt welding that was completed. This report must detail the location and length of each weld, ABS Surveyor approval for each final weld and any testing results required in way of each weld. This report shall be included in the Data Book reference section G 1.13.

11.2 UNDERWATER HULL PAINTING

11.2.A Identification

- 11.2.A.1 The Contractor must clean, grit blast and prepare underwater hull surfaces for recoating. Contractor must paint the underwater surfaces with the CCG define coating system as per manufacturer's recommendations.

11.2.B References

- 11.2.B.1 Drawings:

S30109mil – Shell Expansion

- 11.2.B.2 Documentation:

International Paint Technical Specification – CASL1-3BQP-PFR4/1

- 11.2.B.3 The total underwater hull area of the vessel is approximately 1650 sq. meters.

11.2.C Statement of Work

- 11.2.C.1 The Contractor must supply all necessary staging and man lifts for the work of this specification, including inspections by ABS Surveyor and the TA.

- 11.2.C.2 The Contractor must ensure that all items not being grit blasted or being painted are protected during the execution of this specification item.
- 11.2.C.3 All equipment protection must be removed at completion.
- 11.2.C.4 Where blasting grit and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor's expense prior to the completion of the contract.
- 11.2.C.5 The Contractor must ensure no ingress of blasting grit and/or overspray to the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting grit and/or overspray.
- 11.2.C.6 The Contractor is responsible for the cleanup of all blasting grit, debris and overspray from the vessel's interior and exterior decks.
- 11.2.C.7 All overboard discharges must be plugged and protected from blasting grit and hull coating.
- 11.2.C.8 All scuttles, port holes and windows must be protected from blasting grit and paint/hull coating.
- 11.2.C.9 All deck machinery must be protected from blasting grit and the paint/hull coating.
- 11.2.C.10 The Contractor must dispose of all blasting grit and debris according to applicable Federal, Provincial, and Municipal regulations.
- 11.2.C.11 The Contractor must ensure that all coatings are applied within the allotted dry dock time period in order to allow for the full and proper curing of the coating to the vessel's hull prior to immersion.
- 11.2.C.12 Any application that results in an unacceptable coating to the FSR and TA must be redone (blasting included) at the Contractor's expense within the allotted dry dock time period.
- 11.2.C.13 Underwater Hull Coating Renewal
 - 11.2.C.13.1 The Contractor must obtain the services of a qualified International FSR to supervise the surface preparation and hull coating application.
 - 11.2.C.13.2 The representative must be present during the entire process to verify conformity to the manufacturer's required procedures for the preparatory work, equipment, procedures, storage, environmental conditions and application of the hull coating.

11.2.C.13.3 The Contractor must re-coat as per the recommendation of the International FSR all disturbed areas after ABS has inspected and all identified welds have been repaired and approved.

11.2.C.13.4 For the purpose of bidding, the Contractor must submit in the bid a price per square meter cost for grit blasting the underwater hull to a SSPC SP-10 standard and coating the vessel with single coat of Intershield 163 - Inerta 160 Black; with coating thickness of 20 mils DFT minimum on the following;

- 1650 m² of underwater hull
- Port and Starboard rudders
- Port and Starboard propeller nozzles
- Port and Starboard rope guards
- Bow thruster tunnel

Pricing to be adjusted up or down by 1379.

11.2.C.13.5 The Contractor must adhere to all coating system requirements for the application of the coating manufacturer's requirements and must be inspected during preparatory work, application and completion by TA and NACE inspector.

11.2.C.13.6 Coast Guard will retain the services of an independent consultant to verify that the surface preparation, application and final coatings are in accordance with manufacturer's instructions. This consultant will be NACE coating certified and contractor must provide safe access to all work being performed under this section as well as storage and mixing locations.

11.2.C.14 Renewal of Symbols and Lettering

11.2.C.14.1 The Contractor must supply and apply 2 coats of Intersheen 579 white epoxy paint to outline and paint all ships side lettering after the completion of the application and curing of the hull coating system. This includes:

- a) Re-coating a total of 86 draft marks
- b) Re-coating 2 Plimsoll marks
- c) Re-coating a total of 20 tank frame markings with the existing hull coating system
- d) Re-coating of Thruster markings Fore and Aft

11.2.D Proof of Performance

- 11.2.D.1 All coatings work carried out to the satisfaction of the TA and CCG provided NACE coating inspector.
- 11.2.D.2 The Contractor must provide a 'coating application report' from the FSR to the TA that details all of the particulars of the coating application process as completed by the Contractor.
- 11.2.D.3 The report must include details of all environmental conditions at the time any hull coatings were applied and at which areas on the hull the coating was applied and include but not be limited to the dry and wet bulb temperatures, relative humidity, dew point and the times when painting was started and stopped as well as the temperature of the product at application time and wet and dry film thickness gauge readings.
- 11.2.D.4 This report shall be included in the Data Book reference section G 1.13.

11.3 ABOVE HULL PAINTING

11.3.A Identification

- 11.3.A.1 Contractor must sweep blast above waterline portion of hull and renew coating as per CCG requirements listed below.

11.3.B References

- 11.3.B.1 Drawings:

S30109mil – Shell Expansion

- 11.3.B.2 Documentation:

International Paint Specifications

- 11.3.B.3 The total area of hull above the ice belt excluding the removable bulwarks is approximately 650 m².

11.3.C Statement of Work

- 11.3.C.1 The Contractor must supply all necessary staging and man lifts for the work of this specification, including inspections by ABS Surveyor and the TA.
- 11.3.C.2 The Contractor must ensure that all items not being grit blasted or being painted are protected during the execution of this specification item.

- 11.3.C.3 All equipment protection must be removed at completion.
- 11.3.C.4 Where blasting grit and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor's expense prior to the completion of the contract.
- 11.3.C.5 The Contractor must ensure no ingress of blasting grit and/or overspray to the accommodation area of the vessel.
- 11.3.C.6 All openings must be sealed or closed off to prevent the ingress of blasting grit and/or overspray.
- 11.3.C.7 The Contractor is responsible for the cleanup of all blasting grit, debris and overspray from the vessel's interior and exterior decks.
- 11.3.C.8 All overboard discharges must be plugged and protected from blasting grit and hull coating.
- 11.3.C.9 All scuttles, port holes and windows must be protected from blasting grit and paint/hull coating.
- 11.3.C.10 All deck machinery must be protected from blasting grit and the paint/hull coating.
- 11.3.C.11 The Contractor must dispose of all blasting grit and debris according to applicable Federal, Provincial, and Municipal regulations.
- 11.3.C.12 The Contractor must ensure that all coatings are applied within the allotted dry dock time period in order to allow for the full and proper curing of the coating to the vessel's hull prior to immersion.
- 11.3.C.13 Any application that results in an unacceptable coating to the FSR and TA must be redone (blasting included) at the Contractor's expense within the allotted dry dock time period.
- 11.3.C.14 Renewal of Symbols and Lettering
- 11.3.C.14.1 The Contractor must supply and apply 2 coats of Intersheen 579 white epoxy paint to outline and paint all ships side lettering after the completion of the application and curing of the hull coating system. This includes:
- a) Re-coating the "SAMUEL RISLEY" located at the bow, Port and STBD
 - b) Re-coating the "SAMUEL RISLEY OTTAWA" located at the stern
- 11.3.C.15 Hull Coating Renewal – Above the Ice Belt

- 11.3.C.15.1 All fendering must be protected from grit blasting and hull coating. The Contractor must ensure that no coating is removed from between the fendering and the steel retention system.
- 11.3.C.15.2 The Contractor must punch mark the white stripe mark prior blasting the markings.
- 11.3.C.15.3 The Contractor must sweep blast and coat the following hull areas:
- 11.3.C.15.4 Hull areas identified in RED on drawing “ABOVE WATERLINE HULL COATING AREA”. For the purpose of the bidding process, the Contractor must bid on a total 650 m² hull coating to be renewed.
- 11.3.C.15.5 All areas must be sweep blasted to remove any loose paint and provide a level re-coating surface for application of new top coating.
- 11.3.C.15.6 The Contractor must take care to leave the underlying primer coats intact as it is only the intention to re-new the top coat on the vessel sides.
- 11.3.C.15.7 The Contractor must grit blast the tops of the bulwarks in way of the bow section from the Focsle Deck railing aft to the bow (Port and Starboard). All areas must be grit blasted to bare steel: near white SA 2 1/2 SSPC SP10 63T. The profile of blasted steel must be a minimum of 3 mils.
- 11.3.C.15.8 The tops of the Bulwarks outlined in 11.3.C.15.7: 2 coats of Interprime 198, @ 3 mils DFT (Grey – first coat, red – second coat CPA099);
- 11.3.C.15.9 Above waterline hull and Bulwarks tops: 2 coats of Intersheen 579 @ 1.5 mils DFT (RED – RAL 3000) each coat;
- 11.3.C.15.10 White stripe: 3 coats of Intersheen 579 @ 1.5 mils DFT (WHITE – RAL9003) each coat;
- 11.3.C.15.11 Black border stripe: 3 coats of Intersheen 579 @ 1.5 mils DFT (Black – RAL 9004) each coat. 3 inch stipe bordering the white diagonal stripe.
- 11.3.C.15.12 The Contractor must adhere to all coating system requirements for the application of the coating system.
- 11.3.C.15.13 The Contractor must record ambient and dew point temperatures in the presence of the TA prior to the application of the coatings. These readings must be recorded and be provided in the final coating application report.
- 11.3.C.15.14 The Contractor must apply the Federal Identity Program Canada Word Mark decals. The word mark decals must be applied in the same location as they are currently.

11.3.D Proof of Performance

- 11.3.D.1 Prior to any hull coating, the Contractor must have all welding repairs inspected and approved by ABS.
- 11.3.D.2 All coatings work carried out to the satisfaction of the TA and CCG provided NACE coating inspector.
- 11.3.D.3 The Contractor must provide a Quality Assurance (QA) report indicating that all areas as defined in this specification have been inspected by the Contractor's QA Department and all areas of defects established by this survey have been identified for remedial action.
- 11.3.D.4 The Contractor must provide a 'coating application report' from the FSR to the TA that details all of the particulars of the coating application process as completed by the Contractor.
- 11.3.D.5 The report must include details of all environmental conditions at the time any hull coatings were applied and at which areas on the hull the coating was applied and include but not be limited to the dry and wet bulb temperatures, relative humidity, dew point and the times when painting was started and stopped as well as the temperature of the product at application time and wet and dry film thickness gauge readings.
- 11.3.D.6 The Contractor must include in the final report the details of the seam and butt welding that was completed. This report must detail the location and length of each weld, ABS Surveyor approval for each final weld and any testing results required in way of each weld.
- 11.3.D.7 This report shall be included in the Data Book reference section G 1.13.

11.4 SEA INLETS**11.4.A Identification**

- 11.4.A.1 The Contractor must remove the sea chest grids and clean the sea bays. The sea bay grids must then be re-installed.
- 11.4.A.2 The sea bay and grids are to be inspected by the TA and the attending ABS Surveyor.

11.4.B References

- 11.4.B.1 Sea inlets:

The Contractor will remove the grids and/or covers from the following:

DESCRIPTION	LOCATION	AREA
Port Sea Chest	Frames 25-27	50 m2
Stbd Sea Chest	Frames 25-27	50 m2
Sea Bay	Frames 25-27	130 m2
Port fire monitor sea chest	Frames 16-18	10 m2
Stbd fire monitor sea chest	Frames 16-18	10 m2

11.4.B.2 Drawing:

S30109mi1 – Shell Expansion

S30112as1 – CCGS Samuel Risley Sea Chest Grid Frames 24-26 (P&S)

S30112as2 – CCGS Samuel Risley Sea Chest Grid Fwd Frames 39-41 (P&S)

S30112as3 – CCGS Samuel Risley Sea Chest Grid Aft Frames 16-18 (P&S)

11.4.C Statement of Work

- 11.4.C.1 The Contractor must remove all sea chest grids. The Contractor must renew all fasteners with new CSM fasteners.
- 11.4.C.2 The Contractor will remove all sea chest and sea bay access covers.
- 11.4.C.3 The Contractor will note the condition of all defective bolts on the sea chest grids and bring these to the attention of the TA.
- 11.4.C.4 The Contractor will provide 60 bolts for the purpose of replacement if required. Bolt size for reference 1” – 8 TPI x 3.5” 316 Stainless with a ¾” hex socket head.
- 11.4.C.5 Aft Sea Chests have 16 fitted each and the foreword sea chests have 14 fitted each.
- 11.4.C.6 The Contractor must thoroughly clean all sea chests of all marine growth, dirt and debris.
- 11.4.C.7 All dirt and debris must be removed from the vessel and disposed of ashore in accordance with Federal, Provincial and Municipal regulations in effect.

- 11.4.C.8 The Contractor must bid on the removal and disposal of 5m³ of solid debris from the sea chests and sea bay areas. Final pricing to be pro-rated and adjusted based on the volume of actual debris removed.
- 11.4.C.9 The Contractor must blast and renew the paint on all sea inlet grids to hull paint standards as detailed in section 11.2.
- 11.4.C.10 The Contractor, in conjunction with TA and the International Paint FSR will inspect and determine the condition of the coatings in the sea bays and the sea chests. Based on this inspection the TA and Contractor will agree on the areas to be re-coated from bare steel and any other necessary work to fully restore the coatings in the sea bays and sea chests.

11.4.D Proof of Performance

- 11.4.D.1 The Contractor must provide waste disposal certificates to the TA prior to the completion of the contract.
- 11.4.D.2 The Contractor must provide a report of the findings, work completed and final condition of the work of Section 11.4.
- 11.4.D.3 The Contractor must provide a 'coating application report' from the FSR to the TA that details all of the particulars of the coating application process as completed by the Contractor. The report must include details of all environmental conditions at the time any hull coatings were applied and at which areas on the hull the coating was applied and include but not be limited to the dry and wet bulb temperatures, relative humidity, dew point and the times when painting was started and stopped as well as the temperature of the product at application time and wet and dry film thickness gauge readings. This report shall be included in the Data Book reference section G 1.13.
- 11.4.D.4 The Contractor must provide survey credit documentation as per the Canada Shipping Act and associated regulations inspection requirements for the work of Section 11.4.

12.0 PROPULSION AND MANUEVERING

12.1 STARBOARD MAIN ENGINE #4 REMOVAL AND REPLACEMENT

12.1.A Identification

- 12.1.A.1 The Contractor must remove Main Engine #4 block and crankshaft. The engine is located furthest outboard on starboard side.

- 12.1.A.2 The installed block is damaged and must be removed and renewed.
- 12.1.A.3 The engine is a Wartsila VASA 12V22 rated at 1590 kW, similar to other 3 main engines.
- 12.1.A.4 Once removed the contractor must install a new Wartsila VASA 12V22 block and crankshaft provided as GSM. Main engine #4 is located approximately 4047mm off centerline to starboard side between frames 20 and 24.
- 12.1.A.5 Contractor is responsible for the removal and reinstallation of all piping, ventilation ducting, structural components, lighting, brackets, fire suppression systems and all other systems that are located in the removal and installation path of the engine.

12.1.B References

Documents

161-201-100	Profile and decks
161-201-101	Tank top and flat plan
161-201-102 Sheet 1 of 2	Longitudinal Bulkheads 0 to FR 32
161-201-102	Main Deck Girders & Longitudinals FR 0-32
161-202-20	Structural Section FR 20
161-202-21	Structural Section FR 21
161-202-22	Structural Section FR 22
161-202-23	Structural Section FR 23
161-260-1	Main Engine and Gear Boxes Foundations
161-300-001	General arrangement
S030-Engine overhaul-01	Engine removal and replacement (5 sheets)
161-500-100	Machinery Arrangement
161-625-3	Engine Room Lighting Layout
161-702-001	Vent and Sounding Diagrammatic
161-703-001	Fuel Oil Piping Diagrammatic
161-709-001	Compressed Air Piping Diagrammatic
161-713-100	Exhaust Uptakes and Fire Monitor Piping
161-800-001	Thermal Fluid Heater Diagrammatic
161-807-001	Domestic Fresh Water Piping
LI-4354228-01 Sheets 1-2-9 & 11	Kidd Marine FM-200 System Layout and Installation
Ventec 81066-1433- CD3	Ductwork Sys. – Below Main Deck & Thruster Compartment
Reference Doc#1	Wartsila Engine Installation Data
Reference Doc#2	Wartsila Component Weights
Reference Doc#3	Chockfast Pad Dimension Information
Reference Doc#4	Info from Chockfast for Fitted Bolts

Reference Doc#5	Risley Chock Calcs Main Engine rev.2
Reference Doc#6	Vulkan-Ratio S Coupling M-E Series 2200
Reference Doc#7	Wartsilla VASA Manual
Reference Doc#8	Wartsila Ops&Maint Manual
Reference Doc#9	Flywheel Details

12.1.B.1 Regulations

C.S.A., Hull and Machinery Regulations;

IASCS, Document No.47; Shipbuilding and Repair Quality Standard

12.1.C Statement of Work

General

12.1.C.1 The contractor is responsible for all aspects of the removal and installation of ME#4 including engine rebuild, commissioning and performance trials. All manufacturer's recommendations and requirements must be followed for each stage of the removal and installation.

12.1.C.2 The Contractor must hire Wartsila FSR to complete the following work;

- Oversee existing engine removal.
- Inspect new engine upon delivery to shipyard.
- Remove and reinstall flywheel on new engine.
- Balance and add counterweights to new crankshaft.
- Install new engine in engine room.
- Reconnect all piping, electrical, controls and exhaust connections to existing systems.
- Complete rebuild of the new engine.
- Complete connection of driveline from engine to gearbox.
- Commission engine.

12.1.C.3 The Contractor must submit CWB stamped welding specifications and weld procedure data sheets to ABS where required. Weld procedures for joining pipe connections must be recorded and approved by CWB in accordance with ASME, Section IX.

- 12.1.C.4 The new engine block provided by CCG is class approved and comes with manufacturer's warranty. This documentation can be provided to the contractor upon request once engine has been delivered to contractor's facility.
- 12.1.C.5 Any parts required during the rebuild and installation of the new engine block outside the parts provided in the GSM list for this specification must be new, not reconditioned. These parts must be defined in a list and provided to TA for acceptance prior to rebuild. All parts must be purchased from the engine manufacturer. All new parts must carry manufacturer's warranties.
- 12.1.C.6 Upon receiving the vessel the contractor must note the damaged ME#4 engine will be stripped of most auxiliary equipment and partially ready for removal.
- 12.1.C.7 The Contractor must coordinate with Wartsila FSR's to ensure all required components that will be re-used on the new block have been removed and the old engine block is free to be removed.
- 12.1.C.8 The Contractor must coordinate with Wartsila FSR's to determine what work will require yard assistance and what will be the responsibility of the on site Wartsila team.
- 12.1.C.9 The Coast Guard will not provide any labour for the removal and installation of the new engine.
- 12.1.C.10 The Contractor/Wartsila must be prepared to perform the following:
- Disconnection/reconnection of all sea water piping.
 - Disconnection/reconnection of all electrical and electronic monitoring devices and sensors.
 - Disconnection/reconnection of engine components that must be exchanged onto the new block: (including but not limited to) Oil Sump, Front cover plates, Flywheel, Side covers, End covers, Studs, Bolts and Plugs, Sensor Lines, Drain Lines, Fuel, Oil and Water Piping, Combustion Air Space, Shaft Coupling, Oil Filter Housing, Fuel Filter Housing, Fuel Racks and Control Systems, Gearing, Fitted bolts, Brackets and Hold Down bolts.
 - Any other assemblies that are required for the completion of the new engine install and commissioning.
- 12.1.C.11 It is the contractor's responsibility to provide all tools and supplies to complete the work required. No tools or supplies must be used from the ships inventory without

specific approval by the TA. All tools that require calibration certificates must be provided by the Contractor.

- 12.1.C.12 Care must be taken while installing and rebuilding the new engine that no debris enters the engine. This must include cleaning of crank case of all debris prior to installing on new engine block, covering and protecting top end of engine block during installation, welding and reinstallation of both piping, deck plate and lifting beams.
- 12.1.C.13 Any problems resulting from debris entering the new engine must be repaired at contractor's expense.
- 12.1.C.14 Several components must be removed and reinstalled once the new engine block is in place. While these parts are removed the contractor must store them in a secure, dry environment and protect each item from developing flash rust/corrosion.
- 12.1.C.15 Pipes that are removed must be temporarily capped to prevent debris entering the system once reinstalled.
- 12.1.C.16 Any damage to parts temporarily removed must be repair or replaced at contractors expense.
- 12.1.C.17 The contractor must allow for 50 hours machining/welding to be used for repairs found required as components are removed from the old engine for exchange. An example is chaffed piping in way of a bracket.

Lifting

- 12.1.C.18 All lifting procedures must be carried out in accordance with all industrial regulations for the region. Lifting appliances must have safe working loads (SWL) above all intended lifts. Only certified lifting gear with SWL within lifting tolerances must be used. Any off-axis lifting must consider all vector loads and lifting appliances designed to withstand these loads.
- 12.1.C.19 A lifting plan must be provided to the TA prior to work being completed.
- 12.1.C.20 All temporary lifting lugs must be removed prior to contract end.
- 12.1.C.21 All lifting lug designs and calculation must be provided to TA prior to install. CCG has developed a lifting arrangement for guidance only. Please reference (Ref DWG S030 -01).
- 12.1.C.22 All loose or rotating parts within both new and existing engines must be secured prior to lifting.

Piping (required for engine removal)

- 12.1.C.23 All pipes and piping systems broken during the engine block removal and install must be broken at the most convenient pipe joint unless defined within this document.
- 12.1.C.24 Pipe system removal must be kept to a minimum while providing a safe, clear working space for removing and installing the engine block with minimal risk of damage to surrounding systems.
- 12.1.C.25 All broken pipe systems must be capped at both ends to prevent debris from entering. Pipes that are removed must be stored in a clean and dry environment protected from damage.
- 12.1.C.26 Any pipes damaged during the removal, storing and reinstallation must be replaced with new at the contractor's expense.
- 12.1.C.27 All pipes must be proven clear prior to reinstallation.
- 12.1.C.28 The Fuel Manifold vent piping will require cutting to remove. This piping will need to be reconnected by welding. The Contractor must take appropriate measures for Hot Work and prove the final welding to be leak free.
- 12.1.C.29 The FM 200 system has a large 3" pipe fitted with a non union type coupling. This pipe will require cutting the coupling to remove. The contractor must replace the coupling with a union during re-installation of the pipe.
- 12.1.C.30 Several pipes must be removed for the Water Tight Door system. The contractor must drain the system as required and contain any oils from the piping as they are removed. Piping must be re-installed only after being cleaned and free of any debris. The Contractor must re-fill the hydraulic system and bleed any air remaining. The Water Tight door system must be proven operational following piping installation.

Storage

- 12.1.C.31 All temporarily removed parts and equipment must be protected against flash corrosion, protected from debris and stored in a dry, secure area in accordance with section G 1.24.

Joints, Connections and Hangers

- 12.1.C.32 All removed pipe work must be reinstalled in the original configuration. Any gaskets, flanges and connectors damaged during removal must be replaced with new by contractor at contractor's expense.

- 12.1.C.33 All pipe hangers removed during the engine work must be reinstalled in original position and provide adequate support and protection to piping system. The contractor must replace any isolating rubber during the reinstallation of the hangers.

Pipe Labeling

- 12.1.C.34 All piping systems must be identified in accordance with CCG Piping Identification Standard CGFM 308.00.03.

Painting

- 12.1.C.35 All zones affected by the work must be painted. All paint will be provided as GSM. One (1) primer coat must be applied followed by two (2) top coats. One (1) stripe coat must be applied on all welds, edges, across holes etc. before the application of the primer coats well as before the application of the first finish coat.
- 12.1.C.36 All painting applications must be carried out in accordance with paint manufacturer's specifications.

Removal

- 12.1.C.37 The contractor must use the engine manufacturer's Field Service Representatives (FSR) to oversee/participate in all aspects of the existing engine block and crankshaft removal.

Deck Cut-out

- 12.1.C.38 The contractor must cut an access hole in the aft working deck between frame 20 and frame 22. This access hole must be cut in accordance with drawing S030-Engine overhaul-01.
- 12.1.C.39 During this procedure the STBD outside stairway access to the boat deck must be removed by the contractor.
- 12.1.C.40 The contractor must reinstall the stairway to original position and condition once access hole is sealed. Any damage to the stairway must be repaired at contractor's expense. The Contractor can use the Port Stairway as an example of the modifications required.
- 12.1.C.41 Temporary barricades must be installed IWO stairways and the access hole. These barricades must be removed prior to end of contract.
- 12.1.C.42 The opening must be protected from water ingress in the event of poor weather conditions. The access opening will result in a flat surface where rain water and other

water flow may result in flooding into the engine room. A suitable cowling around the perimeter of the access hole must be installed if the access is to remain open.

- 12.1.C.43 The deck penetrations in way of the cut-out (Fuel oil header Vent STBD, #3 water ballast tank vent STBD, fresh water fill STBD, Aft Sea Chest vent) must be disconnected at the nearest possible pipe joint and removed with the deck plate keeping the watertight penetrations intact.
- 12.1.C.44 The large longitudinal deck girder located at 2940 mm off centerline must be cut IWO the access hole.
- 12.1.C.45 Section of deck plate removed with girder and pipe penetrations must be stored by contractor in accordance with section 12.1.C.37 and reused to seal deck once engine work is complete.
- 12.1.C.46 Once engine reinstallation is complete the contractor must seal the deck access hole in accordance with drawing S030-Engine Ohaul-01 to original condition. It is highly recommended that the Contractor coordinate efforts with the engine installation team to close up the access as soon as practical after the engine block has been installed and the access is no longer required.
- 12.1.C.47 Contractor must arrange for ABS inspection of work and witness a hose test to verify water tightness prior to painting welds.
- 12.1.C.48 All tests and inspections of this repair must be define by contractor and submitted to TA for approval prior to completion. All painting to be done in accordance with section 12.1.C.35 - 12.1.C.36.

Main Engine #4

- 12.1.C.49 A new Wartsila VASA 12V22 block and crankshaft will be supplied as GSM. The dimensions and weight of the engine assembly are as follows;

Total Assembly Weight: 8573.2 KG

Short Block Ass. Height: 1.255 m

Short Block Ass. Width: 1.350 m

Short Block Ass. Length: 2.845 m

- 12.1.C.50 Please refer to Wartsila dimensional drawing Ref. Dwg#3 for guidance.

- 12.1.C.51 For further technical information concerning the engine block and installation please contact Wartsila Canada. Lifting lugs are shipped with the new block for lifting.
- 12.1.C.52 These lugs can be removed and installed on old block to help facilitate removal.
- 12.1.C.53 These lugs must be returned to CCG at contract end as they are the property of Wartsila and must be returned to Wartsila in Finland.
- 12.1.C.54 Contractor is liable for any costs incurred by CCG if the lifting lugs are lost, stolen or damaged.

Existing ME#4 Removal

- 12.1.C.55 All work with respect to the ME#4 removal must be done in the witness of or using Wartsila Canada certified FSR's as defined in this specification.
- 12.1.C.56 Contractor must install the Wartsila provided lifting lugs onto the existing block.
- 12.1.C.57 Deck access hole allows for a shore side crane to lift almost directly over the centre of the engine in ME#4 position. Any small adjustments must be made using other lifting equipment.
- 12.1.C.58 Current engine position must be marked by the contractor on the engine beds at all four corners prior to removal of the engine block.
- 12.1.C.59 The jacking screws located on the four corners of the engine must be removed and installed on the new block.
- 12.1.C.60 Existing engine block and crank must be prepared by contractor for shipping to CCG's facility. This must include temporary shipping seating and tie-downs to secure equipment and shrink wrapped to avoid water accessing engine parts.
- 12.1.C.61 Any damage caused to engine and crankshaft due to improper shipping preparation must be paid at contractor's expense. CCG will pick up existing engine and crank from the contractor facility prior to end of contract.
- 12.1.C.62 The existing Oil Sump (Wartsila part number 100 300) must remain in place once the block is removed. It is advised that the Contractor coordinate with the Wartsila FSR's regarding storage, removal and temporary placement of engine components that will be removed from the existing #4 block for re-use on the new block. Space is limited in the engine room for these parts.

Cleaning of Area IWO Engine Block

- 12.1.C.63 Once the existing block is removed the Oil Sump must be cleaned of all debris, oil and residue.
- 12.1.C.64 The bilge beneath the Oil Sump must be cleaned and removed of all oily residue and debris prior to the new block being installed. The Oil Sump must be lifted clear in order to perform this task properly.
- 12.1.C.65 The engine beds must be cleaned and all old chocking material and paint removed.
- 12.1.C.66 Engine beds must be buffed down to bare metal in accordance with Chock Fast recommendation.
- 12.1.C.67 Once bilge and engine beds are cleaned the contractor must have the TA inspect the area and approve prior to repositioning the crank case and installing the new block.
- 12.1.C.68 All removed material must be disposed of in accordance with all Federal, Provincial and Municipal laws and regulations.

Engine Beds

- 12.1.C.69 The contractor must use drawing 161-260-1 and Ref. Dwg #2 for guidance. Alignment plates must be welding to the engine beds at all four corners (Ref. Pic #10) using the marks provided prior to the engine removal as guidance.
- 12.1.C.70 Once final alignment and engine fastening, these alignment plates must be removed.
- 12.1.C.71 To bed the engine the contractor must use Chock Fast provided by Philadelphia Resins.
- 12.1.C.72 The contractor must provide an updated Chock Fast Pad dimensions drawing (Ref #3) and Chock calculations (Ref #4).
- 12.1.C.73 All chocking must be completed in accordance with manufacturer's recommendations, ABS and Wartsila requirements.
- 12.1.C.74 Once chock fast has cured 4 samples must be taken at predetermined location to ensure proper curing before the engine is bolted down to final torque.

New Block and Crankshaft Installation

- 12.1.C.75 The Contractor must use Wartsila technicians to complete all work required with the installation of the new engine.
- 12.1.C.76 The new block and crankshaft must be unpacked from its shipping crate and inspected by Wartsila prior to installation.

- 12.1.C.77 Contractor must use the Wartsila provided lifting lugs (Ref. Doc #1) to lift the engine assembly.
- 12.1.C.78 Using a shore side crane the contractor must lower the new engine block and crankshaft into the engine room space, (Ref Dwg S030-engine ohaul-01).
- 12.1.C.79 All installation details must be in accordance with manufacturer's recommendations and completed by a Wartsila FSR to ensure proper installation.
- 12.1.C.80 Any damaged noted after Contractor has received the new engine shall be repaired at Contractor cost.

Engine Alignment

- 12.1.C.81 The engine must be aligned using the alignment plates and jacking screws installed on the engine.
- 12.1.C.82 Alignment must be done under the supervision of Wartsila, ABS and the TA in accordance with the requirements for the Vulkan – Ratio S Coupling (Ref Doc #6).
- 12.1.C.83 The existing Vulkan coupling and flywheel must remain and be used to connect the engine to the gearbox.
- 12.1.C.84 All Alignment must be completed using laser measurement devices or other standard marine industry practices as approved by TA and ABS.

Crankshaft, Counterweights and Flywheel

- 12.1.C.85 It is expected that the new engine block and crankshaft assemblies will come complete as a short block assembly.
- 12.1.C.86 The contractor must have Wartsila FSR fit the existing flywheel to the new crankshaft prior to installation into the new block. (Ref Doc 9).
- 12.1.C.87 The existing flywheel will be reused and therefore needs to be removed from the existing crankshaft. The flange of the crankshaft comes with threaded holes that will require precision boring and reaming. This fitting process must be completed to ensure proper operation of the engine and driveline and must be done before the new engine block is installed in the engine room and the entire fitting process must be completed by a Wartsila FSR.
- 12.1.C.88 Wartsila FSR to use custom fitted bolts supplied as GSM to connect the crankshaft to the flywheel.

- 12.1.C.89 Once flywheel is fitted the crankshaft and flywheel assembly must be balanced by Wartsila FSR and correct counter weights attached to the crankshaft in accordance with Wartsila recommendations.
- 12.1.C.90 Once engine is aligned and installed the contractor must have Wartsila FSR connect the flywheel to the crankshaft and then connect the flywheel to the Vulkan coupling to complete the driveline assembly. Pictures of crank and flywheel assembly from previous crankshaft renewal on board the CCGS Samuel Risley are provided for guidance (Ref Pic #11-14).

Engine Bolting and Chocking

- 12.1.C.91 The engine must be bolted to the engine beds using bolts fitted using chock fast in accordance with document Ref.4. Drawings of the fitted bolts must be submitted to the TA for acceptance.
- 12.1.C.92 Chock fast must be poured by qualified technician and final torqueing of the bolts must be in accordance with Wartsila and Chock fast installation requirements.
- 12.1.C.93 Any coffer dams or moulds used during the pouring of the chock fast must be removed upon completion.

Engine Rebuild

- 12.1.C.94 The contractor must contract Wartsila Canada certified FSR's to complete the engine rebuild and connection of driveline.
- 12.1.C.95 The Wartsila technicians must utilize all GSM supplied equipment as defined in the GSM list to rebuild the engine.
- 12.1.C.96 All GSM parts provided must be new or reconditioned and measured with manufacturer's tolerances.
- 12.1.C.97 Any additional equipment outside of the equipment provided by CCG must be defined in a list prior to the rebuild and submitted to the TA for approval.
- 12.1.C.98 During the rebuild the contractor must ensure access to the area for the TA and ABS to carry out inspections.
- 12.1.C.99 All work carried out must be in accordance with manufacturer's specifications as well as to the TA's satisfaction.
- 12.1.C.100 Wartsila is responsible for all electrical, controls, piping and mechanical reconnections to the vessels existing systems.

- 12.1.C.101 The contractor must flush all systems to avoid debris damaging the system. Flush must be completed under Wartsila FSR supervision and to manufacturer's recommendations.
- 12.1.C.102 All operating fluids must be supplied and installed by contractor under supervision of Wartsila FSR to manufacturer's specifications.
- 12.1.C.103 Any temporary lifting lugs must be removed prior to contract end.

Ventilation Duct Work

- 12.1.C.104 Located between frame 20 and 22 running transversely are the air supply ducts for ME#3 and ME#4 (Ref Pic#1) and Engine Room Supply. These ducts must be dismantled and stored in a suitable location by the contractor in accordance with section 12.1.C.37.
- 12.1.C.105 These ducts must be disconnected at the most convenient flange to provide a clear removal/access path for the engine block.
- 12.1.C.106 Once engine removal/install is complete the ducting must be reconnected.

Thermal Heating Pipes

- 12.1.C.107 The thermal pipes noted in Ref. Pic#2-8, that run longitudinally along the longitudinal girder 2940mm off centerline and cross transversely at frame 21/22 must be drained and broken outside of the deck access opening.
- 12.1.C.108 The pipes are connected using threaded couplings and must be removed IWO the engine block removal/access path.
- 12.1.C.109 All piping must be reinstalled and returned to fully operational prior to contract completion.

Sea bay Vent

- 12.1.C.110 The sea bay vent pipe must be disconnected at the closest Victaulic coupling and the deck penetration must be removed with the deck cut-out. Details of the penetration can be reviewed in Ref. Pic#2-8.
- 12.1.C.111 Additional sections of the vent pipes must be removed to the closest coupling as required to avoid the engine removal/access path.
- 12.1.C.112 All piping must be reinstalled and returned to fully operational prior to contract completion.

Fresh Water Fill

- 12.1.C.113 The fresh water fill pipe must be disconnected at the closest Victaulic coupling or union and the deck penetration must be removed with the deck cut-out. Details of the penetration can be reviewed in Ref. Pic#2-8.
- 12.1.C.114 Additional sections of the vent pipes must be removed to the closest coupling as required to avoid the engine removal/access path.
- 12.1.C.115 Great care must be taken to cap this system to avoid debris and contamination entering the system.
- 12.1.C.116 All piping must be reinstalled and returned to fully operational prior to contract completion.
- 12.1.C.117 Once the system is reinstalled the contractor must preform a super-chlorination test on the system as per section G 1.29.

Fuel Header Tank Vent Pipe

- 12.1.C.118 The fuel header tank vent pipe must be disconnected and a portion removed as detailed in Ref. Pic#2-8.
- 12.1.C.119 This pipe is connected by welded pipe connections and can be removed at the closest weld to avoid the engine removal/access path.
- 12.1.C.120 All piping must be reinstalled and returned to fully operational prior to contract completion.

FM200 Fire Suppression System

- 12.1.C.121 The contractor must contact Troy Fire and Safety FSR to advise them the Contractor will disconnect and remove the portion of FM200 suppression system IWO the engine removal/access path.
- 12.1.C.122 The Contractor must request Troy FSR isolate this portion of the fire suppression system including all alarms, discharge pipes etc.
- 12.1.C.123 Once engine work is completed the contractor must hire Troy FSR to reinstall, inspect and test the portion of the fire suppression system, reinstate all alarms and re-certify system. Please refer to Ref. Pic#2-8 for guidance on pipe location.

Water Tight Door Pipes

- 12.1.C.124 The remote hydraulic connections for the water tight doors run in way of the required opening. The contractor must drain and remove the piping that is required.
- 12.1.C.125 The piping is assembled with swage type fittings and can be disassembled.
- 12.1.C.126 Upon completion of the work the Contractor must ensure the piping is clean and free of debris before re-assembly.
- 12.1.C.127 The Contractor must bleed any air from the hydraulic system and ensure the proper operation of the doors.

Pipes to Avoid

- 12.1.C.128 There are hydraulic lines that run transversely along frame 20 (Ref. Pic#2-8). These pipes are located aft of the intended deck cut-out. These pipes power the port deck winch and must be maintained intact throughout this work.

Lifting Beams

- 12.1.C.129 The lifting Rails located over ME#4 and between ME#3 and ME#4 must be removed.
- 12.1.C.130 Care must be taken to maintain these rails especially to protect the running rails.
- 12.1.C.131 These rails are required to be reinstalled prior to the building of the new ME#4 by Wartsila as they will require them to lift various components.
- 12.1.C.132 Temporary storage of these items must be in accordance with section G 1.24
- 12.1.C.133 When reinstalling the lifting beams the contractor must ensure the beams are within a maximum deviation of <2 degrees from horizontal.
- 12.1.C.134 Once lifting beams are installed a static load test must be carried out in accordance with TCMS regulations and witnessed by ABS inspectors to provide a safe working load. The lifting capacities for each beam must be maintained (SWL 3 ton).

Electrical Trays

- 12.1.C.135 There are two main electrical wire trays running fore and aft outboard of ME#4.
- 12.1.C.136 These trays are attached to the deck head and must remain intact throughout this work. The deck cut-out must be designed to avoid altering these wire conduits.

Lighting

- 12.1.C.137 The contractor must disconnect all permanent lighting IWO the engine removal/access route.

12.1.C.138 These permanent lights must be removed and stored in a suitable location in accordance with Section G 1.24

12.1.C.139 . The contractor must supply auxiliary lighting in the area surrounding ME#4 for the duration of the removal/installation process.

12.1.C.140 Once the new engine block is in place the ship's permanent lighting can be reinstalled and commissioned to be used during the engine rebuilding process.

12.1.D Proof of Performance

12.1.D.1 The Contractor must provide all new material certificates to the TA prior to installation. Certificates must also be made available to all ABS inspectors.

12.1.D.2 The contractor must arrange for ABS inspectors to inspect all work throughout the removal and replacement of the engine block, the rebuild of ME#4 and the commissioning of the engine.

12.1.D.3 Contractor must provide ABS inspection certificates for all engine systems and provide proof of operation to the satisfaction of the TA and ABS inspectors.

Commissioning

12.1.D.4 Commissioning of the new engine must be completed by Wartsila Canada.

12.1.D.5 All commissioning must be done in accordance with manufacturer's specifications.

12.1.D.6 The contractor must arrange ABS inspection during commissioning process.

Performance Trials

12.1.D.7 The contractor under the guidance of Wartsila Canada must perform a set of performance trials to ensure the engine is operating at optimum performance.

12.1.D.8 A trial agenda must be submitted to the TA and ABS for approval prior to the trials.

12.1.D.9 Any deficiencies noted during the trials must be rectified by the contractor under the guidance of Wartsila prior to acceptance by the TA.

12.1.D.10 Any additional work required to repair deficiencies must be completed at contractor's expense.

Inspection

12.1.D.11 The contractor must arrange for ABS to inspect all aspects of this engine overhaul.

- 12.1.D.12 Contractor must consult with ABS and define an inspection schedule. This schedule is to be provided to the TA for approval.
- 12.1.D.13 All documents provided by ABS must be handed over to the TA at contract end.
- 12.1.D.14 It is the contractor's responsibility to ensure all work completed is approved by ABS prior to contract completion.
- 12.1.D.15 During the ME#4 removal and installation Wartsila Canada must be involved with the inspection of equipment, lifting plan, installation, alignment and total overhaul of engine. All documents provided by Wartsila must be handed over to the TA at contract end.

12.1.E Deliverables

- 12.1.E.1 Contractor must deliver to the TA all original signed compliance reports provided by ABS with regards to this work.
- 12.1.E.2 The contractor must supply the TA with a schedule of work completed. The contractor must also provide TA with a signed certificate from the engine manufacturer stating the engine has been rebuilt within manufacturer's tolerances, operation tolerances are verified and accepted, and all warranties are accepted by manufacturer.
- 12.1.E.3 Once approved the original signed report must be submitted to the TA located within the Data book as defined in section G 1.13.
- 12.1.E.4 Copy of QA report noting all work completed, field report from Wartsila FSR, verification of all measurements and readings for engine systems and checklist of completed work must be submitted to TA within the test and trials data book.
- 12.1.E.5 The contractor must supply all manufacturer's installation manuals and documents with regards to the engine removal and install. All manuals must be provided in both Hard and electronic copies; 1 x hard copies and 2 x electronic copy.
- 12.1.E.6 Copies of all disposal certificates must be provided to the TA.
- 12.1.E.7 The Contractor is responsible for updating all "As Fitted" drawings affected by the ME#4 replacement. Three (3) hard copies as well as original CAD drawings must be provided to the TA. CAD drawing format to be ACAD 2010.dwg.

13.0 POWER GENERATION SYSTEMS

13.1 EMERGENCY GENERATOR OVERHAUL

13.1.A Identification

13.1.A.1 The Contractor must fully inspect and report on the condition of the Emergency Generator diesel onboard the CCGS Samuel Risley. The Contractor must perform a run test under full load for the attending ABS surveyor. The Contractor must obtain a TCMS survey credit for the generator. The Contractor must be a fully accredited Detroit Diesel Technician familiar with the operation, service and maintenance of the 6-71 In Line series of Detroit Diesel engine.

13.1.B References

13.1.B.1 Documents

Detroit Diesel Engines In Line 71 Operators Manual 6SE329 (Rev 12/81).

Part Plate 6_71 Samuel Risley.pdf

13.1.B.2 Generator Details

The emergency generator diesel engine is of the following make and model number:

- Detroit Marine Diesel 6-71T Series
- Serial Number: 6A0439657;
- Model Number: 1063-7305;
- Unit Number: 6A0439675
- Location: Emergency Generator Room, STBD side Winch Compartment.

13.1.C Statement of Work

13.1.C.1 Except where specified, the Contractor must supply all parts, consumable products, hardware, tools and labor required to complete the service inspection as outlined in section 13.1.C.

- 13.1.C.2 The Contractor must make reference to the Detroit Diesel Engine Service Manual for the in-line 71 series of engines. The Manual to be referenced is 6SE329 (Rev 12/81). The Contractor must adhere to all precautions and work instructions provided within the manual in respect to the disassembly, measurements and assembly of the emergency generator diesel engine.
- 13.1.C.3 The Contractor must isolate the diesel engine from the starting air circuit and fuel circuit with an approved lock-out tag system. The generator must also be electrically isolated from the switchboard with an approved lock-out tag system as well as the electrical control circuit.
- 13.1.C.4 The Contractor must drain and dispose ashore of all fluids from the diesel engine in accordance with all Federal, Provincial and Municipal regulations in effect, as required during the Inspection and Service work. The Contractor must provide proof of disposal for this waste to the Technical Authority.
- 13.1.C.5 The Contractor must mark matching parts and must record these match marks so that parts will be assembled into their original location upon assembly of the diesel engine.
- 13.1.C.6 The Contractor must remove all fuel injectors, as required, from the diesel engine and perform a compression test on the diesel engine. The Contractor must record reading from all six cylinders for a final report.
- 13.1.C.7 The Contractor must perform the Compression Test at the applicable engine temperature and RPM for the engine arrangement fitted. The Contractor must provide the special compression testing tools required for this performance assessment.
- 13.1.C.8 Injector removal and installation is presented in Section 2 of the Operators Manual.
- 13.1.C.9 The Contractor must open up the inspection ports for all six cylinders and inspect the condition of the piston rings and the cylinders. The contractor must replace the gaskets with new prior to replacing the inspection covers.
- 13.1.C.10 The Contractor must inspect the interior of the cylinder combustion spaces and pistons using a borescope through the injector ports and exhaust ports. The borescope must be capable of taking photo or video feed back. A copy of this inspection must be included in the final report.
- 13.1.C.11 The Contractor must remove the oil pan and visually inspect the big end bearings and main bearings and oil pump. The Contractor must install a new oil pan gasket after the inspection.

- 13.1.C.12 The Contractor must inspect the diesel engine, visually, mechanically and operationally and provide Coast Guard with a Condition Assessment of the Emergency Generator Diesel Engine.
- 13.1.C.13 The Contractor must replace the 6 Fuel injectors with Coast Guard supplied injectors. The Contractor must perform a proper adjustment of the injectors as described the Service Manual.
- 13.1.C.14 The Contractor must return the old removed injectors to the Coast Guard.
- 13.1.C.15 The Contractor must replace the fuel jumpers to and from each injector with new Contractor supplied jumper lines.
- 13.1.C.16 The Contractor must perform the service work for tune up on the in line 71 series engine as applicable to the engine arrangement fitted. The guidelines for the engine service are found in Section 6 of the Operators Manual.
- 13.1.C.17 The Contractor must replace all fluids: Lube Oil and Jacket Water.
- 13.1.C.18 The Contractor must employ all new Contractor supplied gaskets when assembling the diesel engine.
- 13.1.C.19 The Contractor must use new Coast Guard supplied lube oil, fuel and air filters.
- 13.1.C.20 The Contractor must fill the engine with Coast Guard supplied glycol for the cooling water circuit and Coast Guard supplied oil for the lubricating circuit.
- 13.1.C.21 Upon completion of all service work the Contractor must run up the Emergency Generator and make any adjustments as required to establish proper function of the diesel engine.
- 13.1.C.22 All leaks and/or mechanical defects must be corrected by the Contractor prior to final contract acceptance.

13.1.D Proof of Performance

- 13.1.D.1 The Contractor must verify the operation of all alarm and monitoring equipment fitted to the diesel engine. All local gauges must be verified as providing the correct readings.
- 13.1.D.2 The Contractor must check and test all normal and emergency engine shut downs. The results of these tests must be recorded. The Contractor must perform these tests in the presence of ABS and the TA.

13.1.E Deliverables

- 13.1.E.1 The Contractor must present the recorded readings and measurements to the attending ABS surveyor for TCMS survey credit.
- 13.1.E.2 The Contractor must produce an assessment report on the Diesel Engine with notes on the service work provided, measurements taken, recorded readings and an overall condition of the engine. This report must be included in the test and trials data book.

14.0 POWER DISTRIBUTION SYSTEMS

14.1 MEGGER TEST

14.1.A Identification

- 14.1.A.1 The CCG has a requirement for the Contractor to perform an annual Megger test on the CCGS Samuel Risley as required by TP127E to satisfy TCMS statutory requirements.

14.1.B References

- 14.1.B.1 Documents
2018 Risley Meggering Log
- 14.1.B.2 Regulations
TP127 E – Latest Edition

14.1.C Statement of Work

- 14.1.C.1 The Contractor must perform thorough visual examinations and electrical insulation resistance tests of all items of machinery and equipment identified in the referenced Risley Meggering Log in order to determine the mechanical and electrical conditions of the equipment and machinery to the requirements of TP 127 E Section 34.1 and section 34.6 (a), (b).
- 14.1.C.2 Thorough visual examination must include the external condition and internal conditions where the equipment internals are accessible through doors, cover plates, terminal boxes, removable enclosures, ventilation louvers that require opening or removal to perform the electrical insulation resistance tests.
- 14.1.C.3 The Contractor must perform electrical insulation resistance tests on the machinery and equipment to the requirements of TP 127 E Section 34.6 (b). Tests must be conducted between each phase and ground, and between each phase as applicable to the machinery and equipment under test. Motor circuits must be tested from the switchboard to the motor controller and from the motor controller to the motor. General power circuits must be tested from switchboards to distribution panels and sub-circuits, and must include permanently connected equipment. The Contractor must exercise caution and disconnect all sensitive electronic equipment which may be damaged by the testing.
- 14.1.C.4 The Contractor must notify the TA of any unsatisfactory or doubtful condition discovered during the thorough visual examination before the end of the working day in which the condition is discovered. The Contractor must notify the TA of any insulation resistance test that shows a resistance below 0.1 mega-ohm before the end

of the working day in which the test is made. The repair if any will be made under a 1379 action.

14.1.C.5 The Contractor must prepare and submit a report of the electrical insulation resistance test results as an updated copy of the MS-Excel spreadsheet provided. The Contractor must add columns as required and retain the historic data. The Contractor must submit to the TA the report required in this section in the paper and electronic formats and numbers required by Section 8.5.1 within 4 days of completion of the testing and any repairs and retesting required.

14.1.C.6 The Contractor must supply in the report a detailed explanation and for any circuit or device that cannot be satisfactorily tested due to the presence of sensitive electronic components or circuits that cannot be disconnected from the device or circuit being tested.

14.1.D Proof of Performance

14.1.D.1 The CCG will provide one engineering officer familiar with the vessel to assist the Contractor with the identification of machinery and equipment. The Contractor must be responsible for the disconnection and isolation of the machinery and equipment under test and for the reconnection and setting back into service of the machinery and equipment after testing. The Contractor must demonstrate to the assisting CCG personnel the correct functioning of the machinery and equipment after testing. The Contractor must be responsible to correct and repair damage consequent to any incorrect reconnection and setting to work.

14.1.E Deliverables

14.1.E.1 The Contractor must submit the reports in electronic formats in an MS-Excel file as a new version of the file supplied, 1 copy as an open MS-Excel spreadsheet, 1 copy in PDF format on separate memory key. The new version must insert the new data into the existing spreadsheet so that old and new data can be compared.

14.2 BREAKER REPLACEMENT

14.2.A Identification

14.2.A.1 The contractor must replace the current Merlin Gerin distribution breakers within the Main Switchboard Panel, Cubicle #1. The breakers will be replaced with GSM supplied breakers.

14.2.B References**Main Distribution Breakers**

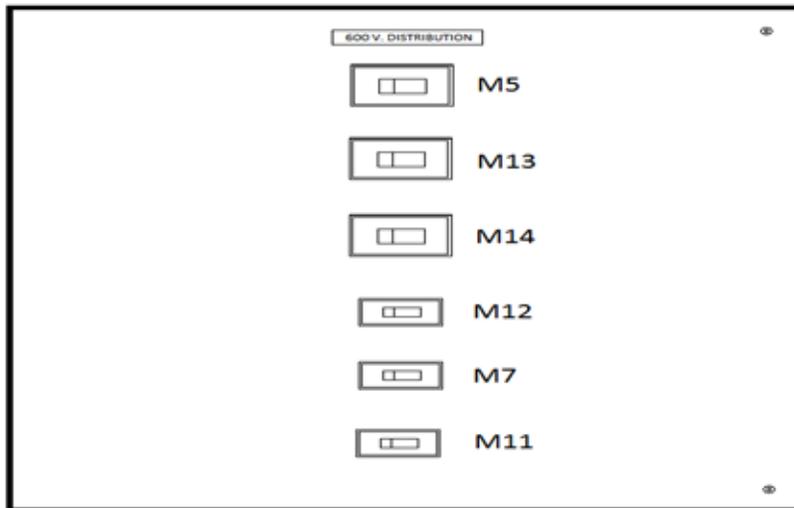
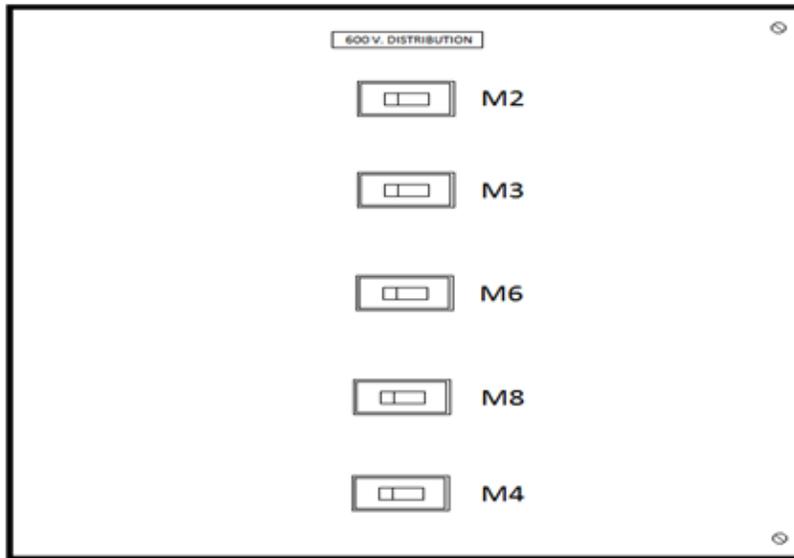
MAIN SWITCHBOARD FRONT PANEL CUBICLE 1

TAG	DESCRIPTION (AS FITTED)
M2 NON ESSENTIAL MCC NO.1 180A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M3 SEMI-ESSENTIAL MCC NO.2 150A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M6 SEMI-ESSENTIAL MCC NO.1 155A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M8 NON-ESSENTIAL MCC NO.3 150A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M4 120 VOLT SEMI-ESSENTIAL DISTRIBUTION 135A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C160L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL

MAIN SWITCHBOARD BACK PANEL CUBICLE 1

TAG	DESCRIPTION (AS FITTED)
M5 240 VOLT NON ESSENTIAL DISTRIBUTION NO.1 271A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M13 ESSENTIAL MCC NO.1 266A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M14 ESSENTIAL MCC NO.2 268A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M12 NON-ESSENTIAL MCC NO.2 150A	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C250L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
M7 SPARE	CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C160L

	3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL
<p>M11 240 VOLT NONESSENTIAL DISTRIBUTION CENTRE NO.2 90A</p>	<p>CIRCUIT BREAKER, MERLIN GERIN, MOULDED CASE, MODEL C160L 3 POLE, 600V, 89 KA I.C. C/W TRIP MODEL</p>



Drawings

161-603-1 CCGS Samuel Risley EL. Power One Line Schematic (9 pages)

Regulations

Transport Canada TP127E – Ships Electrical Standard (Latest Version)

Canada Shipping Act – Marine Machinery Regulations (Latest Version)

IEEE 45 – Recommended Practice for Electrical Installations on Shipboard

14.2.C Statement of Work

- 14.2.C.1 The contractor must isolate and lock out the 600VAC Essential MCC #1 and MCC #2 cabinets.
- 14.2.C.2 The contractor must removed the following existing breakers M2, M3, M6, M8, M4, M5, M13, M14, M12, M7, M11 from the Essential MCC #1 and MCC #2 cabinets located in the Machinery Control Room.
- 14.2.C.3 The contractor must install the new GSM supplied replacement breakers.
- 14.2.C.4 The Contractor must allow the TA and ABS inspectors to inspect the installation prior to closing the cabinet and energizing the circuit. Any deficiencies noted by the TA or ABS must be rectified by the Contractor at their own expense.
- 14.2.C.5 Any changes to the front cabinet doors to accommodate the new breakers must be completed by the Contractor.
- 14.2.C.6 The contractor must fabricate cover patches where require to close exposed gaps in the switchboard. These covers must be designed and manufacturer in accordance with TCMS regulations for electric switchboards and subject to TA' and ABS approval for fit and finish.
- 14.2.C.7 The Contractor must replace any damaged placards with suitable engraved lamazoid placards similar to existing in terms of size, font and colour. All Placards subject to TA's approval.

14.2.D Proof of Performance

- 14.2.D.1 The Contractor must energize the switchboards and each individual circuit under the supervision of the TA and ABS inspector.
- 14.2.D.2 The contractor shall adjust the settings of each breaker as required and must demonstrate the operation of all breakers installed.

14.2.E Deliverables

- 14.2.E.1 The Contractor must complete a QA report noting the work completed in this section of the specification. All defects or repairs must be noted within this report. The report must be included in the Data book to be handed over to the TA upon completion of the contract.

15.0 AUXILIARY SYSTEMS**15.1 REPLACEMENT OF SHIP-SIDE VALVES****15.1.A Identification**

- 15.1.A.1 Contractor must replace identified ship-side valves as detailed in this section.

15.1.B References

- 15.1.B.1 List of valves to be replaced, sizes and locations;

Overboard Discharge Valves			
Description	Type	Inch Size	Frame Location
Port S.S.G. Raw Water Discharge	S.D.N.R.	3	25-26 Port
STBD S.S.G. Raw Water Discharge	S.D.N.R.	3	25-26 Port
Main Engine Raw Water Discharge	S.D.N.R.	6	24-25 Port
Main Engine Raw Water Discharge	S.D.N.R.	6	24-25 Stbd
Bilge Pump Discharge	S.D.N.R.	4	24-25 Port
Oily Water Separator Discharge	S.D.N.R.	2	26-27 Stbd
General Service Pump Discharge	S.D.N.R.	4	24-25 Stbd

Air Conditioning Discharge	S.D.N.R.	3	26-27 Port
Sea Connections			
Description	Type	Inch Size	Frame Location
Recirc to Main Sea Chest	Globe	6	25-26 Port
Recirc to Main Sea Chest	Globe	6	25-26 Stbd

15.1.C Statement of Work

- 15.1.C.1 The Contractor will co-ordinate the work in this Section with that of Sections 11.1 and 11.2. Where skin valves are removed and hull blasting is underway the Contractor will ensure that no blasting media or coating system overspray enter the system from which the skin valves have been removed.
- 15.1.C.2 Contractor to remove all existing valves to be replaced as detailed in section 15.1.B.1
- 15.1.C.3 Contractor to install new GSM valves in accordance with section 15.1.B.1
- 15.1.C.4 Contractors to ensure correct positioning of the valve handles, positioned same as existing valves.
- 15.1.C.5 Contractor must ensure valves are install in correct orientation to allow proper flow and operation of non-return checks.
- 15.1.C.6 Contractor must install new valves using contractor supplied gaskets and packing.
- 15.1.C.7 All installed valves to be left in their closed position.
- 15.1.C.8 Contractor to tag all new valves with correct valve name tags permanently attached to the valves similar to existing.

15.1.D Proof of Performance

- 15.1.D.1 During the undocking of the vessel, the contractor will have sufficient personnel on hand such that all new valves installed within this section can be inspected for leaks.
- 15.1.D.2 Once sufficient depth has been obtained, all closed valves will be opened and verified that no bonnets or valve packings are leaking.
- 15.1.D.3 Any leaks will be rectified by contractor prior to close of the contract.
- 15.1.D.4 Contractor will demonstrate to the TA and ABS that all valves are operating as designed.

- 15.1.D.5 Contractor must include final condition report and all deficiencies noted during installation within the test and trials report.

15.2 PIPING STUB ENDS REPAIR

15.2.A Identification

- 15.2.A.1 The Samuel Risley has a requirement to replace piping and fittings that extend through several tanks and into tank spaces. The piping typically starts in the space (suction end) or terminates (discharge to overboard or re-circulation). The piping to be replaced is typically referred to as the stub end. The Samuel Risley will require replacing several of the stub ends identified as having wastage to the pipe wall thickness.

15.2.B References

- 15.2.B.1 Drawings

Drawing Number	Description
161-702-001	VENT & SOUNDING DIAGRAMATIC
161-704-100	“AS FITTED” ENGINE ROOM BALLAST & FIRE PIPING SHEET #1 OF 2 SHEETS SHEET #2 OF 2 SHEETS
161-704-101	“AS FITTED” ENGINE ROOM BILGE PIPING
161-711-001	“AS FITTED” ENGINE COOLING PIPING DIAGRAMATIC
161-712-100	“AS FITTED” ENGINE S.W. COOLING PIPING SHEET #1 OF 3 SHEETS SHEET #2 OF 3 SHEETS SHEET#3 OF 3 SHEETS
161-712-101	“AS FITTED” ENGINE F.W. COOLING PIPING
161-809-001	“AS FITTED” SANITARY PIPING DIAGRAMATIC
161-807-3	SANITARY DRAINS (GREY WATER) AND SCUPPERS
161-808-001	SANITARY DRAIN DIAGRAMATIC
161-809-01	SANITARY DRAIN PIPING DIAGRAMATIC

15.2.C Statement of Work

- 15.2.C.1 Contractor must site inspect and take measurements of piping, flanges, valves and fittings to ensure the correct fit for replacement. Where there is a discrepancy between the drawings and the actual fitted materials, the actual fitted materials will be used as the standard.
- 15.2.C.2 All materials must be supplied new and in accordance with current regulations. All flanges must be ASTM stamped for approval and meet classification society standards.
- 15.2.C.3 Shop built flanges are not acceptable.
- 15.2.C.4 Ship board measurements have shown the flanges to all be Class 150 to match up with Class 150 valves.
- 15.2.C.5 All welding must be full penetration fillet with proper plate edge preparation. Welds must be pressure tested to classification standards prior to and after installation.
- 15.2.C.6 All bolts and nuts used to secure the flanges to the valve faces must be sized according to the flange bolt hole fitment requirements and be consistent. Mixing of fastener sizes is not acceptable.
- 15.2.C.7 Fasteners used to secure the flanges and pipe hangers must be coated (zinc or galvanized) to resist corrosion and anti-seize compound applied to threads prior to installing nuts. Bolts and nuts must be properly torqued and new gaskets used to seal faces.
- 15.2.C.8 The following stub ends are listed for replacement:

Stub End Description	Location	Valve Size (Inch)	Valve Type	Pipe size	Flange Diameter	Bolts	Doubler Plate thickness
#3 - Grey Water Drain Port	Frame 39-40 PORT	3	S.D. Check	3	7.5	4	1.5 x 8 OD
#5 - Grey Water Drain STBD	Frame 22-23 STBD	4	S.D. Check	4	9	9	0.5 x 6 OD
#10- Sewage Discharge	Frame 34-35 PORT	6	S.D.N.R.	6	11	8	0.5 x 11 OD
#12- Port SSG RW Discharge	Frame 25-26 PORT	3	S.D.N.R.	3	7.5	4	0.5 x 8 OD
#13- STBD SSG RW Discharge	Frame 25-26 STBD	3	S.D.N.R.	3	7.5	4	0.5 x 8 OD

#14- Main Engine RW Discharge PORT	Frame 24-25 PORT	6	S.D.N.R.	6	11	8	None
#15- Main Engine RW Discharge STBD	Frame 24-25 STBD	6	S.D.N.R.	6	11	8	None
#17-Oily water Separator Discharge	Frame 26-27 STBD	2	S.D.N.R.	2	6	4	0.5 x 6 OD
#23- Aft Port Sea Chest Vent	Frame 17-18 PORT	4	Globe	4	9	8	None
#24- Aft STBD Sea Chest Vent	Frame 17-18 STBD	4	Globe	4	9	8	None
#27- Main Sea Chest Valve Port	Frame 26-27 PORT	16	Globe	16	23.5	16	None
#28- Main Sea Chest Valve STBD	Frame 27-27 STBD	16	Globe	16	23.5	16	None
#29- Main Sea Bay Isolation Valve Port	Frame 26-27 PORT	16	Butterfly	16	23.5	16	0.5 x 24 OD
#30- Main Sea Bay Isolation Valve STBD	Frame 25-26 STBD	16	Butterfly	16	23.5	16	0.2 x 24 OD
#31- Recirc to Main Sea Chest Port	Frame 25-26 Port	6	Globe	6	11	8	None
#32- Recirc to Main Sea Chest STBD	Frame 25-26 STBD	6	Globe	6	11	8	None

- 15.2.C.9 The Stub End replacement consists of replacing the valve flange and piping from the valve flange through the bulkhead or tank top and into the tank as is the current installation for that particular stub end, or to the ship's outer bulkhead as is the current installation for that particular stub ends installation.
- 15.2.C.10 Where doubling plates have been installed the Contractor must ensure that proper doubling plates are replaced where required and reinforcement is suitably re-welded in place for all pipe lengths to mitigate vibration and provide load support.
- 15.2.C.11 All pipe ends must be terminated as per the original installation. Recirculation piping ends are typically 90° square, tank/sea bay suction lines are typically 45° mitered and the discharge piping to overboard is bell mouthed (inside weld is ground flush to the outer bell mouthed side plate).
- 15.2.C.12 Where piping passes through a tank section the piping must be increased from Schedule 40 to schedule 80 for structural support. Contractor is to reference the drawings and make reference to onsite inspection to determine the pipe size required.
- 15.2.C.13 All pipe and flange dimensions and orientation must retain existing fitment properties. Bolt hole placement must ensure valves, gaskets and mating flanges correctly align in their original positions.
- 15.2.C.14 After new installations have passed welding and performance inspections the new stub end and any disturbed coatings inside and outside bulkheads, tank tops and support systems must be coated.
- 15.2.C.15 After welding/leak testing and prior to final installation the stub end assemblies must be hot dip galvanized to ensure corrosion resistance. Where welding is to occur on the

pipe or doubling plates the Contractor must take precautions to mitigate damage to the galvanizing. Damaged to galvanization must be free of any flaking material, cleaned and cold galvanize coated upon completion.

- 15.2.C.16 Once welds have been verified and system is reconnected the system must be flushed to removed debris, grease and oils from the system. Contractor must isolate the system so as not to damage valves, gauges and other items attached to the system upstream of the piping stub end. Flushing must be carried out to the satisfaction of the TA.

15.2.D Proof of Performance

- 15.2.D.1 All stub ends must be blanked at both ends and subjected to an air pressure of 1.5 bar (2.2 psi) for 1 hour using a calibrated pressure gauge with TA and ABS in attendance.
- 15.2.D.2 Leak testing must be completed around each full penetration weld using a soupy solution to identify any weld defects.
- 15.2.D.3 All weld defects must be repair at contractor's expense and subjected to 1 hour pressure test along with leaking testing of the weld.
- 15.2.D.4 All welds to be tested and only passed when TA and ABS are satisfied with holding pressure and weld repairs.

15.2.E Deliverables

- 15.2.E.1 Contractor must provide all welding schedules to the TA and ABS prior to commencing the work.
- 15.2.E.2 Contractor must provide QA report noting all welding defects noted and repaired, all pressure test results and gauge calibration certificates. This data must be tabulated in the Data book reference section G 1.13.

15.3 FIRE MAIN PIPING REPLACEMENT

15.3.A Identification

- 15.3.A.1 The Samuel Risley has a requirement to replace the existing Fire Main piping and fittings due to wastage. The piping to be replaced will extend from the Main Deck Isolation valves and extend forward throughout the vessel to the various fire stations and end back down at the suction piping of the Emergency Fire Pump in the bow thruster compartment. The new piping will be installed using Victaulic 77 series couplings.

15.3.B **References**

15.3.B.1 Documents

CFN 161-704-001 Bilge and Fire Piping Diagrammatic

30-000-000-ES-TE-001 Colour Coding Standard for Piping Systems

161-300-01 General Arrangement

Fire Main Isometric PNG file

15.3.C **Statement of Work**

- 15.3.C.1 Contractor must site inspect and take measurements of piping, flanges, valves and fittings to ensure the correct fit for replacement. Where there is a discrepancy between the drawings and the actual fitted materials, the actual fitted materials will be used as the standard.
- 15.3.C.2 The Contractor will provide all technicians, rigger/millwrights rigging equipment, welders, crane and crane operator, hand, power and specialty tools required to perform the work.
- 15.3.C.3 All materials must be supplied new and in accordance with current regulations.
- 15.3.C.4 All welding must be full penetration fillet with proper plate edge preparation. All welds to meet current industry standards.
- 15.3.C.5 New Victaulic fittings and valves will be GSM. Where there is an occurrence where a fitting is missing the contractor must procure the proper Victaulic fitting.
- 15.3.C.6 All existing Brass fire station hose valves will be retained and reused.
- 15.3.C.7 There are approximately 6 welded reducing tees in the system. The contractor must include in his bid the fabrication of 6 new tees. The welded Tees must be fully hot dip galvanized.
- 15.3.C.8 The contractor will make custom piping bends to match existing piping in order to reduce the number of fittings needed.
- 15.3.C.9 The contractor must also supply and fabricate two custom 90's with flanges to join to the Emergency Fire pump discharge and suction flanges. The Flanges must be standard 150# and must be factory supply not fabricated.

15.3.C.10 The following fire main sections are listed for replacement:

Focsile Deck							
1	Focsile Fire Station to Stack Bulkhead	2" Sch 40 Pipe(inch)	32.5	90° Reducing 2" to 1-1/2" NPT	1	90° Sch40 1-1/2" NPT	1
		1.5" Sch 40 Pipe(inch)	10.5	2" NPT Union	1	1-1/2" Close nipple NPT	2
		90° Sch40 2" NPT Fitting	1	Tee Sch40 1-1/2" NPT	1		
2	Stack to Electronics Room	2" Sch 40 Pipe(inch)	238.5	45° Sch 40 2" NPT Fitting	1		
		2" Close Nipple NPT	1				
		90° Sch40 2" NPT Fitting	3				
3	Forward Bridge Deck Fire Station to Focsile Deck	2" Sch 40 Pipe(inch)	150.8				
		90° Sch40 2" NPT Fitting	3				
Boat Deck							
4	Forward Boat Deck Fire Station to Cleaning Locker	2" Sch 40 Pipe(inch)	48.5	45° Sch 40 2" NPT Fitting	1	2" NPT Union	1
		1-1/2" Sch 40 Pipe(inch)	5.25	90° Reducing 2" to 1-1/2"NPT	1		
		90° Sch40 2" NPT Fitting	1	Tee Sch40 1-1/2" NPT	1		
5	Bosun Stores to Stpd Boat Deck Alley	2" Sch 40 Pipe(inch)	374	2" to 1-1/2" NPT Reducer	1	2" NPT Union	3
		1-1/2" Sch 40 Pipe(inch)	42.75	90° Reducing 2" to 1-1/2" NPT	1	1-1/2" NPT Union	2
		90° Sch40 2" NPT Fitting	2	Tee Sch40 1-1/2" NPT	3	2" Vic. Coupling	10
		90° Sch40 1-1/2" NPT	8	Close Nipple 1-1/2" NPT	3	2" Vic. 90°	3
		2" NPT Ball Valve	2	2" Victaulic Butterfly Valve	1		
6	Bosun Store Bulkhead and Port/Stbd Fwd Focsile Ext. Fire Stations to Cleaning Locker	2" Sch 40 Pipe(inch)	412	2" Vic. Coupling	13	2" Vic. 90°	5
		3" Sch 40 Pipe(inch)	181.8	3" Vic. Coupling	2	3" to 2" Red. Vic. Coupling	2
		3" to 2" Reducing Coupling	2				
7	Boat deck Stairwell Fire Station in Stack to Deck	2" Sch 40 Pipe(inch)	62.5	2" to 1-1/2" NPT Bushing	2	90° Sch 40 2" NPT	2
		Tee Sch40 2" NPT	1	45° Sch 40 2" NPT Fitting	2	2" NPT Union	1
		2" Close nipple NPT	1				
Main Deck							
8	Forward Main Deck Fire Station to Mess	1-1/2" Sch 40 Pipe(inch)	6	Tee Sch40 1-1/2" NPT	1	90° Sch40 1-1/2" NPT	1
		2" Sch 40 Pipe(inch)	80.25	2" Vic. Coupling	3	2" Vic. 90°	1
		3" Sch 40 Pipe(inch)	5	3" Vic. Coupling	1	4" Vic. 45°	1
		4" Sch 40 Pipe(inch)	195	4" Vic. Coupling	8	4" Vic. 90°	2
		90° Reducing 2" to 1-1/2" NPT	1				
Main Deck							
9	Mess from Forward Main to Deck in Deck Workshop and Inc. Bulkhead and Stairwell Bulkhead	2" Sch 40 Pipe(inch)	131	2" Vic. Coupling	2	2-1/2" Vic. Butterfly Valve	1
		2-1/2" Sch 40 Pipe(inch)	149.5	2-1/2" Vic. Coupling	7	2-1/2" Vic. 90°	2
		4" Sch 40 Pipe(inch)	1130	4" Vic. Coupling	18	4" Vic. 45°	2
		4" to 2-1/2" Red. Vic. Coupling	1	4" Victaulic Butterfly Valve	1	4" Vic. 90°	2
		4" Victaulic Tee	1				
10	Main Deck Stairwell Fire Station to Mess Bulkhead	2" Sch 40 Pipe(inch)	58.25	2" Vic. Coupling	2	2" Vic. 90°	1
		1-1/2" Sch 40 Pipe(inch)	8.5	90° Sch40 1-1/2" NPT	1	45° Sch 40 2" NPT Fitting	1
		90° Reducing 2" to 1-1/2" NPT	1	Tee Sch40 1-1/2" NPT	1		
11	Laundry Alley Fire Station to Incinerator Bulkhead	1-1/2" Sch 40 Pipe(inch)	3.25	90° Sch40 1-1/2" NPT	1	Tee Sch40 1-1/2" NPT	1
		2" Sch 40 Pipe(inch)	308.8	2" Vic. Coupling	9	2" Vic. 90°	2
		2-1/2" Sch 40 Pipe(inch)	139.5	90° Sch40 2" NPT Fitting	3	2" NPT Union	1
				2-1/2" Vic. Coupling	1		
		2-1/2" to 2" Red. Vic. Coupling	1	90° Reducing 2" to 1-1/2" NPT	1	1-1/2" Close Nipple	1
Below Main Deck							
12	Dry Stores to Bow Thruster	4" Sch 40 Pipe(inch)	456.5	4" Vic. Coupling	22	4" Vic. 90°	8
		4" Victaulic Check Valve	1	Custom 90° w/ Flanges to P/P	2	4" Victaulic Tee	1
		4" Victaulic Butterfly Valve	2	4" SDNR w/ flange	1		

15.3.C.11 The contractor will provide the proper tooling and expertise to roll Victaulic grooves in the new piping to manufactures recommendations and tolerances.

15.3.C.12 Piping is to be systematically removed in sections and replaced with new piping matching the dimensions of the existing piping. The contractor is responsible for the disposal of the old piping and fittings.

15.3.C.13 The Contractor must supply the following approximate lengths of Schedule 40 Galvanized Pipe and the following galvanized threaded fittings:

List of Total Pipe and Fittings Required for all sections except aft deck and engine room.				
Pipe				
	1-1/2" Sch 40 Galvanized Pipe		10	ft
	2" Sch 40 Galvanized Pipe		160	ft
	2-1/2" Sch 40 Galvanized Pipe		25	ft
	2-1/2" Sch 80 Galvanized Pipe		0.00	ft
	3" Sch 40 Galvanized Pipe		20	ft
	4" Sch 40 Galvanized Pipe		150	ft
Threaded Fittings				
	Close Nips NPT			
		1-1/2"	6	
		2"	2	
	45° NPT Sch 40 Galvanized			
		2"	5	
	90° NPT Sch 40 Galvanized			
		1-1/2"	12	
		2"	15	
	Tee NPT Sch 40 Galvanized			
		1-1/2"	8	
		2"	1	
	Unions NPT Galvanized			
		1-1/2"	2	
		2"	7	
	Other Galvanized NPT			
	2" to 1-1/2" Reducing 90°		6	
	Adaptor 2" to 1-1/2"		1	
	2" Ball Valve		2	
	2" to 1-1/2" Bushing		2	

15.3.C.14 All rolled pipe ends must be cold galvanized in way of the grooving to restore any disturbed galvanizing.`

- 15.3.C.15 The fire main piping will pass through approximately 28 bulkhead/deckhead penetrations. The contractor is responsible for cropping out the old piping and welding in the new piping.
- 15.3.C.16 All welds must be made to the satisfaction of the TA and regulatory bodies.
- 15.3.C.17 All galvanizing disturbed by the welding process will be cold galvanized to ensure proper corrosion protection.
- 15.3.C.18 The fire main will pass through various accommodation areas of the ship. The contractor is required to remove and reinstall bulkhead and deckhead Isolamin panels as required.
- 15.3.C.19 The Contractor is responsible for any damages done to the deck head or bulkhead panels.
- 15.3.C.20 The Contractor must protect any flooring or furniture in cabins that the piping passes through.
- 15.3.C.21 The contractor must clean up any mess or debris from these areas caused by the fire main removal and installation.
- 15.3.C.22 The fire main will pass through the crawlspace under the bridge. This requires the cement to be chipped away around the pipe and the new pipe will require new cement to the height of the existing floor.
- 15.3.C.23 If any piping needs to be disturbed to access the fire main piping then the disturbed piping must be reassembled in the same as found condition.
- 15.3.C.24 All piping must be properly supported with suitable brackets to withstand icebreaking conditions. All new brackets are contractor supplied and installed. All brackets must have new contractor supplied bolts, nuts and washers.
- 15.3.C.25 Any deviation from the original path of the fire main piping must be approved by TA.
- 15.3.C.26 After new installations have passed welding and performance inspections any disturbed coatings in the deckheads must be coated with 2 coats of Interprime 198 with the final coat matching the original paint color.
- 15.3.C.27 The fire main piping is to be color coded as per the Coast Guard Colour Coding Standard for piping Systems.

15.3.D Proof of Performance

- 15.3.D.1 The finished piping work will be made available for inspection by the TA and ABS inspector.
- 15.3.D.2 Prior to closing up deckheads and spaces the fire main will be subject to a pressurized water test of minimum 90 psi.
- 15.3.D.3 All joints and flanges must be leak free and witnessed by the TA.

15.3.E Deliverables

- 15.3.E.1 The contractor must supply a list of all materials used and the time and date of system pressure test. This data must be logged in the data booked to be handed over at completion of the contract.

16.0 DOMESTIC SYSTEMS

16.1 CHIEF ENGINEER CABIN WASHROOM/SHOWER FLOOR

16.1.A Identification

16.1.A.1 The Contractor must remove the existing coating of DEX-O-TEX epoxy flooring installed in the Chief Engineer's washroom and shower. Once removed the Contractor must install a new Dex-O-Tex epoxy floor in the washroom and shower areas.

16.1.B References

161-300-01 General Arrangement

16.1.C Statement of Work

16.1.C.1 The Contractor must ensure that no damage is done to existing cabinetry and prevent any airborne particulate from circulating outside the washroom space. Damages will be repaired at Contractor expense.

16.1.C.2 The Contractor must reuse the existing floor drain assemblies.

16.1.C.3 The Contractor must remove the existing top coating of Dex-O-Tex epoxy.

16.1.C.4 The contractor must replace the cement and steel substrate to allow for the proper adhesion of a new DEX-O-Tex coating.

16.1.C.5 The Contractor must use the same colour of substrate when replacing the floor. The colour must be provided to the TA for approval prior to installation.

16.1.C.6 The Contractor must adhere to the manufacturer's recommended application and curing schedules, including proper mixing, leveling and sub surface preparation.

16.1.C.7 The Contractor must ensure that all surfaces are properly cured and sealed.

16.1.C.8 The Contractor must refer to the flooring applications in the Senior Engineer and Chief Officers cabins for an example of a proper flooring application.

16.1.C.9 The Contractor must use an inlay to allow for proper surface leveling is required.

16.1.C.10 The Contractor must allow the TA the opportunity to witness the reinstallation of the flooring surface and obtain approval of the TA prior to final acceptance.

16.1.C.11 The new floor must be allowed to fully cure and the TA witness a water test to ensure the floor has proper drainage and is sealed.

16.1.D Proof of Performance

- 16.1.D.1 The Contractor must provide a ‘coating application report’ to the TA that details all of the particulars of the coating application process as completed by the Contractor. The report must include details of all environmental conditions at the time floor coatings were applied. This must include but not be limited to the dry and wet bulb temperatures, relative humidity, dew point and the times when flooring was started and stopped.
- 16.1.D.2 The Contractor must provide waste disposal certificates to the TA prior to the completion of the contract.

16.2 BOAT DECK AND FOCSLE DECK FLOOR COVERINGS**16.2.A Identification**

- 16.2.A.1 The Contractor must remove the existing tile coverings from the passage floors on both the Boat and Focsle decks.
- 16.2.A.2 The Contractor must prepare the underlying cement and apply a new seamless vinyl floor covering.
- 16.2.A.3 The vinyl covering must be seamless Marine type approved by a TCMS approved classification society and be of similar colour, quality and thickness to the Main Deck covering.
- 16.2.A.4 The Contractor must provide vinyl colour samples and product samples for TA approval prior to installation.

16.2.B References

- 16.2.B.1 Drawings:

Drawings #	Drawing Name
161-300-001	GENERAL ARRANGMENT USB Folder 26.0
161-300-002	MAIN & BOAT Deck ACCOM LAYOUT
161-300-003	FOCSLE DK ACCOM & BRIDGE DK ARRANGMENT
161-320-003	FIRE FIGHTING PLAN
161-320-008	MAIN & BOAT DECK JOINER BHDS
161-320-004	FOCSLE & BRIDGE DECK JOINER BHDS
161-320-07	DECK COVER PLAN

16.2.C Statement of Work

- 16.2.C.1 The Contractor must remove and dispose of the existing “peel and stick” type vinyl floor tiles on the Boat and Focsle Decks.
- 16.2.C.2 The Contractor must clean and repair the existing cement sub floor and then prepare the floor for seamless vinyl according to manufacturer’s requirements.
- 16.2.C.3 The Contractor must apply the seamless vinyl as per manufacturer’s recommendations using certified and experienced installers.
- 16.2.C.4 The flooring must be protected from damage and allowed to fully cure before any worker traffic is allowed to pass. The Sub Contractor must approve the use of the floor prior to use and any damage must be repaired at the Contractors expense.
- 16.2.C.5 The Contractor must replace all vinyl base board required for the installation of the new flooring.
- 16.2.C.6 Baseboards must be Black 4” vinyl base board with similar profile to the existing.

16.2.D Proof of Performance

- 16.2.D.1 The Contract must supply colour and product samples to TA for approval prior to installation.
- 16.2.D.2 The Contract must provide TA with Marine type certification by a TCMS approved classification society prior to installation.
- 16.2.D.3 The Contractor must provide access to the floor to the TA for final approval.

16.2.E Deliverables

- 16.2.E.1 The contractor must provide all Marine type approval certificates for flooring installed.

17.0 DECK EQUIPMENT/SHIP SUPPORT SYSTEMS

17.1 ANCHOR WINDLASS OVERHAUL

17.1.A Identification

- 17.1.A.1 The Contractor must disassemble, overhaul and re-assemble the Anchor Windlass fitted on the bow of the Samuel Risley.
- 17.1.A.2 The Contractor must supply and re-new bearings, bushings, brake pads, pins and spindles.
- 17.1.A.3 The contractor must clean and inspect the main drive gears, hydraulic power pack, hoses and tubing connections. Hydraulic components and fittings to be overhauled and renewed as required.

17.1.B References

- 17.1.B.1 Documentation:

Westec Forward Hydraulic System and Deck Machinery

- 17.1.B.2 Drawings:

General Arrangement – CCGS Samuel Risley

Section 3 of Westec Manual – Assembly Drawings Complete with Parts List

17.1.C Statement of Work

- 17.1.C.1 The Contractor must drain and dispose of hydraulic oils and gear box oils contained in the Anchor Windlass and hydraulic supply lines (approx. 100 litres).
- 17.1.C.2 The Contractor must carefully strip down the Windlass and inspect all sleeve bearings, bushings and shafts for wear.
- 17.1.C.3 The Contractor must replace all roller ball bearings with new and replace all locking tabs and damaged jam nuts with new.
- 17.1.C.4 Where it is determined that the bushings, sleeve bearings and spacers are out of wear tolerances the Contractor must have new bushings, sleeves and/or spacers made to the correct “as new” fitted tolerances out of bearing bronze. The bearing bronze material must be selected to match the loading capabilities of the original bushings and sleeves.

- 17.1.C.5 The contractor must allow for 75 hours of machining and fitting for the replacement of the bronze fittings. Times will be adjusted through 1379 action
- 17.1.C.6 The Contractor must inspect all gearing for wear and deficiencies. Where issues with the gearing is noted the Contractor must contract a suitable reconditioning contractor that is capable of returning the gearing to original specifications.
- 17.1.C.7 The Contractor must replace any corroded hydraulic fittings, tubing and existing hydraulic hoses with new material. The hydraulic hoses must be sleeved in safety mesh. All metal hydraulic lines and fittings must be stainless steel NAD sized according to the original installation.
- 17.1.C.8 The Contractor must supply and renew the band brake shoes with new material in accordance with manufacturers recommendations.
- 17.1.C.9 The Contractor must inspect all Windlass components. The Contractor must identify all defects and proposed repairs to the TA for approval prior to commencing work. All repairs not covered in the general overhaul must be by 1379 action after consultation with the TA.

17.1.D Proof of Performance

- 17.1.D.1 The Contractor must provide a detailed report of the findings including volumes removed/returned/disposed.
- 17.1.D.2 The Contractor must provide disposal certificate for the disposed oils removed from the windlass.
- 17.1.D.3 The Contractor must coordinate the inspection of the windlass with ABS inspectors to obtain a survey credit in accordance with Transport Canada regulations.
- 17.1.D.4 The Contractor must return all scrap metals/parts to the TA.
- 17.1.D.5 The Contractor must prove operation of the windlass as per manufacturer's specs to TA and TCMS/ABS.

17.1.E Deliverables

- 17.1.E.1 The Contractor must provide a report detailing all work completed on the windlass including bearing and bushing tolerances. This report must be included in the vessels data book to be delivery upon completion of the contract.
- 17.1.E.2 The Contractor must provide all inspection certificates and credits received during this overhaul.

17.2 THERMAIL HEATER REPLACEMENT

17.2.A Identification

- 17.2.A.1 The Contractor must remove nine (9) thermal fluid heaters on board the vessel and replace with GSM supplied new equipment.
- 17.2.A.2 The replacement heaters are similar in size and application to the existing heaters and require minimal changes to the existing system to install.

17.2.B References

Drawings

CMS30-101-PL (S30101p11)

161-624-28A & B(S30159wi 1&2)

Existing Heaters to be Replaced

Engine Room Supply Air Preheater

Existing two (2) supply air preheaters with the following specifications;

- 255 kW
- L 33" x W 48" x D 5.25" (heater core recessed in 1-5/8" from outside)
- 30 tubes, double pass with tubes enter and exit on 48" side
- 2" Manifolds
- CFM: 12920

Engine Room Combustion Air Preheater

Existing two (2) Combustion air preheaters with the following specifications;

- 140 kW
- L 33" x W 48" x D 5.25" (heater core recessed in 1-5/8" from outside)
- 20 tubes, single pass with tubes enter and exit on 33" side
- 2" Manifolds
- CFM: 12920

MCR Supply Air Preheater

Existing one (1) supply air preheaters with the following specifications;

- 12 kW
- L 12" x W 12" x D 5.25" (heater core recessed in 1-5/8" from outside)
- 2" Manifolds
- CFM: ~1000

Engine Room & Winch Room Fan Heaters

Existing four (4) Fan Heaters with the following specifications;

- 82 kW
- L 33.5” x W 20.5” x D 33.5”
- 2-1/2” Manifolds
- 1-1.2” Valves
- 115VAC/1-phase/60 Hz
- Existing Model# CAT.NO. V-240 RPM: 820 & CAT.NO.V-280 RPM:1100

Regulations

Transport Canada TP127E – Ships Electrical Standard (Latest Version)

Canada Shipping Act 2001 – Marine Machinery Regulations (Latest Version)

17.2.C Statement of Work

- 17.2.C.1 Contractor must electrically isolate all electrical connections and lockout circuits.
- 17.2.C.2 Contractor must isolate the glycol fluid connections on the heaters to be replaced.
- 17.2.C.3 Contractor must drain each existing unit scheduled to be replaced and dispose of the glycol fluid in accordance with Federal, Provincial and municipal laws and regulation.
- 17.2.C.4 Once each unit is electrically isolated and drained the Contractor must remove the units from the ventilation system. Removed units must be returned to CCG prior to contract completion.
- 17.2.C.5 The Contractor must install the new GSM supplied thermal heaters in place of the existing heaters using new mounting hardware.
- 17.2.C.6 All mounting hardware must be in accordance with manufacturer’s recommendations unless the existing hardware surpasses the manufacturer’s specifications in which case the higher specified hardware must be used.
- 17.2.C.7 All new mounting hardware must be provided by the contractor.
- 17.2.C.8 The installation of the new thermal heaters must be in accordance with the manufacturer’s installation manual.
- 17.2.C.9 Once installed each heater must be connected to the thermal fluid glycol system and electrical systems as per manufacturer’s recommendations.

17.2.C.10 Once all heaters are re-connected to thermal fluid system the fluid header tank must be returned to normal operating levels. The Contractor is responsible for providing all new thermal fluid liquid as well as installing the fluid in the header tank.

17.2.C.11 Once all systems are reconnected the Contractor must commission each heater to ensure full operation.

17.2.D Proof of Performance

17.2.D.1 The Contractor must allow the TA and ABS inspector availability to inspect the installation during all phases of installation.

17.2.D.2 The Contractor must preform a leak test to ensure all fluid connections are free of leaks. Any deficiencies noted must be repaired at contractor's expense.

17.2.D.3 The Contractor must provide proof of operation for each thermal fluid heater. Any deficiencies must be repaired by the Contractor at their own expense.

17.2.E Deliverables

17.2.E.1 The contractor must provide data sheets on the thermal fluid installed in the system.

17.2.E.2 The Contractor must provide removed heater units to CCG for disposal.

17.3 HVAC AXIAL FAN REPLACEMENT

17.3.A Identification

17.3.A.1 The Contractor must remove 18 existing axial fans located onboard the vessel and replace with GSM supplied fans.

17.3.A.2 GSM supplied fans are similar in shape and size to the existing fans with minimal alterations required to existing ducting systems.

17.3.B References

Drawings

81066-1433 Sh.1,2 &3 (S30181hv1,2 &3)

CMS30-181-HV

CMS30-182-MI

CMS30-183-HV

CMS30-186-WI (2 pages)

Regulations

Transport Canada TP127E – Ships Electrical Standard (Latest Version)

Canada Shipping Act 2001- Marine Machinery Regulations (Latest Version)

IEEE 45 – Recommended Practice for Electrical Installations on Shipboard

Existing Equipment to Replace

Engine Room Supply

Existing two (2) supply air fans with the following specifications;

- Myson Model # 30G4/8
- Length of tube; 9”
- Diameter of tube OD; 30”
- Flange Diameter OD; 34.25”
- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage 8.5/1.6
- Break HP; 7.78/0.97
- CFM: 12920 (HI)

Engine Room Exhaust Fans

Existing two (2) Exhaust Fans with the following specifications;

- Myson Model # 30 1/3 4P/8
- Length of tube; 9”
- Diameter of tube OD; 30”
- Flange Diameter OD; 34.25”
- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 4.3/2.0
- Break HP; 2.4/0.33
- CFM: 12920 (HI)

ME Supply Fans

Existing two (2) Supply Fans with the following specifications;

- Myson Model # 30G.4P/8P
- Length of tube; 26.0625”
- Diameter of tube OD; 30”
- Flange Diameter OD; 34.25”

- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 7.8/1.6
- Break HP; 7.14/0.89
- CFM: 12920 (HI)

Main Deck Supply Fan

Existing one (1) Supply Fans with the following specifications;

- Myson Model # 194P8P
- Length of tube; 15”
- Diameter of tube OD; 19”
- Flange Diameter OD; 22.5”
- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 2.05/0.5
- Break HP; 1.0/0.13
- CFM: 2683 (HI)

Boat Deck Supply Fan

Existing one (1) Supply Fans with the following specifications;

- Myson Model # 194P8P
- Length of tube; 15”
- Diameter of tube OD; 19”
- Flange Diameter OD; 22.5”
- 2 Speed control
- Voltage; 575VAC / 3 phase / 60 Hz
- Amperage; 2.05/0.5
- Break HP; 0.62/0.08
- CFM: 2683 (HI)

Emergency Gen Supply Fan

Existing one (1) Supply Fans with the following specifications;

- Myson Model # 194P8P
- Length of tube; 15”
- Diameter of tube OD; 19”
- Flange Diameter OD; 22.5”
- 1 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 2.05
- Break HP; 0.62
- CFM: 2683 (HI)

Focsle Deck Supply Fan

Existing one (1) Supply Fans with the following specifications;

- Myson Model # 15GV4/8P
- Length of tube; 15”
- Diameter of tube OD; 15”
- Flange Diameter OD; 17.8”
- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 1.2/0.32
- Break HP; 0.22/0.03
- CFM: 1600 (HI)

Galley Exhaust Fan

Existing one (1) Exhaust Fans with the following specifications;

- Myson Model # 15GVP
- Length of tube; 15”
- Diameter of tube OD; 15”
- Flange Diameter OD; 17.8”
- 1 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 2.35
- Break HP; 1.34
- CFM: 2125 (HI)

Deck Workshop Supply Fan

Existing two (2) Supply Fans contra rotating in series with the following specifications;

- Myson Model # 15G4P
- Length of tube; 15” each section and 30” total length
- Diameter of tube OD; 12.25”
- Flange Diameter OD; 14.8”
- Tandem Speed
- Voltage; 120 VAC / 1 phase / 60 Hz
- Amperage; 4.0
- Break HP; 0.05
- CFM: 1234 (HI) (Both Stages Combined)

MCR Supply Fan

Existing one (1) Supply Fans with the following specifications;

- Model # -
- Length of tube; 26”
- Diameter of tube OD; 12.25”
- Flange Diameter OD; 14.8”
- 1 Speed control
- Voltage; 120 VAC / 1 phase / 60 Hz

- Amperage; 7.5
- Break HP; 0.5
- CFM: 1000 (HI)

Toilet Exhaust Fan

Existing two (2) Exhaust Fans contra rotating in series with the following specifications;

- Myson Model # 194P8P
- Length of tube; 15” each and 30” total length
- Diameter of tube OD; 19”
- Flange Diameter OD; 22.5”
- 2 Speed control
- Voltage; 575 VAC / 3 phase / 60 Hz
- Amperage; 2.05/0.58 (combined)
- Break HP; 1.0/0.13 (combined)
- CFM: 3288 (HI combined)

Dry Stores Supply Fan

Existing two (2) Supply Fans contra rotating combined with the following specifications;

- Myson Model # 12G2.4P
- Length of tube; 15” each and 30” combined
- Diameter of tube OD; 12”
- Flange Diameter OD; 14.8”
- 1 Speed control
- Voltage; 115 VAC / 1 phase / 60 Hz
- Amperage; 4.0 (combined)
- Break HP; 0.16 (combined)
- CFM: 1236 (HI combined)

17.3.C Statement of Work

- 17.3.C.1 The Contractor must electrically isolate each fan to be replaced and lock-out.
- 17.3.C.2 The Contractor must remove each of the existing fans noted in section **Error! Reference source not found..**
- 17.3.C.3 The contractor must drill each new fan flange to match the existing ductwork flanges. New GSM supplied fans are equipped with blank flanges.
- 17.3.C.4 The Contractor must install each new fan provided. New fans are of similar size and type to the existing requiring minimal ductwork modifications.

- 17.3.C.5 The Contractor must provide new installation hardware which must include grade five (5) steel bolts, washers, lock washers and nuts as well as new neoprene gaskets for each flange connection.
- 17.3.C.6 The contractor must install each fan in accordance with manufacturer's recommendations.
- 17.3.C.7 Each fan must re-use the isolation mounts present on the existing ductwork in order to provide a low vibration mount. Any deficiencies noted in the existing isolation mounts must be brought forward to the TA and replaced under TA approval. This will be handled by 1379 action.
- 17.3.C.8 All electrical connections must be re-established and each fan energized to ensure proper operation at all speeds.

17.3.D Proof of Performance

- 17.3.D.1 The contractor must provide the TA and ABS inspector access to the installation of the new fans during all stages of installation. Any defects noted during these inspections must be repaired at Contractor's expense.
- 17.3.D.2 The contractor must perform operational tests on each fan in order to demonstrate full operation. These tests must include operating the fans at each given speed and witnessed by the TA and ABS inspector. Any deficiencies noted must be repaired at Contractor's expense.

17.3.E Deliverables

- 17.3.E.1 The Contractor must submit a report of all installation hardware used to install each fan. This list of hardware must be included in the vessels data book.
- 17.3.E.2 All existing fans must be returned to CCG for disposal.

17.4 INSTALLATION OF AIR COMPRESSOR

17.4.A Identification

- 17.4.A.1 The Contractor must remove and install a new GSM supplied air compressor to replace the forward compressor unit in the Machinery room.

17.4.B References

Documents

523233 Fisheries and Oceans – Sperre Air Compressor Technical Documentation

Instruction Manual HL2-105A_version 02 – Instruction Manual Air Compressor HL2/105A

User Manual Controller 020518 – User Manual Sperre Controller

Drawings

Machinery Arrangement 161-500-100 Sh.1 & 2

Regulations

Transport Canada TP127E – Ships Electrical Standard (Latest Version)

Canada Shipping Act 2001- Marine Machinery Regulations (Latest Version)

IEEE 45 – Recommended Practice for Electrical Installations on Shipboard

17.4.C Statement of Work

- 17.4.C.1 The Contractor must isolate all electrical connections to the old existing compressor.
- 17.4.C.2 The Contractor must isolate and disconnect the compressed air lines from the replacement compressor.
- 17.4.C.3 The Contractor must remove the existing compressor from its mounting in the engine room.
- 17.4.C.4 The Contractor must review the existing compressor mounts and complete any modifications to mount the new GSM supplied compressor. The new compressor is a Sperre HL2-105A that is the same unit as the aft compressor unit. The mounting is similar on both units.
- 17.4.C.5 The new compressor must be installed in accordance with manufacturer's recommendations.
- 17.4.C.6 Once the compressor is installed the compressed air lines must be reconnected.
- 17.4.C.7 Once the compressor unit is installed the compressor electrical connections must be connected and the controller installed in accordance with manufacturer's recommendations.

17.4.D Proof of Performance

- 17.4.D.1 The Contractor must perform a leak test on the compressed air lines to ensure no leaks are present. This test must be completed in the attendance of the TA. If a deficiencies are noted they must be repaired at Contractors expense.

17.4.D.2 The Contractor must perform an operational test on the compressor in accordance with manufacturer's recommendations. The operational test must demonstrate to the TA the compressor unit is operational during all operational conditions. Any deficiencies must be repaired at contractor's expense.

17.4.D.3 The Contractor must allow ABS to inspect the compressor installation and operational test to obtain TCMS survey credit.

17.4.E Deliverables

17.4.E.1 The contractor must provide the TA with the certification of TCMS survey credit.

17.4.E.2 The contractor must provide CCG with old compressor unit for disposal.

18.0 COMMUNICATIONS AND NAVIGATION

18.1 GMDSS INSTALLATION

18.1.A Identification

18.1.A.1 The CCG has the requirement to change the GMDSS (Global Maritime Distress and Safety System) to a more modern system. This change will require equipment to be removed, new equipment to be installed and new cables pulled throughout the wheelhouse and mast locations.

18.1.A.2 The Contractor must inform TA ten (10) working days in advance of when the schedule to commence the work within this section of the specification.

- 18.1.A.3 All work completed by the Contractor within this sections must be completed under the supervision of CCG electrical technicians and completed to the TA's approval. All deficiencies must be repaired at the Contractor's expense.
- 18.1.A.4 All electrical disconnection must be completed by CCG electrical technicians.
- 18.1.A.5 The Contractor must removed stated equipment under the guidance of CCG electrical technicians. These removed items must be stored in a secure, climate controlled location upon removal and returned to CCG for disposal prior to the end of the contract.
- 18.1.A.6 The Contractor must pull new GSM supplied wire to the locations stated. All electrical disconnections and re-connections must be completed by CCG electrical technicians.
- 18.1.A.7 The Contractor must install new cabinets and equipment as stated under the guidance of CCG electrical technicians. All final electrical connections and commissioning will be completed by CCG electrical technicians.

18.1.B **References**

18.1.B.1 Drawings:

CM706-010-IN – CCGS Samuel Risley GMDSS Interconnection (1 of 1)

18.1.B.2 Documentation:

Samuel Risley's GMDSS Pictures

18.1.C **Statement of Work**

- 18.1.C.1 The Contractor under the guidance of CCG electrical technicians must disconnect and isolate all sources of power to the GMDSS system.

Turn off Breakers:

- Panel M4-12, Breaker #9 – GMDSS Battery Charger
- Panel M4-12, Breaker #11 – Inmarsat-C system
- Panel M4-12, Breaker #12 - MF/HF #1 Power Supply (Sailor N2161)

- 18.1.C.2 The Contractor must disconnect the GMDSS batteries from the GMDSS system by disconnecting the Positive and Negative cables from the posts on the batteries. Tape

up the cable ends and tuck away and secure the cables in a way that they will not get damaged or be a tripping hazard.

- 18.1.C.3 The Contractor must remove the second MF/HF #2 radio (Icom IC-M802).
- 18.1.C.4 The Contractor must disconnect power to the Navtex System and disconnect power from the 24 VDC rectifier located in the cabinet (wheelhouse, top of stairs)
- 18.1.C.5 The Contractor must move and store the following equipment;

Sailor GMDSS 2000 equipment to be removed for disposal includes:

- Mini C LCD display c/w Power Converter
- Battery Charger N1674
- MF/HF Power Supply N2161
- Mini C Power Supply H2096B
- MF/HF Transceiver T2130
- ATU – Starboard side (do not remove antenna or antenna feed wire)
- Keyboard and tray
- Navtex Lokata 2 Unit (including antenna and cabling)

Icom IC-M802 MF/HF Radio system

- Control Unit (located on chart table)
 - Transceiver (located in chart table, forward side)
 - ATU - Port side (do not remove antenna or antenna feed wire)
 - All associated cabling
- 18.1.C.6 The Contractor must ensure the following cables remain intact, un-damaged and suitable for re-use;

- **GMD-19** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)

Existing 24VDC battery cables which run from the batteries to the battery charger. It is not necessary to replace these cables. Reroute these cable to the new power termination block and re-label GMD-19 for positive, GMD-20 for negative.

- **GMD-23** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)

Existing 24VDC power cable which runs from the battery charger (N1674) to the forward VHF DSC radio.

- **GMD-25** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)

Existing 120VAC power cable which runs from panel M4-12/breaker 9 to the battery charger (N1674). This will be repurposed as 120VAC for Charger “B” in the new system.

- **GMD-26** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing 120VAC power cable which runs from panel M4-12/breaker 12 to the battery charger (N1674). This will be repurposed as 120VAC for Charger “B” in the new system.
- **GMD-28** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing 120VAC power cable which runs from panel M4-12/breaker 12 to the battery charger (N1674).
- **GMD-29** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing RG-213 RF cable which runs between the existing forward VHF Transceiver (Sailor 6222) to Antenna #22 (main mast, lower yardarm, Stbd side, inverted antenna). It is not feasible to replace this cable at this time.
- **GMD-30** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing RG-213 RF cable which runs between the existing forward VHF DSC Receiver (Sailor 6222) to Antenna #24 (main mast, upper yardarm, Stbd side, upright antenna). It is not feasible to replace this cable at this time.
- **GMD-31** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing RG-213 RF cable which runs between the existing AFT VHF Transceiver (Sailor 6222) to Antenna #8 (fire monitor platform, port side antenna). It may not be feasible to replace this cable with LMR-400 at this time.
- **GMD-32** (see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1)
Existing RG-213 RF cable which runs between the existing AFT VHF DSC Receiver (Sailor 6222) to Antenna #23 (main mast, upper yardarm, port side, upright antenna).

18.1.C.7 The Contractor must remove the following cables and store and return to CCG for disposal;

see drawing: CM706-010-IN, CCGS Samuel Risley GMDSS Interconnection – 1of 1

Remove cables GMDSS-1, GMDSS-2, GMDSS-3, GMDSS-4, GMDSS-5, GMDSS-6, GMDSS-7, GMDSS-8, GMDSS-9, GMDSS-10, GMDSS-11, GMDSS-12, GMD-13, GMDSS-14, GMDSS-15, GMDSS-16, GMD-17, GMD-18, GMD-20, GMD-21, GMDSS-22, GMDSS-24.

- **GMDSS-1**
Multiconductor data cable from MF/HF transmitter (T2130) to PORT side ATU. No data cable required for new ATU.
- **GMDSS-2**
Triax RF cable which runs between the existing MF/HF transmitter (T2130) to the ATU.
- **GMDSS-3**
RG214 cable which runs from the DSC receive long wire balun to the Protection Unit (H1223) located in the wall cabinet. This cable will be replaced with LMR-400 cable.
- **GMDSS-4**
RG213 cable which runs from the H2095B (Inmarsat C receiver) to the Inmarsat C antenna. This cable will no longer be required as the new Inmarsat C system uses a multi-conductor data cable instead of an RF cable.
- **GMDSS-5**
24V power from MF/HF SSB Power supply (N2161) to MF/HF radio.
- **GMDSS-6**
Speaker cable.
- **GMDSS-7**
RG58 cable runs between the MF/HF SSB transceiver (T2130) and RE2100 SSB control head (RE2100).
- **GMDSS-8**
Multiconductor cable which runs from the existing MF/HF transmitter (T2130) to the SSB Control Unit (RE2100).
- **GMDSS-9**
Multi-conductor cable which runs from the existing MF/HF transmitter (T2130) to the HF DSC watch receiver Power Supply (N2165).
- **GMDSS-10**
RG58 cable runs between the MF/HF SSS Transceiver (T2130) and the DSC Watch Receiver (RM2150).
- **GMDSS-11**
RG58 cable runs between the MF/HF SSB Control Unit (RE2100) and the DSC Watch Receiver (RM2150).
- **GMDSS-12**
Power cable from the MF/HF DSC watch receiver power supply (N2161) to the MF/HF DSC watch receiver.

- **GMDSS-13**
Cable from the Sat-C transceiver (H2095B) to the Sat-C Message Processor (H2098B).
 - **GMDSS-14**
Cable from the Sat-C transceiver (H2095B) to the Printer (H1252B).
 - **GMDSS-15**
Power cable from the Sat-C power supply (H2096B) to the Sat-C transceiver (H2095B).
 - **GMDSS-16**
Power cable from the Sat-C power supply (H2096B) to the Sat-C Message Processor (H2098B).
 - **GMDSS-17**
Power cable from the Sat-C power supply (H2096B) to the Sat-C Monitor Power Converter (N418).
 - **GMDSS-18**
Power cable from the Sat-C power supply (H2096B) to the Printer (H1252B).
 - **GMDSS-20**
24V power from the charger (N1674) to MF/HF radio Power Supply (N2161).
 - **GMDSS-21**
24V power from the charger (N1674) to MF/HF DSC watch receiver Power Supply (N2165).
 - **GMDSS-22**
24V power from the charger (N1674) to Sat-C Power Supply (H2096B).
 - **GMD-24**
24VDC power cable which runs from the battery charger (N1674) to the aft VHF DSC radio.
- 18.1.C.8 The Contractor must install the new charger/PSU rack and new wall mount GMDSS cabinet. The deckhead panels surrounding the existing cabinet as well as the old GMDSS components will need to be removed prior to the cabinet replacement.
- 18.1.C.9 The new wooden GMDSS cabinet is GSM supplied and has been fabricated with the same outer dimensions as the old one to allow for the ceiling panels to be replaced without modification.
- 18.1.C.10 The Contractor must install the charger/PSU mounting rack and must be installed directly above the wooden cabinet. For ease of installation, it is recommended to install the charger/PSU mounting rack after the old wooden cabinet has been removed and before the new cabinet is installed. The rack is to be hung on top of the wall and then anchored to the wall with appropriate fasteners.

- 18.1.C.11 The Contractor must ensure the new wall cabinet is anchored to the wall using appropriate fasteners. Ensure the brass pillar used to support the existing cabinet is reused to support the weight of the new cabinet.
- 18.1.C.12 CCG Electrical Technicians will install both MF/HF transceivers that will be mounted underneath the desk where the satellite phone transceiver is currently located (See Figure: 6). the satellite phone must be relocated to the compartment to the left of its current location underneath the desk and will be completed by CCG electrical technicians.
- 18.1.C.13 The Contractor must fabricate a 1/4 inch aluminum plate with 5/16” studs pre-installed for mounting the MF/HF transceivers (See Figure: 7). The mounting plate must be installed by the Contractor using #12, flat head, self tapping sheet metal screws the aluminum plate must be fastened to the back wall below the desk.
- 18.1.C.14 The Contractor must run the following GSM supplied cable;

Cable Number	Cable Type	Location (From)	Location (To)	Notes
GMD-1	LMR-400FR	Wheelhouse, starboard wing, ceiling (Location C)	Wheelhouse, below desk (Location J)	Cable to be ran in wheelhouse ceiling, down through new cabinet, to underneath desk. Do not kink the cable or exceed a 1 inch bend radius at any time as this will necessitate the replacement of the cable.
GMD-4	LMR-400FR	Mast top, starboard side (Location D)	Wheelhouse, below desk (Location J)	Cable to be ran in wheelhouse ceiling, down through new cabinet, to underneath desk. Do not kink the cable or exceed a 1 inch bend radius at any time as this will necessitate the replacement of the cable. Tape up the end of the cable with electrical tape to prevent water from entering the cable.

GMD-62	LMR-400FR	Wheelhouse, starboard wing, ceiling (Location C)	Wheelhouse, below desk (Location J)	Cable to be ran in wheelhouse ceiling, down through new cabinet, to underneath desk. Do not kink the cable or exceed a 1 inch bend radius at any time as this will necessitate the replacement of the cable.
GMD-13	LMR-400FR	Mast top, starboard side (Location D)	Wheelhouse, below desk (Location J)	Cable to be ran in wheelhouse ceiling, down through new cabinet, to underneath desk. Do not kink the cable or exceed a 1 inch bend radius at any time as this will necessitate the replacement of the cable. Tape up the end of the cable with electrical tape to prevent water from entering the cable.
GMD-61A	Texcan 12 conductor/18AWG	Chart Table (Location B)	Wheelhouse, below desk (Location J)	Cable to be ran in wheelhouse ceiling, down through new cabinet, to underneath desk.
GMD-3	Manufacturer supplied Inmarsat-C multi-conductor cable	Main mast, top (Location I)	Wheelhouse, new GMDSS cabinet (Location A)	Do not cut off the connector on the antenna end of the cable. Tape up the end of the cable with electrical tape to prevent water from entering the cable.
GMD-12	Nexans MPRXCX 2 X 2.5mm ² (14AWG)	Chart Table (Location B)	Wheelhouse, new GMDSS cabinet (Location A)	
GMD-32	Belden 1300SB CAT5e	Chart Table (Location B)	Wheelhouse, new GMDSS cabinet (Location A)	

GMD-63	Belden 1300SB CAT5e	Chart Table (Location B)	Wheelhouse, new GMDSS cabinet (Location A)	
GMD-50	LMR-400FR	Wheelhouse, top of stairwell, aft wall (Location G)	Fire monitor platform, port aft railing area (Location H)	Do not kink the cable or exceed a 1 inch bend radius at any time as this will necessitate the replacement of the cable. Tape up the end of the cable with electrical tape to prevent water from entering the cable.

- 18.1.C.15 The Contractor must ensure all run cables are left an extra 2 meters past the termination location.
- 18.1.C.16 The Contractor must ensure all cables are run inside existing cable trays and through existing cable deck glands and transits. Where the cable passes through deck glands the appropriate sized blocks must be used.
- 18.1.C.17 The Contractor must ensure all cables are labelled on both ends of the cable with appropriate cable tags and labelled accordingly.

18.1.D Proof of Performance

- 18.1.D.1 All equipment removals and installation must be completed under the supervision of CCG electrical technicians.
- 18.1.D.2 All work completed by the Contractor with respect to section 18.1 must be approved by CCG electrical technicians. Any deficiencies noted by TA must be repaired at Contractor's expense.

18.2 SAT DOME REPLACEMENT

18.2.A Identification

- 18.2.A.1 The Contractor must remove and replace the Email at Sea SAT dome as well as the TV SAT Dome both located on the Aft Searchlight Platform.

- 18.2.A.2 The Contractor must allow CCG electrical techs onboard to perform the disconnection of both domes as well as the securing and protecting of the cables prior to removal.
- 18.2.A.3 The Contractor must allow CCG electrical techs onboard to perform final electrical connections and commissioning of the Domes as this equipment falls under the CCG internal communication requirements.

18.2.B **References**

Drawings

S 30190st 1,2 & 3 CMS30-190-ST (3 pages) - CCGS Samuel Risley Seatel 406 Dome Pedestal & Maintenance Platform Structural Arrangement

Documents

99-148045-A_Installation Manual_4009MK3 – Sea Tel 4009MK3-36 Installation Manual

540983 F TV5 Install Guide – TracVision TV5 Installation Guide

18.2.C **Statement of Work**

- 18.2.C.1 The Contractor must notify the TA 10 working days prior to Dome removal to allow CCG techs the ability to come and disconnect the SAT domes and secure the cables.
- 18.2.C.2 Once the domes are disconnected the Contractor must un-bolts the existing domes from there pedestals and remove.
- 18.2.C.3 The Existing domes must be store in a warm, dry and secure location until the completion of the contract when they will be returned to CCG for disposal.
- 18.2.C.4 The Contractor must crane the new Domes into position using the Manufacturer’s recommended hoisting arrangements under the supervision of CCG electrical techs.
- 18.2.C.5 Once the domes are hoisted into location the Contractor must bolt the units into place using the existing pedestals. The contractor must use 306 stainless steel bolts, washers, lock washers and nuts to complete the connections. The installation hardware must sized in accordance with Manufacturer’s requirements.
- 18.2.C.6 The Contractor must make all necessary modifications to the pedestal mounts to install the new Domes.
- 18.2.C.7 Any disturbed paint must be repaired by the Contractor.

- 18.2.C.8 Once the Domes have been install the Contractor must allow CCG electrical techs to perform the final end connections for the units and commissioning of the units.

18.2.D Proof of Performance

- 18.2.D.1 The Contractor must demonstrate the Domes have been installed in accordance with the Manufacturer's Requirements to the TA. Any deficiencies must be repaired by the Contractor at their own expense.

18.2.E Deliverables

- 18.2.E.1 The Contractor must provide the old domes to CCG for disposal.

19.0 CONTROL SYSTEMS – Not Used

20.0 – Appendix A – Government Supplied Material

Specification Section	Quantity	Item Description
12.1	1	Wartsila VASA12V22 Short Block Assembly
12.1	10 Gal	International Paint Interprime 234 -CPA234
12.1	10 Gal	International Paint Interlac White 665- CLB000
12.1	10 Gal	International Paint Interlac Grey 665-CLA011
12.1	1 Lot	All New Gaskets and Seals to complete engine rebuild
12.1	12	Wartsila VASA12V22 Overhauled Cylinder Heads
12.1	13	Wartsila VASA12V22 Overhauled Fuel Oil Injection Pumps
12.1	2	Overhauled ABB Turbochargers
12.1	1 Lot	Used Parts removed fro existing engine to complete rebuild
14.2	3	Schneider Moulded Case Breaker #JRL36250DU31XYA1 w/ Shunt Trips
14.2	5	Schneider Moulded Case Breaker #JRL36250DU31XYA1 w/o Shunt Trips
14.2	2	Schneider Moulded Case Breaker #HRL36150U31XYA1 w/ Shunt Trip
14.2	1	Schneider Moulded Case Breaker #HRL36150U31XYA1 w/o Shunt Trip
15.1	1	4" sch.40 Galv. Victaulic Elbow 30DEg
15.1	3	4 11 Galv GRV 45 ELL
15.1	12	2 10 Galv GRV 90 ELL
15.1	12	2-1/2 10 Galv GRV 90 ELL
15.1	23	4 10 Galv GRV TEE
15.1	2	2-1/2 20 Galv GRV TEE
15.1	5	4 20 Galv GRV TEE
15.1	40	2 77 Galv STD CPLG W/E GSKT
15.1	50	2-1/2 77 Galv STD CPLG W/E GSKT
15.1	3	3 77 Galv STD CPLG W/E GSKT
15.1	88	4 77 GALV STD CPLG W/E GSKT
15.1	2	2-1/2X2 50 GALV GRV RED
15.1	2	3X2 50 GALV GRV RED
15.1	1	4X2-1/2 50 GALV GRV RED
15.1	1	4X2 50 GALV GRV RED
15.1	1	2 700 BFV LVR-LK HDL W/E
15.1	1	2-1/2 700 BFV LVR-LK HDL W/E
15.1	5	4 700 BFV LVR-LK HDL W/E
15.1	2	4 712 GRV CHK VLV W/E

17.2	2	Atmosphair 47.5" FH x 33"FL Tag 1.3.1 Hot Water Coil
17.2	2	Atmosphair 32.5" FH x 48"FL Tag 1.3.2 Hot Water Coil
17.2	1	Atmosphair 12.5" FH x 12"FL Tag 1.3.2 Hot Water Coil
17.2	4	Atmosphair V-252 Fan Heaters w/ diffuser
17.3	2	Myson Model #30G4/8 supply fan or similar
17.3	2	Myson Model #30 1/3 4P/8 Exhaust Fan or similar
17.3	2	Myson Model #30G.4P/8P Supply Fan or similar
17.3	5	Myson Model #194P8P Supply/Exhaust Fan or similar
17.3	1	Myson Model #15GV4/8P Supply Fan or similar
17.3	1	Myson Model #15GVP Exhaust Fan or similar
17.3	2	Myson Model #15G4P Supply Fan or similar
17.3	2	Myson Model #12G2.4P Supply Fan or similar
17.3	1	26"L x 12.25"OD Supply Fan
17.4	1	Sperre Air Compressor Model# TSHL07A
17.4	1	Sperre Control Cabinet Model# Z32510000
17.4	1	Sperre Transmitter Model# 84130
17.4	1	Sperre Vibration Damper Set Model# 8458S1
17.4	1	Sperre 1" Flex Tube Model# 4597
17.4	1	Sperre 1/2" Flex Tube Model# 4595
17.4	1	Sperre Drain/unload Valve Model# 9170
17.4	1	Sperre SPK Pressure Transmitter Model# 56551
17.4	1	Sperre Oil Level Switch Model# 4356
17.4	1	Sperre SPK Temp Transmitter Model# 56481
18.1	1	Wodden Cabinet to replace current GMDSS cabinet
18.1	1	Transceiver mounting plate
18.1	1	Charger Rack
18.1	1 lot	LMR-400 Cable
18.1	1 lot	Texcan 12C/18AWG Cable
18.1	1 unit	Inmarsat-C specialty cable
18.1	1 lot	Nexan MPRXCX 2C/14AWG cable
18.1	1 lot	Belden 1300SB LAN Cable
18.2	1	Seatel 4009MK3-36 Dome
18.2	1	KVH Tracvision TV5 Dome

2019 DRYDOCK

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