CCGS Frederik G Creed

Requisition F3084-16IN665

Drydocking & Winterizing Specification

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LIST OF ACRONYMS

BV	Bureau Veritas
CA	Contracting Authority (PWGSC)
CCG	Canadian Coast Guard
CLC	Canadian Labour Code
CPM	Contractor Provided Material
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
DFO	Fisheries and Oceans Canada
FSR	Field Service Representative
FSR	Field Service Representative
FSSM	Fleet Safety and Security Manual (CCG)
GSE	Government Supplied equipment
GSM	Government Supplied Materials
HC	Health Canada
IEEE	Institute of Electrical and Electronics Engineers
MSDS	Material Safety Data Sheet
NACE	National Association of Corrosion Engineers
OHS	Occupational Health and Safety
OL	Overall length
PWGSC	Public Works and Government Services Canada
SSMS	Safety and Security Management System
TA	Technical Authority - Owner’s Representative (CCG)
TBS	Treasury Board Secretariat of Canada
TCMS	Transport Canada Marine Safety
WHMIS	Workplace Hazardous Materials Information System

SHIP'S CHARACTERISTICS

Type	SWATH
Construction	Aluminum
Overall length	19.02 metres
Overall width	9.91 metres
Draught	2.74 metres
Maximum displacement	75 tonnes
Year of construction	1991

Attached drawings and documents:

Docking plan	176-DCK_2
Construction profile	65-B1
Shaft Line/Ligne d'arbre	65-C8
Lighting and switch plan	65-d1_1
Accommodation	176-100-1
Docking plan Port	176-B
Docking plan starboard version 2013	176-T
Safran/Rudder	65-A5
INCENDIE/Fire	02604-20
Rescue Equipment/Équipement de sauvetage	02604-10
Symbolization (2)	02604-SF
Stabilizer fin Detail	65-A4
Shaft Line	65-C8
Rudder construction	8265-200
Canard fin Detail	65-A3
Construction profile	SOS65-B1
Aileron stabilizer	FR-98-2
Deck Framing Plan	65-B4
Hull thickness gauging	02604S02

Photos/Pictures Divers pour réparations/ various repairs

Liste des anodes/ Anodes list

Liste d'extincteurs / Extinguishers list

Specification	Belzona 1111 instructions for use
Specification	Rev15_9-13 paper FR_Amercoat 240

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1 GENERAL REMARKS

1.1 Scope

These general remarks describe the Canadian Coast Guard (CCG) requirements applicable to all the attached technical specifications.

1.2 Reference documents

Canadian Coast Guard Fleet Safety and Security Manual:

Fleet Safety and Security Manual (FSSM) Procedures	Title
7. A. 1	Risk prevention program
7. B .1	Diving operation
7. B. 2	Fall protection
7. B. 3	Access to confined spaces
7. B. 4	Hot work
7. B. 5	Lockout/tagout
7. B. 6	Electrical work on live circuits
10. A. 2	Contractor's safety and security

Referenced publications:

TP3177E	Standard for the Control of Gas Hazards in Vessels to be Repaired or Altered
TP127E	Electrical Standards of Transport Canada Marine Safety
IEEE 45	Recommended Practice for Electrical Installations on Shipboard
CSA W47.1	Certification of Companies for Fusion Welding of Steel, Section 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

Referenced legislation and regulations:

NR467 .A1 DT R09E	Bureau Veritas – Steel vessel classification regulations
NR 216 DT R04 E	Bureau Veritas – Rules on Materials and Welding for the classification of Marine Units
CLC	Canada Labour Code
MOHS	Marine Occupational Safety and Health

1.3 Occupational Health and Safety

1.3.1 The Contractor and all sub-contractors shall comply with occupational health and safety (OHS) instructions in accordance with relevant federal and provincial regulations and ensure that the Contractor’s activities are conducted safely and without compromising the safety of a staff member.

1.3.2 The Contractor and its employees, including sub-contractors, shall participate in an orientation session on safety on board the vessel prior to commencing work in order to fully understand the risks specific to a vessel and the work protocol permit systems, as well as the procedures for safety, risk prevention, hazard response and assessment of safety prior to working. The Contractor will have access to an uncontrolled copy of the Fleet Safety and Security Manual.

1.3.3 The Contractor shall comply with the Fleet Safety and Security Manual (DFO/5737) and with the work instructions on board the vessel, in addition to the relevant Canada Labour Code regulations, while performing tasks that include the following:

- Diving operation
- Hot work;
- Work at heights;
- Access to confined spaces;
    - Lockout/tagout;
    - Electrical work on live circuits
    - Electrical hazard assessment

1.3.4 For lockout/tagout needs, the Contractor shall provide its employees with locks and locking devices in addition to those supplied by the vessel’s Chief Engineer.

1.3.5 The Contractor shall provide a copy of the gas free certificate from a certified marine chemist or other qualified person to the technical authority

when performing work in tanks and bilges, prior to beginning work. The certificates must specify “no danger for persons” or “no danger for hot work,” as applicable. The certificates are to be displayed in full view near the compartment entrance. All tanks and pipe tunnels open for inspections and tests shall be cleaned and undergo a final inspection by the technical authority before they are closed.

1.3.6 The Contractor and its employees will not have access to crew stations or to the vessel’s sanitary facilities. The Contractor shall provide the necessary amenities for its employees and sub-contractors.

1.4 Access to the workplace

1.4.1 The Contractor shall ensure that the technical authority and CCG staff have free access to the workplace at all times throughout the term of the contract.

1.5 Workplace Hazardous Materials Information System (WHMIS).

1.5.1 The Contractor shall provide the TA with the Material Safety Data Sheets (MSDS) for all the products it supplies that are controlled under WHMIS.

1.5.2 The TA will give the Contractor access to the MSDS for all controlled products on board the vessel for all work items specified.

1.6 Tobacco in the workplace

1.6.1 The Contractor shall ensure compliance with the Non-smokers' Health Act. The Contractor shall ensure that each employer and any person acting on behalf of an employer ensures that they refrain from smoking in work spaces under the employer’s control. The Contractor shall ensure that absolutely no person smokes on board the vessel.

1.7 Healthy and safe workplace

1.7.1 Before the Contractor begins work on the vessel, the TA and the Contractor’s quality assurance representative shall inspect the areas where the work will take place, including access routes. The Contractor’s quality assurance representative shall take digital photographs of each area in order to demonstrate that it has complied with the requirements of this document. It shall then upload these photographs in JPG format to a CD or a DVD. Each photograph shall be dated and indicate where on the vessel it was taken. Copies of the CD or DVD shall be provided to the TA for reference purposes within 48 hours of the start of the contract period.

1.7.2 During the work period, the Contractor shall ensure the upkeep of areas of the vessel that its staff use to access the work areas. The areas shall be clean and free of debris, and waste must be removed every day.

1.7.3 Areas that present a danger due to the work being performed under this specification shall be secured and clearly marked by the Contractor. Signage shall be installed to inform and protect all staff members in accordance with the applicable requirements of the Canada Labour Code.

1.7.4 At the end of this contract, the Contractor shall ensure that all waste produced during the performance of work under this specification is disposed of and that the vessel is as clean as it was before the beginning of the contract period.

1.7.5 Once all known work has been completed and the final cleaning has been performed, the Contractor’s quality assurance representative shall inspect all areas of the vessel where work was performed by the Contractor. Any observed deficiency or damage shall be noted and compared to the photographs in order to determine whether the deficiency or damage stems from the work performed by the Contractor. If this is the case, the damage must be repaired by the Contractor, at no cost to the CCG.

1.8 Fire protection

1.8.1 The Contractor shall ensure that the isolation, removal and installation of fire detection and extinguishing systems and related components are performed by a qualified technician. When fire detection or extinguishing systems are deactivated or put out of service by the Contractor during the term of the contract, a qualified technician shall certify that they are fully functional again. The original signed and dated certificate shall be given to the Technical Authority (TA) and to Technical Inspection before the end of the contract.

1.8.2 The Contractor shall inform Technical Inspection and the TA and obtain written approval before disturbing, removing, isolating, deactivating, putting out of service or locking out any element of the fire detection and extinguishing systems, including heat and smoke detectors.

1.8.3 The Contractor shall provide fire protection at all times, including while work is being performed on the vessel’s fire detection and extinguishing systems. This can be done in the manner proposed below, only after having obtained written approval from the TA:

- Put only one part of the system out of service at a time;
- Keep the system functional by using spare parts while the work is underway;
- Employ other methods accepted and approved by the TA.

1.8.4 The Contractor must know that if all the necessary precautions are not taken during work on the vessel’s fire extinguishing systems, accidental discharge of extinguishing agent may occur. The Contractor shall then fill and

certify, at its expense, any containers or systems that are depleted due to such work.

1.9 Damaged paint and retouching

1.9.1 Unless otherwise indicated, the Contractor shall provide and apply two coats of marine primer paint compatible with the vessel’s paint system on all new metal surfaces and surfaces requiring retouching.

1.9.2 Before applying the first coat, the Contractor shall prepare all new aluminum structures and those that require retouching in accordance with the paint manufacturer’s directions.

1.10 CCG and other employees on board the vessel

1.10.1 CCG and DFO employees, as well as other employees such as manufacturer representatives, TCMS or classification investigators, may perform other work on board the vessel, including work not mentioned in this specification, during the work period. The TA will do its utmost to ensure that other work, related inspections and investigations do not interfere with the Contractor’s work. The Contractor should not coordinate the related inspections or pay the inspection costs for such work.

1.11 Ship Safety Office

1.11.1 The vessel is subject to regulations of Transport Canada. It is the Contractor's responsibility to ensure that all the work meets the requirements of the Transport Canada regulations.

1.12 Regulatory inspections and/or classification review

1.12.1 The Contractor shall schedule and coordinate all regulatory inspections and classification surveys in collaboration with the authority concerned, e.g., Transport Canada Marine Safety, classification society, Health Canada, Environment Canada and others, on the basis of this specification.

1.12.2 All documents produced in the context of the inspections and surveys referred to above and substantiating that they have taken place (e.g., original signed and dated certificates) shall be submitted to the TA.

1.12.3 The Contractor shall not substitute the TA’s inspection for regulatory inspections by the TCMS or classification surveys.

1.12.4 The Contractor shall give prior notice (of at least 24 hours) to the TA before the planned TCMS regulatory inspections or classification surveys so that the TA can be present for the inspection.

1.13 Test results and data collection

1.13.1 The Contractor shall develop a testing and trial plan including at least all of the tests and trials mentioned in the specification. This plan must be submitted to the TA for review purposes one week before the start of the originally planned work period.

1.13.2 Any data specific to the trials, measurements, calibrations or readings shall be recorded, dated, accompanied by the signature of the person who took the measurements, and forwarded to the technical authority and to Marine Safety as a report in hard copy and electronic format.

1.13.3 The recorded data shall be accurate to three decimal places (unless otherwise specified) and comply with the measurement system in place on the vessel.

1.13.4 The Contractor shall provide the TA with valid calibration certificates for all instruments used for the testing and trial plan to prove that the instruments have been calibrated in accordance with the manufacturer’s instructions.

1.13.5 Hard copies of reports shall be placed in standard three-ring binders, typewritten on letter-size paper and classified by specification number. Electronic copies shall be in unprotected Adobe PDF format on CD-ROM. The Contractor shall provide three paper copies and one electronic copy of all reports.

1.13.6 All documents produced during the contract shall be placed in a data collection then submitted to the TA at the end of the contract.

1.13.7 All requested drawings shall be produced on ANSI format B (11 in. x 17 in.) paper or smaller. Three copies must be provided. Drawings shall also be provided in DWG format (AutoCAD 2000 or more recent version), on CD-ROM, and are not to be password protected. One (1) CD-ROM shall be provided.

1.14 Material and tools provided by the Contractor

1.14.1 Unless otherwise indicated, the Contractor shall supply all the material, equipment and parts necessary to perform the work in the specifications.

1.14.2 The Contractor shall ensure that all material is new and has never been used.

1.14.3 The Contractor shall ensure that all replacement products such as sealing components, gaskets, insulation, small hardware items, oils, lubricants, degreasing solvents, preservation agents, paints, coatings, bolts and fastening materials, among others, comply with the drawings, manuals and instructions of the equipment’s manufacturer.

1.14.4 When no particular item is specified or when a replacement must be made, the TA shall approve the replacement item in writing. The

Contractor shall give the TA details on the material used and the grade and quality certificate of the various materials before use.

1.14.5 The Contractor shall provide all equipment, devices, tools and machinery, such as welders, cranes, scaffolding and fixtures required to perform the work indicated in this specification.

1.14.6 The Contractor shall provide services for the disposal of waste oil, hydrocarbons and any other hazardous or controlled waste produced as part of the work planned under this specification. The Contractor shall provide certificates of disposal for all waste listed above.

1.14.7 These certificates of disposal must show that the disposal has been carried out in accordance with federal, provincial and municipal regulations in force.

1.15 Material and tools provided by the government

1.15.1 All material and tools shall be provided by the Contractor unless otherwise specified in the technical specification.

1.15.2 If the TA provides tools, the Contractor shall return them in the condition in which they were borrowed. Borrowed tools must be inventoried. The Contractor shall affix its signature on the inventory statement upon receipt of the tools and when they are returned to the TA.

1.15.3 The Contractor shall keep all goods supplied by the government in a warehouse or secure storage in a controlled environment, in accordance with the manufacturer’s instructions.

1.16 Restricted access areas

1.16.1 The Contractor shall not enter the following areas (except to perform work in accordance with the specification): cabins, offices, workshops, engineer’s office, wheelhouse, control room, toilets, kitchen, crew stations, recreation areas or other areas where restricted access is posted.

1.16.2 The Contractor shall give 24 hours' prior notice to the TA when it needs to work in occupied spaces or offices. The CCG will then have sufficient time to move staff and secure the areas.

1.17 Contractor inspections and protection of equipment and the workplace

1.17.1 In collaboration with the TA, the Contractor shall coordinate an inspection of the condition and location of items to be removed before performing the specified work or accessing a location to work on it.

1.17.2 Any damage resulting from the Contractor’s work and attributable to its performance of the work shall be repaired by the Contractor at its own expense. Material used for replacements or repairs shall comply with the

criteria for material supplied by the Contractor, indicated in the "Material and tools provided by the Contractor" section.

1.17.3 The Contractor shall protect adjacent equipment and areas from damage. Workplaces shall be protected against water infiltration, sanding and welding particles, etc. Temporary covers shall be installed on workplaces.

1.17.4 The Contractor shall protect the vessel from infestation by vermin (insects, mammals). If an infestation occurs during the contract period, the Contractor shall ensure, at its expense, extermination of the vermin prior to the vessel’s departure and the end of the contract.

1.18 Records of work in progress

1.18.1 The TA may record work in progress using various methods, including photos, digital videos and film.

1.19 List of confined spaces

1.19.1 The Contractor may request a list of confined spaces in the vessel at the meeting prior to the refit.

1.20 Hazardous materials

1.20.1 The Contractor shall not use any material containing asbestos.

1.20.2 Handling of materials containing asbestos shall be performed by personnel trained and certified in the removal of material containing asbestos in accordance with the federal, provincial and municipal regulations in force as well as the Fleet Safety and Security Manual. The Contractor shall provide the TA with certificates of disposal for all asbestos-containing materials removed from the vessel so as to demonstrate that the disposal has been performed in accordance with federal, provincial and municipal regulations in force.

The Contractor must not use paint containing lead.

1.20.4 In the past, paint containing lead was used to paint CCG vessels. Consequently, some of the Contractor’s processes, such as grinding, welding and burning, may release the lead content of the paint. The Contractor shall ensure that analyses are conducted in the work areas to test for the presence of lead in the paint and ensure that the work is performed in accordance with applicable federal and provincial regulations.

1.20.5 The Contractor shall obtain Health Canada approval for paint applied to the surface of hulls subject to the regulations of Health Canada and the Pest Management Regulatory Agency.

1.21 Removed material and equipment

1.21.1 All equipment removed under this specification remains the property of the CCG unless otherwise noted in certain sections of the specification.

1.22 Welding certification

1.22.1 For any work requiring fusion welding of steel, the Contractor or its sub-contractors must hold certification from the Canadian Welding Bureau in accordance with subsection 2.1 of the most recent version of standard W47.1-03 of the Canadian Standards Association.

1.22.2 For any work requiring fusion welding of steel, the Contractor or its sub-contractors must hold certification from the Canadian Welding Bureau in accordance with subsection 16 of the most recent version of standard CSA\ACNOR AWS of the Canadian Standards Association.

1.22.3 For any work requiring fusion welding of aluminum structures, the Contractor or its sub-contractors must hold certification from the Canadian Welding Bureau in accordance with subsection 2.1 of the most recent version of standard W47.2 of the Canadian Standards Association.

1.22.4 The Contractor shall provide the technical authority with documents clearly indicating the welding certification of all the employees who will perform all the welding work indicated in this specification.

1.23 Electrical installations

1.23.1 All electrical installations and repairs shall be performed in accordance with the most recent version of Standard TP127E (Electrical Standards of Transport Canada Marine Safety) and Standard 45 of the Institute of Electrical and Electronic Engineers (Recommended Practice for Electrical Installations on Shipboard).

1.23.2 All electronic equipment installations and repairs shall be performed in accordance with the Canadian Coast Guard publication on telecommunications and electronics entitled “General Specification for the Installation of Shipboard Electronic Equipment.”

1.24 Refrigeration and air conditioning systems

1.24.1 Any work on refrigeration and air conditioning systems shall be performed in accordance with Sections 2.7 and 2.8 of the Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.

1.25 Competence of tradespersons

1.25.1 The Contractor shall employ qualified, certified (if applicable) and competent tradespersons and supervise them to ensure a high and consistent quality of workmanship.

1.25.2 The head of inspection may ask to consult and record details of the certification or qualifications of the Contractor’s tradespersons. This request must not be made unduly, and is only intended to ensure that qualified tradespersons are performing the necessary work.

1.26 Electric power and compressed air supply

1.26.1 120 VAC electricity will be provided by the vessel.

1.27 Obstructions

1.27.1 The Contractor is responsible for identifying items causing an obstruction, temporarily removing and storing them, and then reinstalling them on the vessel.

1.28 Reports

1.28.1 For each task of the specification for which a report is requested, the Contractor shall produce a report in pdf format recording the work done, parts replaced and all records (measurements, photos, readings, imaging, etc.) taken during the inspection and all readings (pressure, temperature, speed, position, etc.) taken during the tests and trials.

2 SERVICES

2.1 Scope

The purpose of this specification is to provide and connect to the vessel said required services as of the start of the refit and to disconnect them at the end of said refit. These services will be supervised by the Chief Engineer and will remain connected throughout the refit. The Contractor shall provide all the material and tools up to the connection points. It shall specify the cost of each service in its quote.

2.2 Technical description

The Contractor shall provide a full and complete quotation and daily rates for all services supplied to the vessel during the contract period.

2.2.1 *Power supply* – The vessel is shore powered from a single source of 100 amperes using cables and connections provided by the Contractor. The vessel's shore power transformer requires a 220 Volt/1 phase/60 Hz/100 amp power supply. The Contractor is to provide a price for total consumption estimated at 55000 kWh. Throughout the winterizing period, the vessel (the accommodations, the two (2) engine rooms and the wheelhouse) will be heated according to the needs of the Coast Guard. The final consumption will be adjusted upward or downward on PWGSC Form 1379. The Contractor shall provide the meter for taking consumption readings in kWh.Meter readings shall be recorded by the Contractor and Chief Engineer during connection and disconnection.

2.2.2 *Firemain* -The vessel’s firemain is emptied during overwintering so the Contractor must provide installation of a non-pressurized fire hose ready for use at all times with the necessary hose lengths.

2.2.3 *Gangway* - The Contractor shall provide and erect a gangway with safety nets, handrails and adequate lighting to the satisfaction of the Commanding Officer. The gangway must give access to the afterdeck. Gangways are to be secured, well-lit and suitable for shipyard workers and crew to pass over them. The Contractor shall ensure that gangways remain in good condition throughout dry-docking. The vessel's gangways must not be used during the refit/dry-docking unless authorized by the Commanding Officer. CCG disclaims all liability. Any costs incurred from moving gangways for the execution of the work shall be at the Contractor's expense.

2.2.4 *Bathrooms* – Supply and install piping under the vessel to collect sewage and waste water. The Contractor is to provide the crew with access to a bathroom in its facilities and maintenance of this bathroom is to be performed once a week.

2.2.5 *Waste container* – A lidded waste container is to be provided throughout the refit. Contractor staff and Coast Guard crew members may use

the waste container, which shall be emptied when needed at the Contractor's expense.

2.2.6 *Docking* – Docking and undocking facilities must be appropriate for a vessel of this size and to the satisfaction of the Commanding Officer. Throughout the contract, if the vessel is not in dry-dock, it can be docked at the Contractor's wharf in a safe position where the water level is sufficient even at the lowest tides to prevent the ship from touching the bottom. The Contractor is responsible for all vessel movements throughout the contract. It must manage the services of lineshandlers, tug operators, pilots, etc., and assume these costs.

2.2.7 *Crane services* – The Contractor is to provide the hourly rate for the service of a crane including all necessary personnel for transfer of components on board the vessel for the needs of the Coast Guard; this hourly rate will be used to correct the final amount on Form 1379. Include 15 hours of work in the contract. Obtain permission (signature, email or other) from the CCG representative for each request and record it in a log that will be submitted to the CCG at the end of the contract, along with supporting documents.

Including:

Disembark the winch (it must be stored until collected by MLI). Return to position when the vessel’s operations resume.

Disembark the Zodiac (it must be stored until collected by MLI). Return to position when the vessel’s operations resume.

Disembark the life rafts (they must be stored until they are sent by the shipyard to a certified firm for annual recertification). Return to position when the vessel’s operations resume.

2.2.8 *Telephone, Internet* - Provide a telephone line and a high-speed Internet access line connected to the vessel’s existing system. Provide an office for the CCG representative with a telephone line and high-speed Internet access. Provide a printer with integral fax and 8-1/2” x 11’’ paper for the duration of the work.

2.2.9 *Parking* - The Contractor shall provide three (3) parking spaces reserved for the Technical Authority and the project team throughout the duration of the contract. The Contractor shall also provide snow clearing service in order to maintain access to the vessel for personnel of the Coast Guard and various contractors.

2.2.10 *Vessel security* - The shipyard will be responsible for conducting daily onboard security rounds at the end of the day throughout the drydocking period in addition to responding to monitoring system alarms. A report shall be made to the Coast Guard representative for each alarm response.e. The shipyard shall record all occurrences in a log, to be given to the CCG representative when the vessel is returned. Include five (5) alarm visits in the contract.

2.2.11 *Responsibility for the vessel* – The Contractor shall be responsible for the vessel during the overwintering period. Throughout the overwintering period, the vessel (accommodations, the two (2) engine rooms and the wheelhouse) shall be heated according the requirements of the Coast Guard. The Contractor shall ensure at the end of the work that the vessel is delivered to the Coast Guard representative in a clean, dust-free condition both inside and outside.

The shipyard shall authorize the Coast Guard and certain contractors to work on board the vessel during wintering. Among other things, there will be visits from:

- Two (2) mechanics and an electrician from the Coast Guard for maintenance and repairs; and
- Electronic technicians from the DFO
- Two (2) integrated technical support project officers
- Two (2) Technicians from the Maurice Lamontagne Institute.

2.3 Proof of performance

Inspection

All work must be approved by the TA

Deliverable documents

The Contractor is to take readings and compile them, along with its reports, in a book. It shall submit two (2) paper copies and an electronic copy of the books to the TA before the end of the refit.

3 PRODUCTION DIAGRAM

3.1 Scope

This specification aims to provide the owner's representatives with an exact schedule of the work and its completion for the needs of the Canadian Coast Guard (CCG).

3.2 Technical description

3.2.1 The Contractor shall provide three bound copies of a detailed bar diagram (*Gantt chart*), illustrating the planned schedule of work to refit the vessel. The chart shall show each task of the specification with its start date, duration, and planned and actual completion date. An electronic version must also be sent to the TA. The Contractor shall also send a copy of the production diagram to the contracting authority.

3.2.2 All critical work paths shall be indicated, with the critical tasks that could delay the refit work if the planned work schedule is not adhered to. These may include problems with labour or tasks that cannot be carried out in parallel to other tasks.

3.2.3 All inspections, tests and trials shall be registered in the production diagram.

3.2.4 In case of work affecting the critical workflow, the TA is to be notified immediately. Every effort shall be made to avoid delaying the vessel's refit. Regular quality assurance procedures shall be applied.

3.2.5 The bar chart will be updated each week and prior to each production meeting to illustrate actual progress of the refit and changes made to the completion date of each item. The Contractor shall include in the updates to the chart any special work requested on PWGSC Form 1379, indicating the impact this additional work will have on the work schedule.

3.3 Proof of performance

Inspection

All work must be approved by the TA

Deliverable Documents

The selected Contractor shall provide three paper copies and an electronic copy of the bar chart to the vessel's TA within five (5) days after contract award.

4 DRY DOCKING

4.1 Scope

The purpose of this specification is for the Contractor to provide all services required to drydock and refloat the vessel, as well as the vessel’s stay for overwintering. The vessel shall also be place in the shipyard for return to the water on the date specified in the call for tenders if ice conditions allow. The Contractor shall provide a safe docking location after refloating, to permit the crew to carry out inspection, tests, certification and start-up of the vessel.

4.2 References 176-DCK 2 – Docking plan

4.3 Technical description

4.3.1 The Contractor shall drydock the vessel in accordance with vessel refit plan drawing 176-DCK2.

4.3.2 The Contractor's quotation shall include docking and undocking costs, including the time planned for the performance of the requested work.

4.3.3 The Contractor shall dry-dock and refloat the vessel under the direct supervision of a certified docking master.

4.3.4 A copy of the refit plan drawing 176-DCK2 will be provided to the Contractor before the docking date. The Contractor shall prepare the keelblocks and shoring necessary to maintain the true alignment of the vessel's hull and machinery throughout the dry-docking period. The Contractor shall align the keelblocks using a laser and submit an alignment report to the Owner's representative prior to drydocking.

4.3.5 The Contractor shall record the following information in the vessel condition reports:

4.3.6 Prior to docking, all tanks on the vessel shall be sounded and their contents recorded. A copy of the soundings shall be signed by the vessel's Commanding Officer, Chief Engineer and the Contractor's Docking Master.

4.3.7 At docking, all drained tanks must be recorded, and copies shall be kept by the Contractor and the Chief Engineer.

4.3.8 At undocking, all tanks must be refilled to obtain the same draught and trim as at the time of the dry-docking and the conditions agreed to by the Harbour Pilot, the Commanding Officer and the Chief Engineer.

4.3.9 The Contractor shall provide the services of a diver to confirm that the vessel rests evenly on the bilge blocks and the keelblocks.

4.3.10 There shall be a minimum under-keel clearance of 122 cm (4 ft.).

4.3.11 The Contractor is responsible for rope handling during docking and undocking, including towing and/or piloting service charges.

4.3.12 The Contractor shall prevent the transducer and sounder plates in the port and starboard hulls from resting on the keelblocks. Particularly on the forward starboard side this year. New scientific equipment must be installed.

4.3.13 Frame spacing shall be marked on the hull to facilitate hull inspection by the representative of the Marine Safety office and the Owner's Representative. Immediately after water cleaning the hull, but before sandblasting the hull, the Contractor shall mark the frame spacing at a five-frame intervals from the sternpost (frame 0): markings shall be of opposite shades, 6 feet high, on the bilge curve, port side and starboard side. The keelblocks aligned with the frames shall be marked in the same manner, starboard side and port side.

4.3.14 The Contractor shall remove the docking plugs (drain plugs) to drain accumulated water. All removed docking plugs must be labelled immediately after their removal, stored in an appropriate container and handed over to the Owner's Representative. An officer from the vessel must be present during the removal and reinstallation of the docking plugs. The docking plugs to be removed are in the ballast and drinking water tanks. The location of the plugs is shown on the refit plan. The opening from any removed plug must be temporarily filled with a wooden stopper during the execution of work, such as sanding and painting, that could contaminate the tanks.

4.3.15 During refloating, the Contractor must have sufficient staff posted next to all sea water outlets, sternpost tubes, sea water inlets, etc., that were opened during dry-docking to correct any deficiencies that may arise.

4.3.16 At undocking, all tanks shall be refilled to obtain the same draught and trim as at the time of the dry-docking and in the conditions agreed to by the Docking Master, the Commanding Officer and the Chief Engineer.

4.4 Proof of performance

Inspection

All work must be approved by the TA

Deliverable Documents

The Contractor shall provide two paper copies and one electronic copy of checklists and reports to the Chief Engineer and send an electronic copy to the Vessel Maintenance Manager no later than five (5) days after the end of each job.

5 CLEANING AND PAINTING THE HULL

5.1 Scope

5.1.1 The purpose of this specification is to perform the cleaning and retouching of missing or cracked paint on the vessel's hull.

5.2 Reference

- 02604-s02 port hull
- TP12445E Paint and Coating Standard
- 65B4 deck framing plan
- 65B1 construction
- 02604 equipment locations
- 02604-el elevation

5.3 Technical description

5.3.1 The Contractor is to supply and apply the International paint system or an equivalent using the appropriate equipment and in accordance with the paint manufacturer’s recommendations. The Contractor shall choose a single paint manufacturer for all of the work.

5.3.2 The Contractor shall ensure that the entire surface of the hull, from the main deck to the keel, including the rudders, propellers and canards are cleaned with fresh water under high pressure (5,000 PSI) within two hours after drydocking the vessel. All fouling must be removed for a preliminary inspection. Before beginning hydraulic cleaning, all equipment mounted on the hull and all openings must be completely protected. The owner’s representative will inspect the entire surface of the hull.

5.3.3 The Contractor shall remove damaged zinc sacrificial anodes affixed to the hull and appendages.

5.3.4 The Contractor shall ensure that all transponders and sensors for sonars, sounders, all drain hole plugs, propellers, intakes and rudder bearings, etc., are well protected from the coating applied.

5.3.5 The Contractor shall designate a person who will inspect the vessel while it is still on the keel and bilge blocks, after cleaning but before blasting and painting. An owner’s representative and a representative of the Contractor will inspect the vessel and determine the total surface area of the hull to be blasted and refurbished. The contractor provides in its bid price for blasting 40 m^2 square meters under the keel.

5.3.6 If scaling is found that goes down to the hull, the old paint must be completely removed and all steps taken to repaint it.

5.3.7 The Contractor shall supply material and sandblast surfaces of the hull to be repainted to commercial standard (SA21/2”). It is the contractor's responsibility to clean, gather and dispose of all sand used for sandblasting.

5.3.8 All precautions shall be taken to minimize oxidation of the aluminum after sandblasting by applying paint in accordance with application standards.

5.3.9 The Contractor shall comply with the manufacturer’s recommendations for application of the paint: Type of paint, paint colour, dry thickness, drying time, etc.).

5.3.10 The Contractor is to supply and apply the following coatings on the designated surfaces of the hull:

First coat: INTERPRIME VTA 528/VTA 529, thickness .0005" dry. One gallon can cover about 208 square feet.

2nd and 3rd coats: INTERTUF JVA 203 at .004" dry per coat. One gallon can cover about 112 square feet.

4th coat on all surfaces: INTERTUF JVA 203 at .004" dry.

5th coat: HISOL BFA 254 at .005" dry. One gallon can cover about 112 square feet.

6th coat: HISOL BFA 259 black at .005" dry.

The contractor provides in its bid price for the paint repairs on 50 m² square meters under the keel.

This application will be done as late as possible prior to launching the vessel.

5.3.11 The Contractor shall ensure that sea chest grids are protected from the coating applied. The diameter of their orifices are to be checked before refloating the vessel to ensure they are not fully or partially blocked.

5.3.12 The Contractor is responsible for ensuring that the hull is clean before, during and immediately after application of the coating.

5.3.13 The Contractor is to retain the services of an inspector accredited by the NACE who will ensure that the surfaces are prepared and coated in accordance with the manufacturer’s instructions.

5.3.14 The Contractor shall provide platforms and scaffolding, crane services, grills, lighting systems and other services and equipment necessary for cleaning and coating the hull.

5.3.15 Storage facilities shall be provided close to the worksite to store the necessary materials and equipment, which must be kept at the temperature recommended by the coating manufacturer to ensure ease of preparation and application.

5.3.16 Mixing and spraying equipment must be heated and protected as required during use to ensure that the coating remains at the recommended temperature.

5.3.17 Before retouching the paint on the hull, the Contractor must cover anodes in good condition that have not been removed.

5.3.18 If needed, the Contractor shall build a heated shelter around the hull to ensure that the coating and the hull remain at the recommended temperature.

5.4 Draught markings - Technical description

5.4.1 The Contractor must redo the following draught marks on the vessel by removing each mark down to bare aluminum by sandblasting, re-stamping the edges of the marks as needed and applying white INTERGARD paint coating that the Contractor must supply. Applications of white INTERGARD paint must be compatible with the vessel’s hull coating. These marks must be redone after the final application and the hardening of the hull coating.

5.4.2 When redoing the draught markings, the Contractor shall ensure that they are at the correct height and the correct angle relative to the hull in order to represent the vessel’s true draught, and obtain the approval of the MSO inspector.

5.5 Proof of performance

Inspection:

5.5.1 All work shall be approved by the TA and the NACE inspector.

5.5.2 The Contractor shall provide the services of a telescopic boom lift for inspection.

5.5.3 Abrasive contaminants left from sanding must not enter any part of the vessel. The Contractor shall ensure that any opening in the vessel where abrasive contaminant could enter is well covered. The Contractor shall remove any trace of abrasive contaminant remaining from sanding.

5.5.4 The Contractor shall block the scuppers and deck exhaust ducts and take other necessary steps to prevent liquid contamination from areas being prepared or having coating applied. It shall also take steps to ensure that surfaces and equipment other than those specified are not coated and that the coating does not block any hull inlet or outlet orifice. Deck machinery and equipment that could be damaged by blasting or coating must also be protected. The Contractor shall remove all protections before its work is checked and accepted. The Contractor shall remove any excess paint on the vessel resulting from its work.

5.5.5 All work shall be done to the satisfaction of the Canadian Coast Guard representative. Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Tests

5.5.6 Measurements of paint coating thickness as well as the environmental conditions are to be recorded. The hull temperature, air temperature and humidity levels are to be taken, among others.

Deliverable Documents

5.5.7 The Contractor is to prepare a report indicating:

- surfaces of the hull repaired;
- blasted surfaces, with the type of grit and air pressure used;

- coated surfaces, with the type and quantity of product applied;
- thickness measurements of the various layers;
- atmospheric conditions (temperature, humidity, etc.);
- temperature of the vessel's hull.

5.5.8 The Contractor is to provide three (3) paper copies and one electronic copy of checklists and reports to the TA prior to refloating.

5.5.9 The Contractor shall provide certificates from the paint supplier prior to refloating.

6 MAIN DECK PAINTING

6.1 Scope

This specification covers sandblasting, cleaning and repainting the entire main deck with an area of **1200 sq. feet**.

6.2 Reference

65B4 deck framing plan

65B1 construction

02604 equipment locations

02604-el elevation

6.3 Technical description

6.3.1 The Contractor is to supply and apply the International paint system or an equivalent using the appropriate equipment and in accordance with the paint manufacturer's recommendations. The Contractor shall choose a single paint manufacturer for all of the work.

6.3.2 The Contractor shall supply material and sandblast all surfaces of the main deck to commercial standard (SA2 1/2"). It is the contractor's responsibility to clean, gather and dispose of all sand used for sandblasting. If the paint of the sides of the bulwarks and side walls have been touched when sandblasting the deck, the Contractor must repaint the places affected with the established paint system.

6.3.3 On the foredeck (in front of the wheelhouse), the forward grille must be sandblasted to the commercial standard (SA21/2") to bare metal then all steps followed to reapply anti-skid paint **with a high sand concentration.** The surface to be painted is 9 square metres.

Note: No abrasive containing steel is to be used on the boat.

6.3.4 The Contractor shall remove any trace of abrasive contaminant remaining from sandblasting and shall ensure that all lights, windows, openings, controls, antennae, identification and equipment are well covered in

order to avoid any damage and incrustation of dust caused by sandblasting, in accordance with government environmental standards and also against the coating applied.

6.3.5 The owner’s representative will inspect the entire surface of the deck when it has been sandblasted and cleaned, before application of the paint.

6.3.6 The Contractor shall provide the price for the blasting of one (1) square metre to adjust the final price up or down.

6.3.7 All precautions shall be taken to minimize oxidation of the aluminum after cleaning by applying paint in accordance with the application standards.

6.3.8 The Contractor shall comply with the manufacturer’s recommendations for application of the paint: (Type of paint, paint colour, dry thickness, drying time, etc.).

6.3.9 The Contractor is to retain the services of an inspector accredited by the NACE who will ensure that the surfaces are prepared and coated in accordance with the manufacturer’s instructions.

6.3.10 The Contractor shall provide lighting systems and other services and equipment necessary for buffing, cleaning and coating the hull.

6.4 Proof of performance

Inspection:

6.4.1. All work shall be approved by the TA and the NACE inspector.

6.4.2 The Contractor shall block the scuppers and deck exhaust ducts and take other necessary steps to prevent liquid contamination from areas being prepared or having coating applied. It shall also take steps to ensure that surfaces and equipment other than those specified are not coated and that the coating does not block any hull inlet or outlet orifice. Deck machinery and equipment that may be damaged by blasting or coating must also be protected. The Contractor shall remove all protections before its work is checked and accepted. The Contractor shall remove any excess paint on the vessel resulting from its work.

6.4.3 All work shall be done to the satisfaction of the Canadian Coast Guard representative. Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Testing

5.5.6 Measurements of paint coating thickness as well as the environmental conditions are to be recorded. The hull temperature, air temperature and humidity levels are to be taken, among others.

6.5 Deliverable Documents

6.5.1 The Contractor is to prepare a report indicating:

- Type of grit and the pneumatic pressure used;
- Area coated, with the type and quantity of product applied;
- Thickness measurements of the various layers;
- Atmospheric conditions (temperature, humidity, etc.);
- Temperature of the vessel's deck.

6.5.2 The Contractor is to provide three (3) paper copies and one electronic copy of checklists and reports to the TA prior to refloating.

6.5.3 The Contractor shall provide certificates from the paint supplier prior to refloating.

7 SEA WATER INTAKES, VALVES AND VALVE CHESTS

7.1 Seawater intakes:

7.1.1 SCOPE

The purpose of this specification is to open sea water intakes to clean and paint them, and have them inspected by MSO.

7.1.2 References

n/a

7.1.3 Technical description

7.1.3.1 The Contractor shall remove the six (6) sea water intake grids and clean them by high pressure water jet. It shall clean the area of the grid and water inlet. It shall also ream the grid holes to bring them back to their original diameter. The Contractor shall remove all grime, scale and rust from the water intakes and paint them in accordance with section 7. Remove and replace the anodes in accordance with section 10.

7.1.3.2 At the end of the specified and related work, the Contractor is to reposition the grids in place with new stainless steel bolts and locking wire, which it must supply.

7.1.4 Proof of performance

Inspection

All work shall be approved by the TA and the MSO inspector.

7.2 Valves and valve chests:

7.2.1 Scope

7.2.1.1 This specification covers replacement of two (2) ball valves as specified in section 7.2.2.

7.2.1.2 This specification covers opening the sea water intake valves and valve chests (sea bay piping systems) mentioned in the list below for cleaning, inspection and reviewing them to obtain certification from the MSO.

7.2.2 References

- Replacement of the propulsion engine suction valves (item # 4)
- Replacement of the Port propulsion engine discharge valve (item 31)

Table of hull valves and valve chests

Seawater intake

#	Qty	Hull	Name	Location	Dimension
1	1	Port	Rear ballast tank	Stabilizer compartment	2"
2	1	Port	Fire pump	Engine room	2"
3	1	Port	Generator set	Engine room	2"
4	1	Port	Main engine	Engine room	3"
5	1	Port	Seawater pump	Forward canard compart.	2"
6	1	Port	Air conditioning	Forward canard compart.	2"
7	2	Port	Sternpost tube discharge	Engine room	¾"
8	1	Port	Echo sounder	Forward canard compart.	1-1/4"
9	1	Starboard	Rear ballast tank	Stabilizer compartment	2"
10	1	Starboard	Fire pump	Engine room	2"
11	1	Starboard	Generator set	Engine room	2"
12	1	Starboard	Main engine	Engine room	3"
13	1	Starboard	Reverse osmosis	Forward canard compart.	2"
14	1	Starboard	Air conditioning	Forward canard compart.	2"
15	2	Starboard	Sternpost tube discharge	Engine room	¾"

Overboard discharge

#	Qty	Hull	Name	Location	Dimension
16	1	Starboard	Canard compart. bilge pump	Sponson Fr. 6	¾"
17	1	Starboard	Dry compartment bilge pump	Foreward dry compartment Fr.2	¾"
18	1	Starboard	Engine room bilge pump	Sponson Fr. 16	1"
19	1	Starboard	Bilge pump under propeller shaft	Sponson Fr. 16.5	1"
20	1	Starboard	Ballast pump	Sponson Fr. 18	2"
21	1	Starboard	Stabilizer compartment bilge pump	Sponson Fr. 19	¾"

22	1	Starboard	Steering gear compart. bilge pump	Sponson Fr. 22	¾"
23	1	Port	Science seawater pump	Sponson Fr. 5	1"
24	1	Port	Canard compartment bilge pump	Sponson Fr. 6	¾"
25	1	Port	Dry compartment bilge pump	Foreward dry compartment Fr.2	¾"
26	1	Port	Engine room bilge pump	Sponson Fr. 16	1"
27	1	Port	Bilge pump under propeller shaft	Sponson Fr. 16.5	1"
28	1	Port	Ballast pump	Sponson Fr. 18	2"
29	1	Port	Stabilizer compartment bilge pump	Sponson Fr. 19	¾"
30	1	Port	Steering gear compart. bilge pump	Sponson Fr. 22	¾"
31	1	Port	Main engine port discharge	Engine Room	2''

7.2.3 Technical description

7.2.3.1 The Contractor shall remove the two (2) valves referred to above and replace with the same type of valves, which will be approved and accepted by the MSO representative.

7.2.3.2 The Contractor shall include in its bid the cost for disconnection and removal of items needed in order to access stopcocks and valves and to perform its work.

7.2.3.3 The Contractor shall provide all material necessary for the work under this specification.

7.2.3.4 Disassemble, clean and present all the valves on the attached list to the MSO expert for inspection. They are all stainless steel ball type. Reassemble and reinstall in place with new seals provided by the Contractor.

7.2.4 Proof of performance

Inspection

7.2.4.1 The Contractor is responsible for all inspections and must consult MSO before beginning work to establish the inspection calendar; at each inspection point the Contractor shall inform the TA in advance so that he can be present.

7.2.4.2 The Contractor shall check the sealing of the stopcocks and valves when refloating the vessel. Any leaks shall be repaired by the Contractor.

Tests

7.2.4.3 The Contractor shall subject the stopcocks and valves to performance tests to ensure that they are watertight and that they function properly, to the satisfaction of the Chief Engineer and MSO.

Deliverable Documents

7.2.4.4 The Contractor shall provide the TA with two (2) paper copies and one electronic copy of checklists and reports detailing the work done, defects, repairs made, no later than five (5) days after completing the work.

8 SACRIFICIAL ANODES

8.1 Scope

This specification covers replacement by the Contractor of damaged anodes attached to the hull.

8.2 References

- Attached table - cathodic protection anodes

8.3 Technical description

8.3.1 After consultation with the TA, the Contractor shall remove all damaged anodes. Anodes are found on the port & starboard outside hulls and the port & starboard interior hulls:

Port exterior:

- 5 rectangular anodes 6” X 11” located at frames #24, 19, 14, 7 and 4.
- 1 fish anode 5"1/2 X 2”1/2 located at frame #9 in the rear ballast suction water chest from the outside.
- 1 fish anode 5"1/2 X 2”1/2 located at frame #6 on the outer hull between the forward ballast tank and the drinking water tank. (This is the reference anode)

Port interior:

- 4 rectangular anodes 6” X 11” located at frames #24, 19, 13 and 5, that is, aft above the rudder, at the aft stabilizer compartment, in the engine room and in the forward canard compartment.
- 2 fish anodes 5"1/2 X 2”1/2 located at frame #15 in the M/ES, S/S suction water chest and fire pump.
- 1 fish anode 5"1/2 X 2”1/2 located at frame #7 in the suction sea water chest for the bathrooms and air conditioning.

Starboard exterior:

- 5 rectangular anodes 6” X 11” located at frames #24, 19, 14, 7, and 4.

- 1 fish anode 5"1/2 X 2”1/2 located at frame #9 on the hull exterior under the aft ballast suction water chest. (this is the reference anode)
- 1 fish anode 5"1/2 X 2”1/2 located at frame #19 in the rear ballast suction water chest from the outside.
- 1 anode 5"X 1”1/4 rectangular, located at frame #5 in the Simrad transducer hole.
- 2 fish anodes 5"1/2 X 2”1/2 located at frame #15 in the water chest, M/E, S/S suction sea water and fire pumps.

Starboard interior:

- 4 rectangular anodes 6” X 11” located at frames #24, 19, 14, and 5, that is, aft above the rudder, at the aft stabilizer compartment, in the engine room and in the forward canard compartment.
- 1 fish anode 5"1/2 X 2”1/2 located at frame #7 in the suction sea water chest for the forward starboard R.O. and A.C.
- 1 anode 5"X 1”1/4 x 1” thick, rectangular, located in the Simrad transducer hole.
- Port shaft pool: 2 fish anodes 5"1/2 X 2"1/2.
- Starboard shaft pool: 2 fish anodes 5"1/2 X 2"1/2.
- Forward port and starboard ballast tanks: 8 rectangular anodes 5” X 11” X 1” thick.
- Aft port and starboard ballast tanks: 4 rectangular anodes 5” X 11” X 1” thick.

8.3.2 The Contractor is to include in its bid the price to supply and install:

- Eighteen (18) rectangular anodes (6’’X11’’X1’’),
- one (1) rectangular anode (5.5’’X2.5’’X1’’),
- fourteen (14) fish-shaped anodes (5.5’’X2.5’’),
- two (2) rectangular anodes (5’’X1.25’’X1”)
- twelve (12) rectangular anodes (5’’X11’’X1’’).

8.3.3 The Contractor is to provide the price for one anode of each model, which will serve to correct the final total amount on PWGSC Form 1379.

8.3.4 Additional damaged anodes noted during drydocking are to be replaced and the final cost will be adjusted on PWGSC Form 1379 at the cost referred to above.

8.4 Proof of performance

8.4.1 Inspection

All work shall be approved by the TA and the MSO inspector.

8.4.2 Deliverable Documents

The Contractor shall submit to the TA two paper copies and one electronic copy of reports and checklists no later than five (5) days after completing the work.

9 DRINKING WATER TANKS

9.1 Scope

The purpose of this specification is for the Contractor to open the two (2) drinking water tanks to clean, inspect and test them for certification by MSO.The Contractor shall repair any defective items; the cost of repairs is to be shown on PWGSC Form 1379.

9.2 Reference

N/A

9.3 Work description – Preparation and initial cleaning

List of tanks:

- Port Drinking water, capacity 381 gals. 1440 litres,
- Starboard Drinking water, capacity 381 gals. 1440 litres

9.3.1 Once the vessel has been docked safely, the Contractor will be responsible for immediately draining their contents. The Contractor shall degas and certify safe access to each drinking water tank, in accordance with the requirements and recommendations of the Fleet Safety and Security Manual (DFO 5737) of Fisheries and Oceans Canada

9.3.2 The drinking water tanks shall be drained, opened and cleaned of any contaminant or debris and wiped dry, then closed again on completion of the work.

9.3.3 For bidding, the Contractor shall plan on removing and disposing of approximately one hundred (100) litres of water and debris.

9.4 Work description – Commissioning drinking water tanks

9.4.1 The manholes are to be provided with new nitrile gaskets supplied by the Contractor, and then secured in place. Drain plugs are to be reinstalled.

9.4.2 The CCG Inspection Authority and Technical Authority will both inspect the tanks before they are reclosed.

9.4.3 Once closed, each tank shall be disinfected in accordance with the directives of Section 7.F.12 in the CCG Fleet Safety Manual (FSM) on drinking water quality, prior to filling for testing.

9.4.4 Each tank is to be subjected to a hydrostatic test using a water column to the top of the vent pipe. The Chief Engineer, the CCG Technical Authority and the MSO expert are all to witness these tests. These tests can be done at the same time as the chlorination process required by the FSM.

9.4.5 After rinsing the tanks, the Contractor shall ensure that fresh water samples are taken and sent to a certified laboratory for analysis with a view to obtaining a drinking water certificate of inspection.

To obtain these samples, the Contractor shall follow the steps below:

- Each drinking water tank is to be filled to half of its normal capacity.
- Each tank is left to sit without being disturbed for forty-eight (48) hours before taking samples.
- One (1) water sample will be taken from the fresh water supply line used to fill tanks.
- Two (2) samples will be taken from the interior of each tank.
- The Contractor shall ensure that samples are examined for all parameters found in paragraph 3.6.7 of section 7.F.12 of the FSM as well for other chemicals identified as a source of concern on the WHMIS technical data sheets of the coating's manufacturer.
- The shipyard will be responsible for disposal of chlorinated drinking water in accordance with the regulations in force, all disposal costs being at its expense.

9.5 Proof of performance

Inspection:

9.5.1 The quality assurance representative of the Contractor, the TA and the MSO inspector shall perform the following tasks:

- Inspect each water tank after cleaning and preparation of the surfaces;
- Perform a final inspection of all tanks before they are closed.

Test:

9.5.2 Hydrostatic testing shall be performed on the two (2) drinking water tanks:

Deliverable Documents:

9.5.3 The Contractor shall provide the TA with four (4) paper copies and one electronic copy of a report detailing the work done, defects, repairs made, measurements and readings taken before refloating, no later than five (5) days after completing the work.

9.5.4 Four (4) copies of the laboratory analyses of water samples shall be provided before refloating.

10 BALLAST & COFFERDAM TANKS

10.1 Scope

10.1.1 The purpose of this specification is for the Contractor to open the ballast tanks to clean, inspect and test them for certification by MSO. The Contractor shall repair any defective items; the cost of repairs is to be shown on PWGSC Form 1379.

10.2 References

- Tank Plan
- Forward port ballast tanks 535 gals., 2022.3 litres
- Forward starboard ballast tanks 535 gals., 2022.3 litres
- Aft port ballast tanks 513 gals. , 1939.14 litres
- Port cofferdam tank
- Starboard cofferdam tank

10.3 Technical description

10.3.1 The Contractor shall have a method for degassing these spaces so that personnel can safely access them and perform hot work. It is to provide a paper copy of the certificate to the Chief Engineer. A copy shall also be posted prominently near the entrance to each space.

10.3.2 The Contractor shall provide the ventilation equipment required for degassing and ensure that the certificates remain valid for the duration the refit.

10.3.3 All openings in the tanks (vents, hoses, valves, controls, transducers, etc.) and related material shall be sealed off or protected before and during cleaning, blasting and painting work.

10.3.4 If possible, the ship’s crew will empty the tanks as much as possible. The Contractor is to use its pumps and hoses to pump out residual water, sludge, dirt and debris from the tanks.

10.3.5 The Contractor shall clean all interior surfaces of the tanks; fresh, hot water under pressure must be used if necessary. It shall remove blistered paint, scale, salt deposits, dirt and other debris from aluminum surfaces. All debris and wash water must be removed from the vessel.

10.3.6 Each tank shall be inspected by the MSO inspector, the Chief Engineer and the Vessel Maintenance Manager before the start of blasting and painting operations.

10.3.7 In the three (3) ballast tanks, using a mechanical tool, prepare the surface of the bottom of the tanks to aid adhesion of the paint.

10.3.8 The Contractor shall ensure that grit does not leave the tanks and shall eliminate any trace of grit from the vessel. The Contractor is to provide in its bid the cost of blasting a surface of 20 m^2 and for a surface of 1 m^2 to adjust the final price up or down.

10.3.9 The Contractor shall apply two (2) coats of Intergard FP264 colour white or grey to the bottom of the tanks.

10.3.10 The Contractor shall comply with the paint manufacturer's instructions for mixing, ventilation, application and precautions.

10.3.11 The Contractor shall provide the price for painting 9 m².This includes all paint coats.

Surfaces to be considered:

- Forward ballast tanks (2): 6.3 square meter each
- Aft ballast tank (1): 2.8 square meter.

10.3.12 The Vessel Maintenance Manager, the Chief Engineer and, if necessary, the MSO inspector are to witness the replacement of manhole covers. The Contractor is to clean sealing surfaces around the manhole and cover and install the cover with new neoprene seals. It is to apply anti-seize compound on all threads.

10.3.13 The Contractor is to also provide the price for pneumatic testing of each tank and the price for hydrostatic testing of each tank. The quote is to include installation and removal of drain plugs, removal of overflow lines and vent heads, the opening of a supplementary tank and draining tanks (including removing water and wiping the interior surfaces of tanks).

10.3.14 The inspector from the MSO classification company onsite will alone determine the test method. All tests are to be done in the presence of the MSO inspector on site, the Chief Engineer and the Vessel Maintenance Manager.

10.3.15 List of tanks to be cleaned and inspected:

- Forward port ballast tanks 535 gals., 2022.3 litres
- Forward starboard ballast tanks 535 gals., 2022.3 litres
- Aft port ballast tanks 513 gals. , 1939.14 litres
- Port cofferdam tank
- Starboard cofferdam tank

10.4 Proofs of performance

Inspection

10.4.1 All work shall be approved by the TA and the BV inspector.

Tests

10.4.2 Pneumatic or hydrostatic test for each tank, depending on what the MSO inspector decides.

Deliverable Documents

10.4.3 The Contractor shall provide the TA with two paper copies and one electronic copy of test certificates and reports detailing the work, prior to refloating.

11 FUEL TANKS,

11.1 Scope

The purpose of this specification is for the Contractor to open and reclose the fuel tanks to clean, inspect and test them for certification by MSO. The Contractor shall repair any defective items; the cost of repairs is to be shown on PWGSC Form 1379.

11.2 References

- Tank Plan

11.3 Technical description

11.3.1 The Contractor shall have a method for degassing these spaces so that personnel can safely access them and perform hot work. It must obtain a certificate from a recognized chemist. It must provide a paper copy of the certificate to the Chief Engineer. A copy shall also be posted prominently near the entrance to each space.

11.3.2 The Contractor shall provide the ventilation equipment required for degassing and ensure that the certificates remain valid for the duration the refit.

11.3.3 The Contractor is to use its pumps and hoses to pump out residual oil and water, sludge, dirt and debris from the tanks.

11.3.4 The Contractor shall clean all inside surfaces of the tanks; it can use water under pressure or steam if necessary. It must remove remains of fuel, deposits, sludge, dirt and other debris from aluminum surfaces. All debris and washing residue must be removed from the vessel.

11.3.5 Any openings in functioning tanks (vents, hoses, valves, controls, transducers, etc.) and related material shall be sealed off or protected before and during the cleaning work.

11.3.6 Each tank shall be inspected by the MSO inspector, the Chief Engineer and the Vessel Maintenance Manager before the start of blasting and painting operations.

11.3.7 The Vessel Maintenance Manager, the Chief Engineer and, if necessary, the MSO inspector are to witness the replacement of manhole covers. The Contractor is to clean sealing surfaces around the manhole and cover and install the cover with new 1/4 in. thick neoprene seals. It is to apply anti-seize compound on all threads.

11.3.8 The Contractor is to also provide the price for pneumatic testing of each tank and the price for hydrostatic testing of a tank. The quote is to

include installation and removal of drain plugs, removal of overflow lines and vent heads, the opening of a supplementary tank and draining tanks (including removing water and wiping the interior surfaces of tanks).

11.3.9 The inspector from the MSO classification company onsite will alone determine the test method. All tests are to be done in the presence of the MSO inspector on site, the Chief Engineer and the Vessel Maintenance Manager.

11.3.10 As the vessel will be in operation until it enters drydock, the Contractor shall provide a clean fuel tank with sufficient capacity to store the vessel’s fuel during the cleaning work. This fuel is to be returned to the vessel at the end of the work and put into the tanks in the same condition as when entering drydock. The fuel may also be transferred from one of the vessel’s tanks to another rather than to a tank on land.

11.3.11 List of tanks to be cleaned and inspected:

- Aft port fuel tanks: 923 gals. 3489 litres (each)
- Aft starboard fuel tanks: 923 gals. 3489 litres (each)

The contractor must include to dispose 125 liters of fuel residue before to clean the tanks, to be adjust higher or lower on a PW & GSC 1379 Form.

11.4 Proof of performance

Inspection

11.4.1 All work shall be approved by the TA and the MSO inspector.

Tests

11.4.2 Pneumatic or hydrostatic test for each tank, depending on what the MSO inspector decides.

Deliverable Documents

11.4.3 The Contractor shall provide the TA with two paper copies and one electronic copy of test certificates and reports detailing the work, prior to refloating.

12 RUDDERS

12.1 Scope

12.1.1 This specification covers the four-year inspection of rudders.

12.1.2 Installation of a physical angle indicator on the rudder stock.

12.1.3 Inspection of port and starboard canards and stabilizers. Replace the starboard canard shaft support bearing.

12.2 Reference

- 65-A4- Rudder

12.3 Technical description – Rudders, stocks and pintle links

12.3.1 Perform a four-year inspection of rudders, stocks and pintle links upon drydocking of the vessel.

12.3.2 If necessary, the Contractor shall repair any defective items; the cost of repairs is to be shown on PWGSC Form 1379.

12.3.3 Dismount the two (2) rudders and their stocks for inspection by the MSO.

12.3.4 Clean and measure the pintles and their gudgeon.

12.3.5 Clean and measure the rudder trunk bearings and stocks.

12.3.6 Perform a hydrostatic test of the two (2) rudders in the presents of CG representatives and the MSO inspector.

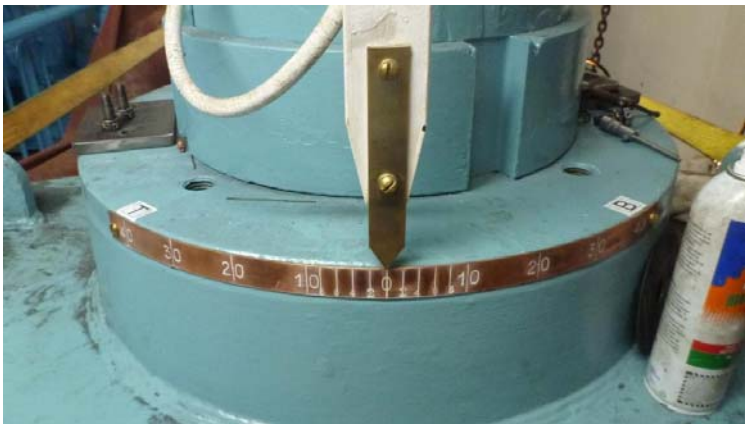
12.3.7 The steering gear hydraulic cylinders are to be checked and those leaking are to be removed, rebuilt and reinstalled.

12.3.8 After inspection, reinstall the rudders and stocks in position.

12.3.9 Supply and completely renew the rudder stock packings.The packings are O-rings, three (3) per stock.

12.3.10 Fabrication and installation of two (2) physical angle indicator below directly on the rudder stock. It must be ensured that it is very well adjusted.

The indicators will indicate the degrees on a brass plate 1 inch high, 35 degree portside, 0 degree center, 35 degree starboard, and for guidance in 5 degree on each line. The material used is brass.



12.4 Technical description – Canards & stabilizers

12.4.1 Remove the control linkages from the inside then remove the two (2) stabilizers and the two (2) canards, which will be transported to the contractor’s shop. Clearly identify the position of each stabilizer and canard.

Before removing completely, measure the end play of the canards and stabilizers.

12.4.2 Clean the stocks and bearings of the stabilizers and canards. Conduct dye penetrant tests at the connection of the stocks to the stabilizers and canards.

12.4.3 Measure the wear of the stocks relative to their bearings. Take the corresponding measurements inside the plastic bearings.

12.4.4 Supply material, machine and fit four (4) new Teflon (PTFE) disks for the canard and stabilizer stops to obtain an end play of 0.020” inch. Approximate dimensions of disks: diam. 6-1/2” inch, thickness ¾” inch.

12.4.5 The port and starboard canard and stabilizer hydraulic cylinders are to be checked and those leaking are to be removed, rebuilt and reinstalled.

12.4.6 Supply and replace the Buna-N O-rings, three (3) per stock, 5mm cross-section, and the lip seals, one per stock.

12.4.7 Transport the stabilizers and canards to the vessel, install them, connect the control linkages and carry out a trial in the presence of the Coast Guard representative.

12.4.8 After completion of the work on the stabilizers and canards, a Coast Guard technician will perform adjustment of positioning prior to refloating the vessel.

12.5 Proof of performance

Inspection

12.5.1 All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the MSO inspector.

Tests

12.5.2 The Contractor shall conduct sea trials to demonstrate that the propulsion is functioning properly.

Deliverable Documents

12.5.3 The Contractor shall provide the Chief Engineer with two paper copies of test certificates and reports prior to refloating the vessel. The Contractor is also to send an electronic copy of all reports and certificates to the Vessel Maintenance Manager prior to refloating the vessel no later than five (5) days after completion of the work. All clearance, dimensional and alignment measurements shall be recorded in the report if necessary.

13 PROPELLER SHAFTS AND PROPELLERS

13.1 Scope

13.1.1 This specification covers a four-year drydock inspection of the vessel.

13.1.2 Any additional work not described in this specification shall be negotiated using Form PWGSC 1379. The description of the work to be done will be prepared by the Coast Guard and Government Services representative to obtain a reasonable firm price, before the work concerned begins.

13.1.3 Items to be inspected:

- propellers
- propeller shafts
- couplings
- water lubricated bearings (sternpost)
- propeller shaft glands

13.2 Reference

- 65-C8 – Shafting arrangement
-

13.3 Technical description - Propeller, Propeller shaft, Propeller shaft glands

Conduct a four-year drydock inspection of the vessel.

13.3.1 Propellers:

13.3.1.1 Propellers are to be removed for inspection and carrying out repairs, as necessary.

13.3.1.2 Remove the propellers from their shaft then place them ashore for inspection. Test the propeller keyways and keys using liquid penetrant. If the propellers are damaged, and after having obtained an expert assessment, propellers will be loaded onto a truck and shipped to the expert. The price for propeller reconditioning work will be adjusted on a PWGSC Form 1379 as billed.

13.3.1.3 In time, according to the work schedule, the propellers will be reinstalled in position. Blue fit each propeller to the satisfaction of an expert from the Marine Safety Office (MSO).

13.3.1.4 Include three (3) blue fits for each of the vessel's propellers to be adjusted up or down on PWGSC Form 1379.

13.3.1.5 The propellers will then be finally installed on their shaft then tightened and locked to the satisfaction of the MSO expert.

13.3.1.6 Following the inspections, the propeller shafts and propellers must be reassembled in accordance with the specifications of the reference drawings and manuals.

13.3.1.7 If some components have to be replaced, they must be equivalent and shall meet the requirements of the reference drawings and manuals.

13.3.1.8 The propeller nuts shall be barred in place.

13.3.1.9 Align transmissions with propeller shafts so as to obtain parallelism of mating flanges (shaft and transmission) in the presence of the Coast Guard representative and the MSO expert. Provide a detailed report of the alignment work prior to refloating. The alignment must be measured again when the vessel is in the water.

13.3.2 Propeller shafts:

13.3.2.1 Measure concentricity in place and wear toward the bottom before partially removing the shafts. Remove the cable cutter knives.

13.3.2.2 Measure alignment of couplings with the transmissions before removing the shafts and after returning the shafts to position with the vessel afloat.

13.3.2.3 Remove the transmission couplings, remove the interior glands. Pull out the shafts to enable inspections of the bearings and shafts by the MSO expert. Clean the shafts and sternpost tubes. Test the shaft and coupling keyways using liquid penetrant.

13.3.2.4 Measure the shaft wear relative to their rubber bearings. Take the corresponding measurements inside the rubber bearings.

13.3.2.5 Transport the shafts to the shop, and mount them on a lathe to check straightness.

13.3.2.6 Remove the two (2) stuffing boxes from the port and starboard sternpost tubes, submit to the Chief Engineer. Supply new seals and install the two (2) new stuffing boxes supplied by the Coast Guard.

13.3.2.7 If necessary, remove the two (2) "Thordon" bearings in each sternpost tube, and measure the housings of each bearing in three (3) places, in each sternpost tube.

13.3.2.8 If the services of a specialized machine shop is required to machine the four (4) bearing housings, the cost will be adjusted on PWGSC Form 1379.

13.3.2.9 If necessary, the services of a firm that specializes in laser or optical alignment will be required to maintain the alignment of the sternpost tubes with the propulsion systems during machining. Provide a written report confirming maintenance of alignment after the machining work is completed; costs to be adjusted on PWGSC Form 1379.

NOTE: Following inspection by the MSO expert and the CCG representative, this work may be cancelled.

13.3.2.10 After inspection, reinstall the shafts, connect the couplings to the transmissions. Reinstall the stuffing boxes and replenish with new packing supplied by the CCG. Reinstall the cable cutter knives with new parts supplied by the Coast Guard.

13.4 Proof of performance

Inspection:

13.4.1 All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the MSO inspector.

Testing:

13.4.2 The Contractor shall conduct sea trials to demonstrate that the propulsion is functioning properly.

Deliverable Documents

13.4.3 The Contractor shall provide the TA with two paper copies and one electronic copy of test certificates and reports. All dimensional and alignment measurements shall be recorded in the report no later than five (5) days after the end of the work.

14 HULL AND STRUCTURE

14.1 Inspection of watertight bulkheads.

14.1.1 Scope

14.1.1.1 Ensure that anything running through the watertight bulkheads complies with Technical Bulletin 2016.

14.1.2 References

14.1.2.1 Technical Bulletin 2016 Watertight Bulkhead.

14.1.3 Technical description

The Contractor shall perform the following work:

14.1.3.1 Check that each wiring pass-through from each of the rooms located at the waterline are watertight as described in Technical Bulletin 2016.

14.1.3.2 The Contractor shall first carry out a visual inspection of the different inlets and note any damage, missing pieces, poorly installed items and corrosion problems that could interfere with the structural solidity of the inlets.Damaged wiring pass-throughs noted are to be replaced and the final cost adjusted on PWGSC Form 1379.

14.1.4 Proof of performance

Inspection

14.1.4.1 All work shall be completed to the satisfaction of the Chief Engineer and the Vessel Maintenance Manager.

14.2 Repair of floors under the propeller shafts in the engine compartments

14.2.1 Scope

14.2.1.1 Repair the two (2) Port and Starboard surfaces, 32 inches X 24 inches.

14.2.2 References

N/A

14.2.3 Technical description

14.2.3.1 Perform manual sanding of surfaces to standard SA2.

14.2.3.2 Apply the product Belzona 1111 on the surfaces in accordance with the manufacturer’s specifications.

14.2.3.3 Sand the treated surface.

14.2.3.4 Apply the following paint system: One coat of Amercoat 240 (grey) 6-10 mils dry. In accordance with the manufacturer’s specifications.

14.2.4 Proof of performance

Inspection

14.2.4.1 All work shall be approved by the TA.

14.2.4.2 Abrasive contaminants left from sanding must not enter any part of the vessel. The Contractor shall ensure that any opening in the vessel where

abrasive contaminant could enter is well covered. The Contractor shall remove any trace of abrasive contaminant remaining from sanding.

14.2.4.3 The Contractor shall take the necessary steps to prevent liquid contamination of areas being prepared or having coating applied. It shall also take steps to ensure that surfaces and equipment other than those specified are not coated and that the coating does not block any hull inlet or outlet orifice. Machinery that could be damaged by blasting or coating shall also be protected. The Contractor shall remove all protections before its work is checked and accepted.

14.2.4.4 All work shall be done to the satisfaction of the Canadian Coast Guard representative. Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Tests

14.2.4.5 Measurements of paint coating thickness as well as the environmental conditions are to be recorded. The hull temperature, air temperature and humidity levels are to be taken, among others.

Deliverable Documents

14.2.4.6 The Contractor is to prepare a report indicating:

- type of grit and the pneumatic pressure used;
- area coated, with the type and quantity of product applied;
- thickness measurements of the various layers;
- atmospheric conditions (temperature, humidity, etc.);
- temperature of the vessel’s deck.

14.2.4.7 The Contractor is to provide three (3) paper copies and one electronic copy of checklists and reports to the TA prior to refloating.

14.3 Replacement of ceiling insulation, rear culvert

14.3.1 Scope

15.3.1.1 Replacement of ceiling insulation, rear culvert, on an area of 20 ft X 11 ft.

14.3.2 References

N/A

14.3.3 Technical description

14.3.3.1 The Contractor shall remove the old insulation and make the required arrangements for ecological disposal.

14.3.3.2 Check whether the ceiling is in good condition and free of dust, damp or other issues.

14.3.3.3 The Contractor shall replace it with the same type of insulation and the same thickness, with a vapour barrier.

14.3.3.4 The Contractor shall provide the material and labour to cover 20’ by 11’

14.3.4 Proof of performance

Inspection

All work must be approved by the TA

The work shall be done to the satisfaction of the Canadian Coast Guard representative.

Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Testing

N/A

Deliverable Documents

N/A

14.4 Suspended ceiling replacement

14.4.1 Scope

14.4.1.1 Replace the suspended ceiling of main deck accommodations and the wheelhouse and dispose of it.

14.4.2 References

Photos

14.4.3 Technical description

14.4.3.1 The Contractor shall remove the old suspended ceiling of the main deck accommodations and the wheelhouse and dispose of it.

14.4.3.2 The walls and floors must be protected as well as all other accessories such as chairs, tables, offices and beds, etc.

14.4.3.3 For suspended ceiling tiles in accommodations and the wheelhouse, the Contractor shall provide material of equal or superior quality to that already in place and the Contractor shall also supply the labour for installation.

14.4.3.4 Ceiling areas to be redone:

Main deck accommodations: 30’ by 24’, which includes the bathrooms (port and starboard), 5 rooms, laboratory, kitchen and crew messroom.

Wheelhouse: 15’ by 11’

14.4.4 Proof of performance

Inspection

14.4.4.1 All work shall be approved by the TA.

14.4.4.2 All work shall be done to the satisfaction of the Canadian Coast Guard representative.

14.4.4.3 Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Testing

N/A

Deliverable Documents

N/A

14.5 Replacement of wheelhouse windows (This article includes options)

14.5.1 Scope

14.5.1.1 Replace port window on the front of the wheelhouse and three (3) other windows on the front of the wheelhouse shall be optional.

14.5.2 References

14.5.2.1 Photo

14.5.3 Technical description

14.5.3.1 The Contractor shall provide and replace the port window on the front of the wheelhouse and three (3) other windows are optional.

14.5.3.2 It will be responsible for taking measurements and ordering windows of the same dimensions and same type.

14.5.3.3 It shall remove the old windows and clean the profile and all surfaces of the four (4) windows.

14.5.3.4 The damaged attachment profiles are to be refurbished.

14.5.3.5 The damaged bolts are also to be refurbished.

14.5.3.6 A leak test shall be conducted upon completion of the work

14.5.4 Proof of performance

Inspection

14.5.4.1 All work shall be approved by the TA and MSO.

14.5.4.2 All work shall be done to the satisfaction of the Canadian Coast Guard representative.

14.5.4.3 Schedule an inspection at each step of the process. The Contractor shall notify the Coast Guard representative in sufficient time to allow him to reach the site.

Testing

14.5.4.4 Conduct a leak test upon completion of the work.

Deliverable Documents

14.5.4.5 The Contractor shall submit to the TA two paper copies and one electronic copy of window certificates, tests and reports no later than five (5) days after completing the work contracted. All dimensional measurements and the installation procedure shall be recorded in the report.

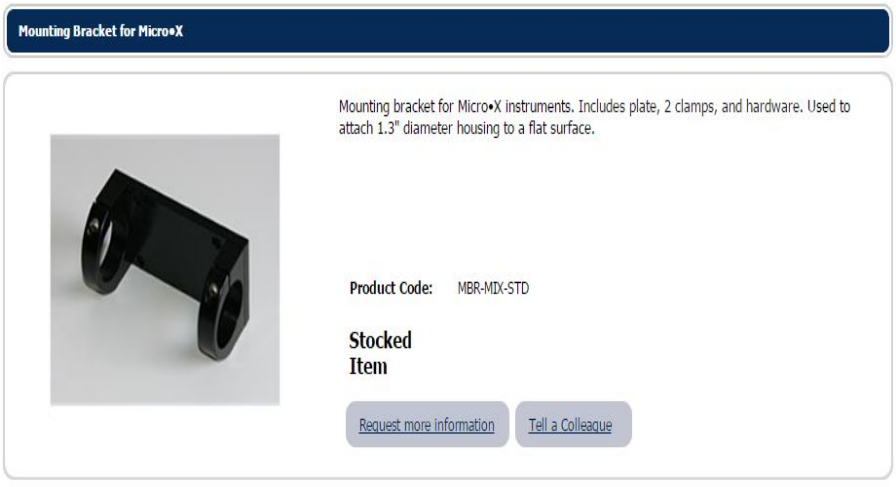
14.6 Installation of speed sensors.

14.6.1 Scope

14.6.1.1 Installation of two (2) speed sensors on the vessel’s hull

14.6.2 References

14.6.2.1 Photos and documents



14.6.3 Technical description

The Contractor shall perform the following work:

14.6.3.1 Weld the two speed sensor supports to the vessel’s hull.

14.6.3.2 Drill through the vessel’s hull for the sensor’s wiring. The wire holes must be sealed.

14.6.3.3 Paint shall be applied to places damaged by welding and the Contractor shall comply with the manufacturer’s recommendations for application of the paint: Type of paint, paint colour, dry thickness, drying time, etc.).

14.6.4 Proof of performance

Inspection

14.1.4.1 All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the MSO.

15 ELECTRICITY DISTRIBUTION

15.1 Scope

15.1.1 Replace neon tube fixtures with LED tubes of at least 5000k.

15.2 References

15.2.1 65-d1_1 lighting and switch plan

15.2.2 TP127E Ships Electrical Standards

15.3 Technical description

15.3.1 The Contractor shall remove the fixtures on the list below

15.3.2 The Contractor will be responsible for making the necessary provisions for disposing of the ballasts in accordance with regulations.

15.3.3 The Contractor takes the necessary measures to supply LED fixtures of at least 5000K.

15.3.4 It shall install and connect all new LED fixtures.

15.3.5 It shall check the continuity of power supply circuits of the fixtures upon completion of each installation.

LIST OF FIXTURES TO BE REPLACED

- Wheelhouse: 3 fixtures of 48’’ x 24 in and 1 fixture of 24 in X 24 in
- Crew messroom: 3 fixtures 48’’ x 24 in
- Laboratory 4 fixtures 24 in X 24 in and 2 fixtures 48 in. X 24 in.
- Kitchen 4 fixtures 24 in X 24 in
- Cabin 6 fixtures 24 in X 24 in.
- Port bathroom 2 fixtures 24 in X 24 in
- Starboard bathroom 2 fixtures 24 in X 24 in
- Port engine room by Generators

3 fixtures 48 in. X 24 in and 4 fixtures of 24 in X 24 in

- Starboard engine room by Generators
  3 fixtures 48 in. X 24 in and 4 fixtures of 24 in X 24 in
- Port engine room by Main engine

4 fixtures 24 in X 24 in

- Starboard engine room by Main engine
  4 fixtures 24 in X 24 in

15.3.6 The Contractor shall ensure that each fixture installed functions properly.

15.4 Proof of performance

Inspection

15.4.1 All work shall be approved by the TA and MSO.

15.4.2 All work shall be done to the satisfaction of the Canadian Coast Guard representative.

15.4.3 Installation of fixtures must comply with TP127E Ships Electrical Standards.

Testing

15.4.4 Conduct an operational test upon completion of the work.

Deliverable Documents

15.4.5 The Contractor shall submit to the TA two paper copies and one electronic copy of megohmmeter measurements no later than five (5) days after completing the work.

16 SEA TRIALS

16.1 Scope

16.1.1 This specification covers the conducting of operational tests of the propulsion and other vessel systems at sea.

16.2 Technical description

16.2.1 Once all items of the specification have been completed, operationational tests of the propulsion and other vessel systems will take place at sea.

16.2.2 The sea trials must last at least four hours.

16.2.3 The trials will include aheadand astern movements at various speeds.

16.2.4 Unless otherwise indicated by the TA official, the Contractor shall ensure that the sub-contractors and FSRs who have participated in the refit attend the sea trials.

16.2.5 During the trials, the Contractor shall have a sufficient number of monitoring staff on board the vessel to monitor the operation of equipment affected by the refit.

16.3 Proof of performance

Inspection:

16.3.1 All work shall be approved by the TA and MSO.

Testing:

16.3.2 The functioning of the ADCP will be tested by the crew during sea trials under the supervision of the FSR.

Deliverable Documents

16.3.3 The Contractor is to provide three (2) paper copies and one electronic copy of FSR reports to the TA prior to refloating.

17 SAFETY AND SECURITY EQUIPMENT

17.1 PORTABLE FIRE EXTINGUISHER

17.1.1 Scope

17.1.1.1 The Contractor shall inspect all fire extinguishers and certify extinguishers whose certification date has expired.

17.1.2 References

17.1.2.1 CCGS Frederik Creed – list of portable fire extinguishers

17.1.3 Technical description

17.1.3.1 The Contractor shall perform the following work:

17.1.3.2 The Contractor shall undertake the annual inspection of portable fire extinguishers. Inspection and maintenance of fire extinguishers are to be entrusted to a qualified supplier at the contractor's expense and responsibility. The inspection certificate shall be issued by a supplier authorized by MSO.

17.1.3.3 The Contractor shall remove the fire extinguishers in a sequence that ensures that the number of fire extinguishers off the vessel is never more than a third of the total number of fire extinguishers on board. The Chief Engineer will determine the order of removal of the fire extinguishers.

17.1.3.4 Once maintenance has been completed, the Contractor shall return all the fire extinguishers to the vessel and put them back in place following the Chief Engineer's instructions.

17.1.3.5 A hydrostatic test we will perform (5 years) on a CO2 extinguisher is the No. 2 Laboratory No. AB-726 010 series, 36.5 lbs.

17.1.4 PROOF OF PERFORMANCE

Inspection

17.1.4.1 All work shall be completed to the satisfaction of the Chief Engineer and the MSO inspector.

Testing

17.1.4.2 Fire extinguisher tests will be carried out in accordance with MSO rules.

Certification

17.1.4.3 The Contractor shall provide the Chief Engineer with two (2) paper copies of maintenance certificates along with the original no later than April 1, 2017. The Contractor shall also send an electronic copy of certificates to the Vessel Maintenance Manager.

17.1.5 DELIVERABLES

Drawings/reports

17.1.5.1 The Contractor shall provide the Chief Engineer with two (2) paper copies of reports and checklists that explain in detail the work and modifications required. The Contractor shall also send an electronic copy of all the reports to the Vessel Maintenance Manager no later than April 1, 2017.

17.2 FIRE DETECTION SYSTEM

17.2.1 Scope

17.2.1.1 This specification covers supply by the Contractor of qualified labour to carry out the annual inspection and certification of the fire detection system.

17.2.2 References

- Plan 11212 Addressable fire alarm

17.2.3 Technical description

The Contractor shall perform the following work:

17.2.3.1 The vessel is equipped with an integrated fire detection system by BES Marine Inc. with a Honeywell 9050UDC fire alarm panel. The Honeywell 9050UDC panel is connected to the integrated fire alarm system, which is part of the vessel's monitoring and alarm system.

17.2.3.2 The Contractor shall schedule the visit by an MSO inspector before beginning work.

17.2.3.3 The Contractor is to supply qualified labour to carry out the annual inspection and certification of the fire detection system. The inspection certificate must be issued by a supplier authorized by the MSO.

17.2.3.4 The fire detection control panel is located in the wheelhouse.

17.2.4 Proof of performance

Inspection

17.2.4.1 All work shall be completed to the satisfaction of the Chief Engineer and the MSO inspector.

Certification

17.2.4.2 The Contractor shall provide the Chief Engineer with two (2) paper copies of maintenance certificates along with the original. The Contractor shall also send an electronic copy of all the certificates to the Vessel Maintenance Manager no later than April 1, 2017.

17.2.5 DELIVERABLES

Drawings/reports

17.2.5.1 The Contractor shall submit to the Chief Engineer one (1) hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor shall also send an electronic copy of the report to the Vessel Maintenance Manager no later than April 1, 2017.

17.3 ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM

17.3.1 Scope

17.3.1.1 This specification covers maintenance of the fixed firefighting system of the CCGS Frederik G Creed and its certification.

17.3.1.2 The Contractor is to communicate with the Chief Engineer before undertaking this item of work. The work shall be done in parallel with maintenance of the portable fire extinguishers without diminishing the firefighting capacity on board the vessel.

17.3.1.3 The fixed firefighting system is a FM 200 system.

17.3.2 References

02604-10 fire system localization

17.3.3 Technical description

The Contractor shall perform the following work:

17.3.3.1 The Contractor shall provide authorized labour to conduct the tests and inspections of the vessel’s FM200 system as part of the annual inspection and certification of this system. The inspection certificate must be issued by a supplier authorized by the MSO.

17.3.3.2 The Chief Engineer shall attend all tests.

17.3.3.3 In addition to the following tests, the Contractor shall conduct all tests required by the MSO inspector on site. The Contractor shall provide in its quote the cost for testing alarms (indicator lights, sirens and bells) of all devices, testing the nitrogen release cylinders, testing ventilation closure devices and the test for slack loops and cables.

17.3.3.4 The Contractor shall clean the air pressure pipes and pneumatic actuators and ensure that they function correctly. Pipes and nozzles must be free from obstruction.

17.3.3.5 The Contractor shall ensure that the alarm displays and sirens are working correctly. The Contractor shall weigh each cylinder and record the results. At the end of the refit, it shall submit copies of all certificates to the Chief Engineer.

17.3.3.6 At the end of the tests and inspections, the Contractor shall reassemble and reactivate the systems.

17.3.3.7 The Contractor must be licensed for renewal of this system’s certification in accordance with the most recent requirements of MSO regulations.

17.3.4 PROOF OF PERFORMANCE

Inspection

17.3.4.1 All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the MSO inspector.

Testing

17.3.4.2 The Chief Engineer must be present for the system inspection and test.

Certification

17.3.4.3 The Contractor shall provide the Chief Engineer with two paper copies of maintenance certificates along with the original no later than April 1, 2017. The Contractor shall also send an electronic copy of the certificates to the Vessel Maintenance Manager no later than April 1, 2017.

17.3.5 DELIVERABLES

Drawings/reports

17.3.5.1 The Contractor shall provide the Chief Engineer with a paper copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item, no later than April 1, 2017. The Contractor shall also send an electronic copy of the report to the Vessel Maintenance Manager no later than April 1, 2017.

17.4 LIFE RAFT

17.4.1 Scope

174.1.1 The Contractor shall remove the life rafts and their hydrostatic release device, transport them to an authorized service centre to carry out annual inspection and certification, then return them to the vessel.

17.4.2 References

- Unless otherwise indicated, the Contractor shall supply all the material, equipment and parts necessary to perform the work in the specifications.
- Two life rafts (16-person, series # 16DK+ - A120998 16DK+ - Y170702) .

17.4.3 Technical description

17.4.3.1 The Contractor is to include in its estimate the cost to remove the two life rafts from the vessel with their release devicea and transport them to a service centre for their annual inspection. The life rafts shall then be put back in place.

17.4.3.2 The Contractor is to provide in its estimate an amount of $800 per life raft for replacement of the survival equipment, or $1,600 for this item; the final cost will be adjusted on PWGSC Form 1379 with supporting invoices.

17.4.4 PROOF OF PERFORMANCE

Inspection

17.4.4.1 All work shall be completed to the satisfaction of the Chief Engineer or the Vessel Maintenance Manager.

Certification

17.4.4.2 The Contractor shall provide the Chief Engineer with two (2) paper copies of maintenance certificates along with the original no later than April 1, 2017. The Contractor shall also send an electronic copy of all the reports and certificates to the Vessel Maintenance Manager no later than April 1, 2017.

17.4.5 DELIVERABLES

Drawings/reports

The Contractor shall provide the Chief Engineer with one (1) paper copy of its typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item, no later than April 1, 2017. The Contractor shall also send an electronic copy of the report to the Vessel Maintenance Manager no later than April 1, 2017.

18 MAINTENANCE OF MAIN ENGINES AND GENERATORS

18.1 Scope

18.1.1 This specification provides for the Contractor to retain the services of a recognized company, certified by Detroit Diesel Corporation for the propulsion engines with their transmissions and by John Deere for the generators, for the full maintenance services explained in detail in the technical descriptions.

18.1.2 Recognized companies are to replace or repair all defective items; the final cost is to be adjusted on PWGSC Form 1379.

18.2 References

18.2.1 Main engines:

18.2.1.1 Port main engine – Brand: Detroit Diesel, Model: 12V92 TA, Serial number 12VF 003734

18.2.1.2 Starboard main engine – Brand: Detroit Diesel, Model: 12V92 TA, Serial number 12VF 003743

18.2.2 Transmissions

18.2.2.1 Port transmission, Brand: ZF Model: BW250, Port serial number: 3124

18.2.2.2 Starboard transmission, Brand: ZF Model: BW250, Starboard serial number: 3123

18.2.3 Ship service generators

18.2.3.1 Port service generator – Brand: John Deere, Model: 4239 DF 001 DEERE Serial number: T04239D188787

18.2.3.2 Starboard service generator – Brand: John Deere, Model: 4239 DF 001 DEERE Serial number: T04239D390053

18.3 Standards

To comply with the manufacturer’s recommendations.

18.4 Regulation

N.A.

18.5 Equipment provided by owner

Unless otherwise indicated, the Contractor shall supply all the material, equipment and parts necessary to perform the work in the specifications.

18.6 Technical description

18.6.1 General

18.6.1.1 The Contractor is to retain the services of a recognized company to carry out the maintenance work below, as indicated in the Owner’s Manual.

18.6.2 Main engine

- Replace all wiring, sensors, indicators, up to the wheelhouse. Clearly identify each wire and provide a clear schematic. OPTION 1
- Replacement of all wiring and sensors. Install a monitoring system to replace the one next to the Generator. A simple audible signal and/or light will be required in the wheelhouse to indicate that there is an abnormal situation with an engine. OPTION 2
- Change the oil and filters
- Replace the anodes
- Clean the cooling water circuit
- Check valve play.
- Check the injectors
- Replace the coolant/fuel coolers
- Check and inspection of turbos
- Replace the fuel filters
- Check and maintenance of the tachometer
- Check of the drive cable
- Check of the starter motor and its wiring
- Check of the pyrometers
- Clean the scavengers
- Check air exhaust valves
- Replace the air filters
- Check the emergency stop
- Check air flaps
- Check the overspeed regulator
- Replacement of thermostats
- Check and clean the crankcase air exhaust breather
- Check the Jabsco pump
- Total hours port engine 626:30 starboard engine engine 5825:30
- Oil hours 224:30 267:30

- Fuel filter hours 442:30 474:30

- The company shall conduct an expert assessment of the starboard diesel propulsion engine and also see whether there is a possibility of converting the exhaust to a wet exhaust. The starboard engine is due for a five-year inspection next year.

18.6.3 Transmission

- Replace all wiring, sensors, indicators, up to the wheelhouse. Clearly identify each wire and provide a clear schematic. OPTION 1
- Replacement of all wiring and sensors. Install a monitoring system to replace the one next to the Generator. A simple audible signal and/or light will be required in the wheelhouse to indicate that there is an abnormal situation with an engine. OPTION 2
- Transmission Oil Hrs port 630:30 starboard 631:30

18.6.4 Ship service generators

- Replace all wiring, sensors, indicators, up to the wheelhouse. Clearly identify each wire and provide a clear schematic.
- Replace the 3 ammeters with 0.5A / 200A digital ammeters
- Check the governors
- Replace the Turbo air filters
- Check the turbofan
- Check the belt, replace if necessary
- Check the injectors
- Replace the anode
- Check the cooling circuit, flush and replace with liquid as recommended by the manufacturer
- Check the air intake manifold
- Check valve play
- Check and clean heat exchangers
- Test thermostats
- Total hours Port Gen 8122:00 Starboard gen 7077:10
- Oil hours 342:00 161:00
- Fuel filter hours 602:00 547:10

18.7 Proof of performance

Inspection

18.7.1 All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the PWGSC inspector, and shall be approved by the TA and the MSO inspector.

Certification

18.7.2 The Contractor shall submit to the TA two (2) paper copies of inspection certificates and their original copy no later than five (5) days after completing the work.

18.8 Deliverable Documents

18.8.1 The Contractor is to provide the TA with one (1) paper copy and one electronic copy of its typewritten report detailing the inspections, modifications and repairs made prior to acceptance of this item and prior to refloating the vessel no later than five (5) days after completion of the work.

18.9 Testing

18.9.1 The Contractor shall attend sea trials after the refit to check that the Detroit Diesel and John Deere equipment are functioning properly.

19 DOMESTIC SYSTEM

19.1 Annual inspection of heating, ventilation, air conditioning and refrigeration systems

19.1.1 Scope

19.1.1.1 Conduct the annual inspection of the refrigeration & air conditioning systems.

Note: Technicians performing work shall hold a valid CRHA card and indicate their number on the report; provide a copy of the card to the Coast Guard representative.

19.1.1.2 Replace the 4 remaining Cruisair systems, the gas expires within one year.

- Laboratory and science cabin
- Crew lounge
- Starboard cabins
- Wheelhouse

19.1.2 Technical description:

The Contractor shall perform the following work:

19.1.2.1 It shall replace the four (4) remaining Cruisair A/C systems with the same model already in place: 14500 BTU unit, KeepRite brand with copper nickel condenser. The Contractor shall consider the location and restricted space or possibly make modifications to the unit.

19.1.2.2 The Contractor will be responsible for removing the four old air conditioners; it shall take the necessary steps to recover and dispose of the refrigerant gas in accordance with environmental regulations.

19.1.2.3 It shall perform the disconnection and reconnection of electricity to the four (4) heat pump systems.

19.1.2.4 Carry out a complete inspection of all components of the heating, ventilation, air conditioning and refrigeration systems. Any breakage or defects are to be addressed as additional work on Form 1379.

19.1.2.5 Conduct a refrigerant leak detection test on all components of the air conditioning and refrigeration systems.

19.1.2.6 Check operating parameters.

19.1.2.7 On each piece of equipment, the Contractor shall apply a label with its detailed information, stating that the equipment has been inspected and tested.

19.1.2.8 Completely clean the vessel’s ventilation system using the mechanical suction / impulse / brushing (octopus) method and an extraction vacuum equipped with a HEPA filter.

19.1.2.9 The ventilation system consists of the following components: the central ventilation ducts of the dryer and bathroom exhausts, heat exchangers, diffusers, as well as the outside air intakes.

19.1.2.10 Degrease the kitchen hood, including its fan and exhaust duct.

19.1.2.11 The Contractor shall take the necessary measures to adequately protect the vessel’s furniture and equipment during the work.

19.1.3 Proof of performance

Inspection

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

Certification

19.1.3.2 The Contractor shall submit to the Chief Engineer two (2) paper copies of inspection certificates with their original copy no later than five (5) days after completing the work. The Contractor shall also send an electronic copy of the certificates to the Vessel Maintenance Manager no later than five (5) days after completion of the work.

19.1.3.3 On request from the Chief Engineer, the refrigeration technician shall present a valid refrigeration certificate.

19.1.4 Deliverables

Drawings/reports

19.1.4.1 The Contractor shall provide the Chief Engineer with a paper copy of its report, detailing the inspections, modifications and repairs made, prior to

acceptance of this item. The Contractor shall also send an electronic copy of the report to the Vessel Maintenance Manager no later than five (5) days after completion of the work.

19.2 Replacement of the oil-fired furnace chimney

19.2.1 Scope

19.2.1.1 Replacement of the furnace chimney

19.2.2 Technical description

19.2.2.1 The Contractor shall remove the old chimney and keep it to fabricate one of the same model.

19.2.2.2 Installation of the chimney with its mounting brackets.

19.2.2.3 Checking its sealing.

19.2.3 Proof of performance

Inspection

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

Certification

19.2.3.2 The Contractor shall submit to the Chief Engineer two (2) paper copies of inspection certificates with their original copy no later than five (5) days after completing the work. The Contractor shall also send an electronic copy of the certificates to the Vessel Maintenance Manager no later than five (5) days after completion of the work.

19.2.4 Deliverables

Drawings/reports

19.2.4.1 The Contractor shall provide the Chief Engineer with a paper copy of its report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor is to also send an electronic copy of the report to the Vessel Maintenance Manager.

19.3 Main port engine central ventilation

19.3.1 Scope

19.3.1.1 Remove the central supply fan from the port main engine,

19.3.1.2 The recognized firm shall replace or repair all defective items; the final cost is to be adjusted on PWGSC Form 1379.

19.3.2 Technical description:

19.3.2.1 The Contractor shall remove the fan with its motor.

19.3.2.2 It will be responsible for ensuring that the fan circuit breaker is OFF and that the safety lockout is applied.

19.3.2.3 All electrical and mechanical connection work is to be carried out by the Contractor.

19.3.2.4 The motor shall be shipped to an electric motor specialist that will assess the motor’s condition before making the decision to rewind it or purchase a new one.

19.3.2.5 The Contractor will be responsible for handling and transporting it.

19.3.2.6 Please notify the manager if abnormalities are found.

19.3.3 Proof of performance

Inspection

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

Certification

19.3.3.2 The Contractor shall submit to the Chief Engineer two (2) paper copies of inspection certificates (Megger insulation test) with their original copy no later than five (5) days after completing the work. The Contractor shall also send an electronic copy of the certificates to the Vessel Maintenance Manager no later than five (5) days after completion of the work.

19.3.4 Deliverables

Drawings/reports

19.2.4.1 The Contractor shall provide the Chief Engineer with a paper copy of its report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor is to also send an electronic copy of the report to the Vessel Maintenance Manager.

20 VARIOUS WORK

20.1 Installation of a washing machine and moving paint store:

20.1.1 Scope

20.1.1.1 Move the paint cabinet and install new laundry washing machine.

20.1.1.2 The washing machine and the paint cabinet are provided by the Coast Guard.

20.1.2 Reference

20.1.2.1 Photo

20.1.2 Technical description

20.1.2.1 The Contractor shall fabricate and install a 24 inch by 24 inch support for the new washing machine.

20.1.2.2 And another 22 inch X 20 inch support for mounting the paint cabinet.

20.1.2.3 The supports are to be fabricated from aluminum angles 1½ in. X 1 ½ in.

20.1.2.4 The paint store location shall be used to mount the washing machine support and the paint store support shall be mounted behind the wheelhouse in the centre.

20.1.3 Proof of performance

Inspection

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

20.2 Replacement of kitchen cabinets (optional)

20.2.1 Scope

20.2.1.1 Remove and install new kitchen cabinets.

20.2.1.2 Fabricate kitchen cabinets

20.2.2 Reference

N/A

20.2.2 Technical description

20.2.2.1 The Contractor shall remove the old cabinet and prepare the surface.

20.2.2.2 The Contractor shall take the measurements to fabricate cabinets, special storage furniture, kitchen table and supply a corner vanity.

20.2.2.3 The Contractor shall install the new furniture.

20.2.2.4 The Contractor will be responsible for disconnecting and reconnecting electrical accessories (kitchen hood, microwave and power outlets)

20.2.3 Proof of performance

Inspection

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