CCGS Louis S St Laurent

ANNUAL REFIT SPECIFICATIONS

Spring 2023

CANADIAN COAST GUARD

ATLANTIC REGION

Version 1

April 03 – June 30, 2023

Preamble

1. **Owner's Representative**: All the following work shall be completed to the satisfaction of the Owner's Representative, who, unless otherwise advised, will be the Chief Engineer of the ship or his designated representative. Upon completion of each item of the specification, the Owner's Representative shall be notified so that he may inspect the work prior to final closing up and after complete closing up. Failure to give notification does not absolve the Contractor of the responsibility of providing the Owner's Representative the opportunity to inspect any item. Inspection of any item by the Owner's Representative does not substitute for any required inspection by Lloyd's Register Inspector (LRS), Public Works Procurement Canada (PWPC) or Health and Welfare Canada (HWC).

2. **Welding Standards:** The Contractor shall be certified by the Canadian Welding Bureau according to CSA Standard W47.1-1983 "Certification of companies for Fusion Welding of Steel Structures," Division 1, 2.1 or 2.2. Where welding is required on aluminium superstructure Canadian Coast Guard (CCG) specification for ALUMINIUM WELDING (TP 9415E) will apply and Contractor shall be qualified to CWB 47.2 for aluminium welding. The Canadian Welding Bureau shall approve all personnel performing welding. Any welding near bearings or electronic equipment shall have its work locally grounded. Welding is to be in accordance with the Canadian Coast Guard Welding Specifications for Ferrous Materials, Rev 4. A copy of the Welding Specifications is available upon request from the Owner's Representative.

3. **Service Conditions:** All work carried out shall be designed to meet the following service conditions:
    - Outside air temperature of minus (-) 40 degrees C to plus (+) 35 degrees C;
    - Wind velocity of 50 knots;
    - Water temperature of minus (-) 2 degrees C to plus (+) 30 degrees C;
    - Shock loading of 2.5 g horizontal, 1.5 g vertical.

4. **Staging:** Contractor shall supply labour and material to erect staging for access as necessary to carry out specified work and additional work as agreed and remove same after completion. Staging shall be included in quotation.

5. **Equipment:** The Contractor shall include in quotation the costs of all transportation, rigging, slinging, cranage, removals and installations of parts and equipment required to carry out work.

6. **Hot Work:** Any item of work involving the use of heat in its execution requires that the Contractor advise the Owners' Representative before starting such heating and upon its completion. The Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and for one full hour after all hot work. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. The Ship's extinguishers shall not to be used except in an emergency. The Contractor shall service and to refill any ship's extinguisher used under such conditions. The Contractor shall provide suitable fire-retardant coverings to protect wire ways, cables, equipment and structure from welding slag, splatter etc. The Contractor shall abide by the Coast Guard Hot Work Policy outlined in Appendix

7. **Equipment Removal**: Any piping, manholes, parts and/or equipment requiring removal to carry

out specified work and/or to gain access shall be refitted upon completion with new jointing, anti-seize compound, clamps and brackets as applicable (Contractor supplied) and secured in original condition. Any removals shall be jointly inspected by both the Contractor and the Owner's Representative prior to removal.

8. **Temporary Lighting/Ventilation:** Temporary lighting and/or temporary ventilation required by Contractor to carry out any item of this specification shall be Contractor supplied CSA approved equipment in good repair. This equipment shall be maintained in safe working condition during the work and removed upon completion.

9. **Cleanliness:** The Contractor shall ensure that all spaces, compartments and areas, both internal and external, are left in as clean a condition as found. The Contractor is fully responsible for the containment and removal of all debris and dust created by work arising from this contract. The Contractor shall be responsible for all costs associated with the containment and removal of such debris. All areas affected by the work are to be sealed and mechanically vented to an area well clear of the ship's interior, especially during removals and steel deck preparations.

10. **Chemist's Certificates:** The Contractor shall supply the Owner's Representative with marine chemists' or other qualified persons, certificates according to Transport Canada Marine Safety Bulletin (TCMSB) TP 3177E before any entry, cleaning, painting or hot work is commenced in confined spaces or machinery compartments. Certificates shall clearly state the type of work allowed and be renewed as required by the regulations. Copies of all certificates are required as follows: one to Owner's Representative, one posted outside each entrance to the space in question and one copy for the Fire Control Plan, located at the Gangway.

11. **Fire Fighting Systems:** Whenever any work is being carried out involving a ship's firefighting or fire detecting system, it shall be done in a way that leaves the vessel and any persons aboard with adequate protection against fire at all times. This shall be accomplished by removal or disarming of only part of the system at a time, by replacement with spares while work is in progress or by other means acceptable to the Owner's Representative.

12. **Primers:** Unless specified otherwise, any replacement and/or disturbed steel work shall be given a minimum of two (2) coats of Contractor supplied marine primer, CPA 234 Interprime 234 (RED) or CPA 098 Interprime 198 (GREY), acceptable to Owner's Representative, immediately upon completion of work. Lead-based paints shall not be used. All welds shall be chipped and cleaned prior to priming. All coatings to be applied as per manufactures instructions.

13. **Tools:** All materials, unless otherwise specified, shall be supplied by the Contractor. The Contractor to supply all necessary tools to do specified work except speciality tools that will be issued by and returned to the Owner's Representative. Otherwise, the ship's tools and equipment shall not be available for Contractor's use. Where an item is specified, and substitution must be made, the Owner's Representative must approve all material offered.

14. **Inspection:** The Contractor shall be responsible for calling in the services of Lloyd's Register Inspector (LR), and Health and Welfare Canada (HWC) Inspectors as required for surveys and inspections. The Contractor shall provide as much notice as is practical prior to inspections. The Owner's Representative reserves the right to attend such inspections. Such inspections do not replace the requirement to have the Owner's Representative inspect the work.

15. **Crown Access/Activities:** During the period that this vessel is in refit, members of the ship's crew, ship's engineers, Regional staff and service specialists will be carrying out repairs and maintenance to various ship's equipment not covered in this specification. The Contractor shall not deny access to the vessel to these persons. Every effort will be taken to ensure that this self-maintenance will not interfere or conflict with work being carried out by Contractor's personnel.

16. **Scheduling:** The successful Contractor shall provide at Pre-Refit Meeting a Production Bar Chart showing commencement and completion dates for each item in this specification. This document shall highlight any critical dates and show the effects of late completion of the work plan. Updated Production Schedules shall be presented by the Contractor at each refit meeting or more frequently if requested by the Owner's Representative.

17. **Test Results:** All test results, calibrations, measurements, trials and readings shall be properly tabulated and complied into three typewritten copies and distributed as follows; two copies to Coast Guard Technical Services and one to the Lloyd's Inspector. All test and trials shall be performed to the satisfaction of the owner's representatives and the LR inspector prior to completion of the Contract.

18. **Instructions:** The overhaul and installation of all machinery and equipment specified herein shall be as per the Manufacturers' applicable instructions, drawings and specifications.

19. **Equipment Calibration:** The Contractor shall be responsible to ensure all testing and measurement equipment (mechanical or electronic) required to complete the specified work is calibrated and that calibration certificates for said devices are submitted to the Technical Authority prior to final inspection or witnessing of tests.

20. **Workmanship:** The Contractor shall use fully qualified, certified and competent tradesmen and supervision to ensure a uniform and high level of workmanship as judged by normally accepted shipbuilding standards to the Owner's Representative's satisfaction.

21. **Supervision:** During all phases of the contract, the Contractor will ensure appropriate supervision of both Contractor's and subcontractor's personnel. Supervisory personnel are to accompany employees always while working in the vessel's accommodation areas and cabins.

22. **Equipment Inspection:** Any items or equipment removed and subsequently reinstalled in order to carry out the work specified or arising shall be jointly inspected for damages prior to removal by both the Contractor and Owners representative.

23. **Protection:** The Contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The Contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit which might become damaged by exposure, movement of materials, paint, sand grit or shot blasting, welding, airborne particles from sand grit or shot blasting, welding, grinding, burning, gouging, painting or airborne particles of paint. Any damage shall be the responsibility of the Contractor.

24. **Asbestos Containing Materials:** Contractor shall ensure all materials supplied are asbestos free. An onboard asbestos materials survey conducted in 2006 has determined that there are small quantities of non-friable ACMs (Asbestos Containing Materials) onboard the Canadian Coast Guard Ship (CCGS) Louis S. St-Laurent. The ACMs were found to be in some:
    - Window caulking / linings, dark grey in colour.
    - Conduit penetrations, fire-stop grey, beige, and brown in colour.
    - A black insulating sink underside coating in science labs No. 426

    All other materials onboard the CCGS Louis S. St. Laurent have been found to be asbestos free. Contractors must follow the vessel's Asbestos Management Plan when handling, disturbing, or working in the direct vicinity of these identified ACMs. Type 1 Work Procedures are necessary when working with these materials. Contractors must employ workers specifically trained and certified in dealing with ACMs or subcontract to parties that have personnel certified and trained to work with these materials.

    There is a comprehensive list onboard of spaces and materials regarding their ACM composition. The Contractor shall obtain specific job site information from the Owner's Representative to determine if these ACMs are present.

    All necessary documentation of compliance with these standards shall be completed and given to the Owner's Representative prior to, during, and after completion of all work as applicable to the process. Air quality testing shall be carried out prior to and after completion of work by certified personnel with the proper equipment. Copies of all air quality testing shall be given to the Owner's Representative.

25. **Smoking:** The Public Service Smoking Policy forbids smoking in Government ships in all areas inside the ship where shipyard personnel shall be working. The Contractor shall inform employees of this policy and ensure it is complied with in all cases.

26. **Cranage:** Any crane work in CCG yard, CCG Yard Supervisor has to be notified prior to any crane preferable 24hrs notice. Contractor must abide by the attached load restrictions for the various wharf sections as detailed in the Appendix.

27. **Restricted Areas:** The following areas are out of bounds to Contractor's and Sub-Contractors' personnel except to do work as required by the specifications: all cabins, offices, wheelhouse, control room, converter room, transformer room, gym area, public washrooms, cafeteria, dining room and lounge areas. The Contractor shall cover any carpeted areas before commencement of any work. The Contractor shall ensure that no employees bring meals on board the ship.

28. **Drawings:** All drawings and drawing revisions that the Contractor is requested to do, in the execution of this contract are to be of a quality equal to that of the drawings that are requested to be updated. For example, drawings that have been lettered and dimensioned in a professional manner are not to be updated using a freehand scrawl. Prints and reproducible that a Contractor is required to provide are to be made on one sheet of paper as opposed to gluing, taping and stapling smaller pieces

29. **Halocarbon Policy**: The Contractor is to note that the Coast Guard has a Policy for Controlling Halocarbon Use Aboard Ships in place. The policy is section 7.F.10. of the Fleet Safety Manual, a copy of which is in the attached Safety Annex. The Contractor will be responsible to ensure the Contractor’s personnel, including subcontractors, follow this policy.

30. **Waste Oil Disposal:** Disposal of waste oil products shall be carried out by the Contractor, or subcontractors, who have been licensed by provincial authorities for the disposal of petroleum products. Copies of certificates must be produced upon request. This must be in accordance with the Coast Guard Policy for Handling Fuel, Oil, and Waste Oil Products, which is part of the Fleet Safety Manual, section 7.F.1. a copy of which is in the attached safety annex.

31. **Waste Products Disposal:** Similarly, the disposal of waste products from blasting and mechanical cleaning is to be carried out by the Contractor, or subcontractor, who have been licensed by provincial authorities for the disposal of such products and is to abide by provincial and municipal regulations. Copies of certificates must be produced upon request.

32. **Standards:** All requirements of Canadian Labour Code Part 2 and applicable provincial regulations, Marine Occupational Health and Safety Regulations and Canadian Coast Guard Fleet Safety Manual are to be satisfied by all contractual activities undertaken onboard the CCGS Louis S. St. Laurent.

33. **Electrical Installations:** All electrical installations or renewals shall be in accordance with the latest edition of the following Marine standards:
    - TP 127 - Ship Safety Electrical Standards
    - IEEE Standard 45 - Recommended Practice for Electrical Installation on Shipboard.

34. **Safety:** Prior to the pre-refit meeting, the successful Contractor is to provide his company Safety Plan pertaining to this contract and addressing the CCG Safety Regulations and relevant Government Regulations. The Contractor shall note that Canadian Coast Guard ships are presently working under the ISM code and each ship has a Fleet Safety Manual onboard. The Fleet Safety Manual will be adhered to when contract work involves CCG personnel and any other Public Service Employee during the contract period. Following are the listings of the applicable work instructions found in the Safety Manual and are contained in Appendix

    7.B.2 Fall Protection
    7.D.9 Entry into Enclosed Spaces
    7.D.11 Hot Work
    7.D.19 Lockout and Tag Out
    7.F.1 Handling Fuel, Oil and Waste Oil Products
    7.F.6 Handling Storage and Disposal of Hazardous Materials
    7.F.9 Paint and Other Coatings
    7.F.10 Controlling Halocarbon Use Aboard Ships
    7.F.12 Potable Water Quality Policy

**** Note*****

1. The Contractor shall maintain a log recording all personnel entering confined spaces. The log shall record times of entry, departure and names of all persons involved.

2. The Contractor is to ensure that their rescue equipment is aboard ship as stated in the Contractor's Safety Plan.

3. This is considered a Federal Workplace to which the Canada Labour Code Part II will apply.

All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. An Electrical Officer shall assist Contractor in identifying the locations to perform the lock outs but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work an Electrical Officer shall be in attendance when all locks/tags are removed.

H-01 Services

PART 1: SCOPE

1.1. The Contractor shall provide the services listed below for the duration of the refit period.

PART 2: REFERENCES

2.1. N/A

PART 3: TECHNICAL DESCRIPTION

3.1. The following services shall be supplied or be available upon the commencement and duration of the contract work period.

3.1.1. Oily Bilge Water: The Contractor shall quote on removing from the ship's bilges 200m^3 of oil/water mixture and a unit price per additional m^3 for adjustment purposes. The quotation shall include carnage, pump, trucking and disposal of waste mixture. Original documentation must be provided from the licensed firm(s) subcontracted for pumping and disposal of oily bilge water.

3.1.2. Cleaning: The Contractor shall ensure all spaces, compartments and areas of the ship where work was done are left in an "as clean as found condition". The cost of clean-up shall be included in each specification item.

3.1.3. Equipment/Machinery Survey Reports: Contractor shall prepare two bound and one electronic copy (in a .pdf format) report of all specified certificates, readings and measurements. All documentation will be dated when data was collected and correlated by specification. A bound copy shall be hand delivered to the Chief Engineer and Vessel Maintenance Manager. The electronic copy will be provided on USB flash drive.

3.1.4. Quality Control: The Contractor shall provide and mange quality assurance documentation and Inspection and Test Plan (ITP) as per ISO certification requirements. The IPT shall be provided to CCG within two weeks of contract award. Any changes to the ITP, required by CCG, shall be identified and forwarded to the Contractor for inclusion in the document. The ITP must include witness and hold points that provide all parties (i.e. Contractor, CCG, ABS) an opportunity to inspect to ensure quality of the work. All witnesses shall sign the applicable ITP as having been completed and acceptable. Any inspection that is not acceptable must be corrected by the contractor in a timely fashion and retested/re-inspected to the satisfaction of the Chief Engineer. At the completion, the Contractor must present one electronic copy of the signed ITP to the Chief Engineer and Vessel Maintenance Manager.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection/Testing

5.1.1. Completed ITP and Machinery Survey Reports

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Completed ITP and Machinery Survey Reports.

6.1.2. Proof of final Oily Bilge Water volume removed from vessel.

H-02 Bilge Cleaning

PART 1: SCOPE

1.1. The contractor shall clean the bilge area of the vessel near the end of the refit.

1.2. The following bilge areas are to be cleaned:

1.2.1. Upper forward engine room around and beneath #1& #2 ship service generator sets, and around and beneath #1 and #2 main generator sets.

1.2.2. Lower forward engine room – all areas beneath deck plate level

1.2.3. Aft engine room – all areas beneath deck plate level

1.2.4. Fwd motor room – all areas beneath deck plate level and beneath motor seats

1.2.5. Aft motor room – all areas beneath deck plate level out to ships side including area beneath motor seat.

PART 2: REFERENCES

2.1. None

PART 3: TECHNICAL DESCRIPTION

3.1. Contractor shall water clean and degrease the areas noted above using high pressure (3000 psi minimum) and hot water.

3.2. Contractor shall remove any loose scale or accumulated sludge. Hand scraping shall be required to facilitate the removal of same.

3.3. Contractor shall remove all sludge, scale and accumulated debris in all suction wells, cofferdams and frame spaces in which various suction pipes are located. The contractor shall assume mechanical power tool removal shall be required. Assume:

- Four cofferdams
- Eight wells
- Four frames spaces

3.4. All scupper drains from upper forward engine room flat to lower forward engine room bilges shall be thoroughly washed, flushed and proven clear. The contractor shall allow time for the cleaning of six scuppers and connected drain piping

3.5. Contractor shall be responsible for removal of all wash water and debris found in bilge areas.

3.6. Any free liquid in bilges at commencement of this item shall be removed by Contractor. Cost for doing so will be dealt with under H-02 Services.

3.7. Contractor shall take all necessary precautions to protect electrical machinery and equipment, junction boxes and other machinery and equipment from ingress of water during the washing process. Any ingress of water or damage to any equipment caused thereby will be corrected by the Contractor at their expense.

3.8. Any splashing of dirt, debris, oily sludge or other substance onto any area above or beyond areas dealt with shall be contained and limited to as great a degree as is reasonably practical. Any areas so affected are to be cleaned by the Contractor. All areas are to be left in a clean condition.

3.9. Cleaning shall be undertaken as close as practical to the end of refit, any dirt or debris found in the bilges after that cleaning will be the responsibility of the contractor to clean/remove.

3.10. This item is intended for the cleaning of bilge spaces from an as found condition. Any dirt or debris in the bilge caused by a specific work item in this specification shall be removed as part of that specification item.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All areas shall be inspected by Chief Engineer or his delegate before being considered complete.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The contractor shall provide original documentation of fluids removed from vessel so that it can be entered into Oil Record Log Book.

H-03 Fire Fighting Service

PART 1: SCOPE

1.1. The contractor shall carryout inspection and certification of the fixed and portable firefighting equipment fitted to the vessel.

1.2. The Contractor shall remove designated CO2 bottles from the fixed firefighting system and perform hydro test that are due.

PART 2: REFERENCES

2.1. Alongside 2023-List of Extinguishers

2.2. Alongside 2023-List of CO_2 Bottles

2.3. Contractor shall inspect and service all equipment herein specified to applicable NFPA Standards and requirements.

PART 3: TECHNICAL DESCRIPTION

3.1. The contractor will arrange for inspection and recertification of all fixed and portable firefighting equipment onboard the vessel. The contractor to include in the bid price all service, materials and supplies required to for annual inspection and certification of equipment. Systems to be serviced are described below.

3.2. Fixed CO_2 System

3.2.1. The Contractor shall inspect all systems including all piping, pull stations, alarms, pressure switches, sirens, lights, etc. **All flexible hoses (one per bottle) shall be replaced with new hose assemblies certified as acceptable for CO2 application. The Contractor shall include in their bid an allowance of $7000 for the replacement of hoses. Actual cost shall be adjusted via a 1379**

3.2.2. The Contractor shall remove the following CO_2 bottles from the vessel and complete a hydrostatic testing. After successful completion of the hydro-testing. The Contractor shall refill the bottles and install back on the vessel

3.2.2.1. Five 75lb spare bottles in the CO_2 room.

3.2.2.2. Five 50lb main engine bottles

3.2.3. Seventy-eight (78) 100lb CO_2 cylinders located in the CO_2 Room on the Upper Deck cover the following spaces:

3.2.3.1. Two 75lb CO_2 cylinders- Aviation Fuel Cofferdam (Main Dk. Aft)

3.2.3.2. Two 75lb CO_2 cylinders- Port, Centre and Starboard Propulsion Motors (AMR 19' Flat Port)

3.2.3.3. One 75lb CO_2 cylinder- Transformer Battery Room (Converter Rm. Stbd)

3.2.3.4. One 75lb CO_2 cylinder- Shore Transformer Room (B/Dk. Stbd)

3.2.3.5. One 25lb CO_2 cylinder- Battery Rm. (F/B Dk. Port by Barge)

3.2.3.6. One 75lb CO_2 cylinder- Lamp & Paint Room (Lower Dk. Aft)

3.2.3.7. One 75lb CO_2 cylinder- Ship's Stores Locker (Lower Dk. Aft)

3.2.3.8. One 50lb CO_2 cylinder- #1 Main Engine

3.2.3.9. One 50lb CO_2 cylinder- #2 Main Engine

3.2.3.10. One 50lb CO_2 cylinder- #3 Main Engine

3.2.3.11. One 50lb CO_2 cylinder- #4 Main Engine

3.2.3.12. One 50lb CO_2 cylinder- #5 Main Engine

NOTE: CO2 hose connections to main engines (alternators) and propulsion motor are to be disconnected from respective machines prior to blowing through to prove clear.

3.3. Foam Systems

3.3.1. The contractor shall inspect, test and certify the AFFF foam system for Helicopter Deck.

3.3.2. Inspection to include cleaning of strainers, pressure balance diaphragm and all control tubing, hoses and fittings.

3.3.3. The contractor shall also have a sample of foam tested from the system. The contractor shall provide documentation of test results.

3.4. Galley Suppression System

3.4.1. The contractor shall inspect, test and certify the galley range hood fire suppression system.

3.4.2. The system is an Ansul R-102 arrangement with one 24lb wet chemical extinguisher.

3.5. Portable Extinguisher

3.5.1. The contractor shall perform annual testing on the fire extinguishers on board the vessel.

3.5.2. The contractor shall ensure that the vessel is left with adequate extinguishers onboard the vessel at all times during the testing. At no time shall all the extinguishers be removed from the vessel. The contractor shall consult with the CCG TA or his designate on this matter to determine appropriate levels.

3.5.3. A summary of extinguishers are listed below and a detailed list of extinguishers is provided in appendix.

3.5.4. Extinguisher type and quantity carried on board (Total number: 172)

2.5 lb. Dry Chemical:	8	5 lb. CO2:	19
5 lb. Dry Chemical:	16	10 lb. CO2:	11
10 lb. Dry Chemical:	52	15 lb. CO2:	32
20 lb. Dry Chemical:	10	20 lb. CO2:	7
30 lb. Dry Chemical:	2	2.5 gal Foam:	3
50 lb. Dry Chemical:	2	2.5 gal Pressurized Water:	4
300 lb. Dry Chemical:	1	24 lb. Wet Chemical:	1
20 lb. PK:	4		

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be carried out to the satisfaction of the Chief Engineer and attending Class Surveyor.

5.2. Testing

5.2.1. All inspections and testing of equipment to be completed to NFPA Standards and Requirements

5.3. Certification

5.3.1. The contractor shall provide original certificates.

5.3.2. The contractor shall provide .pdf copies of certificates in final report.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The contractor shall provide detailed reports of all inspections, defect found and corrective measures taken.

H-04 Fire & Bilge Detection

PART 1: SCOPE

1.1. Contractor shall test and certify the fire detection and bilge level alarm system on the vessel.

PART 2: REFERENCES

2.1. Vessel System Location Drawing (Updated Dwg 30-05-2019)(Presented at start of refit).

2.2. Fire Sys Devices (note device type will be changed from this drawing).

PART 3: TECHNICAL DESCRIPTION

3.1. The ship's fire detection and bilge level monitoring system shall be inspected, tested, serviced and recertified by a recognized service provider for the specific make and type of the noted system.

3.2. Contractor to include an allowance in bid cost of $10,000.00 for service provider (Siemen's FSR) to recertify system. Final cost to be adjusted to reflect final invoiced cost from service provider.

3.3. Contractor to note a number of devices are situated in confined space areas.

3.4. Contractor shall be responsible for provision of assistance to service provider with regards to personnel access for the purposes of testing bilge level sensors in confined spaces. Contractor shall open, ventilate and certify safe for entry the following spaces:

- #1 void
- #2 voids, port & stbd
- Port transducer compartment
- Center Transducer compartment
- Pipe tunnel
- Speed log compartment
- Av gas cofferdam
- Two additional cofferdams around the Multi-beam transducer casing.

3.5. The contractor shall make allowances for ongoing work on other specification items and schedule the completion of this item only after work and cleaning of disturbed spaces is complete. This shall ensure that fire detection sensors, etc., do not become coated with dust or debris after they are inspected.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be carried out to the satisfaction f the Chief Engineer and attending ABS Surveyor.

5.2. Testing

5.2.1. Testing of detector will be determined by Siemens FSR

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Full report of inspection, complete with certification, indicating that the system is certified for use.

H-05 Electronics Workshop Modernization

PART 1: SCOPE

1.1. The Contractor shall supply furnishing as per attached quote.

1.2. The Contractor shall locate the furniture on the navigation bridge deck and assist supplier in installation.

1.3. This work will be completed in concurrence with specification H-11 Flooring Renewal

PART 2: REFERENCES

2.1. Furniture Layout-Option 1

2.2. Superior Office Interiors Quote-24613 CCG Louis St. Laurent Electronics Workshop Option 1

PART 3: TECHNICAL DESCRIPTION

3.1. Removals

3.1.1. The Ship's Crew shall remove all of the material and furniture in the space.

3.1.2. Time must be allowed for the Ship's crew to wallpaper and run electrical outlets in the space.

3.1.3. Flooring in H-11 must be completed before furniture is installed.

3.2. Furnishings

3.2.1. The Contractor shall supply office furniture as per referenced quote. The quote includes installation.

3.2.2. The furniture shall been lifted to the Navigation Bridge Deck by the ships crane. The Contractor shall be responsible to move the furniture into the space.

3.2.3. The Contractor shall bid 60 hours to assist with installation and any additional work. This will be adjusted by 1379 at the completion of the work.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work shall be completed to the satisfaction of the Chief Engineer and Electronics Technician.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-06 Safety Valve Testing

PART 1: SCOPE

1.1. Contractor shall arrange for the testing and recertification of Safety Relief Valves as listed in 2023 Safety Valve List.

1.2. Individual certificates shall be prepared and delivered with the valves on their return. Work completed on valve will be done by a provincially authorized facility.

PART 2: REFERENCES

2.1. 2023 Safety Valve List

PART 3: TECHNICAL DESCRIPTION

3.1. The contractor shall remove and reinstall all the valves. All open fittings shall be blanked or plugged as appropriate when valves are removed to prevent ingress of foreign material into associated systems. All valves shall be reinstalled in original position with all new jointing materials.

3.2. Ship's crew shall assist with identifying valves and requirements for isolation and lock out. Contractor shall be responsible for all system lock out requirements.

3.3. Access to valves #18 and #19 is via aviation fuel tank cofferdam and will require confined space entry. The aviation fuel tank Fire Engulfment valve, #17, will require a crane to move it to and from the aft deck.

3.4. All steam valves shall be tested on steam and this shall be noted on respective certificates.

3.5. Valves #10, 11, 13 and 14 shall be disassembled for full cleaning and inspection prior to test. Valves shall be inspected by ABS surveyor. Valves shall be reassembled and tested.

3.6. All other valves shall be tested only in an as delivered state unless there are obvious external defects noted which will preclude testing.

3.7. All defects encountered shall be dealt with by 1379.

3.8. It is imperative that status of valves is accurately tracked, that defects are conveyed to CG as soon as possible once identified and that corrective measures are processed as soon as possible.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Refer to 3.5

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Original test certificates for all valves shall be presented to the Chief Engineer. Electronic copies will be presented with deliverable package.

H-07 Steam Piping Renewals

PART 1: SCOPE

1.1. The Contractor shall renew sections of steam and condensate piping as outlined in the specification below.

PART 2: REFERENCES

2.1. Sketch # LSSL-23-01 Steam System Renewal – Flight & Boat Deck, Sheets 1 to 3

PART 3: TECHNICAL DESCRIPTION

3.1. General Notes

3.1.1. Before any work is started, the Contractor must ensure that steam to the system is isolated, locked and tagged. The Senior Engineer with work with the Contractor to ensure that this is done safely.

3.1.2. The current arrangement of steam piping has varied material and securing arrangements for repairs. For the purpose of this specification all steam piping will be renewed with schedule 40 seamless black iron and all condensate piping will be schedule 80 seamless black iron. Sizes noted at nominal.

3.1.3. All steam piping is insulated. Piping runs use piping lagging and blankets are used around valves at steam heaters. At the start of the refit, the Contractor shall remove all pipe lagging and be responsible for disposal. Blankets shall be clearly marked and stored for the duration of the refit to be installed after work is proven. Any new blankets shall be addressed via 1379.

3.1.4. Flanges are only used on bulkhead/deckhead penetrations. The flanges shall be class 150 and will be fully floating slip on, weld to pipe on both sides. The vessel shall supply gasket material for these flanges. The Contractor shall use imperial grade 5, zinc plated hardware for securing and it must have high heat anti-seizing compound applied to the flanges.

3.1.5. The Contractor shall use socket piping for the remainder of the piping runs. These shall be schedule 80 pipe fittings.

3.1.6. There are two types of deckhead and bulkhead penetrations. See reference drawing. Bolted penetrations are used on aluminum decks and welded penetrations are used on steel decks and bulkheads.

3.1.7. Welded penetrations will require lead abatement before hot work can proceed. The Contractor shall bid on replacing all of these penetrations; however, the Chief Engineer shall assess the condition of the penetration to determine if replacement is required.

3.1.8. Following successful pressure testing as indicated in para 5.2, the Contractor shall complete insulation with a certified 3rd party. Insulation must cover all hangars and flanges so that no part of the piping is exposed. The Contractor shall allow $15,000 to complete this work. A 1379 shall be issued to address any changes based on final invoice.

3.1.9. Around space heaters and valves, welded connection shall be used whenever possible. In some instances threaded connections may be used.

3.2. Emergency Generator Compartment

3.2.1. This area contains all piping in the Emergency Generator Compartment. This section has 6 welded bulkhead penetrations as well as 2 welded deckhead penetrations.

3.2.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	75'
2"	75'

3.2.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	8	0	4	0	8
2"	8	0	4	0	8

3.3. Forward of Emergency Compartment

3.3.1. This area is piping forward of the emergency Generator Compartment. It is Engineroom fan inlet and Accommodation stairwell down to 400 deck. This section has 4 bulkhead penetrations. They are bolted connections.

3.3.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	30'
2"	30'

3.3.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	10	8	5	2	9
2"	10	6	5	2	9

3.4. Helicopter Hangar

3.4.1. This area is piping contained within the helicopter hangar and contains two space heaters. There are 8 welded bulkhead penetrations.

3.4.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	60'
2"	65'

3.4.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	10	4	12	2	8
2"	10	0	9	2	8

3.5. Deck Workshop

3.5.1. This area has two welded bulkhead penetrations.

3.5.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	10'
2"	10'

3.5.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	2	0	0	0	4
2"	2	0	0	0	4

3.6. Helicopter Workshop

3.6.1. This area has two welded bulkhead penetrations.

3.6.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	10'
2"	10'

3.6.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	2	2	0	0	4
2"	2	2	0	0	4

3.7. Fan Room No. 4

3.7.1. This area has no bulkhead penetrations.

3.7.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	10'
2"	15'

3.7.3. The fittings are:

Pipe	Coupling	45	90	Tee	Flanges
1 ¼"	2	2	4	0	2
2"	2	1	4	2	8

3.8. Fan Room No. 7

3.8.1. This area has no bulkhead penetrations.

3.8.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	10'
2"	15

3.8.3. The fittings are:

Pipe	Union	45	90	Tee	Flanges
1 ¼"	2	2	4	0	2
2"	2	1	4	2	8

3.9. Fan Room No.9

3.9.1. This area has no bulkhead penetrations

3.9.2. The piping diameter and length is:

Pipe Diameter	Length (approximate)
1 ¼"	10'
2"	15'

3.9.3. The fittings are:

Pipe	Union	45	90	Tee	Flanges
1 ¼”	2	2	4	0	2
2”	2	1	4	2	8

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Gasket Material

4.2. Valves

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

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

5.2. Testing

5.2.1. All connections shall be tested hydraulically to 100psi. This may have to accomplished is sections as they are completed. Testing will be completed before piping is insulated.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-08 Fire Main Piping Renewals

PART 1: SCOPE

1.1. The Contractor shall renew sections of fire main piping. This work shall be completed concurrently with H-09 Sprinkler Piping Renewal, H-10 Deckhead Panel Renewal and Deckhead Panel Lighting.

PART 2: REFERENCES

2.1. Fire Main Renewal- 5 Sheets

PART 3: TECHNICAL DESCRIPTION

3.1. General Notes

3.1.1. The Contractor shall release and remove existing pipe sections from vessel, fabricate a direct replacement and reinstall with new gaskets for the service. Interference items shall be removed, as required, for access and returned to an as found arrangement and condition on completion of pipe renewal and testing.

3.1.2. This run of piping is fed from deck penetration in the port storage locker on the Flight and Boat Dk. This must be blanked at the start of the work period so that the remainder of the fire main is operational. 24 hours' notice must be given to the vessel before work starts.

3.1.3. Existing piping bends may be replaced with shallow angle elbows if required, but must be installed to minimize pipe restrictions.

3.1.4. All new sections of piping and fittings will be schedule seamless 80 black iron. Sizes noted are nominal.

3.1.5. All pipe flanges shall be class 150 and will be fully floating slip on, welded to pipe on both sides.

3.1.6. All pipe fittings shall be schedule 80 and shall be butt welded. No socket weld fittings shall be used.

3.1.7. All new piping shall have the "2023" welded on the outside of each spool to denote year it was installed.

3.1.8. Completed piping shall be hot dip galvanized before installation.

3.1.9. All hardware used at flanged joints shall be imperial, grade 5, zinc plated and shall have anti-seize compound applied at time of fitting.

3.1.10. All joints shall be sealed with 1/8" Duron 8500 sheet packing. Joints shall have anti-seize compound applied at time of fitting.

3.1.11. All new piping shall that was initially insulated shall be re-insulated and relabelled (CCG Pipe Coding Standard) back to an "as found' condition". This means using lagging paste and wrap! In some instances in the accommodations, this may have to be complete before installing the piping.

3.1.12. There are two types of deckhead and bulkhead penetrations. See reference drawing. Bolted penetrations are used on aluminum decks and welded penetrations are used on steel decks and bulkheads.

3.1.13. Welded penetrations will require lead abatement before hot work can proceed. The Contractor shall bid on replacing all of these penetrations, however, the Chief Engineer shall assess the condition of the penetration to determine if replacement is required.

3.2. Piping Run 1: Fire Stations 1 and 2

3.2.1. The scope of this section is the fire stations 1 and 2 located on Monkey's Island that run directly downward through the forward engine room casing down to tie into fire main in the port and starboard hallway of the Flight and Boat Deck.

3.2.2. This section has 4 welded deckhead penetrations.

3.2.3. The Contractor shall have to erect temporary scaffolding in the forward engine room casing so gain access to deck flange at underside of wheelhouse top. The height off deck is approximately 16'

3.2.4. The piping diameter and length is:

Pipe Diameter	Length (approximate)
2 ½"	50'

3.2.5. The fittings are:

Pipe	30	45	90	Tee	Flanges
2 ½"	4	0	6	0	16

3.3. Piping Run 2: Fire Stations 3 and 4

3.3.1. The scope of this section is fire stations 3 and 4 (located on the navigation dk and bridge deck respectively). It ties into the fire main in the forward engine room casing.

3.3.2. In order to complete this work, the Contractor shall remove deckhead sheathing in the Fire Arm Locker (206) to gain access to the deckhead. In addition to this the Contractor shall have to temporarily remove electrical panel PE34 located in the Telephone Exchange Room (105).

3.3.3. This section of piping has one bolted deck penetration and one welded deck penetration.

3.3.4. The piping diameter and length is:

Pipe Diameter	Length (approximate)
2"	20'
2 ½"	15'

3.3.5. The fittings are:

Pipe	30	45	90	Tee	Flanges
2"	2	0	4	0	8
2 ½"	2	0	1	1	6

3.4. Piping Run 3: Fire Stations 6, 9 and 10

3.4.1. The scope of this section is fire stations 6, 9 and 10. It is primary in the deckhead of the boat and fire deck and ties into the fire main in the port storage locker of this deck.

3.4.2. In order to complete this work

3.4.3. This section of piping has one bolted deck penetration, at fire station 6. There are an additional 3 bulkhead welded penetrations.

3.4.4. The piping diameter and length is:

Pipe Diameter	Length (approximate)
2”	15’
2 ½”	90’

3.4.5. The fittings are:

Pipe	30	45	90	Tee	Flanges
2”	2	0	3	5	8
2 ½”	2	2	10	2	32

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work will be completed to satisfaction of the Chief Engineer.

5.2. Testing

5.2.1. Before galvanizing, all piping sections shall be hydrostatically tested to 150 psi for a period of 15 minutes to be witnessed by delegated ship’s personnel.

5.2.2. Upon completion of installation (before insulating when possible), the pipe shall be pressure testing with ship’s General Service Pump to detect and leaks in the system joints.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-09 Sprinkler Piping Renewals

PART 1: SCOPE

1.1. The Contractor shall renew Sprinkler piping in the deckhead on the Bridge Deck (200Dk) and Flight & Boat Deck (300Dk).

1.2. This work will be completed in conjunction with H-08 Fire Main Piping Renewal, H-10 Deckhead Panel Renewal and L-02 Deckhead Panel Lighting.

PART 2: REFERENCES

2.1. Sprinkler System-Bridge Dk. Drawing

2.2. Sprinkler System-Flight and Boat Dk. Drawing

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. The Contractor shall remove, label location and safely store sprinkler heads. It is important that these heads go back in the same place after work is completed.

3.1.2. The sprinkler heads are all color coded for different temperature points for activation. The removed heads shall be stored in a safe location and reinstalled in their original locations upon the completion of the testing.

3.1.3. The final connection requires a reducing coupling these shall all be renewed.

3.1.4. The system requires blanking at the start of the work so that other areas are protected during the maintenance period.

3.1.5. The lengths and number of fittings are estimated. Any deviation from the numbers below will be adjusted by 1379.

3.1.6. Penetrations between decks will be addressed via 1379 once condition is determined.

3.2. Main Lines (above 2")

3.2.1. The Contractor shall renew existing piping with new. Hangars shall be reused.

3.2.2. All pipe flanges shall be class 150 and will be fully floating slip on, welded to pipe on both sides.

3.2.3. All pipe fittings shall be schedule 40 and shall be butt welded. No socket weld fittings shall be used.

3.2.4. Completed piping shall be hydraulically pressure tested to 200psi. After successful testing, they will be installed.

3.2.5. All hardware used at flanged joints shall be imperial, grade 5, zinc plated and shall have anti-seize compound applied at time of fitting.

3.2.6. All joints shall be sealed with 1/8" Durlon 8300 sheet packing. Joints shall have anti- seize compound applied at time of fitting.

3.2.7. <u>Bridge Deck</u>

3.2.7.1.The piping diameters and lengths are:

Pipe Diameter	Length (approximate)
2 ½ ”	100’
2”	30’

3.2.7.2. The pipe fittings for the Navigation Deck are:

Pipe	30	45	90	Tee	Flanges
2 ½ ”	0	2	4	6	10
2”	0	0	0	3	6

3.2.8. Boat and Flight Deck

3.2.8.1. The piping diameters and lengths are:

Pipe Diameter	Length (approximate)
2 ½ ”	75’
2”	60’

3.2.8.2. The pipe fittings for the Navigation Deck are:

Pipe	30	45	90	Tee	Flanges
2 ½”	0	0	4	4	8
2”	0	0	0	6	6

3.3. Branch Lines (below 2”)

3.3.1. The Contractor shall renew existing branch piping with new. Hangars shall be reused. It is critical that lengths remain the same so that existing deckhead panel (that are not being replaced) can be reused.

3.3.2. All new sections of piping and fittings will be schedule 40 seamless black iron.

3.3.3. All fittings shall be malleable iron class 150 fittings and shall be fitted with Teflon paste.

3.3.4. Bridge Deck

3.3.4.1. The piping diameters and lengths are:

Pipe Diameter	Length (approximate)
1 ½”	35’
1 ¼”	30’
1”	150’

3.3.4.2. The pipe fittings are:

Pipe	30	45	90	Tee	Unions
1 ½””	0	0	15	10	10
1 ¼”	0	0	4	6	8
1”	0	0	14	10	16

3.3.5. Boat and Flight Deck

3.3.5.1. The piping diameters and lengths are:

Pipe Diameter	Length (approximate)
1 ½”	40’
1 ¼”	75’
1”	225’

3.3.5.2. The pipe fittings are:

Pipe	30	45	90	Tee	Unions
1 ½””	0	0	2	6	6
1 ¼”	0	0	0	8	6
1”	0	0	30	20	26

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Ball valves for testing

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work will be completed to the satisfaction of the Chief Engineer.

5.2. Testing

5.2.1. For welded sections and before galvanizing (if applicable), all piping sections shall be hydrostatically tested to 200psi for a period of 15 minutes to be witnessed by delegated ship’s personnel.

5.2.2. Once assembled, the sprinkler zone shall be pressure tested:

5.2.2.1. The contractor shall replace all sprinkler heads with ½” short nipples and ball valves (CG supply). These fittings shall be installed with normal thread sealant (Teflon tape or equivalent).

5.2.2.2. The contactor shall install a compressed air connection at main forward and aft zone supply piping located in aft motor room. The connection shall be installed at the appropriate header for the zones being tested.

5.2.2.3. The compressed air connection is to consist of a gauge and isolating valve arranged such that once test pressure has been applied an isolation valve can be closed, air supply disconnected and pressure on system monitored by the gauge.

5.2.2.4. The Contractor shall apply 80psi of air pressure and the system must hold pressure for a period of 15 minutes .

5.2.2.5. On completion of testing, all ball valves and nipples shall be removed, and sprinkler heads reinstalled in original locations according to temperature ratings. All ball valves shall be returned to the vessel/Chief Engineer.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-10 Deckhead Panel Renewals

PART 1: SCOPE

1.1. The contractor shall supply and install new deckhead panels for the 200 and 300 decks as described in reference drawings.

1.2. This work will be completed in conjunction with H-08 Fire Main Piping, H-09 Sprinkler Main Piping Renewal and L-02 Deckhead Panel Lighting

PART 2: REFERENCES

2.1. Deckhead Panel Renewal Navigation Deck Drawing

2.2. Deckhead Panel Renewal Flight & Boat Deck Drawing

2.3. The measured areas are calculated at:

Description	Area
Bridge Deck (200 Dk)	1065 ft^2
Flight & Boat Deck (300 Dk)	1750 ft^2
TOTAL	2815 ft^2

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. It is important that the height of the newly install deckhead panels remains the same as the original.

3.1.2. The original configuration has several lighting fixtures combined with ventilation duct diffusers. These will be replaced with separate lights and diffusers.

3.1.3. During the maintenance period, Ship's Officer will move between Navigation Deck cabins and Flight & Boat Deck cabins. Scheduling of work must be designed to accommodate this.

3.1.4. Prior to commencing any work, Contractor must tag and lock out applicable system(s) being worked.

3.1.5. Any deckhead material (sprinkler heads, lights, fire detection equipment etc.) shall be photographed before removal and tagged for reinstallation.

3.2. Removals

3.2.1. The Contractor shall provide 48 hours' notice before starting work in any area. At that time, the Contractor shall consult with the Chief Engineer to determine if any deck head attachments are to be removed by Electronics Technicians or Electrical Officer.

3.2.2. The Contractor shall cover all furniture before dismantling deckhead panels and will consult with Chief Engineer to ensure that area is adequately covered before work commences.

3.2.3. The Contractor is responsible for the identification of any interference items, their temporary removal (with approval from the CGTA) and storage until work is completed. The Contractor is also responsible for refitting these items back to the vessel upon completion of the scope of work.

3.2.4. Existing deckhead and tracking shall be clearly labelled before removal. The height of deckhead shall be marked in several places so the new deckhead retains the same height as the existing.

3.2.5. The Contractor shall remove the existing deckhead and store until the end of the refit.

3.3. Installation

3.3.1. The Contractor is responsible for protecting surrounding areas and equipment while carrying out this work.

3.3.2. The Contactor shall install all panels and support structure, if required, as per manufacturers' recommendations and will complete panel fitting so that cut edges are not visible after installation. The contractor shall maintain the original deckhead height.

3.3.3. The installation of the new deckhead panels is to present a smooth flat finish with a level deviation not more than 1 cm in 5 meters length without visible gaps or edges.

3.3.4. The Contractor is responsible for any cutting of panels to fit ventilation, fire detection and sprinkler heads, lighting, speakers.

3.3.5. The Contractor shall reinstall items tagged for reuse. Removed items various previously removed components are to be properly reinstalled and their function to be assured by the Contractor.

3.3.6. The Contractor is to remove all debris and clean each space leaving ready for occupation.

3.3.7. The Contractor shall include in the bid to install twelve (12) 12"x12" and twenty (20) 4"x4" access hatches.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Deckhead Panels and Supports

4.2. Access Hatches and diffusers.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be completed to the satisfaction of the Chief Engineer.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-11 Deck Covering Renewal

PART 1: SCOPE

1.1. The contractor shall replace the floor covering in various areas on the vessel as identified below. There are two (2) areas for renewal.

1.1.1. Lower Deck (600 Dk.) Alleyways Port and Stbd: ~591 ft^2

1.1.2. Electronics Workshop (Nav. Bridge Dk.): ~130 ft^2

PART 2: REFERENCES

2.1. Drawing: Deck Covering Renewal Spring 2023 (4 sheets)

PART 3: TECHNICAL DESCRIPTION

3.1. Preparation and Removals

3.1.1. The contractor shall provide 48 hours' notice before starting work.

3.1.2. The contractor shall temporarily seal each work area with 6 mil plastic and tape to prevent escape of dust and debris from the removal of the flooring and substrate. Work area shall be sealed and ventilated such that a negative pressure is established in areas in which material is being removed. Extraction arrangement shall be sufficient to ensure no dust from removal process migrates to other adjoining areas of the ship. This preparation is to be completed and ventilation established prior to commencement of material removal and maintained for the duration of work.

3.1.3. The contractor shall notify the vessel's Duty Officer of the area in which they are removing deck covering and underlay material prior to commencing so that smoke detectors in respective work area may be isolated. The contractor shall ensure that heat and smoke detection devices are protected from ingress of air borne dust and debris.

3.2. Installation

3.2.1. Existing flooring in the areas identified in section 1.1 is vinyl tile on Laticrete or Dexotex underlay. All existing tiles and base trim shall be released from deck and bulkheads and removed from the vessel and disposed of by contractor.

3.2.2. On completion of tile removal, Contractor shall inform CGTA, who, along with the contractor shall inspect the underlayment to determine the amount that requires replacement.

3.2.3. The contactor shall quote on a separate line the cost to replace 200ft^2 of underlayment with a unit price adjustment. This work will include removing existing loose underlayment, preparation of exposed steel (assume power tool clean SSPC-SP-11) in accordance with Dexotex product instruction sheets and installation of new Dexotex Subkote #1 to level with existing

3.2.4. The contractor shall supply and install new Dexotex, Subkote #1 which will be applied to the entire surface to level and smooth decking at a minimum thickness of ½" to provide proper surface finish for tile installation.

3.2.5. The contractor shall install the sheets of Noraplan Envirocare as per manufacturer's recommendations.

3.2.6. New, 4" black base trim shall be installed as per original arrangement.

3.3. Finish

3.3.1. Upon completion of the Noraplan Envirocare installation, the contractor shall ensure that the newly laid floor covering is free from cuts, tears, burrs, stains or any defects.

3.4. All protections put in place to limit dust on vessel including smoke and heater detectors shall be removed to an “as found” condition.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Noraplan Envirocare Deck Covering 7065 – Pool Party (4 Rolls)

4.2. Noraplan Envirocare Deck Covering 7038 – Hide N Seek (2 Rolls)

4.3. Deck Covering Adhesive – AC MR/95 (4 Gallons)

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Before removal of tile, the Chief Engineer will inspect protections in place.

5.1.2. Before repairs to damaged subcoat, the contractor and Chief Engineer will agree on areas of repair. The Chief Engineer shall inspect bare steel areas to determine condition of steel after power tool cleaning.

5.1.3. After work is completed, the Chief Engineer and Contractor shall inspect area for cleanliness and tile finish.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. None

H-12 Official A Cabin Modernization (301)

PART 1: SCOPE

1.1. The contractor shall level and renew the flooring.

1.2. The contractor shall supply furnishing as per attached quote.

1.3. This work has to be completed early in the refit because the compartment requires fitting of furniture before the end of the contract.

PART 2: REFERENCES

2.1. R Corcoran Contracting Limited quote

2.2. Furnishing quote

PART 3: TECHNICAL DESCRIPTION

3.1. Removals

3.1.1. The Ship's Crew shall remove the all computers, supplies and furniture in the space.

3.1.2. The Contractor shall remove existing floor tiles

3.2. Flooring

3.2.1. The deck on the cabin has a high camber that shall be partially leveled with Dex-o-tex VLW @ 3" thick on outboard aft corner tapering forward and inboard @ 5' to meet existing deck.

3.2.2. The Contractor shall supply and install new Dexotex, Subkote #1 to the entire surface to level and smooth decking at a minimum thickness of ½" to provide proper surface finish for vinyl planks.

3.2.3. The Contractor shall install GSM vinyl planks as per guidance documents that will be presented at start of refit.

3.2.4. The calculated area is 160 ft^2.

3.3. Furnishing

3.3.1. The Contractor shall supply furniture as per referenced quote.

3.3.2. Ship's Crew will secure furniture.

3.3.3. Ship will load furniture on board vessel.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Vinyl Planks

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Before laying flooring, the Chief Engineer will inspect area to ensure that it properly prepared.

5.1.2. All work shall be completed to the satisfaction of the Chief Engineer and Logistic Officer.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-13 Wet Lab Modernization

PART 1: SCOPE

1.1. The contractor shall install new deckhead paneling (GSM) in this space.

1.2. The Contractor shall repair flooring as required.

1.3. The contractor shall supply furnishing as per attached quote.

1.4. This work has to be completed early in the refit because the compartment requires fitting of furniture before the end of the contract.

PART 2: REFERENCES

2.1. Furniture quote

PART 3: TECHNICAL DESCRIPTION

3.1. Preparations and Removals

3.1.1. The Ship's Crew shall remove the all supplies and furniture in the space.

3.1.2. The Ship's Crew shall cap off plumbing in the space.

3.1.3. The Contractor shall temporarily seal each work area with 6 mil plastic and tape to prevent escape of dust and debris from the removal of the flooring and substrate. Work area shall be sealed and ventilated such that a negative pressure is established in areas in which material is being removed. Extraction arrangement shall be sufficient to ensure no dust from removal process migrates to other adjoining areas of the ship. This preparation is to be completed and ventilation established prior to commencement of material removal and maintained for the duration of work.

3.1.4. The Contractor shall notify the vessel's Duty Officer of the area in which they are removing deck covering and underlay material prior to commencing so that smoke detectors in respective work area may be isolated. The contractor shall ensure that heat and smoke detection devices are protected from ingress of air borne dust and debris.

3.1.5. The Contractor shall remove steel backed coving that is currently around the existing cabinets.

3.1.6. The existing cabinets are mounted directly on the steel deck. Each cabinet has an area of 6ft^2. This area will require preparation of exposed steel (assume power tool clean SSPC-SP-11) in accordance with Dexotex product instruction sheets. and installation of new Dexotex Subkote #1 to level with existing flooring.

3.1.7. The Contractor shall remove and store the existing deckhead.

3.2. Flooring

3.2.1. The Contractor shall supply and install new Dexotex, Subkote #1 to the disturbed areas from 3.1.4 to level and smooth decking at a minimum thickness of ½" to provide proper surface finish.

3.2.2. The Contractor shall rough existing flooring to accept epoxy paint that will be applied by the Ship's crew.

3.3. Furnishing

3.3.1. The Contractor shall supply furniture as per referenced quote.

3.3.2. Ship's Crew will secure furniture.

3.3.3. Ship will load furniture on board vessel.

3.4. Deckhead

3.4.1. The total deckhead area is 150ft^2. The deckhead panel used shall be perforated type that shall be supplied by CCG.

3.4.2. The Contractor is responsible for protecting surrounding areas and equipment while carrying out this work.

3.4.3. The Contactor shall install all panels and support structure, if required, as per manufacturers' recommendations and will complete panel fitting so that cut edges are not visible after installation. The contractor shall maintain the original deckhead height.

3.4.4. The installation of the new deckhead panels is to present a smooth flat finish with a level deviation not more than 1 cm in 5 meters length without visible gaps or edges.

3.4.5. The Contractor is responsible for any cutting of panels to fit ventilation, fire detection and sprinkler heads, lighting, speakers.

3.4.6. The Contractor shall reinstall items tagged for reuse. Removed items various previously removed components are to be properly reinstalled and their function to be assured by the Contractor.

3.4.7. The Contractor is to remove all debris and clean each space leaving ready for occupation.

3.4.8. The Contractor shall include in the bid to install two air diffusers and one 4"x4" access hatch.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Deckhead Panels and associated trim

4.2. Ventilation air diffusers

4.3. 4"x4" access hatch

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

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

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

H-14 Hatch Renewal

PART 1: SCOPE

1.1. The Contractor shall procure a new hatch 5’ x 5’ flush mounted spring assisted hatch as specified by the Vessel’s Owners.

1.2. The Contractor shall remove existing hatch on the lower deck and replace with new hatch. This work will be complete concurrently with E-12 Air Receiver Installation

PART 2: REFERENCES

2.1. EMC H70 Series Hatch-size T.B.D

2.2. Quote

2.3. Engineering Drawing Package (To Follow)

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. Contractor to supply and install a new deck hatch on ship’s centre line located on the lower deck between frames 58 to 63. The new hatch shall be flush fitted on the deck plate of the bolted soft patch and installed with hinge connection.

3.1.2. Contractor shall perform all strip-out, manufacture and installation requirements to rework deck structure and fit the new hatches in accordance with referenced construction drawings and general notes therein.

3.1.3. Contractor shall ensure that new hatch aligns with existing hatch on upper levels. Pallets of material lowered through the hanger top hatch must pass through hatches below without the need to move or reposition lift hook or cable.

3.1.4. Affected areas of work shall be certified safe for hot work, with certification maintained throughout the entire work period.

3.1.5. All equipment, materials, and outfit located near work areas shall be suitably protected against any damage from work herein specified.

3.1.6. A concerted effort shall be initiated and maintained to ensure no materials, including sparks, slag, grindings, etc from cutting and/or welding, can migrate from the immediate work area and/or drop to the lower levels.

3.1.7. All removals shall be disposed of by Contractor.

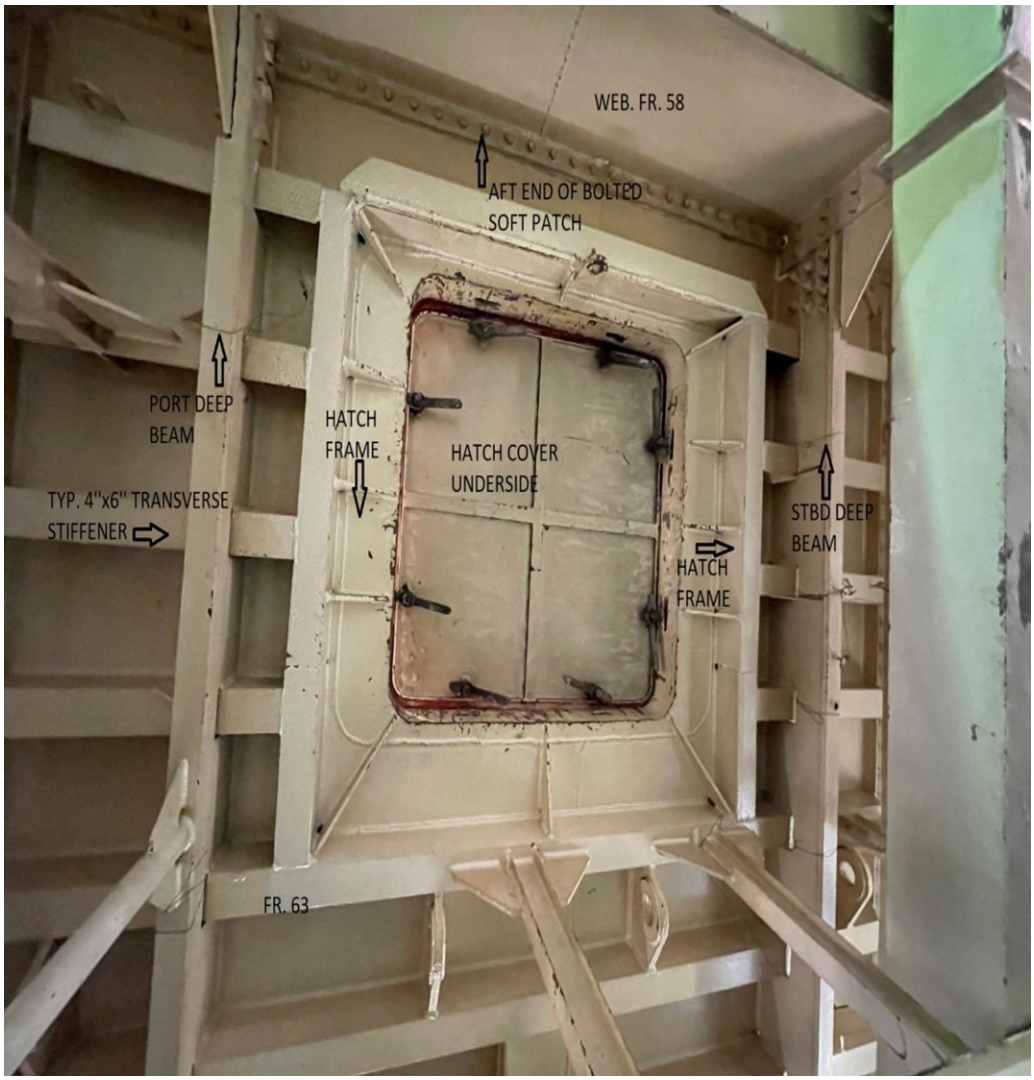
3.2. Procurement

3.2.1. The Contractor shall procure a hatch as per CG supplied quote.

3.2.2. The Contractor shall ensure that hatch is ABS approved.

3.3. Removals

3.3.1. The Contractor shall crop out existing hatch and associated underdeck support structure. This shall be removed from the vessel for disposal. Port and Starboard bolted longitudinal deep members on each side of the existing hatch in the soft patch shall be maintained and not altered. Soft patch deck transverse angle bar stiffeners shall be crop (or extended) to suit according to the required install opening for the new hatch. (See Picture 3.3.1 below)

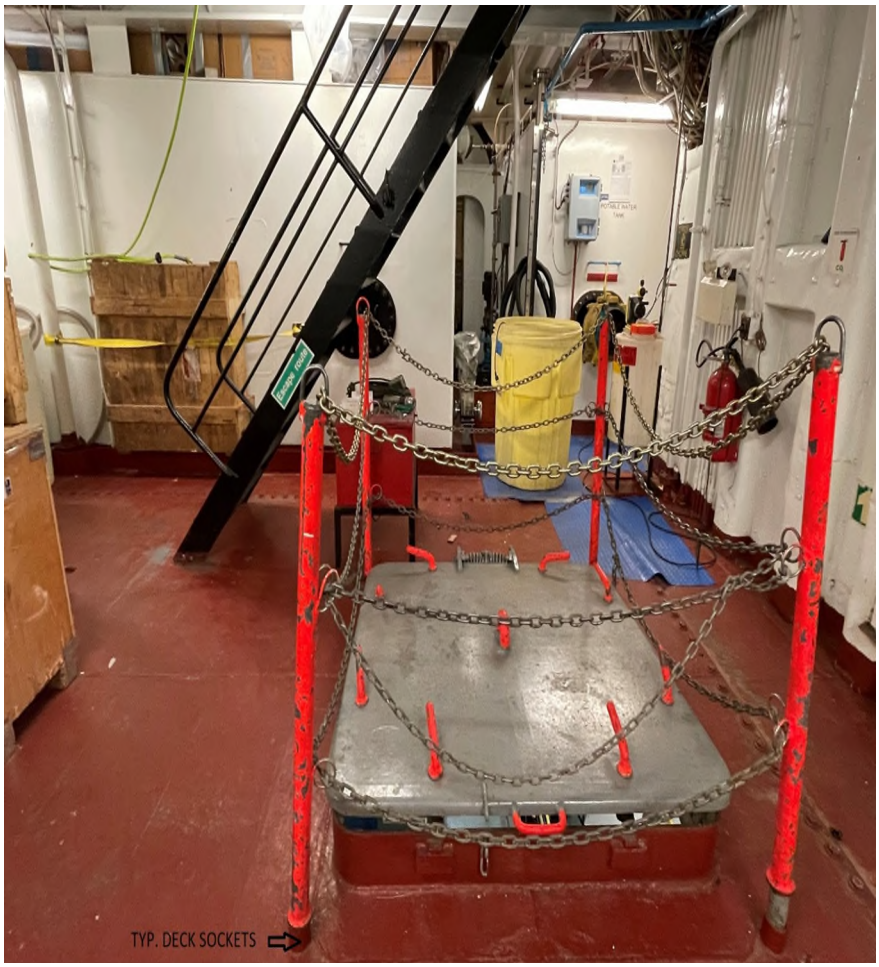


Picture 3.3.1 (Hatch underside)

3.3.2. The Contractor shall crop the monorail at the joint of curved section to straight. The forward section with hangers shall be cropped from the deckhead. This shall be reused after new hatch is installed. It is anticipated that the monorail will be moved forward by approximately one frame space (400 mm) and the Contractor shall install new monorail I-Beam extension pieces as required to re-install the monorail. (see picture 3.3.2 below)

Picture 3.2.2 (Hatch underside)

3.3.3. The Contractor shall remove existing security post sockets that are welded to the deck. (See picture 3.3.3 below)



Picture 3.3.3 (Hatch topside)

3.4. Hatch Installation

3.4.1. The deck plate opening shall be enlarged to match the required install dimensions of the new hatch. The opening shall be transversely located on the centre line of the vessel, in line with upper hatches. Longitudinal position will be in line with upper hatches as much as possible while being forward enough to access soft patch bolts.

3.4.2. The new flush deck hatches shall be installed as per manufacturer's instructions. The hinge shall be located to open to starboard toward the existing stairs.

3.4.3. The Contractor shall bid on extending or cropping (as necessary) existing 4"x 6" angle bar soft patch transverse stiffeners to connect to the new hatch frame. The required install opening of the new hatch will determine the necessary alterations to the transverse deck stiffeners.

3.4.4. The hatch assembly shall be inserted into the opening in the bolted soft patch deck plate. The new hatch frame shall be fillet welded to existing underdeck transverse deck stiffeners. The hatch insert plate shall be welded to the deck plate with full penetration welding.

3.4.5. All welds shall receive full NDT

3.5. Winch Post and Safety Post Pockets

3.5.1. A securing post shall be installed at starboard of hatch opening under the existing stairs. This post shall be installed on a 1/2" thick deck doubler plate, 12" in diameter. Post shall be five feet high and capped at top. Posts shall be of 6" X 6" X ¼" square steel tube material. The GSM winches shall be fitted to this post with suitable mounting bracket.

3.5.2. Electrical supply for winches shall be 115VAC and shall be taken from panel NL-7 on main deck, port side, under stairwell at frame #100. Contractor shall install new breakers, GSM, and run 14-3 marine approved cable to winch control stations near each winch. Additional cables shall be run from control stations to winches. Assume 300 feet of cable shall be required (total) and that one packed structural transit shall have to be dealt with as well as one transit collar sealed with fire stop material.

3.5.3. A latch retainer mechanism shall be welded to the stairway stringer on the stbd side.

3.5.4. The contractor shall install four new flush security post pockets in the deck. These are Ø2" schedule 40 pipe that is approximately 2.5" deep. The exact location of the holders will be determined after the new hatch is installed.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Winches

4.2. Electrical Breakers

4.3. Paint

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work shall be carried out to the satisfaction of CG Technical Authority and attending ABS surveyor.

5.1.2. Hatch operation shall be demonstrated to prove satisfactory function and ensure no deficiencies or binding occurs.

5.2. Testing

5.2.1. New structural welds shall be 100% tested with MPI for acceptance.

5.2.2. Hatches shall be chalk tested and adjusted to ensure 100% contact between hatch gaskets and seats.

5.3. Certification

5.3.1. Hatch to be ABS certified

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. NDT reports shall be forwarded to CCG upon completion of inspections.

E-01 Lower Windlass Foundation

PART 1: SCOPE

1.1. In 2021 a new anchor windlass was installed on the vessel. The increased size and use of an adapter plate has placed the unit too high for safe operations.

1.2. The purpose of this specification is to remove the windlass and adapter plate. Crop off the existing foundation, fabricate and install a new purpose built foundation to match current windlass.

PART 2: REFERENCES

2.1. Anchor Windlass Arrangement and Sightlines (ABS stamped) (2 Sheets)

2.2. Anchor Windlass Foundation Structural Details (ABS stamped)(5 Sheets)

2.3. Anchor Windlass Footprint

2.4. AW-60-2-75E Installation Manual

PART 3: TECHNICAL DESCRIPTION

3.1. Removals

3.1.1. Anchor and Chain Removal

3.1.1.1. Both chain locker manhole covers are located on forward bulkhead of cargo hold and shall be removed by the Contractor. The chain lockers shall be thoroughly ventilated and certified safe for personnel to enter for the duration of the refit. During the work period, the Contractor shall allow 2 hours, with ample notice, access to the chain locker for inspections by Chief Engineer and ABS inspector.

3.1.1.2. The fitted anchor chains have 12 shots. This chain will be disposed of as the sizing is incorrect for the new windlass. Bitter ends can be released from the Carpenters Workshop.

3.1.1.3. The anchors and chains shall be removed from vessel (barge or crane) and moved off sight, flaked out and prepared for inspection by ABS. During this period, the Ship's crew will have access to mark Kenter shackles between shots.

3.1.1.4. The Contractor shall be responsible to provide all craneage and barges if required.

3.1.1.5. The current anchors (2) fitted to the vessel are:

Type:	AC-14 Stockless High Holding Power
Weight (complete):	4,550kg

3.1.1.6. Both anchors shall be moved offsite to be abrasive blasted to white metal, SSPV-SP10 standard and coated with two coats of International Intershield KZ, Black. The anchors to be turned as required ensuring that all bare metal is coated satisfactorily.

3.1.1.7. Before bringing the anchor back, the anchors shall be inspected by ABS and CCG representative.

3.1.2. Electrical Disconnection

3.1.2.1. The Contractor shall lock-out the Anchor Windlass.

3.1.2.2. The Hawboldt Installation Manual has wiring diagrams that can be referenced.

3.1.2.3. The Contractor shall open all three Roxtec transits that run between VFD Panel in Windlass/Stores Compartment and the foredeck.

3.1.2.4. The following cables shall be pulled back to the VFD Panel to be renewed once new platform is installed (the new platform is higher than existing and these cables will not be long enough)

3.1.2.4.1. CBL3081(2+Gx14AWG)- VFD Panel to Control Console

3.1.2.4.2. CBL4101(19+Gx18AWG)-VFD Panel to Control Console.

3.1.2.5. The following cables shall be pulled back to the Cargo hold, clearly marked and coiled for reuse.

3.1.2.5.1. CBL3121(4+Gx14AWG)-VFD Panel to Winch Motor

3.1.2.5.2. CBL2101(3+Gx1AWG)-VFD Panel to Winch Motor

3.1.2.5.3. RTD-VFD Panel to Winch Motor (Not in installation manual)

3.1.2.6. The following cables shall be removed from the equipment on deck and stored to be re-installed once windlass is on new foundation

3.1.2.6.1. CBL7221(6X18AWG)- Control Console to Winch JB (X2)

3.1.2.6.2. Proximity Sensors to Junction Box (x4)

3.1.3. Windlass Disassembly

3.1.3.1. The Contractor shall remove Control Pedestal from control platform and store while foundation is being replaced.

3.1.3.2. The Contractor shall crop port and starboard platforms. The main aft platform shall be cropped at a height above the deck. The height of this platform will be increased. The Contractor shall bid on raising this platform by 360mm. If a new platform is deemed to be more feasible during installation, a 1379 will be raised.

3.1.3.3. The Contractor shall mark, remove and store grease lines to be re-installed upon completion of work.

3.1.3.4. The Contractor shall disassemble the windlass as per 2.1.2 in the Hawboldt AW-60-2-75E Installation Manual. The three sections (Port & Stbd Windlass and Oil Bath) shall be removed from the vessel and stored ashore while foundation is being replaced.

3.1.3.5. The Spurling pipes are currently welded to the windlass and will have to cropped.

3.1.3.6. The Contractor shall remove and dispose of the adapter plate. Bolts from disassemble shall be retained. If new bolts are deemed necessary, a 1379 will be raised.

3.1.4. Removal of Windlass Foundation

3.1.4.1. Before windlass foundation is removed from the vessel, the Contractor shall remove insulation in way of hotwork in the Cargo Hold and Carpenter's Workshop. The Contractor shall mark and carefully remove metal sheathing and insulation for reuse at the end of the work. Refer to Anchor Windlass Footprint Drawing to show areas of deckheads that are required to be exposed.

3.1.4.2. The Contractor shall crop the existing anchor windlass foundation and ground welds smooth to deck.

3.2. Installing New Foundations

3.2.1. Refer to AMS drawing series "Anchor Windlass Foundation Structural Detail Sheets 1-5" for fabrication details. Notes found on sheet one shall be strictly adhered to.

3.2.2. The Contractor shall employ the services of a certified NDT third party to complete 100% visual and MPI inspections. This work will be completed with the allowance stated in E-11 Portable Gangway 5 Year Survey.

3.2.3. The Contractor shall bid on 500ft^2 of SSPC-SP11 power tool cleaning to clean the disturbed area of the deck and give an appropriate profile for paint.

3.2.4. The Contractor shall bid on 500ft^2 of ENA300 epoxy 5-7mils dft per coat. All edges and corners shall require a stripe coating followed by two coats of contrasting colors and one final complete coat of Interthane at 3-5mils dft in a grey.

3.3. Installing Windlass

3.3.1. Windlass Assembly

3.3.1.1. The Contractor shall place windlass components on the foundation, confirm alignment and drill foundations as per Hawboldt drawing 34-00322-990.

3.3.1.2. The installation on windlass components shall strictly adhere to section 2.1.2. in installation manual.

3.3.1.3. The Contractor shall supply and run new cables listed below. The Contractor shall assume for bidding purposes that the cables will be 100ft long

3.3.1.3.1. CBL3081(2+Gx14AWG)- VFD Panel to Control Console

3.3.1.3.2. CBL4101(19+Gx18AWG)-VFD Panel to Control Console.

3.3.1.4. The Contractor shall run the remaining cable as noted in 3.1.2.5 through deck transit and connect as per wiring diagrams.

3.3.1.5. The Contractor shall repack the 3 transits that were opened for removals.

3.3.1.6. The Contract shall connect the cables as noted in 3.1.2.6 as per original configuration.

3.4. Anchor and Chain Installation

3.4.1. The Contractor shall ship assembled anchors and chains. The chain shall be fed up through hawse pipe. Bitter end of the anchor chain shall be connected and will require access to chain locker. The plan to install shall be presented to CCG at least 48 hours before work is to occur.

3.4.2. The Contractor shall remove the existing pear link and swivel and replace with new, CCG supplied, components.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Underdeck insulation removal shall be verified by Chief Engineer before hotwork permits are issued.

5.1.2. All work to be completed to the satisfaction of Chief Engineer.

5.1.3. Coast Guard may employ a third party NACE inspection to ensure preparation and painting are completed as per specification.

5.2. Testing

5.2.1. The windlass once installed, will run through a set of operational tests to ensure proper functionality before operational testing is completed and the unit deemed satisfactory.

5.2.2. Weld inspections will be completed as per section 3.2.2

PART 6: DELIVERABLES

6.2. Drawings/Reports

6.2.1. Copies of all NDT tests shall be presented to the Chief Engineer.

E-02 Refrigeration System Service

PART 1: SCOPE

1.1. The vessel has several refrigeration systems on board that require services of a certified refrigeration contractor.

PART 2: REFERENCES

2.1. 2023 Modified Equipment List

PART 3: TECHNICAL DESCRIPTION

3.1. Only a certified refrigeration contractor will be allowed to complete the following work. The contractor shall provide the cost of all labour including subcontractor in their bid.

3.2. Semi-Annual Leak Test/ Visual Inspection

3.2.1. The contractor shall conduct a leak test on items that are listed on the modified equipment list.

3.2.2. In addition the contractor shall conduct a visual inspection to prove correct operation of items on the modified equipment list.

3.3. Annual Cargo/Domestic Maintenance.

3.3.1. The domestic and cargo systems are each arranged with two compressors, two condensers, one accumulator, two filter driers and other various components and controls. The contractor shall note the refrigerant used in both systems is RS-45.

3.3.2. The domestic refrigeration system is arranged with thirteen individual spaces each with evaporator, thermostatic expansion valve and associated controls.

3.3.3. The cargo freezer system is arranged with one refrigerated space with evaporator, thermostatic expansion valve and associated controls.

3.3.4. The refrigeration compressors (4 of) oil condition shall be tested and oil changed if necessary.

3.3.5. All filter driers shall be renewed.

3.3.6. All controls are to be tested and proven correct.

3.4. Any deficiencies noted shall be reported to the Chief Engineer and will be addressed via 1379.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. All refrigerant that is required.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Upon completion of work the Contractor and Chief Engineer will review all work completed, service log books and work slips.

5.2. Certification

5.2.1. The Contractor shall be responsible to complete entries in the equipment specific log books and issue work slips for work completed above.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Full service report detailing all work completed, all defects found and corrective action taken.

E-03 Pump Renewal

PART 1: SCOPE

1.1. The Contractor shall remove three old pumps (General Service, Submersible, and Bilge) and install new pumps.

1.2. The Submersible and General Service pump will require the installation of variable frequency drives.

PART 2: REFERENCES

2.1. General Service Pump-Installation Package

2.2. Submersible Pump-Installation Package

2.3. Bilge Pump-Installation Package

2.4. Optidrive P2 User Guide V3.08- VFD Installation and Operation Manual

2.5. ODP-2-64045-3KF4N-MN Datasheet- 45 kW VFD

2.6. ODP-2-64075-3KF4N-MN Datasheet- 75 kW VFD

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. The project is a continuation of pump installations from previous refits.

3.1.2. The drawing package above has drawings for removals, foundation modifications and installation. These drawings shall be strictly adhered to.

3.1.3. The foundation adapters and spools will be supplied. The spools are tack welded and will require final welds once the orientation is confirmed.

3.2. Removals

3.2.1. The Contractor shall isolate, lock out and tag out electrically and mechanically the General Service Pump (Lower Fwd Machinery Room), Stbd Bilge Pump (Fwd Motor Room) and the Submersible Pump (Aft Motor Room).

3.2.2. The Contractor shall tag and identify individual conductors prior to disconnection. Cable is to be disconnected from stbd Bilge Pump motor and pulled back to protect them from damage.

3.2.3. The Contractor shall completely remove the cables for the General Service and Submersible Pumps to allow for installation of new cables.

3.2.4. The Contractor shall adhere to approved removal drawings in the appendix.

3.2.5. The Contractor shall disconnect pump at flanges and bedding and remove from machinery spaces. The pumps shall be held in helicopter hangar until the end of the refit period.

3.2.6. The Contractor shall remove completely the existing foundation for the Submersible Pump.

3.2.7. Suction and discharge pipe spools shall be disconnected as per instructions in the removal drawing.

3.3. Installation

3.3.1. Foundation

The Submersible pump requires a complete new foundation. The Contractor shall strictly adhere to the foundation drawing.

3.3.2. Foundation Adapters

3.3.2.1. The Bilge and General Service pumps require a foundation adapter to be installed. This adapter has already been fabricated. The Contractor shall strictly adhere to the foundation drawing. This includes modifications and preparation of existing foundations.

3.3.2.2. Once the foundation adapters have been installed, the foundations shall be power tool cleaned and coated with two full coats of ENA 300, 5-7 mils DFT per coat in contrasting colors and one final complete coat of Interthane at 3-5 mils in a grey color.

3.3.3. Pump Mounting

3.3.3.1. The Contractor shall be responsible to rig the new pumps in place. The Contractor shall not permanently mount the pump until piping alignment is confirmed.

3.3.4. Piping

3.3.4.1. The prefabricated spools are assembled by only tack welded together.

3.3.4.2. The Contractor shall fit spools as per design drawings to ensure proper alignment. Note: The pumps are not mounted to the deck to allow for some adjustment. Any misalignment shall be addressed with 1379's.

3.3.4.3. Once alignment is verified, the Contractors shall full weld all joints.

3.3.4.4. The Contractor shall pressure test all pipes for 15 minutes at 200 psi before galvanizing.

3.3.4.5. Completed piping shall be hot dip galvanized before installation, unless otherwise noted.

3.3.4.6. All hardware used at flanged joints shall be imperial, grade 5, zinc plated and shall have anti-seize compound applied at time of fitting.

3.3.4.7. All joints shall be sealed with 1/8" Duron 8300 sheet packing. Joints shall have anti-seize compound applied at time of fitting.

3.3.4.8. All piping shall have adequate pipe hangars installed every 6 feet.

3.3.5. General Electrical

3.3.5.1. The bilge pump power supply cable will be re-used.

3.3.5.2. The Submersible and General Service pumps shall be connected with new power feed and control cables, as well as new supply breakers. New cabling will be required as per section 3.3.5.4 below. Cable runs shall be suitably supported and secured.

3.3.5.3. Motor feed cables shall be run separately of control wiring and shall be properly spaced in accordance with Section 4.13.2, page 33 of Optidrive P2 User Guide V3.08, Recommended Installation. Contractor shall be responsible for commissioning of VFD units to perform parameters as requested by Chief Engineer, and defined by manufacturer as per Optidrive P2 User Guide V3.08.

3.3.5.4. New motor feed cable routing to be determined at time of install. For bidding purposes, contractor to assume 4 transits to be opened per cable run, for a total of **8 transits**

opened. Any further transit removal/repacking or new transit installs to be adjusted via 1379.

3.3.5.5. All commissioning activities that require pump operation to be supervised by Chief Engineer or delegate. System pressures to be closely monitored during commissioning as to avoid over pressurization and possible damage.

3.3.6. Variable Frequency Drives-General

3.3.6.1. The Canadian Coast Guard is supplying two (2) VFD Units for installation, connection, and commissioning as part of this scope of work. The units are as follows:

1) Submersible Pump– Invertek - 75kW, 150A, 380-480V, 3Ph, IP55 VFD
2) General Service Fire Pump- Invertek 45kW, 90A, 380-480V, 3Ph, IP55 VFD

3.3.6.2. The Contractor shall include in bid, price to fabricate and install necessary support structure and brackets for field mounting of VFD units. Installation must be in accordance with TP127E regulations and manufacturer requirements.

3.3.7. Submersible Pump 75kW VFD

3.3.7.1. The VFD for the unit shall be located on the forward bulkhead of the “Intake” on 200 Deck, immediately FWD of the UPS Compartment

3.3.7.2. The Contractor shall remove existing breaker, supply and control cables from Submersible Bilge and Fire Pump MCC cabinet in emergency generator room.

3.3.7.3. The Contractor shall supply and install a new 125A breaker at MCC compartment PE-7-1-1 in emergency generator room.

3.3.7.4. Contractor shall supply and install new 3-Conductor, #1 AWG Marine Rated cable from MCC compartment in emergency generator room, to VFD feed terminals L1, L2, and L3, located in “intake room” on bridge deck (200) immediately forward of UPS compartment. For Bidding purposes **contractor shall allow for 15 meters.** Contractor to verify length prior to cutting/install of cable.

3.3.7.5. Contractor shall supply and install a second new 3-Conductor, #1 AWG Marine rated cable from submersible VFD motor feed terminals U, V, and W, following existing cable route to the location of the Submersible Fire and Bilge Pump (AFT Motor Room). For Bidding purposes **contractor shall allow for 80 meters.** Contractor to verify length prior to cutting/install of cable.

3.3.7.6. Contractor shall supply and install new 5-Conductor #14 AWG marine rated cable from VFD unit to local control stop/start station in cross alleyway on 400 deck alongside new remote valve control panel. For Bidding purposes **contractor shall allow for 20 meters.** Contractor to verify length prior to cutting/install of cable

3.3.7.7. Contractor to supply and install local pushbutton controls to allow for 2 speed operation, stop and emergency stop.

3.3.8. General Service Fire Pump 45kW VFD

3.3.8.1. The VFD for this unit shall be mounted on the Starboard bulkhead of the MCC area in the Converter Room, direct across from General Service Pump MCC Cabinet.

3.3.8.2. Contractor shall remove existing breaker, supply and control cables from General Service and Fire Pump MCC cabinet in converter room.

3.3.8.3. The Contractor shall supply and install a new 100A breaker at MCC compartment in converter room.

3.3.8.4. Contractor shall supply and install new 3-Conductor, #3 AWG Marine Rated cable from MCC compartment in converter room, to VFD feed terminals L1, L2, and L3, located directly across walk way in converter room. For Bidding purposes **contractor shall allow f or 7 meters.** Contractor to verify length prior to cutting/install of cable.

3.3.8.5. Contractor shall supply and install a second new 3-Conductor, #3 AWG Marine rated cable from GS and Fire Pump VFD motor feed terminals U, V, and W, following existing cable route to the location of the General Service and Fire Pump in Forward Limbo Room. For Bidding purposes **contractor shall allow for 70 meters.** Contractor to verify length prior to cutting/install of cable

3.3.8.6. Contractor shall supply and install new 5-Conductor #14 AWG marine rated cable from VFD unit to local control stop/start station located near GS Pump in Forward Limbo Room. For Bidding purposes **contractor shall allow for 70 meters**

3.3.8.7. Contractor to supply and install local pushbutton controls to allow for 2 speed operation, stop and emergency stop.

3.4. Testing

3.4.1. New pumps shall be functionally tested after installation.

3.4.2. The Contractor shall complete the manufacturer's commissioning checklist. This shall include

3.4.2.1. Amperage and voltage while operating.

3.4.2.2. Pressure while operating.

3.4.2.3. Flow rate while operating.

3.4.3. Commissioning and Configuration of VFD will be completed as per manufacturer's procedure

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. New Pumps

4.2. Foundation Adapters

4.3. Prefabricated Spools

4.4. Variable Frequency Drives

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be completed to the satisfaction of the Chief Engineer

5.2. Testing

5.2.1. Testing as per 3.3.3.4 and 3.4

5.3. Certification

5.3.1. N/A

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The Contractor shall submit completed document describing items in 3.4.2.1-3.4.2.3

E-04 Elevating Devices

PART 1: SCOPE

1.1. The vessel has a cargo elevator and a dumbwaiter fitted. This specification is to have these inspected to satisfy regulatory requirement for the devices.

PART 2: REFERENCES

2.1. Drawing #DB-121827 Matot Series 100 Drum Below Dumbwaiter

PART 3: TECHNICAL DESCRIPTION

3.1. The contractor shall arrange for the services of a company certified to carry out elevating device inspections on the two fitted elevating devices.

3.2. The contractor shall arrange for the inspections to take place in consultation with the CCG TA so not to cause undue disruption with daily operations.

3.3. The contractor shall be responsible for inspecting all aspects of the elevating device.

3.4. The contractor with the assistance of the Ship's Electrical Officer shall lock out the power supply to the elevating devices as per the agreed upon procedure.

3.5. Upon completion of inspection, the lock out shall be removed by the contractor and the devices run up for testing to prove all controls are operating correctly.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work completed to the satisfaction of the Chief Engineer.

5.2. Testing

5.2.1. Testing will be completed in accordance with elevating device regulations and manufacturer instructions/recommendations.

5.3. Certification

5.3.1. Proof of inspection and recertification shall be made available to the Coast Guard TA upon completion and Elevating Device Inspection Logbook shall be updated.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Original copies of inspection reports and certificates.

E-05 Port Deck Crane Foundation and Hydraulics

PART 1: SCOPE

1.1. The purpose of this specification is to clear up deck space and remove tripping hazards.

1.2. The port midship crane has been removed and foundation is not being used. The Contractor shall crop the foundation and crane crutch off the deck.

1.3. Hydraulic lines for the av-gas dispenser and helicopter safety net are currently running on Flight and Boat deck and plate protectors. The Contractor shall remove plate protectors and hydraulic lines. New hydraulic lines shall be run in the deckhead of the 400dk breezeway.

PART 2: REFERENCES

2.1. J25020-S03_R0-Sht 1-Drawing

PART 3: TECHNICAL DESCRIPTION

3.1. Removal of Crane Foundations and Crutch

3.1.1. The Contractor shall crop the crane foundation and crutch from the Boat and Flight Deck. The removed foundation and crane crutch shall be disposed of by the Contractor.

3.2. Removal of Hydraulic Lines and Plate Protectors.

3.2.1. The Contractor shall remove all the protection plates from the Boat and Flight Deck and dispose of them.

3.2.2. The Contractor shall crop off all securing tabs for the protection plates from the deck.

3.2.3. The current hydraulic lines are stainless hydraulic tubing:

3.2.3.1. 22mm x 2.5mm (Pressure)

3.2.3.2. 16mm x 2.0mm (Return)

3.2.3.3. 12mm x 1.5mm (Drain Not Used)

3.2.4. The Contractor shall not start work until the hydraulic power pack is locked out.

3.2.5. The Contractor shall crop the lines where they turn up to crane foundation and cap off until new lines are ready to install. All hydraulic fluid shall be drained from the system to ensure no oil leaks on deck. The drain line shall be removed and capped at the bulkhead penetration.

3.2.6. The Contractor shall remove all hydraulic lines under the protection plates along with all securing device shall be removed from the deck.

3.2.7. The Contractor shall remove two inserts for redundant pipe penetrations on the Boat & Flight Deck and new insert shall be welded in place. The inserts are approximately 9”x4”.

3.3. Running New Hydraulic Lines.

3.3.1. The pressure and return stainless steel tubing runs shall be plumbed into existing piping that was cropped during removal. Total length of each run is approximately 24’ for costing purposes. Exact length to be confirmed on site.

3.3.2. The Contractor shall extend the hydraulic lines on the breezeway deckhead. Securing at every deep frame.

3.3.3. Contractor shall fabricate suitable ½” steel insert plates to accommodate new deck at an area close to the av-gas. Dispenser. Heavy walled stainless steel nipples shall be welded into insert plates, plates welded into decks and bulkhead and tubing connections made to nipples with suitable adaptors. New tubing shall be bent to greatest degree practical to facilitate installation. Where fittings required, Swagelok or equivalent fittings shall be used throughout contractor installed tubing runs.

3.3.4. The Contractor shall connect new tubing to av-gas and helicopter hydraulics.

3.4. Painting

3.4.1. The Contractor shall feather damaged paint and coat all bare areas on the deck with two coats of Intershield 300 epoxy primer. Each coat shall be 6 mils DFT. The Ship's crew shall apply 6G anti-skid top coat.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

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

5.2. Testing

5.2.1. All flexible lines and hard pipes shall to be pressure tested and cleaned to a NAS 6 Standard, all pressure testing and cleanliness to be complete with certification stating the 1.5 X's Working Pressure test and the NAS 6 Cleanliness.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

E-06 Bubbler 5 Year Service

PART 1: SCOPE

1.1. The Contractor shall employ the services of a Howden FSR to complete class 1 service on two bubblers.

PART 2: REFERENCES

2.1. Howden Quote: Service Estimate for S558

2.2. Howden Contact:

Name: Tim Lloyd
Phone: (417) 380-5758
Mobile: (417) 414-5834
Email: Tim.Lloyd@howden.com

PART 3: TECHNICAL DESCRIPTION

3.1. FSR Involvement

3.1.1. The FSR will work with the Ship's Crew to complete class 1 service on two bubbler units.

3.1.2. The Contractor shall have an allowance of $30,000 included in the bid for the FSR to be onsite for 12 days. The quote is in the reference as guidance. The cost of the allowance shall be adjusted by PSPC 1379 upon proof of invoice. Note: Howden is an American company and their quote is in USD.

3.1.3. The contractor shall allow for $10,000 for authorized travel and living expenses that are reasonably and properly incurred in the performance of work. There shall be no allowance for overhead or profit. The cost shall be adjusted by PSPC 1379 action upon proof of final invoice.

3.2. Contractor Involvement

3.2.1. The Contractor involvement shall be minimal. The Contractor shall bid 10 hours of labour to provide any assistance that the FSR may require above what the Ship's Crew is able to provide. If there are additional hours required, a PSPC 1379 will be raised to reflect this.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Consumable parts required to complete maintenance

PART 5: PROOF OF PERFORMANCE

5.1. Inspection/Testing

5.1.1. Upon completion of work, the units shall be function tested to ensure proper operation.

PART 6: DELIVERABLES

6.3. Drawings/Reports

6.3.1. The Contractor shall provide a detail report of any readings and observations from the maintenance completed.

E-07 Portable Gangway Survey

PART 1: SCOPE

1.1. The Contractor shall inspect and test the portable gangway for 5 year survey.

PART 2: REFERENCES

2.1. J18057-S01 35ft Aluminum Gangway (2 sheets)

2.2. 2018-Onsite Load Test Report

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. The Ship's Crew will use the ships crane to place the gangway on the wharf and return the gangway to the vessel at the end of inspections.

3.1.2. The gangway cannot be tested at wharf and will require offsite testing. The Contractor shall be responsible for all transportation costs.

3.1.3. The Contractor shall include in their bid an allowance of $5,000 for NDT testing described below by a certified NDT technician. This will be adjusted by 1379 upon final invoice.

3.2. Inspection

3.2.1. The Contractor shall employ a certified inspector to complete visual inspection of the following items:

3.2.1.1. Lifting lugs
3.2.1.2. Stringers
3.2.1.3. Decking Supports
3.2.1.4. Stanchion sockets
3.2.1.5. Tripping brackets
3.2.1.6. Ship End connections

3.2.2. NDT testing shall be completed on the following items:

3.2.2.1. Anomalies where cracking are noted in section 3.2.1

3.2.2.2. All welds of items of items in section 3.2.1

3.3. Testing

3.3.1. The Contractor shall use certified weights for this testing. 6600lbs of weight will be required for this testing.

3.3.2. The Contractor shall support gangway at one end under the roller and at the other end close to ship end connection.

3.3.3. The Contractor shall stretch a thin wire between two support points at ends of the gangway.

3.3.4. The 6600lbs shall be uniformly distributed along the gangway. Maximum deflection shall be measured and recorded. The maximum value of deflection should not exceed L/75.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. None

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. The inspections shall be completed as per 3.2. The Contractor shall ensure that a written report is completed by the NDT technician. This shall be presented to the C/E and ABS inspector before testing is completed.

5.2. Testing

5.2.1. Testing shall be completed as per 3.3. This testing must be witnessed by ABS Inspector and Chief Engineer or his delegate

5.3. Certification

5.3.1. ABS certification

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The contractor shall produce a report that describes work tasks including:

6.1.1.1. Photographs before, during and after inspections

6.1.1.2. NDT report of testing completed.

6.1.1.3. Readings taken from load testing.

E-08 Moatti Filter Installation

PART 1: SCOPE

1.1. The Moatti Filters fitted to the main engines are obsolete.

1.2. The Contractor shall replace existing filter on No. 1 Main Engine with new government supplied unit. This will require replacement of one pipe spool as the dimensions for existing units are slightly different.

PART 2: REFERENCES

2.1. 290D20 Oil Filter (Red Denotes Existing Dimensions)

PART 3: TECHNICAL DESCRIPTION

3.1. Removals

3.1.1. Before work starts, the Contractor shall ensure that the No. 1 Main Engine is locked out and filter is drained of oil.

3.1.2. The Contractor shall disconnect full flow inlet and outlet pipes (4”) and distributer outlet (2”) these shall be immediately blanked.

3.1.3. The Contractor shall disconnect flexible hose to manual drain and cap it.

3.1.4. The Contractor shall remove the unit from the foundation.

3.2. Installation

3.2.1. The ship will arrange to bring the new filter to the Boat and Fire Deck. The Contractor shall be responsible to move the filter to the boiler flat and install the unit.

3.2.2. The Contractor shall fabricate two new mounting pads and replace the existing.

3.2.3. The Contractor shall mount the new filter and secure it as per manufacturers recommendations.

3.3. Piping

3.3.1. The Contractor shall fabricate a new distributer 2” pipe. It shall be schedule 40 seamless black iron (estimated at 100”). It shall require four schedule 40 elbows that shall be butt welded. It will require one class 150 fully floating flange on one end and Alfa Laval supplied square flange on the other. They shall be welded on both sides. After pressure testing, the newly fabricated pipe shall be pickled to remove any contamination in the pipe.

3.3.2. If the full flow piping requires modification or renewal, this will be completed via 1379.

3.3.3. The Contractor shall install the full flow inlet and out pipes and distributer outlet with new Durlon 8500 sheet packing. Joints shall have anti-seize compound applied at time of fitting.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Moatti Filter

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

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

5.2. Testing

5.2.1. Before pickling of the new distributer piping it shall be hydrostatically tested to 100 psi for a period of 15 minutes to be witnessed by delegated ship's personnel.

5.2.2. Upon completion of installation the main engine shall be run up by ship's personnel to determine correct operation.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. Pressure Test Reports

E-09 Mid-Ship A-Frame 5 Year Survey

PART 1: SCOPE

1.1. The Contractor shall inspect, overhaul and test the forward hydraulically operated A-Frame for scientific instrument deployment. This A-Frame on the Flight & Boat Deck.

1.2. This work is part of a regulatory inspection. ABS Surveyor shall witness final load test and readings shall be provided.

PART 2: REFERENCES

2.1. Edstrom Engineering Drawing #98004, Sheets 1-4.

Note: This referenced drawing applies only to aft A-frame. Mid-ship A-frame, although not identical, is very similar. For bidding purposes, the two A-frames shall be assumed to be the same and that drawing applies equally to both.

PART 3: TECHNICAL DESCRIPTION

3.1. Hydraulics

3.1.1. The contractor shall support the A-Frame structure to allow disconnection and removal of hydraulic operating cylinders and associated mounting pins.

3.1.2. The hydraulic rams and A-frame controls shall be hydraulically disconnected. All Ram and hose fittings shall be capped or plugged, using proper hydraulic plugs or caps to seal against leakage and ingress of foreign material. Rags, wood plugs, and other such materials shall not be acceptable for blanking connections.

3.1.3. All hoses shall be marked to ensure accurate re-connection. Appropriate care and diligence shall be exercised to ensure all hydraulic oil is properly captured during component disconnection. No oil shall be allowed to drain to the vessel deck.

3.1.4. Hydraulic ram lower pivot pin and bearing assemblies shall be unbolted from the frame pedestals and removed from vessel. Associated ram end yoke pivot pins shall be pulled and removed. All components shall be thoroughly disassembled and cleaned for inspection and assessment. Contractor shall expect some difficulty in pin removal that may require the use of heat and/or force.

3.1.5. Hydraulic cylinder upper pivot pins shall be released and removed from the frame allowing removal of the hydraulic cylinders. Contractor shall expect some difficulty in pin removal that may require the use of heat and/or force.

3.1.6. Contractor shall bid, separately, unit cost for manufacture and renewal of cylinder pivot pins.

3.1.7. Hydraulic cylinders, counter balance valves and control valves shall be removed from the vessel and transported to a recognized hydraulic repair shop where these units shall be disassembled for assessment. Any repairs will be addressed via 1379.

3.1.8. Cylinders shall be reassembled with new seals, and pressure tested to 3000 psi.

3.1.9. Contractor shall bid, separately, unit cost to re-chrome cylinder rods.

3.1.10. Hydraulic control components shall be inspected and tested to prove function. Any defects shall be addressed via 1379 process.

3.1.11. Hydraulic cylinder end yoke bushings and ram end yoke bushings shall be thoroughly cleaned and inspected for condition. Bushings, and respective pins, shall be measured and working clearances determined.

3.1.12. Contractor shall bid, separately, the unit cost to manufacture and replace bushings with new.

3.1.13. All hydraulic hoses on A-frame shall be replaced with new. For bidding purposes, contractor shall assume four ¾" hoses, five feet in length, suitable for 3000 psi operation shall be required. End fittings shall be steel, JIC, same as original.

3.1.14. After completion of A-Frame structure inspection, all removed parts and components shall be installed and hydraulically connected as required. Any disturbed fasteners shall be renewed using equivalent size and grade. A copper based anti-seize compound is to be used on all exposed fasteners. Denso tape or equivalent is to be applied to all exposed hydraulic fittings and hose ends.

3.1.15. Hydraulic operating system is to be filled and vented as required to provide safe and proper operation.

3.2. A-Frame Structure

3.2.1. The A-frame structure shall be suitably supported and frame pivot pins released and removed. The A-frame structure shall be carefully placed in a secure location. All wearing surfaces of pins and bushings shall be thoroughly cleaned and inspected. Any part renewal will be determined at time of inspection and dealt with through PWGSC 1379 action.

3.2.2. All pivot pins and associated bushings for both the hydraulic cylinders and A-frame shall be measured and recorded. Measurements are to consist of four (4) measurements per pin and four (4) measurements per bushing.

NOTE: For reference purposes, Position 1 for both pin and bushing measurements will be on the outboard facing end with the subject component in its normal operating orientation. Position 2 will be at the inboard end.

3.2.3. Key structural welds of A-Frames shall be prepared, and crack tested by dye penetrant method. For bidding purposes, contractor shall assume a total of 100' of weld shall be tested.

3.2.4. A-frames and associated mounting pedestals shall be fully cleaned, degreased and prepared for application of new coating. All bare areas shall be mechanically cleaned to SSPC – SP-3 standard. Assume 50ft^2 of mechanical cleaning

3.2.5. All areas of intact coating shall be buffed, as required, to achieve necessary surface profile for new coating application. All bare areas shall be coated with one coat of marine primer and one top coat, buff in color. All areas shall then be coated with one top coat, buff in color. For bidding purposes, assume area is 300ft^2.

3.2.6. Hydraulic tubing runs shall be released and removed from A-frames to facilitate coating preparation and repair. Tubing shall be reinstalled after coating application and cure.

3.2.7. All grease nipples and passages shall be proven clear by the Contractor.

3.2.8. Upon completion of all inspections and parts renewal as necessary, the A frame shall be re-installed on the vessel and reassembled in good order. All removed parts and components

shall be installed and hydraulically connected as required. A copper based anti-seize compound shall be used on threads of all exposed fasteners. All hinge, swivel and pivot points shall be amply lubricated with good quality marine, exterior grade grease.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. All paint used in this specification. The vessel will require 48 hours' notice to get paint ready.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Inspections will be completed as per Part 3. ABS Surveyor shall be given a copy of all readings.

5.2. Testing

5.2.1. Testing of cylinder to 3000psi (3.1.8)

5.2.2. The A-frame shall be subjected to multiple operations, without load, to assure proper function

5.2.3. Following all work, reassembly and function testing, the A-frame shall be subjected to a proof load test to provide certification for a safe working load of 4.5 long tons. The Contractor shall be responsible for all aspects of the load testing including supply of test weights and load cell. The Chief Engineer and ABS surveyor shall be notified in advance of the test so that they can witness all aspects of test procedure.

5.3. Certification

5.3.1. Certificate of proof load test clearly stating acceptable Safe Work Load.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The contractor shall deliver a report that outlines

6.1.1.1. All measurements of pins and bushing, corrections

6.1.1.2. NDT testing results with photos

6.1.1.3. Hydraulic condition as found and any repairs outlined.

6.1.1.4. Certificate of load test

E-10 Plate Cooler Renewal

PART 1: SCOPE

1.1. The plate cooler for the central cooling system are obsolete and are to be replaced with new Contractor supplied coolers.

1.2. The central cooling system on the vessel is broken into two circuits, forward and aft. Each circuit has two coolers that will need to be replaced

PART 2: REFERENCES

2.1. 6005-422-001 Diagrammatic Arrangement of F/W Cooling System

2.2. Q309846B Quote for purchase heat exchangers and spare parts.

2.3. Drawing T15_BFG

PART 3: TECHNICAL DESCRIPTION

3.1. Procurement

3.1.1. The Contractor shall procure 4 Alfa Laval T15-BFG plate heat exchangers. The authorized representative for Alfa Laval is Madsen Diesel and Turbine. The contact information is:

Name: Alan Franklin
Phone: (709) 726-6774
Mobile: (709) 769-7275
Email: Alan.franklin@madsen.ca

3.1.2. The Contractor shall procure plate heat exchangers and spare parts as per referenced quote Q309846B. Any pricing changes from quote will be addressed with 1379.

3.1.3. The delivery time is lengthy and order must be placed shortly after refit contract award.

3.2. Removals

3.2.1. The vessel must have propulsion available at all times. The accomplish this, the Contractor shall complete work on one circuit at a time.

3.2.2. The Contractor shall not start any disassembly until new heat exchangers are on site.

3.2.3. In order to complete this work, the Ship's Crew will need 3 days to lock out equipment and drain the system. The forward system has a capacity of 10.4m^3 and the aft system has a capacity of 17.4m^3. The Contractor shall bid collection and disposal of 30m3 of water treated with Maxiguard as well as a unit price per m^3 for adjustment purposes. The Crew will drain the coolant into duct keels for collection

3.2.4. The Contractor shall disconnect four water connections to each of the existing heat exchangers (seawater in, seawater out, jacket water in and jacket water out) and mounting bolts.

3.2.5. If possible, the Contractor shall remove the existing heat exchangers in one piece. If the units have to be disassembled, the Ship's Crew will assist with disassembly. Each of the plates must be numbered so that the order plates are maintained. These heat exchangers shall be kept in machinery space until new coolers are installed.

3.3. Installation

3.3.1. New heat exchangers are to be dismantled and carried into the respective machinery space to be re-assembled in allocated location.

3.3.2. Heat exchanger frame to be fully assembled (loosely,) squared up and then torqued tightly while determining the position of the doubler plates for the foot supports. The heat exchanged shall be positioned to minimize modifications to the piping system.

3.3.3. For the aft engine room heat exchangers, new doubler plates shall be installed to fit foot supports. Doubler thickness shall be selected to aid in piping alignment.

3.3.4. The forward engine room require an extension of the mounting plate. The Contractor shall extend the plate by 10" with suitable supports.

3.3.5. The Contractor shall be responsible for all hot work preparations.

3.3.6. The Contractor shall fabricate new reducers for J/W system which is 8" to DN 150 PN16 flanged short spools (2 per heat exchanger). They shall be fabricated with schedule 40 piping with class fully floating flanges welded on both sides. These spools will have welded couplings that shall be galvanized before installing as per original spools.

3.3.7. The Contractor shall install new expansion 8" to 6" expansion joints for the S/W connections (2 per heat exchanger). New expansion joints are located in the vessel's central stores. The maximum allowable alignment must be respected:

Maximum Axial Compression:	¾"
Maximum Axial Elongation:	3/8"
Transverse Deflection:	½"

3.3.8. Any misalignment that cannot be resolved with reducers and expansion joints will be corrected with piping modifications. Time must be allowed in the schedule, at the planning stage, for this likely event. Additional costing shall be addressed by 1379.

3.3.9. Doubler plates to be securely welded to deck and heat exchanger frame fitted to doubler plates for final position of heat exchanger.

3.4. Testing

3.4.1. The Contractor shall complete a pressure test on the assembled plate cooler as per manufacturer's recommendations.

3.4.2. The Contractor shall complete a hydrostatic pressure test on J/W reducers and any piping that is fabricated. Any modified piping, where modifications are completed in place, shall have applicable NDT completed.

3.4.3. The Ship's crew shall refill and Dose the J/W system. An operational test, alongside and 4 hour sea trial shall be completed before this work package is signed off. During the sea trials, the Contractor shall record various pressures and temperatures as directed by Chief Engineer for different engine configurations.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. S/W expansion joints.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be completed to the satisfaction of Chief Engineer. ABS shall witness final testing.

5.2. Testing

5.2.1. As per section 3.4

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The Contractor present pressure and temperature readings gathered during the sea trials.

6.2. Manual

6.2.1. Manuals for new heat exchangers shall be presented to the Chief Engineer at the end of the refit period.

E-11 Blank

E-12 Air Receiver Installation

PART 1: SCOPE

1.1. The Contractor shall remove existing main air receivers (2) and install new Government supplied air receivers.

1.2. This work with be completed concurrently with H-12 Hatch Renewal.

PART 2: REFERENCES

2.1. MA-286-373 Arrangement & Details of Air Service Receivers (old receiver drawing)

2.2. 20-42-780-250 ASME-ABS Vessel (new receiver drawing)

2.3. 0060EP-R0019_RevA-E-09 Air Receiver Replacement (Interference Items)

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. During the maintenance period at least one receiver must be left in service so that the vessel is able to start main engines. There may be periods up to 72 hours where both may be out of service depending on weather. This will only be allowed on permission of the Commanding Officer.

3.1.2. Before any work is completed, compressed air shall be connected to the vessel to ensure 125psi service without the air receivers in place. The vessels crew will assist with best locations for connection.

3.1.3. During periods when both air receivers are out of service, the Contractor will ensure that both main air compressors and emergency diesel driven air compressors are electrically isolated.

3.2. Removals

3.2.1. The Contractor shall disconnect the following pipes listed below for both air receivers. It shall be removed far enough back to remove pipe interference for the remainder of the removals and installation. The contractor shall suitably mark and store removed piping for reinstallation.

3.2.1.1. Air Inlet Piping and valve
3.2.1.2. Safety Valve and associated pipe (Safety valve to be renewed)
3.2.1.3. Service Air Outlet Piping and valve (this will need to be blanked)
3.2.1.4. Engine Start Outlet Piping and valve (this will need to be blanked)
3.2.1.5. Pressure Switch valve (copper line to be renewed)
3.2.1.6. Pressure Gauge valve (copper line and gauge to be renewed)
3.2.1.7. Drain Valve and Piping

3.2.2. The Contractor shall be responsible to remove/move all items identified in the document (2.3. 0060EP-R0019_RevA-E-09 Air Receiver Replacement). These shall be stored and reinstalled as per original configuration.

3.2.3. The Contractor shall remove the two bands that secure each of the air receivers and store them for reinstallation.

3.2.4. Both air receivers shall be removed from the vessel (without cutting them) via the aft access hatch and stored ashore until new air receivers are installed and proven functional. It shall be the contractor's responsibility to safely complete all rigging

3.3. Installation

3.3.1. Before installing the new air receivers, the contractor shall repair any damaged paint on the air receiver seats, allowing enough time for paint to fully cure. The Contractor shall bid on 50ft2 of paint (one coat of white international 990). In addition, the contractor shall bid on 25ft2 of power tool cleaning (SSPC-SP 3) followed by two coats of ENA-300 and one topcoat of International 990.

3.3.2. The contractor shall install two new air receivers in seats. Any damage to the paint on air receivers shall be repaired by contractor and no additional fee to CCG.

3.3.3. All flanged connections shall be blanketed with gaskets. The tank shall be hydrostatically tested to a pressure of 275 psi for a period of 30 minutes. The test shall be witnessed by the C/E and ABS Surveyor. Upon completion of the testing, water shall be drained and the tank wiped clean.

3.3.4. All flanged connections shall be secured with new grade 8 bolts and nuts of suitable length and installed with Durlon 8300 gaskets.

3.3.5. The contractor shall align air receiver and re-connect the following valves and associated piping.

3.3.5.1. Air Inlet
3.3.5.2. Service Air Outlet
3.3.5.3. Engine Start Outlet
3.3.5.4. Drain Valve and Piping

3.3.6. The contractor shall re-install both bands to secure the air receivers to their seats.

3.3.7. The contractor shall re-install catwalk to original position.

3.3.8. The contractor shall supply and install a new flanged safety valves (set point 230psi) and existing associated pipe. The existing safety valves are a Knuckle 931 model 23MA.

3.3.9. The contractor shall reinstall valves for pressure switches and supply new ¼" K copper tubing and fittings. Estimated length is 10ft per receiver.

3.3.10. The contractor shall re-install valves for pressure gauges and supply new ¼" K copper tubing and fittings. Estimated length is 8ft per receiver. The contractor shall provide and install two new 0-300psi, high clarity, vibration rated, bottom mounted, back flanged, liquid filled pressure gauges.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Two air receivers

4.2. Two safety valves

4.3. Two pressure gauges

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. During installation, all work will be completed to the satisfaction of ABS Surveyor and Chief Engineer.

5.2. Testing

5.2.1. Testing during fabricate of both air receivers shall be fully compliant with all ABS requirements.

5.2.2. After installation, all disturbed connections shall be leak tested. Air compressors shall be tested for proper cut-in and cut-out operation on both units.

5.2.3. The ABS Surveyor shall witness air pressure test to lift the air receiver safeties.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

E-13 Crane Renewals

PART 1: SCOPE

1.1. The Contractor shall remove existing port quarterdeck crane and power pack, existing stbd Appleton crane power pack, as well as crane foundations on port and starboard side of the quarterdeck

1.2. The Contractor shall fabricate and install two new foundations on quarterdeck which will be designed to match or accept the M0625 bases (supplied with the cranes) as well as a foundation for the power pack located in the steering gear compartment.

1.3. The Contractor shall install two government supplied cranes, two government supplied deck control stations and one government supplied power pack.

1.4. The Contractor shall run electrical and hydraulic lines to cranes and power pack. This shall include an electro-hydraulic diverter valve to supply hydraulics to either crane.

PART 2: REFERENCES

2.1. Quarterdeck Crane Renewal (P&S) General Arrangement (2 sheets)

2.2. Quarterdeck Crane (P&S) Demolition/Rip-Out (2 sheets)

2.3. Aft Crane Foundation Detailed Drawings #:ESS22032-331.005-001 to 004 (4 Sheets)

2.4. Palfinger Approval Drawings Document #: 100211612

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. For all work, the Contractor's bid shall include removal of all interference items (ie insulation etc.) to complete work. After installation, the Contractor shall be responsible to return all disturbed items back to "as found" condition.

3.1.2. The Contractor shall employ the services of a Palfinger FSR to oversee the installation of the crane. The FSR will complete electrical cable and hydraulic piping runs and connections.

3.1.3. The Contractor shall be responsible to feather and paint any disturbed paint as well as paint all new steel work. It shall be painted with two coats of Intershield 300 epoxy primer. Each coat shall be 6 mil dft. The final top coat of decking shall be 6G anti-skid applied by the ships crew. The crane foundations shall be given two top coats of black Interlac 665 with a 2mil dft (4mil wet). Contractor to be responsible for any gas freeing and confined space rescue teams associated with paint repairs inside tanks / enclosed spaces.

3.1.4. All steel used in this specification shall be ABS AB/A steel or equivalent. It shall be free of rust, scale dirt and grease.

3.1.5. All inserts shall be 100% visual and MPI inspected. This work shall be done under the allowance for NDT in E-11 Portable Gangway 5 Year Survey.

3.1.6. The Contractor shall wrap all connection fittings with Denso tape after testing and commissioning is completed.

3.2. FSR Involvement

3.2.1. The local area Palfinger FSR is Pennecon and the contact information is:

Name:	Eddy Knox
Phone:	(709) 726-3490
Mobile:	(709) 685-7971
Email:	Eddy.knox@pennecon.com

3.2.2. The FSR shall oversee the installation of the crane, pedestal and power pack.

3.2.3. The FSR shall complete the cable runs from power pack, crane selector switch to crane control pedestal.

3.2.4. The FSR shall complete hydraulic tubing installation.

3.2.5. The Contractor shall have an allowance of $60,000 included in the bid for the FSR to complete work described above. The cost of the allowance shall be adjusted by PSPC 1379 upon proof of final invoice.

3.3. Removals

3.3.1. General

3.3.1.1. For this section refer to Quarterdeck Crane Demolition drawings in the references section.

3.3.2. Crane

3.3.2.1. The power supply for the Palfinger shall be isolated and locked out at Panel 24-2

3.3.2.2. The hydraulic lines from HPU and lines running to control pedestal shall be bled and capped to eliminate oil spillage during removal.

3.3.2.3. Control stand hold down bolts shall be released and stand removed.

3.3.2.4. Crane hold down bolts shall be released and removed. The crane shall be lifted off of vessel.

3.3.2.5. The control station shall be unbolted from the deck and removed.

3.3.2.6. This crane and control pedestal shall be kept in tact as it and the HPU will be put up on Crown Assets for disposal.

3.3.3. HPU Units

3.3.3.1. The existing HPU for the two quarterdeck cranes are not compatible with the new Palfinger PM50002M and will be drained of hydraulic oil and removed from the vessel and disposed of. These are located in the Steering Gear Compartment.

3.3.3.2. The port power pack is welded to the deck. The stbd power pack is mounted on a bedplate. The aft peak tank is directly below and will have to be opened and proven gas free to complete this work.

3.3.3.3. The Contractor shall drain and remove associated stainless steel hydraulic lines.

3.3.3.4. These power packs shall be removed from the vessel and landed ashore for disposal. They will need to be partially disassembled (motor removed) to remove via escape hatch in the steering gear compartment.

3.3.4. Foundation & Other Mounting Arrangements

3.3.4.1. In order to remove the old crane elements from the deck, the Contractor must remove steel sheathing and insulation from the deckhead in the steering gear compartment.

3.3.4.2. For the port side crane, the following must be removed: crane foundation, crane boom rest and control station mounting bolts.

3.3.4.2.1. The crane foundation shall be removed by cutting as close as practical to the deck and then grinding flush.

3.3.4.2.2. The crane boom rest shall have weld ground off and removed from the deck.

3.3.4.2.3. The control station mounting ring shall be cropped from the deck and the opening shall be inserted with 7/16" steel. The corners shall have a 3" radius.

3.3.4.3. For the starboard side crane, the following must be removed: crane foundation, control station doubler and two existing hydraulic penetration plate.

3.3.4.3.1. The crane foundation shall be removed by cutting as close as practical to the deck and then grinding flush.

3.3.4.3.2. The control station doubler shall have weld ground off and removed from the deck.

3.3.4.3.3. The two hydraulic penetration plates shall be cut from the deck and the opening shall be inserted with 7/16" steel. The corners shall have a 3" radius.

3.3.5. Electrical

3.3.5.1. The Contractor shall remove existing cabling and open up transits and kick pipes to accomplish task.

3.3.5.2. Contractor shall remove current Appleton crane HPU start panel on STBD side fed from P68-7, as well as Palfinger HPU start panel fed from P24-2.

3.4. Foundation Installation

3.4.1. The Contractor shall fabricate two crane foundations and secure them to the deck as per AMS drawing series "Aft Crane Renewals Foundation Detail Drawing" for fabrication details. Notes found on sheet one shall be strictly adhered to. Note: These drawings are currently being approved by ABS. Any changes required by class will be addressed with 1379.

3.4.2. The Contractor shall employ the services of a certified NDT third party to complete 100% visual and MPI inspections. This work will be completed the allowance stated in E-11 Portable Gangway 5 Year Survey.

3.5. Crane Installation

3.5.1. The cranes shall be delivered to the vessel and installed on foundation as directed by FSR. The crane shall be secured and torqued as per manufacturer instructions.

3.6. Power Pack Installation

3.6.1. The Contractor shall install one power pack in the location of the power pack of the old port Palfinger Power pack (portside).

3.6.2. The Contractor shall supply and weld in place two 5 x 3½ x 7/16" angles that will be approximately 6' long for the foundation. Any damaged paint in the Aft Peak shall be repaired with two coating of Intershield 300 epoxy primer. NDT will be completed on all welds.

3.6.3. The Contractor will disassemble the new power pack at the direction of the FSR to enable the power pack to be moved into the Steering Gear Compartment.

3.6.4. The Contractor shall mount the power pack on the new foundation and secure it.

3.7. Console Installation

3.7.1. The Contractor shall install a ½" ABS Grade A insert 24" x 12" with 3" radius corners for each console. The Contractor shall drill blind holes that are tapped to accept the 1/2" – 13 UNC studs for securing the console. Refer to appendix item "FLVK_2020" for configuration arrangement.

3.7.2. In addition, the insert plate for each console will have a Roxtec R 70 AISI 316 transit welded in the centre to accept electrical cabling required.

3.7.3. The Contractor shall mount the console at a time directed by the FSR and secured with new stainless hardware. Anti-seize shall be applied to all threads.

3.8. Hydraulic Installation

3.8.1. In order to keep the deck as clear as possible, hydraulic tubing will be utilized under the deck between HPU, console and crane. Insert plates will be used for deck transits. Hydraulic hoses shall only be used for hydraulics between insert plate and crane.

3.8.2. The Contractor shall fabricate four ½" plate inserts (two for each crane) for the crane hydraulics. Two of these plates will be for the crane console and the other two plates will be for the crane. For bidding purposes, the Contractor shall assume that the plates will be 2' x 1' ABS grade A steel with 3" radius corners. The exact location of the inserts will be decided during the refit.

3.8.3. The two console inserts shall be arranged with class 6000# ASTM A182 F316L threaded stainless steel couplings sized to accommodate hydraulic connections (13 total) for the following sizes:

Size	Quantity	Description
Ø8x1.5mm	1	Pump LS
Ø16x2mm	8	(2x) Slewing, (2x) Main Boom, (2x) Knuckle Boom, (2x) Extension Boom
Ø20x2mm	3	(2x) Rope Winch, (1x) Pressure Line
Ø28x2mm	1	Return Line

3.8.4. The two crane inserts shall be arranged with class 6000# ASTM A182 F316L threaded stainless steel couplings sized to accommodation hydraulic connections (11 total) for the following sizes

Size	Quantity	Description
Ø16x2mm	8	(2x) Slewing, (2x) Main Boom, (2x) Knuckle Boom, (2x) Extension Boom
Ø18x1.5mm	1	Winch Motor Case Drain
Ø20x2mm	2	(2x) Rope Winch

3.8.5. The Contractor shall have an allowance of $10,000 for the purchase of hydraulic hoses (SAE 100R9), hydraulic tubes (316L S/S – DIN EN 10216-5, ASTM A213/A269) and hydraulic fittings (316L S/S – DIN 2353 Compression Tube Fittings. This shall be adjusted by PSPC 1379 on final invoice.

3.8.6. Where hydraulic tubing is used, the FSR must use existing hangars in the steering gear compartment as much as possible. Where hangars are not possible, the Contractor shall consult with the Chief Engineer to determine the best location for hangar. Any additional hangers shall be completed using the PSPC 1379.

3.8.7. All new flexible lines and hard lines shall be pressure tested and cleaned to NAS 6 standard.

3.9. Electrical Installation

3.9.1. General

3.9.1.1. All cables shall be bronze braid armoured marine type. Insulation shall be cross linked polyethylene, rated at least WC maximum conductor temperature and shall be impervious to oil and moisture. Conductors shall be of the stranded type and be high conductivity tin or alloy coating coated soft annealed copper. Cables shall be manufactured, tested and installed in accordance with the latest TC/MSB and IEEE requirements.

3.9.1.2. Armoured cabling fitted in locations exposed to the weather or corrosive conditions shall be supplied with a protective PVC jacket over the amour.

3.9.1.3. Where cables pass through watertight decks, bulkheads or fire zone boundaries, cable transits (Roxtec Brand Only), stuffing tubes or kick pipes must be fitted and used. Any bulkhead and/or deck penetrations shall be in compliance with Schedule "D" of TC Regulation TP 2237 "Equivalent Standards for Fire Protection of Passenger Ships."

3.9.1.4. All new cables shall be tagged with the circuit designation at all points of connection and on both sides of bulkhead and deck penetrations. Tags shall be constructed of metal compatible with the armour or cable sheathing.

3.9.1.5. All Cables shall be effectively supported and secured with metal type strapping in order to prevent chafing or other injury.

3.9.2. HPU Starter and Supply

3.9.2.1. A new start panel shall be installed in the steering gear compartment. It shall be mounted in same area (Port Side) from which old Palfinger start panel was removed. Contractor shall supply and install necessary support structures.

3.9.2.2. The existing 150A – Eaton molded case breaker in new 460V, 3Ph, Panel P68 located in MG space #241 on bridge deck will be re-used to accommodate new Palfinger HPU for quarter deck cranes.

3.9.2.3. One (1) run of (3)- conductor 4G70mm^2 cable (W1) as per attached Palfinger Approval Drawings Connection diagram shall be supplied, installed, and connected between crane start panel in steering gear compartment and 460V power panel P68 in upper MG space #241 on bridge deck. Contractor shall assume a cable length of **105 meters** to be required for bidding purposes. Contractor shall confirm actual cable length and size required on site prior to supply, cutting and installation. New cable shall be suitably supported and secured over full run.

3.9.3. Cable Route and Penetrations:

3.9.3.1. Starting at control panel in steering gear compartment, cable will follow existing wire way to kick pipe in deck head. Modification of existing kick pipe will be required to accommodate the larger cable run of 4G70mm^2. Cable will transit to aft quarter deck.

3.9.3.2. From aft quarter deck, cable will transit to upper deck via modification of existing kick pipe to accommodate new cable. Cable will follow same route as original cable on upper deck, port side breezeway to approximately frame 88.

3.9.3.3. At approximately frame 88, cable will transit bulkhead in same area which original cable was pulled. This penetration will require modification of existing kick pipe to accommodate new cable. This gland enters aft boardroom deck head void through which cable will travel forward along port side (Upper Deck).

3.9.3.4. At approximately frame 103, cable will penetrate through deck head near an existing transit in deck head leading into emergency generator room, port side. A new transit will need to be cut and installed (Roxtec Type) to accommodate new cable run as existing transit has no space available.

3.9.3.5. Cable will be run up port side bulkhead into existing cable way, across deck head to existing transit leading into upper MG space #241 where it will be terminated at 460V power panel P-68. Transit at frame 103 (Bridge Deck) shall be opened to accommodate new cable run. Transit shall be repacked with new material, Roxtec A60 or equivalent.

3.9.4. Cabling from HPU Starter Panel to Power Pack

3.9.4.1. Contractor shall supply and install a total of 5 separate (W2, W3, W4, W5, W7) cables from the HPU starter Panel to the HPU Unit as per attached Palfinger Approval Drawings. Cable lengths to be confirmed by contractor prior to cut and install.

3.9.4.2. Contractor shall supply and Install two (2)- 4G25mm^2 cables (W2 and W3) for line terminals and star/delta as per attached Palfinger Approval drawings. For bidding purposes contractor to assume a cable length of 5 meters each for a **total of 10 meters.**

3.9.4.3. Contractor shall supply and install two (2)- 3 Conductor 1.5mm^2 cables (W4 and W5) for PTC terminals and STSH terminals as per attached Palfinger Approval Drawings. For bidding purposes contractor to assume a cable length of 5 meters each for a **total of 10 meters.**

3.9.4.4. Contractor shall supply and install one (1)- 2 Conductor 1.5mm^2 (W7) for 24VDC Oil Cooler terminals. For bidding purposes contractor to assume cable length of **5 meters.**

3.9.5. Cabling from HPU Starter Panel to Pedestal

3.9.5.1. Contractor to supply and install two (2) 5G2.5mm^2 cables (W8), one from HPU starter Panel to each crane control pedestal on aft quarter deck. Cable will follow existing wireways where possible then transit through aft quarter deck into each crane pedestal base through Roxtec R 70 AISI 316 penetration (#1 and #2). Contractor to assume a **total of 50 meters of cable, and Two (2) Roxtec R 70 AISI 316 round weld in type transits** for bidding purposes. Cable length to be confirmed to each pedestal before cut and install.

3.9.5.2. Contractor to supply and install two (2) 12x0.75mm^2 cables (W30), one from each crane pedestal to junction box (XX2) on respective crane base. Cable will transit below quarter deck from Roxtec penetration #1 and #2, to below each crane base where separate Roxtec R70 AISI 316 penetrations (#3 and #4) will allow each cable to transit

upward through aft quarter deck into each crane base for termination at junction box. For bidding purposes contractor to assume 10 meters for each run for a total of **20 meters, and Two (2) Roxtec R70 AISI 316 round weld in type transits.** Cable length to be confirmed to each crane base junction box before cut and install

3.10. Commissioning

3.10.1. Once installation of crane and associated equipment has been completed, the Contractor shall retain the services of Palfinger FSR to commission the cranes. The contractor shall have an allowance of $20,000 that will be adjusted, via 1379, on final invoice.

3.10.2. Include a $10,000 allowance for travel and living costs that will be adjusted based on receipt of invoices. There will be no mark-up on this expense.

3.10.3. After completion of all installation requirements, HPU shall be filled to working level with Contractor supplied 205 Univis Extra oil (Contractor Supplied). Oil replenishment shall be filtered through a portable filtration unit with a 3 micron rating prior to being admitted to the system.

3.10.4. HPU shall be started, system pressurized and checked for leaks, any leaks corrected.

3.10.5. All crane functions shall be tested and proven correct. The FSR will complete all commissioning checklists.

3.10.6. Crane shall be load tested to 1.25 times Safe Working Load. Contractor shall be responsible for provision of all test weights and a calibrated load cell for load test. Test shall be witnessed by ABS.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Two Palfinger PM5002ME cranes

4.2. Two FLVK Deck Consoles

4.3. One Palfinger 55kW HPU units

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. Any disturbed paint to be renewed

5.1.2. All penetrations inspected for proper packing

5.2. Testing

5.2.1. NDT testing of all welds.

5.2.2. All pressure testing and cleanliness shall be supported with certification confirming that 1.5 times working pressure testing and NAS6 cleanliness standard have been successfully achieved for all components dealt with.

5.2.3. Load test for all cranes

5.3. Certification

5.3.1. All cranes will be certified by ABS

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. NDT reports for crane foundations and any deck/bulkhead penetrations

6.1.2. Flexible hoses and tubing pressure test and cleaning report

6.1.3. Commissioning checklist completed by FSR.

6.2. Training

6.2.1. The FSR will complete training with ships crew.

L-01 Electric Motor & Fan Survey

PART 1: SCOPE

1.1. The Contractor shall service electric motors and fans as detailed below.

PART 2: REFERENCES

2.1. N/A

PART 3: TECHNICAL DESCRIPTION

3.1. General Information

3.1.1. Motors shall be electrically isolated and removed from fitted location and transported to contractor's facility for full disassembly, assessment and refurbishment.

3.1.2. All equipment shall be megger tested prior to commencement of disassembly and again on completion of service work.

3.1.3. The contractor shall include in bid the cost for each pump and fan for servicing.

3.2. Fans & Motors

3.2.1. The list of fans and motors are

No	Name	Location	Housing	HP Rating	MCC
1	Propulsion Battery Rm Fan	20 Stores	Axial	1HP	P61-2-1
2	CO2 Rm Exhaust Fan	Fan Room No. 1	Axial	0.25HP	P52-7
3	Bubbler Exhaust Fan	Fwd Lower Deck	Axial	40/17.8	P60-2-1

3.2.2. Axial Fans

3.2.2.1. Above noted axial fan units must be disconnected and released from the air trunk housing and lifted into the air intake space. Dampers and extended spindles are to be let go and removed to provide motor access.

3.2.2.2. Fan/motor assemblies shall be removed from housings with fan impellers removed from motor shafts. Fan impellers shall be thoroughly cleaned and examined for any defects. Suction screens are to be thoroughly cleaned and assessed for condition.

3.2.2.3. All motors shall be disassembled, end bells removed from stator, and rotors removed. Stators and rotors shall be cleaned, inspected and tested.

3.2.2.4. End bell and rotor bearing fits shall be determined and recorded.

3.2.2.5. New bearings shall be installed in end bells, motors assembled, impellers installed and motor/fan assembly dynamically balanced.

3.2.2.6. Axial fan housings, dampers and associated hardware shall be thoroughly cleaned to remove any oil, grease and other surface contaminants. Housings are then to be power tool cleaned to SSPC-SP-11, removing scale, rust, paint and other loose debris. Affected vent trunking is to be adequately sealed and ventilated (suction hose) to the exterior area of the vessel to ensure no dust or debris from the cleaning process is permitted to enter further into the ducting system.

3.2.2.7. All internal areas of the housing are to be coated with two coats of International Interbond 808, each coat of a contrasting colour. A final top coat of Interthane 990 is

to be applied within a specific time period as specified by the manufacturer. Coatings to be applied as per manufacturer's specifications.

3.2.2.8. Motors/fans shall be re-installed in housings and all associated removals reinstalled as per original arrangement. New sheet packing shall be supplied and installed at any released flanged joints.

3.2.2.9. Fans shall be reconnected electrically, electrical supply re-established and test run to satisfaction of Owners' Representative to prove proper operation and rotation. Motor current shall be recorded at each available fan speed.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.4. None

PART 5: PROOF OF PERFORMANCE

5.4. Inspection

5.1.1. Upon reinstallation, pumps and fans will be operated by ship's crew to assess performance. Motor current draw shall be recorded.

5.1.2. Periodic inspection throughout work progression

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The contractor shall provide a full service report for each motor and fan including:

6.1.1.1. Comment on 'as found' condition.

6.1.1.2. All electrical and mechanical verification details. This will include serial number and pump/fan name.

6.1.1.3. Balancing reports.

6.1.1.4. Confirmation of bearing replacement and bearing model

6.1.1.5. Meggar and current readings from before and after servicing.

L-02 Closed Circuit TV

PART 1: SCOPE

1.1. The intent of this specification is to completely remove the existing analog CCTV Cameras and cabling throughout the vessel and install all new owner supplied IP CCTV cabling and equipment as per drawing CCGS LSSL CCTV Project.

1.2. CCG will supply the Bergen BC-10-021 CAT6A cable to be installed.

1.3. Contractor must supply all materials and parts required to perform the specified work unless otherwise stated.

PART 2: REFERENCES

2.1. CCGS Louis St. Laurent Camera System Block Diagram

2.2. CCTV Equipment and Cable Removal List

2.3. CCTV Equipment and Cable Installation List

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.1.1. The Contractor must supply all equipment, enclosures, ventilation, staging, chain falls, slings and shackles necessary to perform the work. All lifting equipment must be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification must be welded into place by CWB-certified welders certified to welding Std. W47.1, Div. 1 and 2.

3.1.2. Prior to any hot work taking place, the Contractor must ensure that the area of work and all equipment, wiring, transits, etc. have been sufficiently protected from any sparks or metal filings. The Contractor must also ensure that the area of work, the system, and the adjacent space is certified as gas free and suitable for hot work as per the Fleet Safety and Security Manual.

3.1.3. In addition to any hot work taking place, which includes grinding and welding, the Contractor must check the vessels lead abatement documents and follow proper lead abatement procedures. If any area is of any concern, if will be brought to the attention of the Chief Engineer and a lead abatement will be conducted.

3.1.4. For the purpose of adjustments, the Contractor must provide a unit cost for the testing of lead. Any lead testing will be covered by a 1379.

3.1.5. Contractor must follow existing cable trays throughout the vessel where fitted. Once installed, all cabling must be secured as per TP127.

3.1.6. Contractor must repack all glands and transits that will be reused as per this specification and the method must meet or exceed TCMS or classification society requirements.

3.1.7. Contractor must be responsible for the temporary removal and reinstallation of any deck heads, bulkheads, paneling, insulation, and any items that is deemed to be interfering to the running of any cables and mounting of any equipment.

3.1.8. All cabling, once installed, the contractor must identify each cable with a marked stamped stainless steel metal tag. The labels are to be securely affixed to the cable at each end and through any deck, deck heads, and gland penetrations with the designation for each cable as provided within the applicable drawings.

3.1.9. Contractor must use, at a minimum, 316 grade stainless steel hardware for the mounting of all equipment.

3.1.10. Contractor must prime and paint mounting brackets/plates to match existing color.

3.1.11. The contractor must dispose of all cables that have been identified for removal indicated below at their expense.

3.1.12. The contractor must be responsible to ensure that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

3.1.13. Contractor must relabel and update all electrical supply feeds on electrical panels within this specification.

3.1.14. Prior to the commencement of any electrical work, the contractor must ensure that all electrical supplies feeding the systems have been isolated at the source following an established lockout/tag out procedure, and as per ISM fleet safety manual. Contractor must check with Chief Engineer or Senior Electrical Officer.

3.1.15. The contractor must work in conjunction with a Coast Guard Electronics Technician to oversee the work to ensure compliance with applicable Coast Guard standards.

3.1.16. Contractor must disconnect and remove all of the existing equipment and cabling associated within the systems as detailed in reference drawings CCGS LSSL CCTV Project and equipment accompanied in the Equipment Removal List table below.

3.2. Removals

3.2.1. All equipment listed in the appendix to be removed. In consultation with CCG Electronics Technologists, it will be determined which equipment is re-useable and be returned to Production or determined obsolete and disposed of at Contractor's expense.

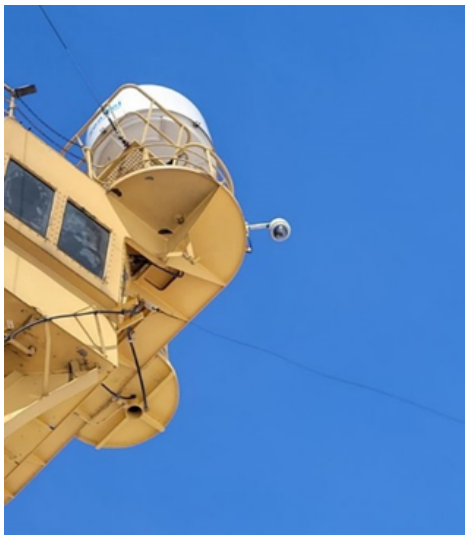
3.2.2. The Contractor must remove and dispose of CCTV cables at their own expense as per reference drawing CCGS LSSL CCTV Project. Fiber cable from Fantail to Forward Lab must remain in place and will be reused as per the appendix.

3.3. Equipment Installation

3.3.1. The CoThe equipment to be installed are as per the appendix.

3.3.2. The Contractor must install all the equipment listed in the Appendix and as per CCGS LSSL CCTV Project. All replacement cameras will be located in same location as the removed old cameras unless otherwise stated. These camera's include

3.3.2.1. Crow's Nest Camera-Axis Q6074-E: The Crow's Nest camera shall be mounted on the Crow's Nest platform to replace existing American Dynamics camera. Camera will be mounted using the existing camera mount in conjunction with the Axis T91L61 wall mount.

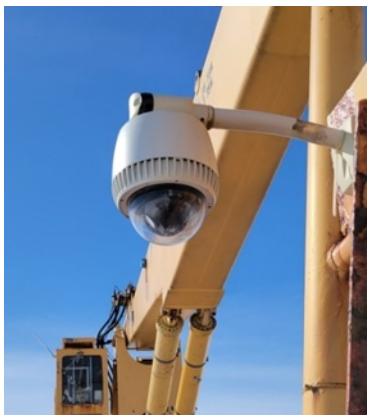


3.3.2.2. Gangway Cameras-Axis Q6074-E: Port and Starboard gangway cameras shall be mounted on the port and starboard wings on the Upper Deck to replace the Samsung cameras. The cameras shall be installed in conjunction with the Axis T91L61 wall mount. Due to those fixed cameras being replaced with PTZ cameras, ensure the camera is mounted low enough to give a clear 180 degree view.

Port Gangway

Stbd Gangway

3.3.2.3. CTD Winch Camera-Axis Q6074-E: The CTD Winch camera shall be mounted on the winch frame on the Nav. Bridge Deck to replace the American Dynamics camera. The camera shall be mounted in conjunction with the Axis T91L61 wall mount.



3.3.2.4. Fantail Camera-Axis Q6215-LE: The Fantail Camera shall be mounted on Aft in the Fantail area to replace the Bosch camera. The camera shall be mounted to the existing pole using the mount included with the camera. The power for this camera will be supplied by an AXIS Midspan T8154 with a T8612SFP module (using existing fiber) to be located in the AV Gas Compartment

3.3.2.5. Forward Engine Room Catwalk Camera-Axis Q6074-E: The Engine Room camera shall be mounted in the forward engine room space on the catwalk replacing the American Dynamics camera. The camera shall be mounted to the existing bracket attached to the catwalk and the Axis T91L61 wall mount.

3.3.2.6. Forward Engine Room Lower Port Camera-Axis Q1785-LE: The Forward Engine Room lower camera shall be mounted in the forward engine room space in the lower port side replacing the current Samsung camera. The camera shall be mounted to the existing bracket using the mount included with the camera.

3.3.2.7. Helicopter Hanger Top – Axis 6215-LE: The Helicopter Hanger Top Camera shall be mounted outside on top of the Helicopter hanger to replace the existing America Dynamics camera. The camera shall be mounted to the existing pole using the mount included with the camera.

3.3.2.8. Helicopter Hanger Inside Camera– Axis D201-S Q6075 PTZ: The Helicopter Hanger Inside camera is an explosion-protected camera and shall be mounted in the helicopter hanger bulkhead replacing the current American Dynamics camera. The camera shall be mounted to the existing bracket and the bracket included with the camera.

3.3.2.9. Bubbler Room Camera - Axis Q6074-E: The Bubbler Room camera shall be mounted in the Bubbler Room replacing the current American Dynamics cameras. The camera shall be mounted to the existing bracket and the Axis T91L61 wall mount.

3.3.2.10. Transformer Room Port and Starboard Cameras - Axis Q6074-E: The Transformer Room Port and Starboard camera shall be mounted in the Transformer Room replacing the

current American Dynamics cameras. The camera shall be mounted to the existing bracket and the Axis T91L61 wall mount. No photos available.

3.4. Cabling

3.4.1. Contractor must supply and install Minicom surface mount boxes at the following locations for the CCTV Controllers:

3.4.1.1. Port Bridge Wing Deckhead

3.4.1.2. STBD Bridge wing Deckhead

3.4.1.3. AFT Lab Deckhead

3.4.1.4. MCR console

3.4.2. Contractor will install the CCG supplied Bergen BC-10-02 CAT6A cable as outlined in the appendix

3.4.3. All cable terminations will be conducted by CCG Technicians with the exception of AC power. Contractor must terminate all AC required power.

3.4.4. All cabling, once installed, the contractor must label each cable with marked with a stamped stainless steel metal tag. The labels are to be securely affixed to the cable at each end and through any deck, deck heads, and gland penetrations with the designation for each cable as provided in this specification.

3.4.5. The CCG Production electronic technicians will terminate all cable runs between devices using shielded RJ45 connectors for the purpose of testing where Minicom junction boxes are not used.

3.4.6. Contractor must be responsible for sealing all cable glands.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Cameras

4.2. Bergen BC-10-02 CAT6A cable

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work must be subject to witness by the Chief Engineer of delegate CCG Electronics Technologist.

5.2. Testing

5.2.1. All cables are to be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.

5.2.2. All cable testing must be verified by a Coast Guard Production Technician.

5.2.3. New AC/DC circuits must be proven operational.

5.2.4. Electronic equipment which has been removed for the performance of this specification item must be returned to operational condition.

5.3. Certification

5.3.1. N/A

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. All owner supplied equipment and materials which has not been used must be returned to the owner prior to the acceptance of the item.

6.1.2. The Contractor must supply an “As Fitted” drawing in Autocad and pdf format upon completion of this spec item.

6.1.3. The Contractor must provide the Chief Engineer a report of the contractor’s work in both electronic and hardcopy formats outlining the details of the inspections and any alterations/repairs prior to the acceptance of this item.

6.1.4. The Contractor must deliver all Manuals and Vendor Information associated with the install.

L-03 Deckhead Panel Lighting

PART 1: SCOPE

1.1. The contractor shall supply and install new lighting and associated dimming/switching hardware on the Navigation Deck and Boat & Flight Deck as per attached lighting arrangement.

1.2. This work will be completed in conjunction with H-08 Fire Main Piping, H-09 Sprinkler Main Piping Renewal and H-10 Deckhead Panel Renewal

PART 2: REFERENCES

2.1. Bridge Deck Lighting Arrangement

2.2. Flight & Boat Deck Lighting Arrangement

PART 3: TECHNICAL DESCRIPTION

3.1. Procurement

3.1.1. The Coast Guard will supply Glamox DL60 Pot lights, panel lights and dimmers.

3.1.2. Contractor to supply new cabling to allow for dimming of Glamox DL60 pot light circuits. The dimming function requires a 5-conductor #14 AWG marine rated cable due to low voltage dimming circuit. For bidding purposes, contractor to assume a total cable length of 600ft.

3.1.3. Contractor to supply new cabling for Glamox panel lights for the science lab. This requires 3 conductor #XX AWG marine rated cable.

3.2. Removals

3.2.1. The contractor shall consult with the Chief Engineer before starting work in any area. At that time, the contractor to determine which lighting fixtures, switches, and cabling to be removed from deckhead to allow installation of new deckhead panels (H-10 Deckhead Renewal) to be completed.

3.2.2. The Contractor is responsible for the identification of any interference items, their temporary removal with approval from the CGTA and storage until work is completed and refitting to the vessel upon completion of the scope of work.

3.2.3. Prior to installation of new deckhead panels, contractor shall install all necessary cabling and junction boxes for new lighting installations to avoid removing newly installed deckhead panels where possible.

3.2.4. Prior to commencing any work, Contractor must tag and lock out applicable system(s) being worked on as a minimum, per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor must install /remove locks and tags accordingly during the scope of work. CGTA will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work CGTA must be in attendance when all locks/tags are removed.

3.1. Installation

3.1.1. The Contractor shall install lighting as per lighting arrangement drawings. The exact location of the lighting shall be determined during installation.

3.1.2. The Contractor is responsible for protecting surrounding areas and equipment while carrying out this work.

3.1.3. The Contactor shall install all lighting and switching/dimming devices as per manufacturers' recommendations and will complete device fitting so that cut edges are not visible after installation. Exact locations of devices to be determined at the start of the work period.

3.1.4. The Contractor shall be responsible for labelling all cables with panel and circuit number on metal cable tags on both ends of each cable run.

3.1.5. The Contractor shall suitably support all cable runs as per TP127E Ships Electrical Standards.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Glamox Potlights

4.2. Glamox Panel Lights

4.3. Dimmers

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work to be completed to the satisfaction of the Chief Engineer

5.1.2. Contractor shall demonstrate correct operation of each lighting circuit and dimming function prior to final sign off of work.

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. N/A

L-04 Distance Measuring Equipment (DME) Replacement

PART 1: SCOPE

1.1. The intention of this specification is for the removal of the existing Pelorus 1118 DME system and replace with CCG supplied Selex 1119A DME system. All legacy equipment and cables are to be removed and new cables and equipment installed and secured.

PART 2: REFERENCES

2.1. Selex 1119A DME User/Installation Manual

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.10.7. The Contractor shall give the Chief Engineer 48 hours advance notice of work being started.

3.10.8. The Contractor is responsible to protect all equipment that may be affected by this work. The Contractor shall complete a pre-work inspection of area before work starts to ensure adequate protection is in place.

3.10.9. This work will be overseen by the Lead Electronics Technologist

3.10.10. The contractor must supply all equipment, enclosures, ventilation, staging, scaffolding, chain falls, crane, slings, and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of a safe working load for the expected duties. Any brackets, mounts, or any other welded attachments required in the performance of this specification must be welded into place by certified welders.

3.10.11. The Contractor shall be responsible to repack any opened transits using manufacturers recommended procedures.

3.10.12. The contractor must remove all sharp edges and grind burrs are smooth.

3.10.13. All nuts, bolts, screws, and hardware are to be stainless steel or other non-corrosive material.

3.10.14. All new and disturbed metal is to be primed and painted to match.

3.2. Removal of Pelorus DME 1118

3.2.1. Prior to the commencement of any electrical work, the contractor must ensure all electrical supplies feeding the system have been isolated at the source following an established lockout/tagout procedure.

3.2.2. All electronic equipment and components removed from the vessel resulting from the performance of this specification must be properly disposed of following provincial guidelines for Electronics Equipment Recycling/Disposal.

3.2.3. Contractor must disconnect and remove all existing equipment and cabling indicated in Table 1 Pelorus DME 118 cable removal and Table 2 Pelorus DME 1118 equipment removal.

Table 1 Pelorus DME 118 Cable Removal List

Cable Label/Type	*Source*	*Destination*	*Signal*	*Length (m)*
DME-ANT /	DME Cabinet Radio	Bridge Top/Monkey's	RF	Unknown

Heliax	Room	Island DME Antenna		
DME-RMT / 6 Conductor Grey Belden	DME Cabinet Radio Room	Wheelhouse – AFT Bulk Head	Data	Unknown
DME-PWR / Braided 14 awg AC Cable	DME Cabinet Electronics Equipment Room	Breaker Panel Radio Room	AC	Unknown

Table 2 Pelorus DME 118 Equipment Removal List

Equipment	***Location***
DME Equipment Cabinet	Radio Room
DME Antenna	Wheelhouse Top
DME Pedestal	Wheelhouse Top

3.3. Installation of DME Equipment

3.3.1. Contractor shall work with a Coast Guard Electronic Technologist to oversee the installation of the new systems and ensure compliance with applicable Coast Guard standards.

3.3.2. The Contractor must install the DME Cabinet in the Radio Room. The exact location will be determined by the Technical Authority at the time of work, but will be in general location will be where legacy equipment was removed.

3.3.3. The Contractor must supply and install a cabinet foundation/mounting bracket as per installation manual. The height of the foundation must be tailored as per space limitations and in consultation with a CCG Electronics Technologist.

3.3.4. The Contractor must supply and install a new antenna Pedestal.

A) The Pedestal must be six (6) feet high.
B) It must be welded to the Deck.
C) It must have strengthening webs.
D) It must have a hole at the bottom to allow water to drain.
E) It must have a hole for cable penetration.
F) The pedestal must have a mounting flange on top as per installation manual.
G) It must be finished with White Powder Coat
H) Antenna Pedestal will be installed in location of Previously removed DME Antenna pedestal

3.3.5. The Contractor must supply and install a cable penetration close to the new pedestal. Cable Penetration must be of one (1) inch NPT kick pipe type with suitable and approved cable gland.

3.3.6. The Contractor must install the new DME Antenna on the new Pedestal.

3.3.7. The Contractor must ground all equipment as per OEM Manuals.

3.3.8. The Contractor will terminate this feed into the new DME cabinet. All other cables will be terminated by a CCGS Electronics Technologist.

3.3.9. The cabling installed by contractor must be identified with a marked stamped stainless steel metal tag. Labels are to be securely affixed to the cable at each end, through any deck head, and gland penetration. The designation for each cable is provided in Table 3.

Table 3 Selex 1119A DME Cable Installation List

Cable Label	*Type*	*Source*	*Destination*	*Signal*	*Length (m)*
DME-ANT 1	LMR-600	DME Cabinet Radio Room	Bridge Top/Monkey's Island DME Antenna	RF	Unknown
DME-ANT 2	LMR-600	DME Cabinet Radio Room	Bridge Top/Monkey's Island DME Antenna	RF	Unknown
DME-RMT	CAT-6e	DME Cabinet Radio Room	Wheelhouse – AFT Bulk Head	Data	Unknown
DME-PWR	Marine Grade AC Cable	DME Cabinet Electronics Equipment Room	Breaker Panel Radio Room	AC	Unknown
ECS-TV	CAT-6e	Centre Console Bridge Deck	Radio Room TV Distribution Rack	Data	Unknown

3.4. Interferences

3.4.1. Contractor is responsible for the identification of interference items, their temporary removal, storage protection, and refitting to vessel.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. Selex 1119A DME Cabinet.

4.2. Selex 1119A Antenna.

4.3. LMR 600 and CAT-6e Cable.

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work must be subject to witness by the Chief Engineer or delegate and the attending surveyor if applicable.

5.1.2. Visual inspection of all welding.

5.1.3. The Contractor is responsible for all air quality testing to ensure hot work and entry is permitted.

5.1.4. Area where work was carried out to be inspected to ensure all debris has been removed.

5.2. Testing

5.2.1. The commissioning of the new DME system must be done under direction of an approved Field Service Representative (FSR) and in accordance with the manufacturers approved procedures. Contractor must bid an allowance of $20,000.00 to arrange for a FSR to attend the vessel for Commissioning of new equipment. Final cost to be adjusted up or down by 1379 action upon receipt of invoice.

5.2.2. Contact information for this system is:

Stephen Leadbetter
VP Marketing & Bus. Development
Approach Navigation Systems
(902)449-5533
sleadbetter@approachnavigation.com

5.2.3. All cables must be checked for continuity after installation to ensure operational capability. Should any cable run fail to pass testing, the cable must be replaced at the contractor's expense.

5.2.4. All cable testing shall be witnessed by the Technical Authority.

5.2.5. Contractor shall be responsible to ensure AC connections to DME Equipment cabinet is proven operational.

5.3. Certification

5.3.1 N/A

PART 6: DELIVERABLES

6.3. Drawings/Reports

6.3.1. The Contractor must provide the Chief Engineer a report of the contractor's work in both electronic and hardcopy formats outlining the details of the inspections and any alterations/repairs prior to the acceptance of this item.

6.4. Training

6.4.1. N/A

6.5. Manual

6.5.1. The Contractor must return all Manuals and Vendor Information associated with the install.

L-05 Helico Tracker System Installation

PART 1: SCOPE

1.1. The intention of this specification is for the new installation of the Helico Tracker System.

PART 2: REFERENCES

2.1. Helico Tracker System User/Installation Manual (Presented at start of refit)

PART 3: TECHNICAL DESCRIPTION

3.1. General

3.10.15. The Contractor shall give the Chief Engineer 48 hours advance notice of work being started.

3.10.16. The Contractor is responsible to protect all equipment that may be affected by this work. The Contractor shall complete a pre-work inspection of area before work starts to ensure adequate protection is in place.

3.10.17. This work will be overseen by the Lead Electronics Technologist

3.10.18. The Contractor must supply all equipment, enclosures, ventilation, staging, scaffolding, chain falls, crane, slings, and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as to being, of a safe working load for the expected duties. Any brackets, mounts, or any other welded attachments required in the performance of this specification must be welded into place by certified welders.

3.10.19. The Contractor shall be responsible to repack any opened transits using manufacturers recommended procedures.

3.10.20. The contractor must remove all sharp edges and grind burrs are smooth.

3.10.21. All nuts, bolts, screws, and hardware are to be stainless steel or other non-corrosive material.

3.10.22. All new and disturbed metal is to be primed and painted to match.

3.2. Installation of Helico Tracker System

3.2.1. Contractor shall work with a Coast Guard Electronic Technologist to oversee the installation of the new system and ensure compliance with applicable Coast Guard standards.

3.2.2. The Contractor must install the CCG supplied antenna on top of the Crow's Nest. A clamp will be required and supplied by Contractor to secure to the railing.

3.2.3. Below deck equipment will be installed by the CCG Electronics Technologist.

3.2.4. The Contractor must install the CCG supplied Low Noise Amplifier (LNA) on the Crow's Nest, close to the newly installed antenna. This is enclosed within a water tight junction box (CCG supplied) and will be secured to the railing by a contractor supplied metal mounting plate welded to the railing. Plate will be approximately 1' X 1'.

3.2.5. The Contractor must supply and install a cable penetration close to the new antenna if no penetration is available. Cable Penetration must be of one (1) inch NPT kick pipe type with suitable and approved cable gland.

3.2.6. The cabling installed by the Contractor must be identified with a marked stamped stainless steel metal tag. Labels are to be securely affixed to the cable at each end, through any deck head, and gland penetration. The designation for each cable is provided in Table 1. All cable terminations are to be completed by a CCG Electronics Technologist.

Table 1 Helico Tracker Cable Installation List

Cable Label	*Type*	*Source*	*Destination*	*Signal*	*Length (m)*
HELI-ANT	LMR-400	Radio Room	LNA - Top of Crow's Nest	RF	Unknown

3.3. Interferences

3.3.1 The Contractor is responsible for the identification of interference items, their temporary removal, storage protection, and refitting to vessel.

PART 4: GOVERNMENT SUPPLIED MATERIAL

4.1. LMR 400 Cable

4.2. 1090 MHz tuned antenna

4.3. Low Noise Amplifier (LNA)

PART 5: PROOF OF PERFORMANCE

5.1. Inspection

5.1.1. All work must be subject to witness by the Chief Engineer or delegate and the attending surveyor if applicable.

5.1.2. Visual inspection of all welding.

5.1.3. The Contractor is responsible for all air quality testing to ensure hot work and entry is permitted.

5.1.4. Area where work was carried out to be inspected to ensure all debris has been removed.

5.2. Testing

5.2.1. Cable is to be tested for continuity to ensure no damage.

5.3. Certification

5.3.1 N/A

PART 6: DELIVERABLES

6.1. Drawings/Reports

6.1.1. The Contractor must provide the Chief Engineer a report of the contractor's work in both electronic and hardcopy formats outlining the details of the inspections and any alterations/repairs prior to the acceptance of this item.

6.2. Training

6.2.1. N/A

6.3. Manual

6.3.1. The Contractor must return all Manuals and Vendor Information associated with the install.