



# CCGS HUDSON

## VESSEL LIFE EXTENSION DRY-DOCK SPECIFICATION



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ATLANTIC REGION

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# General Notes

## 1. Intent

- 1.1 These project requirements are supplied to the Contractor outlining the objectives, performance, standards and engineering requirements for the Dry-docking of the Canadian Coast Guard Ship (CCGS) Hudson.
- 1.2 General (Unmanned): The services as described in H-01 Services shall be supplied, fitted and/or connected to the ship for the duration of the refit period unless otherwise specified. This is expected to include the time period after arrival at Contractor's facility and prior to formal handover to the Contractor. The services shall also to be provided after the vessel has been returned to the care and custody of the ship's crew until signing of the acceptance document and departure of the ship from Contractor's facilities. Contractor shall be responsible for any additional disconnections and re-connections required when the ship is moved between dock / slipway and any berth at Contractor's premises.
- 1.3 COAST GUARD TECHNICAL AUTHORITY (CGTA): The CGTA Shall be the Senior Vessel Maintenance Manager or Project Officer unless this authority is delegated in writing to another individual.
- 1.4 COAST GUARD INSPECTION AUTHORITY (CGIA): The CGIA shall be the Chief Engineer of the vessel or his delegated representative. All final approvals for work packages must be signed by the Chief Engineer themselves and no other signatures will be accepted.
- 1.5 CONTRACTING AUTHORITY (CA) : The Contracting authority will be the representative of Public Works and Procurement Canada (PSPC) who is assigned to this work package.
- 1.6 All the specified work, as well as all work arisings, shall be completed to satisfaction of CGTA and the CGIA. Upon completion of each item of the specification, CGIA shall be notified so that he/she may inspect the work prior to the complete closing up of any work. Failure to give notification does not absolve Contractor of the responsibility of providing CGIA the opportunity to inspect any item. Inspection of any item by CGIA does not substitute for any required inspection by The Regulatory Authority (Lloyd's), CA (PSPC) or Health Canada (HC).
- 1.7 Notwithstanding any errors, omissions, discrepancies, duplication or lack of clarity in these project requirements, it must be the responsibility of the Contractor to ensure that:
  - a. The execution of the work specified herein is to the satisfaction of the CGTA, CGIA, CA and Regulatory Bodies;

- b. All items and equipment supplied are deemed necessary for the safe and satisfactory operation and seaworthiness of the vessel, as required for a vessel of this class.

- 1.8 SAFETY: Vessel shall be under the Contractor's Safety Management program while under their Care & Custody. Potential Contractor s shall include with their bids the name of their Safety Manager or Supervisor who will ensure that these requirements for workplace safety are met. When under CCG Care & Custody, the ISM Safety annex shall apply.
- 1.9 Sections H-01 through to Sections L-03 of this Specification define the individual work items that the Contractor must address during the CCGS Hudson's dry-docking Project.
- 1.10 SUB-CONTRACTORS: All conditions, stipulations etc. listed in the General Notes apply to any Sub-Contractors employed by Main Contractor to carry out work on any Specification item.
- 1.11 SCHEDULE: At the Pre-Refit Meeting, successful Contractor shall provide a Production Bar Chart or Schedule showing commencement and completion dates for each item in this specification. These items shall be broken down to the work package level and show the predicted timelines for each job as well as dependencies as linked to other spec items. This document shall highlight any critical dates and be capable of showing the effects of late completion date of the work package. Contractor shall provide updated Production Schedules to the CGTA and PSPC CA every week and/or whenever the schedule is revised. Contractor shall highlight all milestones as achieved or missed as work progresses.
- 1.12 SAFE WORK CERTIFICATES: Before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments, Contractor and subcontractor personnel issuing these certificates must be fully trained, qualified and certified in accordance with Canada Labour Code requirements and all relevant provincial legislation. Certificates shall clearly state the type of work permitted and shall be renewed as required by the regulations. Contractor and his sub-Contractors are advised that any work carried out in confined spaces as defined by the Canada Labour Code (CLC) and relevant provincial legislation must fully comply with all provisions therein. The Contractor is responsible to provide their own on site Confined Space Rescue team during all Confined space work and activities. This Rescue team shall be made available for use by CGIA or CGTA and Lloyd's inspectors during times when access is required to these spaces for inspection purposes. For CG and Lloyd's, the rescue team will be required to meet all criteria as set out in the CG Fleet Safety Manual.
- 1.13 WELDING: Contractor must ensure that welding is performed by a welder certified by the Canadian Welding Bureau (CWB) in accordance with the requirements of the following Canadian Standards Association (CSA) standards:

- a) CSA W47.1, Certification for Companies for Fusion Welding of Steel Structures (Minimum division level 2.0); and
- (b) CSA W47.2-M1987 (R2003), Certification for Companies for Fusion Welding of Aluminum (Minimum division level 2.1 ).

- 1.14 All welding shall be carried out as per CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event a discrepancy occurs between this specification and the CCG Welding specification, the CCG Welding specification shall be rule.
- 1.15 **HOTWORK VENTILATION AND CONTAINMENT:** During all known work and work arisings that involve hot work, Contractor shall ensure that all dust, debris, gas and smoke generated by the work is evacuated from the vessel by the most direct method. Each item that involves hot work shall have a defined zone which shall be kept sealed off from the rest of the vessel during the complete work period that involves the generation of welding gases, smoke, and grinding dust etc. These zones shall be indicated in the items contained within the known work package. All extra work arisings that involve hot work shall have a zone determined using the same logic. The zone shall be limited to the space(s) where the hot work is being done, boundary areas where fire watches are required, and the access routes between the zone and the exterior of the vessel for workers, welding and cutting equipment and ventilation ductwork. In areas where accommodations and or workplaces cannot be completely isolated from personal access a double sealed door (air lock) arrangement shall be erected to minimize ingress of the contaminants into occupied areas. A ventilation extraction point shall be located as near as practical to the inside door on the worksite side to reduce the egress into the air lock and subsequently the accommodations and/or workspaces. All doorways within the affected area that are not being worked or require access for fire watch activities shall be sealed off to prevent all containments from getting in. Passageway branches that connect to the zone shall be sealed off. Contractor shall completely clean all surfaces and fabrics within a compartment that are not suitably protected.
- 1.16 **ENCLOSURES AND HEATING:** Contractor shall provide all enclosures and heating required to carry out all the scheduled work, taking into account the nature of the work, the time of year the refit is, and the weather conditions for that time of year in Contractor's geographic area. Examples of where heating and enclosures could be required include but are not limited to painting, Potable Water coating, and tank cleaning.
- 1.17 **SERVICE CONDITIONS:** Unless specified otherwise, all components, materials and installations supplied by or carried out by Contractor shall be adequate to meet the following service conditions:

1.18 In areas that are exposed to the elements:

- outside air temperature of minus (-) 40° C to plus (+) 35° C;
- wind velocity of 50 knots;
- water temperature of minus (-) 2° C to plus(+) 30° C;
- shock loading of 2.5g horizontal, 1.5g vertical.

1.19 HOTWORK & FIRE WATCHES: Contractor shall abide by their Safety Management Program when performing Hot-work. Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers are not to be used except in an emergency. Should Contractor have to use ship's extinguishers in an emergency they shall be recharged and re-certified by a local facility, of CCG's choice, at Contractor's expense.

1.20 Security Watches: During the contract period, Contractor shall provide and maintain a continuous, 24 hour-per-day, 7 day-per-week security watch consisting of at least one (1) mobile security patroller. The patrollers are to provide mobile safety and security checks throughout the vessel. The patrols shall be adequate to ensure integrity against personal injury, fire and flood in accordance with Part II of the Canada Labour Code, as well as to ensure that the ship remains free from damage and/or theft resulting from unauthorized entry or activity.

1.21 RELOCATIONS: Any piping, manholes, parts and/or equipment requiring temporary relocation to carry out specified work, or to gain access, shall be refitted upon completion with new jointing, anti-seize compound, clamps and brackets as applicable (Contractor supply). All equipment and systems, so disturbed, shall be tested to prove correct function and fluid integrity upon completion. Defects shall be corrected at Contractor's expense. NOTE: It is Contractor's responsibility to identify equipment and systems that shall be tested to verify correct function, prior to being disturbed for required work. All new components, materials and installations within the ship shall be adequate to withstand the specified shock loading accelerations.

1.22 LIGHTING: Temporary lighting and/or temporary ventilation required by Contractor to carry out any item of this specification shall be supplied, installed and maintained in safe working condition by Contractor and removed on completion of the related work. Naked light bulbs or tubes shall not to be used as temporary lighting inside the vessel. All lights used in the vessel shall be supplied with approved guards.

- 1.23 CLEANUP: Contractor to ensure that all spaces, compartments, and areas where work has been carried out, or Shipyard staff has used for transit routes, are left in "as clean a condition as found" when the vessel commenced refit. All rags, debris, and associated garbage generated by the shipyard staff while on board shall be removed to the garbage container(s) each day. The costs associated with the removal of dirt, debris, and garbage shall be included in the quote.
- 1.24 INSPECTION: Contractor shall be responsible for calling in the services of LLOYD'S & HC Inspectors when and as required for survey and inspection items. All LLOYD'S Surveyors called in by Contractor shall sign-off the Chief Engineer's Inspection Log Book for all items surveyed. The contractor shall endeavor to group inspections as best as practicable to allow the inspector to maximize their time onsite while maintaining the flow of specified work.
- 1.25 PAINTING: Unless specified otherwise, replacement and/or disturbed steelwork shall be given a minimum of one coat of Wasser Miozinc Primer and two (2) coats of Wasser MC Miozinc. Lead-based paints shall not be used. Prior to painting, all new and disturbed steelwork shall be prepped to adhere to manufactures preparation standards for the applicable coating system. Contractor shall arrange for the CG Inspection Authority (CGIA) to be notified after the first coat of paint is fully cured so that it may be inspected prior to the application of the second coat. Failure to do so shall result in another coat being applied at Contractor's expense.
- 1.26 MATERIALS & TOOLS: All materials, unless otherwise specified, shall be supplied by Contractor. Contractor to supply all necessary tools and equipment to perform the specified work. Special, ship-specific tools, as required, will be issued by and returned to Chief Engineer. Contractor shall be responsible for removing the tools from their stored location aboard the vessel, and returning them and securing them in place when finished. Otherwise, ship's tools and equipment will not be available for Contractor's use.
- 1.27 MEASUREMENTS: All dimensional measurements shall be taken and recorded in inches. Unless otherwise specified, the dimensions shall be taken and reported in thousandths of an inch (0.000"). All measuring devices shall be described on the submitted reporting sheets. All reported dimensions shall be either typed or printed in a neat legible manner, and shall include the name of the person who took the readings.

- 1.28 CO-OPERATION: During the period that the ship is in refit, members of the ship's complement, Coast Guard technical staff, CG supplied FSR's and service specialists may be carrying out repairs to, maintenance of, or modifications of various ships' equipment not covered in this specification. Contractor shall not deny access to the vessel to these persons. The contractor shall be given a minimum of 24 hours notice prior to the arrival of non CG personnel and every effort will be taken to ensure that this Coast Guard controlled work will not interfere or conflict with that being carried out by Yard/Contractor.
- 1.29 SMOKING: The Public Service Smoking Policy forbids smoking in Government ships in all areas of the ship. Contractor shall inform workers of this policy and ensure that it is complied with in all cases.
- 1.30 ACCESS: The following areas are out of bounds to Contractor's personnel except to perform work as required by the specifications: all cabins, offices, workshops, Wheelhouse, Control Room, public washrooms, Officers' and Crew's Messes and Lounges. Contractors shall ensure that no workers bring meals onboard the ship.
- 1.31 INSPECTION & GUIDANCE: During this contract, Ship's Crew and Regional Staff will be onboard conducting inspections and providing guidance to Contractor personnel.
- 1.32 ASBESTOS: There may be locations having Asbestos Containing Materials (ACM). The latest Asbestos Re-Assessment Report (March 2018) is available upon request.
- 1.33 The performance requirements specified in Sections 1 through to Sections 7 of these project specifications must be applicable to Sections H-01 through to Sections L-03 in all respects. The specification in Sections H-01 to L-03 may not specifically reference Sections 1 to 7; however, they must still apply.
- 1.34 All available drawings for the CCGS Hudson will be made available to the contractor at their request. It should be noted that due to the age of the vessel some drawings may not be available.
- 1.35 Abbreviations used in this Specification are provided in Appendix C.
- 1.36 The contractor shall allow the CGTA at least two weeks' notice prior to sea trials to allow CGTA time to adequately crew the vessel

## 2. General Particulars of Vessel

**Name:** CCGS Hudson

**Type:** Offshore Oceanographic Science Vessel

**Ice Classes:** Arctic Class 2

**Year Built:** 1963

**Voyage Class:** Unlimited, beyond 2000nm

**Builder:** Saint John SB & DD Ltd., Saint John, New Brunswick

### Principal Dimensions:

Length: 90.4 m (Meters)

Breadth: 15.4 m (Meters)

Draft: 6.8 m (Meters)

Freeboard: 3.2 m (Metres)

Gross Tonnage: 3444.0 t (Tons)

Net Tonnage: 1033.0 t (Tons)

Cruising Range: 23100 nm (Nautical Miles)

Endurance: 105 d (Days)

Cruising Speed: 10.5 kts (Knots)

Maximum Speed: 17.0 kts (Knots)

Fresh Water: 105.00 m<sup>3</sup> (Cubic Meters)

Fuel Capacity: 1268.00 m<sup>3</sup> (Cubic Meters)

Fuel Consumption: 7.60 m<sup>3</sup>/d

## 3. Technical Data Package

3.1 The Contractor is provided with the following data packages to fully define the scope of work for the CCGS Hudson Dry-docking Refit Project:

- Technical Specifications (This Specification Document and appendixes);
- Guidance Drawings – Electronic format;
- CCGS HUDSON Drawings – Electronic format;
- CCGS Hudson Asbestos Re-Assessment Report 2016
- Applicable CCG Standards and Guidelines – Electronic format.
- Supplementary Documentation (not provided by the CCG)
- ASTM G82-95 (2003) – Standard Guide for Development and Use of a Galvanic Series for Predicting Galvanic Corrosion Performance
- CAN/CGSB-1.193-99 – Canadian General Standards Board for High-Build Epoxy Marine Coating

- CAN/CGSB 1.61-2004 – Canadian General Standards Board for Exterior Marine Alkyd Enamels
- CAN/CGSB 3-GP-11D – Naval Distillate Fuel, 2002-11-01
- CAN/CGSB 4.155-M88 – Canadian General Standards Board Flammability of Soft Floor Coverings – Sampling Plans
- CAN/CGSB 51.53-95 – Poly (vinyl chloride), Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- CAN/ULC-S102-03 – Surface Burning Characteristics of Building Materials and Assemblies
- CAN/ULC-S109-03 – Flame Tests of Flame-Resistant Fabrics and Films
- Canada Shipping Act Machinery and Hull regulations pertaining to a Research Vessel having general particulars as specified under Section 1.2
- CSA C22.1 SB-06 – Canadian Electrical Code Standard Part I Safety Standard for Electrical Installations
- CSA C22.2 – No. 0-M91 (R2006) – General Requirements – Canadian Electrical Code Part II
- CSA CAN3-Z299.3-85 (R2002) – Quality Assurance Program Category 3
- CSA W47.1 03 – Certification of Companies for fusion welding of steel
- CSA W47.2-M1987(R2003) – Certification of Companies for fusion welding of aluminum
- IEC 60092-504 ED 3.0 en:2001– Electrical Installations in Ships – Part 504: Special Features – Control and Instrumentation
- CAN/CSA-C22.2 No 60529-05 Degrees of protection provided by enclosures (IP Code)
- International Association of Classification Societies (IACS) - <http://www.iacs.org.uk/>
- IEC 60533 Second Edition – Electrical and Electronic Installations in Ships – Electromagnetic Compatibility
- IEEE 45 STD -2002 – Recommended Practice for Electrical Installations Shipboard
- IEEE STD 315-1975 (Reaffirmed 1993) – Graphic Symbols for Electrical and Electronics Diagrams
- ISO 4406 – 1999 – Hydraulic fluid power -- Fluids -- Method for coding the level of contamination by solid particles
- ISO 18413:2002 – Hydraulic fluid power – Cleanliness of parts and components – Inspection document and principles related to containment collection, analysis, and data reporting



- ISO/TR 10949:2002 – Hydraulic fluid power – Component cleanliness – Guidelines for achieving and controlling cleanliness of components from manufacture to installation
- ISO/TS 16431:2002 – Hydraulic fluid power – Verification of cleanliness
- ISO 15748-1:2002 - Ships and marine technology - Potable water supply on ships and marine structures - Part 1: Planning and design
- ISO 15748-2:2002 - Ships and marine technology - Potable water supply on ships and marine structures - Part 2: Method of calculation
- ISO 2081 – 1986 – Metallic Coatings – Electroplated Coatings of Zinc on Iron or Steel;
- Lloyd’s Classification Society Rules for the Classification of Ships
- MOSH (SOR/87-183) – Marine Occupational Safety and Health Regulations
- PMBoK 3rd Edition – Project Management Institute guidelines to project management
- Provincial Department of Labour Industrial Health Regulations respecting removal of Asbestos
- S.N.A.M.E – Rules/Guidelines for Shop and Installation Trials – latest edition
- S.N.A.M.E.(3-47)\*1989 – Rules/Guidelines for Sea Trials – latest edition
- SOLAS recommendations
- TP 11469 E – Guide to Structural Fire Protection
- TP 127E (2002) – Ship Safety Electrical Standards
- TP 11469 – Guide to Structural Fire Protection 1993
- TP 1861E Standards for Navigation Lights, Shapes, Sound Signal Appliances and Radar Reflectors (1991)
- TP 2072E Deck Cargo Safety Code 1974
- TP 7301 Stability, Subdivision, and Load Line Standards 1975
- T.C.M.S. Ship Safety Bulletin 06/1989 Grounding Safety in Dry-dock
- UL 1309 – Standard for Safety for Marine Shipboard Cable

TP Publications are available at the following web site:

<http://www.tc.gc.ca/marinesafety/tp/menu.htm>

CGSB Standards and publications are available at the following web site:

<http://www.scc.ca>

ULC Standards and publications are available at the following web site:

<http://www.ulc.ca>

Canadian Standards Association Standards are available at the following web site:

<http://www.csa.ca>

International Standards Organization (ISO) is available at the following web site:

<http://www.iso.org>

IEEE Standards and publications are available at the following web site:

<http://www.standards.ieee.org>

British Standards are available at following web site:

<http://www.bsi-global.com>

ANSI Standards are available at the following web site:

<http://www.ansi.org>

ASTM Standards are available at the following web site:

<http://www.astm.org>

ASME Standards are available at the following web site:

<http://www.asme.org>

S.N.A.M.E. Rules/Guidelines are available at the following web site:

<http://www.sname.org>

Project Management Guidelines are available at the following web site

<http://pmi.org>

#### **4. Office and Progress Meetings**

- 4.1 Contractor must provide an adequate boardroom for Progress Review Meetings (PRM). PRMs must be held monthly or more frequently as determined by the Contract Authority.

## 5. Facilities for Government Personnel

- 5.1 The Contractor must provide a minimum of 500 square feet of secure office space exclusively for CG personnel. This office space must meet a minimum of the following requirements:
- 1) Two (2) lockable offices with a minimum of 200 square feet each;
  - 2) Each office shall have one (1) full size “L” shaped secretary style desk with side tables and with double pedestals containing lockable desk drawers.
  - 3) Each office shall have one (1) executive chair and must be fully adjustable and fitted with a swivel base and casters.
  - 4) Each office shall have two (2) waiting room chairs
  - 5) One (1) boardroom with furnishings to seat eight (8) people (arrangements must consist of one large boardroom table with seating for ten). The boardroom must also be furnished with a 4 foot by 6 foot whiteboard on one wall.
  - 6) One (1) desk size table;
  - 7) Ten (10) chairs, of which six (6) must be fully adjustable and fitted with a swivel base and casters (in addition to the boardroom furnishings);
  - 8) Two (2) bookcases – 4 foot wide by 6 foot height;
  - 9) Four (4) keys must be provided for each lockable doors and desks
  - 10) Three (3) direct telephones – one (1) of which must be in the boardroom;
  - 11) Three (3) high speed internet connections as well as High speed secured Wi-Fi; delivering a minimum of 1.5 Mbps download speed and 544 Kbps upload speed.
  - 12) One (1) office copier/scanner capable of handling 8.5 by 11 inch paper, 8.5 by 14 inch paper and 11 by 17 inch paper sizes. The copier must be equipped with an auto sheet feeder and serviceable within two (2) hours of any breakdowns.
- 5.2 The offices must be supplied with heating, ventilation/air conditioning, and lighting as per provincial health and occupancy regulations.
- 5.3 Office must be located no further than 250 feet away from the gangway of the vessel while in dry-dock.
- 5.4 Washroom facilities must be located in or adjacent to the office complete with ventilation fan, fully functional plumbed toilets, running cold and hot water and plumbed wash up facilities.

- 5.5 All of the above equipment and facilities must be clean and in good condition to the full satisfaction of Canada. All facilities must be cleaned once a week for the duration of the refit period.

## **6. Storage Space**

- 6.1 The Contractor must provide 1500 square feet of secure, environmentally controlled storage space for the ship's equipment. The storage space environment must be maintained at 15 degrees Celsius and at a maximum relative humidity of 70 percent for the duration of the contract period.
- 6.2 All items must be stored in such a manner so as to be easily accessible for inspection. No items shall be stored directly on floors.
- 6.3 The storage space must be on the premises of the Contractor's facility and CGTA and CGIA must have unrestricted access to this facility at all times.

## **7. Fees and Costs**

- 7.1 The Contractor must include in their bid for the following fees and costs:
1. Services;
  2. Tests and Trials of equipment and vessel;
  3. Provision of safety services, e.g. gas freeing of tanks, fire protection, cocooning asbestos containing areas;
  4. Certification of lifting devices as required;
  5. Type approval of equipment to be installed if required.
  6. Testing of any watertight penetrations (piping or cableways) that have been added or disturbed, for watertight integrity. Ultrasonic testing is recommended, however a suitable alternative may be used if approved by the CGTA.

- 7.2 The Contractor shall contact, coordinate and schedule all regulatory inspections and/or class surveys by the applicable authority: i.e. HC, Environment Canada, Lloyd's or others as required by the specification. CGTA and CGIA shall be notified in writing at least 12 hours prior any regulatory inspection, shall be on site during all regulatory inspections or surveys. Contractor shall note that CCGS Hudson is now under the Delegated Statutory Inspection Program (DSIP) with the inspection authority of Lloyd's register. All inspections must be coordinated through local Lloyd's office and CGTA. All required site visit by Lloyd's shall be pre-approved by CGTA before they are scheduled. Contractor shall make every reasonable effort to minimize the amount of visits by scheduling multiple inspections per visit as practicable. CGTA shall be given 12 hours' notice prior to any inspections commencing and shall be on site and present during the inspection. The cost of Lloyd's inspections will be paid as per invoice.
- 7.3 The contractor shall include in their bid price the recovery of all grit blasting substrate, this shall include but not be limited to all paint, debris and grit as well as the disposal there of. This recovery and disposal of the substrate shall be completed in accordance with all applicable provincial/federal regulations.

## **8. Quality Assurance**

- 8.1 The Contractor must deliver, as part of its bid package, confirmation that they have an established Quality Assurance program in place. This program shall be used conjointly with all guidelines and deliverables set out in section 5 "Quality assurance and Inspection and testing" in section H-01 - services.
- 8.2 Canada may audit the Quality Assurance program.

## **9. "As Delivered" Inspection**

- 9.1 The Contractor must, with the Technical Authority and the Inspection Authority, carry out an "As delivered" inspection of the vessel. All parties must sign off on the assessment of vessel's equipment and systems. This activity must be carried out before hand-over of the vessel to the Contractor. The Contractor must provide a photographic survey of the inspection to the Inspection Authority and the Technical Authority.
- 9.2 This inspection must meet the requirements of Section 3 "Photographs and Images" in the Services section of this Specification.

## **10. Project Management**

### **10.1 Introduction**

- 10.1.1 Project management refers to system integration and technical control as well as business management of the CCGS Hudson Dry-docking refit project.

NOTE: Items below marked with an asterisk \* must be delivered with the bidder's proposal.

### **10.2 Project Action Plan (PAP)\***

- 10.2.1 The Contractor must document the project management for the work in a Project Action Plan and must update this plan at Bi-weekly intervals or more frequently as required by the Contracting Authority.
- 10.2.2 The PAP must comprise organization structure charts, a master schedule, support schedules, sub-Contractor schedules and work, Government Furnished Equipment (GFE), and Contractor Furnished Equipment (CFE) delivery dates as a minimum.
- 10.2.3 The monthly updates to the PAP must comprise schedule updates, a progress report and review meetings. The components of the PAP and its updates are described in the following sub-sections.

### **10.3 Project Integration Management\***

- 10.3.1 The Contractor must provide an overall project organizational chart identifying all key personnel and sub-Contractors. Further, the Contractor must identify the contract-related work each sub-Contractor is responsible for.

### **10.4 Change Management Log\***

- 10.4.1 The Contractor must provide a Change Management Log that must be used for the duration of the project to manage project changes.
- 10.4.2 The Change Management Log must track project issues with the following criteria:
- 1) Individual tracking number;
  - 2) Date issue was raised;
  - 3) Expected resolution date;
  - 4) Date issue was resolved;
  - 5) Brief note of resolution on issue;
  - 6) Individual who raised issue;
  - 7) Individual assigned to resolve issue;
  - 8) Risk Factor.
- 10.4.3 If issues require a change in the work they must be dealt by submitting a PSPC 1379 Form.

## **10.5 Risk Management\***

- 10.5.1 The Contractor must identify emergent risks and rank these risks by impact on the work. Mitigation strategies must be identified for all “High” risks. The “Risk Management Plan” must be updated at least weekly and provided to the Technical and Contracting Authorities. The “Risk Management Plan” must be included in the Bi-weekly progress meeting Record of Decisions.

## **10.6 Scheduling\***

- 10.6.1 The Contractor must provide a schedule(s) that breaks the work down to the system and component level. The schedule must include sub-Contractor schedules to the same level. The Contractor must update the schedule(s) on a Bi-weekly basis and the updates must be provided to the Contract Authority, the Inspection Authority and the Technical Authority.
- 10.6.2 The schedule(s) must identify all work in the project. It must include long lead items, GFE, strip outs, production, assembly, installation, bench testing, system commissioning and tests and trials, as well as all scheduled and required resources.
- 10.6.3 The schedule(s) must identify the major milestones, critical path and all interrelationships between tasks. The schedule(s) must be baseline.
- 10.6.4 The initial schedule(s) must be delivered 21 calendar days after contract award.
- 10.6.5 A milestone schedule must be supplied with the bidder’s tender package.
- 10.6.6 The PMBoK 2000 must be used as the reference for scheduling.

## **10.7 Project Reporting**

- 10.7.1 The Contractor must provide a Bi-weekly (every two weeks) Progress Report describing the status of the project Time Line, Cost and Performance as an introduction. Time, Cost and Performance must then be addressed in detail. The report must identify significant risks to the program and the actions taken to resolve these risks. The risk analysis must identify any impact upon delivery and actions taken to recover any slippage that may affect the contract delivery date. The report, in electronic format, must be delivered monthly, three (3) working days prior to the progress review meeting to the Contract Authority, the Inspection Authority and the Technical Authority. The progress report must include sub-Contractor and major component supplier activity.

# H-01 Services

## 1. General:

- 1.1 The following services shall be supplied, fitted and/or connected upon arrival at the Contractor's facility, maintained throughout the docking / contract period, and removed from the vessel on completion of the work. Contractor shall be responsible for any additional connections required when ship is moved between dock/slipway and alongside berth at Contractor's premises.

## 2. Prices:

- 2.1 Contractor shall quote a global price and a separate daily or unit cost rates for all services supplied to the vessel during the refit period.

## 3. Documentation:

- 3.1 Contractor shall provide all documentation, including reports and permits, associated with this statement of work in English. This shall include but not be limited to, the Inspection and Test plan documents required as per section 5 of "Services", all job acceptance documents, all posted hot work, man aloft and gas free permits. CCGS Hudson is a unilingual vessel, and for record keeping and historical reference, the vessel is required to retain all documentation in English.
- 3.2 Refit Reports: Contractor shall prepare two (2) USB Drives with a complete copy of all deliverables for each specification and extra. Electronic copies of documentation will be accepted only in JPEG, Word, Excel or Adobe PDF format unless approved by CGTA. All drawings shall be provided in both CAD and PDF format and shall be the property of CCG for future use as deemed necessary. Each Specification item and extras shall have a separate folder and deliverable will be sorted into the appropriate folder and have file names that provide a brief description of the files contents. Readings shall be indexed by specification number. Large documents over 10 pages shall have page numbers and be dated on every page and include a working Table of contents with hyperlinks.

The copies shall be delivered to:

Canadian Coast Guard Technical Services  
Attention: Tim Matthews – Vessel Maintenance Manager  
50 Discovery Drive – CCG Building  
4<sup>th</sup> Floor, Marine Engineering / ITS  
Dartmouth, Nova Scotia,  
B2Y 4A2



## 4. Photographs and Images – General

### 4.1 “As Delivered” Photographs/Image

The Contractor must supply a professional photographer to deliver 1000 high resolution (minimum 8 Mega Pixel) digital images in JPEG format. Images must be clear and all details must be legible. Images must be stored on digital USB storage device. The Inspection Authority and the Technical Authority must be in attendance for all images. The entire ship must be photographed with enough detail to point out specific parts and/or pieces. Contractor will provide a separate cost for this service that will be included in the global price. If Canada requests more images to be taken, the price will be prorated.

### 4.2 The Contractor must provide two (2) copies of all “As Delivered” digital images on individual USB Storage devices to the Inspection Authority and the Technical Authority at the first progress meeting after the delivery of the vessel to the Contractor’s facility. All photos will be organized in folders listing relevant specification numbers and named with a quick description of what the photo is taken of.

### 4.3 Progress Photographs/Images

The Contractor must provide high-resolution (minimum 12 Mega Pixel) JPEG digital images on USB media of the work in progress during each phase of the project. The photographs must commence when the work on the vessel begins and continue as long as work is in progress.

### 4.4 The Contractor must take sufficient exposures during the VLE project to ensure that an adequate record of work progress is captured. The date of exposure must be automatically recorded for all images.

### 4.5 The Contractor must provide two (2) copies of all progress photographs on individual USB media in JPEG format to the Inspection Authority and the Technical Authority at monthly progress meetings.

## 5. Quality Assurance and Inspection and Testing:

### 5.1 The contractor shall assign at a minimum, one full time quality assurance inspector to the vessel for the duration of the refit. The name of this inspector shall be submitted with the deliverables in this section along with the contractors bid.

### 5.2 The contractor shall be responsible for developing an Inspection and testing plan (ITP) and implementing this plan for the duration of the refit. This ITP shall include, at a minimum, all holds points and test procedures as listed in section 4 of each specification item. Contractor shall provide with their bid, an electronic copy of the contractor’s ITP as it applies to this refit for CGTA and CGIA approval.

- 5.3 The contractor shall be responsible for developing a Lloyd's Inspection plan as it relates to this specification and ensure the implementation of this plan for the duration of the refit. The contractor shall be responsible for developing a checklist of inspections to be carried out over the duration of this refit and shall have the attending Lloyd's surveyor sign the check list after each inspection item as confirmation the inspection was completed. Contractor shall provide with their bid, an electronic copy of the above mentioned plan and check list as it applies to this refit for CGTA approval.
- 5.4 The contractor shall provide documentation throughout the refit of inspections and testing of items to ensure the scope of work is completed to the required specifications at each relevant stage. The documentation shall be signed during the inspection and testing stages by the QA representative and the CGIA.
- 5.5 QA representative shall note all observations made during testing and inspections. They shall provide updates and review the documentation during the in-process production work and during the scope of the work on each specification item.
- 5.6 QA representative shall schedule and ensure that all pre-determined check/stop points, as determined by this specification and the contractor's ITP, are witnessed by any required regulatory body and CGIA.
- 5.7 Canada may audit the Quality Management/ Quality Assurance plan and ITP. Failure to comply with the plan as presented will result in a Non-conformance report.
- 5.8 All QA plans and documents must be in English

## **6. Gangways:**

- 6.1 Contractor shall supply and install two (2) gangways complete with safety net, while the ship is on the dock or slipway. Contractor to supply and install two (2) gangways, complete with safety nets, as directed by the CGTA, while the ship is berthed alongside at the Contractor's facilities.
- 6.2 Safety nets shall be in compliance with the Canada Labour Code. Gangways shall be safe, well-lit and structurally suitable for the passage of shipyard personnel and the ship's crew. Contractor shall maintain gangways in a safe condition throughout the duration of the refit while the ship is out of the water.
- 6.3 Initial installation and later removal of gangways shall be included in quote, as well as maintenance and upkeep while vessel is in Contractor's yard. Any movement of gangway(s) required by the Contractor shall be at his cost.

## 7. Electric Power:

- 7.1 Contractor shall quote on connecting and supplying electrical power upon ship's arrival at Contractor's facilities. Power supply shall be 440 VAC, 3 PH, 60 Hz at 400 Amp rating. The contractor shall supply all required transformers and cables required. Power shall be supplied on two (2) services; these services shall be separate and independent of one another, each one having its own 400 amp Breaker. One service will supply the vessels hotel load and one service will supply the vessels heat. It shall be supplied for the support of the vessel's systems and the exclusive use of ship's crew.
- 7.2 Contractor shall bid on the supply of 6500 kWh per day for refit period. The actual consumption shall be pro-rated up or down as per power used as indicated by vessel's kWh meter. The power meter shall be read and recorded by CGIA and Contractor's Representative together at the start and end of contracted period. The kWh unit price shall be quoted for PSPC 1379 adjustment purposes. Cost of connection, maintenance of connection and supply as well as disconnection shall be included in the quote.
- 7.3 If no kW consumption meter is available, the vessels meters will be used to determine power consumption (amps) and shall be paid at the posted utility company rate on the day of the close of contract

## 8. Fire Main:

- 8.1 Contractor shall connect a two (2) inch diameter fresh water line to the ship's fire main, with an isolation valve placed onboard. \*\* Fire main will be dry and ready for emergency operation

## 9. Washroom facilities, Potable Water & Sanitary Water:

- 9.1 Two (2) Portable washroom facilities shall be supplied by contractor for duration of contract. These facilities shall be supplied with a fresh potable water holding tank. The potable water tanks shall be filled and waste water holding tanks shall be emptied weekly for the duration of the contract. **\*\*These toilets will be for the use of CCG employees only.** Washroom facilities must be located on or adjacent (no more than 50 feet from gangway) to the ship. The location of the washroom facilities must be approved by CGTA prior to installation. The washroom facility must be complete with ventilation fan, Heater, fully functional plumbed toilets, running cold and hot water and a plumbed wash up facilities.
- 9.2 Potable fresh and sanitary water at 415 kPa (60 PSI) constant pressure shall be connected to ship's systems complete with pressure regulator and shut-off valves. These connections will be maintained at all times while the ship is manned, The contractor will *include in their bid, as well as a separate unit price*, the supply of 2 tonnes/day for a duration of 20 days for a total of 40 metric tonnes.

- 9.3 If the water supply is disconnected during the unmanned portion of the refit, it shall be re-connected at least two day prior the return of the ships complement, until such time as it is deemed unnecessary by the CGTA. All connections and disconnections will be made at the contractors own expense. Any deviation from the 40 tonne supply will be added or subtracted at a pro-rated amount. If for any reason the ship is tied up alongside for an extended period of time before or after dry docking, connections will be made at the ships location and water will be provided as stated above. Any water required supplied to the vessel due to an extended period alongside tie up within the specified dates that are provided as "Dry-dock" in the schedule presented as per 1.10.6.4 of this specification, will be supplied at the contractor's expense. This will include all hook-ups, maintenance and disconnections required to maintain the service.
- 9.4 Contractor shall supply and connect a water meter to the ship's inlet line. Contractor shall quote a unit rate for PSPC 1379 adjustments, and include **all** connection / disconnection costs in bid price. Contractor shall make arrangements to prevent the potable water supply piping/hoses are protected against freezing.
- 9.5 Contractor shall provide to CGTA at the Pre-Refit Meeting a certificate of potable water quality before water service is connected to the vessel.

## **10. Garbage:**

- 10.1 A garbage container, 6 m<sup>3</sup> (215 Ft.<sup>3</sup>) minimum capacity, strictly for ship's use shall be placed in a convenient location as close as possible to the ship's gangway. The Contractor shall provide this service only for the duration of CCG Custody and when the majority of crew is aboard.

## **11. Cranage:**

- 11.1 Contractor shall bid on supplying general services of a dockside crane, driver and rigger for twenty (20) hours during the dry-docking period as and when requested by the CGTA, plus an hourly rate for PSPC 1379 adjustment purposes.

## **12. Waste oil:**

- 12.1 Contractor shall quote a unit rate per m<sup>3</sup> for the removal and disposal of waste oil / water mixture from the vessel during the refit period. This unit rate Removal and disposal shall be performed by an identified licensed waste oil disposal company in full compliance with regulatory requirements and shall be for PSPC 1379 adjustment purposes. For the purposes of this specification the removal of 200 m<sup>3</sup> will be added to the bid priced. Any difference in the amount of waste oil / water mixture from the 200 m<sup>3</sup> will be adjusted up or down using the 1379 process. All disposal certificates will be maintained and amounts shall be recorded on an excel spreadsheet. These certificates will be used to verify calculations for approval of the final 1379.

### 13. Removal and Disposal of Clean Diesel:

- 13.1 The contractor shall quote a unit rate per m<sup>3</sup> for the removal and disposal of remaining clean fuel (per m<sup>3</sup>) on board at time of dry-dock. For the purposes of this specification, the removal of 200 m<sup>3</sup> of diesel fuel will be added to the bid price using the unit cost provided. Any difference in the amount of fuel from the 200 m<sup>3</sup> will be adjusted up or down using the 1379 process. All disposal certificates will be maintained and amounts shall be recorded on an excel spreadsheet. These certificates will be used to verify calculations for approval of the final 1379.

### 14. Cleaning:

- 14.1 Contractor shall ensure that all spaces, compartments and areas of the ship where work has been carried out, or Shipyard staff has used for transit routes, are **“as clean as found”** when work is completed. The cost of clean-up work shall be included in the quote for each specification item.

### 15. Parking:

- 15.1 Sufficient parking for DFO/CCG and PSPC Contract Authority shall be provided conveniently close to the berthed or docked vessel and CCG office facility. The Contractor shall provide four (4) clearly designated “for DFO/CCG and PSPC use only” parking spaces for the duration of the docking period and provide CGTA with the required passes.

### 16. Deck Protection:

- 16.1 Masonite 1/8" (3 mm) shall be fitted to all access alleyways throughout the ship as indicated by the Chief Engineer and/or Chief Officer. All edges and joints shall be taped with duct tape or equal to prevent the ingress of dirt, etc. Contractor shall quote on supplying and installing 230 m<sup>2</sup> (3,220 ft.<sup>2</sup>) of Masonite. Masonite and duct tape shall be lifted upon completion of refit, and left on board as indicated by Chief Engineer. Contractor shall quote a unit price for PSPC 1379 adjustment purposes. Areas covered shall include Bridge, Upper Deck alleyways, Main Deck alleyways, Chief Engineer's cabin, Senior Engineer's cabin, Engineer's Office, Electrician's Cabin, and Lower Deck alleyways to Engine Room. All deck covering shall be installed within 2 days of contract commencement. All edges and joints are shall be securely duct taped down. Any deck coverings damaged by Contractor's personnel shall be replaced at contract's expense. Weekly inspection of covering shall be made with ship's officer present and all areas of loose covering shall be secured with new tape.

### 17. Bulkhead Protection:

- 17.1 Kraft paper shall be supplied and applied with non-marking tape to all "Isolamin" panels as listed below. Contractor shall quote a unit price per square meter for PSPC 1379 adjustment purposes.
- 17.2 Main Deck: All areas accept the Port Passageway. 250 m<sup>2</sup> (2,690 ft<sup>2</sup>) of Coverage is required.

- 17.3 Upper Deck: Fwd. Passageway between the Quartermasters Stations and the Starboard passageway. 140 m<sup>2</sup> (1,506 ft<sup>2</sup>) of coverage is required.
- 17.4 Stairwells: The forward and aft stairwells between the Main Deck and Upper Deck. 40 m<sup>2</sup> (430 ft<sup>2</sup>) of coverage is required.
- 17.5 All deck and bulkhead coverings shall be installed within 2 days of contract commencement. All edges and joints are shall be securely taped down. Any coverings damaged by Contractor's personnel shall be replaced at his expense. Weekly inspection of covering shall be made with CGIA representative present and all areas of loose covering shall be secured with new tape.

## **18. Highspeed / WiFi Internet on the vessel**

- 18.1 The contractor must provide a high-speed internet connection to the vessel to be hooked into the ships server. Price shall include all connection and disconnection fees incurred and must be available for the entire duration of the contract.

## **19. Protection of Deck Equipment**

- 19.1 All deck equipment, including but not limited to: cranes, winches, davits, windlass, etc. shall be protected with a shrink wrap covering. This covering shall protect the entire unit from dirt and debris ingress as well as weather. An alternative substitution to shrink wrap will not be considered.
- 19.2 All shrink wrap coverings will be in place within the first week of the dry-docking period and remain in place for the duration of the contract.
- 19.3 Upon completion of the work package but prior to sea trials, and with prior approval of the CGTA, the contractor shall remove all shrink wrap coverings.
- 19.4 Immediately after the shrink wrap is removed and under the guidance of the CG personnel, all deck equipment shall be function tested to the satisfaction of the CGIA.

## H-02 Sewage Vacuum Tank Replacement

### 1. Scope:

The CCGS Hudson requires a new sewage collection/vacuum tank to be constructed of steel plate and installed as per the original "as fitted" unit, which now has perforations filled with Epoxy coating.

### 2. Technical Description:

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The vessel has a requirement to replace its failed in service Sewage Collection/vacuum tank. The tank is to be installed in the Sewage System Compartment within the shaft tunnel, above tank top for the #6 Double bottom fuel tanks, between frames 29 and 49.
- 2.1.4 Vessel engine staff shall pump down the old tank until suction is lost. Vessel engine staff will shut and isolate the existing piping at the valves, and level probe connections electrically. Contractor shall be responsible for disconnection and re-connection of all pipes, fittings and valves to the tank. Contractor shall fit blanks to any pipe openings
- 2.1.5 The contractor will be responsible for having the tank pumped out and flushed prior to cutting up the old tank. Contractor shall quote, on a separate line, on one (5) cubic meter of water for disposal which will added to the bid price. This unit cost will be prorated and used for 1379 adjustment purpose.
- 2.1.6 Contractor shall remove all existing fittings that provide communication with the vacuum pumps and any control accessories for the fitted tank. Care shall be taken to store these items for future re-install onto the new tank. Any defects found as a result of contractor interaction in these saved fittings shall be responsibility of contractor to replace with devices/fittings approved by CG Inspection Authority.
- 2.1.7 The sight glass for the 25 Ton waste oil disposal tank shall be removed and protected from damage. The open ports into the 25Ton tank shall be blanked to prevent dirt ingress into the tank.
- 2.1.8 Contractor shall gas free for hotwork the #6DB fuel tanks that exist directly below the work area for this tank removal/replacement work. Contractor shall gas free for hotwork the 25Ton Waste oil tank that is directly fwd of the work area and is accessed from a manhole on the fwd bulkhead of the Sewage system compartment. Vessel engine staff will pump down the #6DB tanks until loss of suction and guide the contractor to apply Lock-out/Tag-out for all devices that communicate with the #6DB and the 25Ton Waste oil tank.

- 2.1.9 For bidding purposes the contractor shall include in their bid, the removal 10m<sup>3</sup> of diesel fuel from the vessel and 20m<sup>3</sup> of waste oily water from the 25 Ton tank to shore disposal facility. These cost will be adjusted by 1379 using the unit rate provided in H-01 – Services paras 12.1 and 13.1.
- 2.1.10 Contractor shall not allow any harm to come to the components of the Water Quality package of the Shaft seal cooling water system. All three flow meters of this system to be given appropriate wooden coverage such that impact damage from steel work is prevented. The Mechanical Shaft seals of the propulsion tailshafts shall be wrapped in protective fire blankets to prevent dirt/dust ingress on their surfaces. The starter and pump for the Water Quality package and the display panel for the Shaft Grounding system (stbd side aft within the Shaft Tunnel) shall be protected from impact and dirt/duct ingress with protective wrappings.
- 2.1.11 Contractor shall make every effort to contain hotwork activity smoke and debris to the shaft tunnel area. Preferred method of exhaust is the utilization of the escape trunk at frame 25 of the shaft tunnel.
- 2.1.12 The contractor shall cut up and remove the existing tank, and dispose of material in an approved manner. The feet for the tank shall not be saved and must be fabricated new and attached to new sections of the tank.
- 2.1.13 The entire mounting cradle for the vacuum tank shall be inspected at this time and any defective steel shall be replaced with concurrence from CG Inspection Authority. The cradle is to retain its position, such that ease of re-alignment for all piping connections is facilitated upon final re-assembly. Contractor is provided an allowance not to exceed \$5000.00 to replace defective steel of the cradle structure. Once actual work requirements are known, contractor shall provide a cost to CGTA for approval prior to any work taking place and all materials shall be proven by invoice action against this portion of the work package.
- 2.1.14 Once all the steel for the vacuum tank has been removed and the cradle steel repaired as needed, construction of the new tank shall commence
- 2.1.15 The attached sketches are for guidance and bidding purposes only. The contractor will verify all dimensions and create a re-assembly plan as the tank must be re-built in sections. All tank ports witnessed on the “AS Fitted” tank with respect to location and size for piping and/or control fittings shall remain the same for the replacement tank except for the 24” diameter cover. The ports on the cover shall be reduced to a total of 2 @ 2.5” NPT as this is all that is required.



- 2.1.16 The tank shall be of similar size and cylindrical shape, being 72" long x 42.25" in diameter. These dimensions are external dimensions of the existing tank. All material, unless otherwise stated, shall be chosen from either of the two preferred choices stated here:
- 1) First preference -- Minimum ¼" ASTM A283, or
  - 2) Second Preference --Minimum 5/16" CSA 300W
- 2.1.17 The tank will be made in seven sub sections. The number of sections to be verified by contractor. CGIA shall be consulted for the number of sections to be fabricated prior to assembly. These include four half round sections, 36" long x 42.25" diameter, two end plates of 42" diameter, and one new access hatch coaming of 18" diameter with a 24" diameter cover arrangement.
- 2.1.18 The number of ports in the 24" diameter cover shall be reduced to 2 only. One port is required in the center and another being the starboard side fwd position as shown on the reference dwg. Each port shall be 2.5" NPT
- 2.1.19 All pipe fittings shall be seamless sch 80 black iron NPT. All fittings shall be continuously seal welded both sides. All flanges shall be ANSI 150 steel of a bolt pattern and size to match existing piping connections. The tank feet (5/16 flat bar construction) shall be fabricated and secured by welding to the tank bottom, so as to align with the existing tank seat arrangement.
- 2.1.20 The end stiffeners of ½ " flatbar shall be stitch welded to the tank ends.
- 2.1.21 The sub sections complete with all fittings and stiffeners are to be fabricated at shipyard metal fabrication shop and tacked together for inspection. Once approved by the CGIA, the contractor shall break down the new tank for transport.
- 2.1.22 The contractor shall abrasive blast all sections as per specification SSPC-SP10, "Near-White Blast Cleaning or per NACE Standard No.2 to a profile depth of 1.5 - 2.0 mils. The tank internals shall be coated up to the expected heat transfer zone from the welded edges with one coat of Wasser MC-MIOZINC primer to protect the steel during the assembly process.
- 2.1.23 Due to restricted passageways, the contractor shall plan and verify the size and pathway for all tank section movements throughout the engineroom and vessel. This pathway shall be in agreement with CGIA. Contractor shall take every precaution to prevent damage to vessel passageways, alleyways, and bulkhead linings when transporting new and old tank sections.
- 2.1.24 Tank sections are to be transported back to the vessel and reassembled. Contractor shall assemble the new sections in the Sewage Compartment ensuring all piping alignments as being correct. Any changes in piping alignment shall be at the contractor's expense. The sections of tank shall now be welded together using an appropriate full penetration process.

- 2.1.25 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements
- 2.1.26 Once all welding has been completed contractor shall isolate the tank by sealing all openings, with the exception of the vacuum connection. The vacuum piping shall be connected to the tank connection.
- a) A new ¼" neoprene rubber gasket will be supplied and installed for the inspection hatch. Contractor may re-use the 24 qty, 1 ½" x ½" NC stainless steel cap screws, nuts, and washers for this cover.
  - b) All piping and float connections shall be sealed with new contractor supplied fittings.
  - c) The lower forward flange shall be sealed by a gasket/spade arrangement. The contractor shall supply suitable materials as required to make this seal. The contractor shall also supply new stainless steel fasteners for the final connection.
- 2.1.27 The ship's vacuum system shall be engaged by vessel engine staff and a 20" vacuum drawn down. Once this value is reached the isolation valve shall be closed and the tank left for one hour. Should the vacuum test fail, ship's compressed air will be connected by the contractor to pressurize the tank to 1.5psi so that a soap test can be used to locate the source of the leak. Once any and all leaks are corrected any new welding residue and coating damage shall be touched-up. This testing procedure will continue at the contractors expense, until a satisfactory test result is approved by CGIA. No additional allowances will be given for the additional testing of the tank.
- 2.1.28 Any piping sections that are deemed necessary and are fabricated to fit the new tank shall be hydro tested to 100psi for 30 minutes and shall be witnessed by CGIA. It is not anticipated that any pipe sections shall be required –this action will be completed by approved 1379 process.
- 2.1.29 Upon completion of welding, inspection and testing of the new sewage vacuum tank, all internal surfaces shall be prepared and painted as per Wasser Coating system. All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached). The Contractor shall also follow the Wasser Moisture-Cured Urethane Ballast Tank Specification (attached). The Coating System is described below:
- a) One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - b) Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - c) An intermediate coat of Wasser MC -TAR RED (DFT 6mil)
  - d) A topcoat of Wasser MC- BALLAST COAT BEIGE (DFT 4mil)

- 2.1.30 The exterior surfaces of the tank, including pipe connections, manhole, and the attachment points of the tank to the legs as well as the tank cradle system shall be prepared to a surface prep of SSPC-SP6 as applicable or as a minimum SSPC-SP3 prior to coating with the following paint schedule:
- a) One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams
  - b) Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas
  - c) One top coat of Wasser MC Luster 100, RAL 9003 WHITE, (DFT 3-5mil) for the areas that are normally painted white
  - d) One top coat of Wasser MC Luster 100, RAL 7042 Deck Grey, (DFT 3-5mil) for the areas that are normally painted deck grey –this shall be for the entire tank cradle system down each leg to the point of contact with the tank top.
- 2.1.31 After coatings are cured, contractor shall reconnect all valves, lines, fittings, and piping back to original with new suitable gaskets of DURALON 8500 as preferred material. Ship's crew will re-connect electrically the sewage probes, and reopen any valves that are required for commissioning.
- 2.1.32 Contractor shall perform a mineral oil wipe down of the #6 DB tanks port and stbd prior to making preparations to close these double bottom tanks. CGIA shall be given the opportunity to perform a final inspection of the mineral oil application and to inspect for any foreign material in the DB tanks prior to closing the manholes. All manholes to be provided with new BUNA-N rubber gaskets of ¼" thickness. Any fasteners destroyed by opening the #6DB manholes shall be replaced by Contractor at this time –fasteners for replacement to be same grade and material as those originally sealing these manholes.
- 2.1.33 Contractor shall allow CGIA to inspect the internals of the 25 Ton tank prior to closing this tank. Once approval is granted to close this tank –contractor shall replace all nuts and washers for each stud of the manhole with 316 stainless, any damaged stud shall be replaced with new 316 stainless stud. Contractor shall be granted an allowance of \$1500.00 to replace 5 studs for this manhole if studs are inspected and found defective by CGIA. A new ¼" thick BUNA-N rubber gasket shall be applied to the manhole upon sealing this tank.
- 2.1.34 After all final clean-up of the work site is completed, contractor shall clean the tank top for the entire area of the forward section of the Sewage compartment for paint touch-up of the tank top, starting at the forward end of the Grey water tank and continuing to the forward bulkhead of the space. Contractor shall apply a touch-up coat of Wasser MC Luster 100, RAL 7042 Deck Grey, (DFT 3-5mil) for this described area.
- 2.1.35 All work shall be carried out to the satisfaction of the CGIA.

## 2.1 Location

- 2.2.1 The old tank is located in the propulsion shaft tunnel, which has restricted and narrow access. The tank operates as a collection and holding tank for raw sewage. The tank normally operates under a vacuum of 16 ½ "Hg.
- 2.2.2 The tank is to be installed in the Sewage System Compartment within the shaft tunnel, above tank top for the #6 Double bottom fuel tanks, between frames 29 and 49.

## 2.2 Interferences

- 2.3.1 This work shall be completed in conjunction with the following specification items:
  - i. HD-01 "Docking & Undocking"
  - ii. H-03 "Fuel Tank Survey"
  - iii. H-32 "Black and Grey Water Overboard Valves"
  - iv. E-02 "Intermediate shafts and Bearings"
- 2.3.2 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item
  - a) All components in the Sewage collection space that cannot be removed for ease of construction for this work must be properly protected from all causes of damage. Contractor is encouraged to take photos of electric starters, pumps, light fixtures and junction boxes that will remain -- such that "before and after" condition is easily assessed. CGIA will use photo's taken in section 4 of H-01 - Services to verify condition on arrival.
  - b) All dirt, debris etc. is to be removed and disposed of by the contractor in an approved manner.

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

- 3.1.1 Guidance drawings of sewage vacuum tank. The attached sketches are for guidance and bidding purposes only. The contractor will verify all dimensions to ensure tank can be assembled in place and installed.

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS –No.47 – Part “B” Ship Building and Repair Quality Standard.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Hold point 1 – Upon removal of the existing tank CGTA shall witness all steel preparation prior to any fitment of new steel to tank cradle.
- b) Hold Point 2 - Tank cradle system to be inspected for any defective steel and repaired as per allowance granted
- c) Hold point 3 – CGTA shall witness the preparation and fitment of the steel tank sections prior to the tank being welded.
- d) Hold point 4 – CGTA shall inspect the inside of the tank prior to any coatings being applied.
- e) Hold Point 5- CGIA and the NACE inspector will inspect each layer of paint and witness all thickness measurements before the Contractor proceeds to the next coat of paint.
- f) Hold point 6 – CGTA shall witness testing as per Section 4.2 prior to any work continuing
- g) Hold point 7 –Inspection of tank top surface as described at para 2.1.34 and application of Touch-up paint.
- h) Hold point 8- CGIA to perform final tank inspection of #6DB tanks to verify mineral oil wipe down and that no foreign objects remain in the tanks prior to closing manholes.
- i) Hold Point 9 –CGIA to perform final tank inspection of the 25Ton waste oil tank and to inspect the manhole studs for any replacements prior to the tank being sealed.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd’s regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the CGIA.

## **4.2 Testing**

- 4.2.1 Contractor shall conduct vacuum testing as per para 2.1.27 of this specification
- 4.2.2 Contractor shall complete NDT testing as per Para 2.1.25 of this specification.
- 4.2.3 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.
- 4.2.4 Contractor shall complete hydro testing on any required piping sections to 100 psi as per para 2.1.28.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.3.3 Lloyd's approval and sign off document shall be completed and presented to CGIA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 All drawings created for the purposes of fabricating the replacement tank shall become the property of the Crown upon completion of this work package. Drawings to be presented in electronic format of both AutoCAD (read-write capable) and PDF versions.
- 5.1.2 All steel plate used for this specification shall be accompanied by mill certs. Grade CSA G40.21 44W is the suggested steel plate for this fabrication process.
- 5.1.3 The Contractor must provide a coating application report, in PDF, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.

- 5.1.4 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

## **5.1 Spares**

- 5.2.1 N/A

## **5.2 Training**

- 5.3.1 N/A

## H-03 Fuel Oil Tanks Survey

### 1. Scope:

The intention of this specification is to open up the fuel tanks as described below, ventilate, certify for gas free entry, strip of all remaining fluids, steam clean and remove all dirt and debris in preparation for inspection and hydrostatic testing for Lloyds Survey credit.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The following tanks shall be opened up, ventilated, certified gas-free for entry, stripped of all remaining fluids, steam cleaned, and all dirt and debris removed in preparation for inspection and testing by LLOYD'S for Survey credit:

<u>Tank</u>	<u>100% Vol m<sup>3</sup></u>	<u>Remaining Est. Sludge m<sup>3</sup></u>
a) #2 Dbl. Btm. Port	75.3	6.0
b) #2 Dbl. Btm. Starboard.	75.3	6.0
c) #4 Dbl. Btm Port	46.1	Tank presently contains treated water
d) #4 Dbl.Btm Starboard	46.1	Tank presently contains treated water
e) #5 Dbl.Btm Port	28.9	3.0
f) #5 Dbl.Btm Stbd	25.6	3.0
g) Flume tank	149	5.0
h) Fwd. Deep Port	183.3	5.0
i) Fwd. Deep Stbd.	203.8	6.0
j) Fwd. Deep Center	149	8.0
k) #3 D/B Port	61.4	5.0
l) #3 D/B Stbd	60.4	5.0
m) #6 D/B Port	19.7	1.0
n) #6 D/B Stbd	19.2	1.0



- 2.1.4 Contractor shall note that there is steel work being performed the #2, #4, Flume tk, Stbd Deep tk, Center Deep tk, and the Port Deep D/B tanks as part of this Docking. This specification deals only with the survey portion of these tanks. Port and Stbd #5 D/B tanks are due only for survey and no steel work is identified in this Docking work package for these tanks.
- 2.1.5 Contractor shall transfer fuel from tanks to be worked until the fuel oil transfer pump loses suction. Volume remaining shall be dealt with by Contractor is reflected in the table above under “Est. Sludge m<sup>3</sup>” (total 55 m<sup>3</sup>) and will not be subtracted from the 200m<sup>3</sup> as quoted in Waste Oil Services H-01 para 12.1. The unit rate used in H-01 para 12.1 will be used for adjustment purposes.
- 2.1.6 Contractor shall open up tanks by removing manhole cover(s). Manhole studs shall be examined and defects brought to the attention of CGIA. Inside of manhole covers and mating flanges shall be power wire-brushed clean. Upon closing up, new neoprene gaskets of original thickness shall be installed.
- 2.1.7 Tanks shall be mechanically ventilated with approved equipment for this purpose. Tanks shall be ventilated and certified as gas-free “Safe for Entry”. Tanks are NOT to be ventilated inside the vessel. Contractor shall supply, operate, and maintain fans.
- 2.1.8 The Contractor shall provide a copy of certificates to CGIA.
- 2.1.9 Contractor shall maintain the tanks in a gas-free state by maintaining adequate ventilation for the duration of the work. Contractor shall renew Certificates as required by the regulations.
- 2.1.10 Sludge as indicated above shall be removed, as well as any dirt and debris found inside the tanks. Sludge, dirt, and debris shall be removed from the vessel and disposed of by Contractor in accordance with provincial environmental requirements.
- 2.1.11 Contractor shall clear all limber holes. Contractor shall ensure that tank outlets, inlets, and sounding tubes are free of any dirt, debris, and obstructions.
- 2.1.12 Contractor shall perform hydrostatic tests as described in Section 4.2 Testing.
- 2.1.13 Once the hydrostatic tests are complete to the satisfaction of the LLOYD’S Surveyor, Contractor shall empty, open up, re-ventilate, re-certified gas-free, and remove remaining water from all the tanks. All removed water shall be disposed of by Contractor at the Contractors expense.
- 2.1.14 Upon successful LLOYD’S Credit for each tank, Contractor shall re-enter and remove all blanks from each of the tanks.

2.1.15 On completion of all inspections and LLOYD'S credits the Contractor shall steam cleaned and wiped dry with clean, lint-free cloths all tanks. Tanks shall then be wiped down with a thin coat of mineral oil to prevent flash corrosion from occurring.

2.1.16 Tank manholes with new neoprene gaskets shall be re-secured. Anti-seize compound shall be applied to all threaded securing fittings.

## **2.2 Location**

2.2.1 Fuel tank locations:

<u>Tank</u>	<u>Frames</u>	<u>Location</u>
a) #2 Dbl. Btm. Port	115-143	Asdic Space
b) #2 Dbl. Btm. Starboard	115-147	Asdic Space
c) #4 Dbl. Btm Port	70-91	Engine room
d) #4 Dbl.Btm Starboard	70-91	Engine room
e) #5 Dbl.Btm Port	51-70	Motor Room
f) #5 Dbl.Btm Starboard	51-70	Motor Room
g) Flume tank	115-128	Fwd Control Room
h) Fwd. Deep Port	127-136	Below lower deck
i) Fwd. Deep Stbd.	127-136	Below lower deck
j) Fwd. Deep Center	123-136	Below lower deck
k) #3 D/B Port	84 - 115	Engine room
l) #3 D/B Stbd	84 - 115	Engine Room
m) #6 D/B Port	26 - 51	Shaft Tunnel
n) #6 D/B Stbd	27 - 51	Shaft Tunnel

2.2.2 For Manhole cover locations see drawing “#001 CCGS Hudson Manhole Locations Layout”

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in conjunction with the following specification items:

- i. HD-01 "DOCKING AND UNDOCKING"
- ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iii. HD-03 "BUTTS & SEAMS"
- iv. HD-06 "SACRIFICIAL ANODES"
- v. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- vi. H-06 "#2 D/BFUEL TANK REPAIRS"
- vii. H-07 "#4 D/BFUEL TANK REPAIRS"
- viii. H-10 "GALLEY DECK STEEL REPAIRS"
- ix. H-11 "FREEZER ROOM DECK REPAIRS"
- x. H-18 "MAIN FREEZER REFURBISHMENT"
- xi. H-29 "ENGINE ROOM FRAME REPAIRS"
- xii. E-01 "PORT & STBD THRUST BLOCKS"
- xiii. E-02 "INTERMEDIATE SHAFTS AND BEARINGS"
- xiv. E-07 "FUEL OIL TRANSFER PUMP INSTALLATION"
- xv. E-08 "MAIN AIR RECEIVER INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/nameplate data**

3.1.1 Drawings #001 CCGS Hudson Manhole Locations Layout

3.1.2 Drawing #A-4 CCGS Hudson Capacity Plan

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

#### **3.3 Owner Furnished Material**

3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

4.1.1 Contractor shall call in Lloyds Inspector to survey the tanks as required. CGIA must be informed at least 24 hours prior to any inspections. Contractor also must inform CGIA on the arrival of the Lloyds inspector aboard the vessel.

4.1.2 All work shall be completed to the satisfaction of the CGIA and the attending Lloyds Inspector.

#### **4.1.3 Inspection Hold Points**

- a) Hold point 1- CGIA shall be notified to inspect the cleanliness of each tank on completion of cleaning and prior to calling in the Lloyds Surveyor.
- b) Hold point 2- CGIA and Lloyds Surveyor shall inspect all tanks after cleaning has been approved by the CGIA.
- c) Hold Point 3- CGIA and Lloyds Surveyor shall witness and approve each pressure test.
- d) Hold Point 4 – CGIA shall witness the removal of all tank vent blanks.
- e) Hold Point 5 - CGIA shall inspect all tanks after all mineral oil has been applied.
- f) Hold Point 6 – CGIA shall inspect to see that the manhole studs are cleaned and that a new neoprene gasket is ready to be installed prior to any manhole covers being secured after final entry.
- g) Hold Point 7-The Contractor shall notify CGIA just prior to installing the manhole covers. CGIA and the Contractor will inspect the tanks to ensure no rags or debris remains inside the tank. The manhole covers will immediately be placed on the tanks after this inspection.

### **4.2 Testing**

4.2.1 After visual inspection is completed by CGIA and LLOYD'S and is satisfactory all tanks shall be hydrostatically tested using fresh water. Contractor shall temporarily blank off all openings for each tank to perform hydrostatic testing. Weather Deck vent pipes shall be removed at their flanges and tanks shall be filled to this point. Contractor shall notify CGIA a minimum of two (2) hours prior to filling of each tank.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services.  
Copies of the sign off document shall be included with the post re-fit deliverables

## **5. Deliverables:**

### **5.3 Reports, Drawings and Manuals**

- 5.1.1 Copies of all waste oil disposal documents, including waste generator numbers, receiving certificates, shall be given to Chief Engineer for Oil Record Book entries and to the CGIA.
- 5.1.2 Copies of sign off documents from Lloyds Registry must be provided for the inspection and testing of each tank.

### **5.4 Spares**

- 5.2.2 N/A

### **5.5 Training**

- 5.3.2 N/A

## H-04 Potable water tanks – Survey Item

### 1. Scope:

The intention of this specification is to open up clean, inspect and recoat the Port and Stbd Potable water tanks using the Royal Coating system.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The tanks shall be drained to the Aft Grey water tank and then overboard through its discharge which is located port side at frame 26. This operation must be done immediately after docking as the potable water tanks are skin tanks and the contained water within will freeze if not drained and stripped out. If this operation is delayed to a point where the contained water within the tanks does freeze Contractor shall be responsible for the removal of the ice/water.
- 2.1.4 The drain piping and valves from the Fresh Water Tanks are located in the Shaft Tunnel Fr. 26 port & stbd. Contractor may use a ship supplied hose arrangement to the drain pipes and directed to the Aft Grey water tank which is located within the Sewage Compartment. Ships staff can assist the Contractor with this process. The manhole for the Aft Grey Water Tank shall be removed and the hose installed so the potable water can be discharged from the vessel.
- 2.1.5 The manhole covers to the Potable Water Tanks shall be removed. Contractor shall strip out the remaining water from the tanks that will not drain through the tank suction pipes. The Port tank will have approximately 3 m<sup>3</sup> remaining and the Stbd 3 m<sup>3</sup>. Entrance to the Gasoline Floatation Tank is via the Port Fresh Water Tank. There is no manhole between them as they are now common with each other. Manhole studs shall be inspected for damage and defects and shall be reported to the CGIA. Internal side of manhole cover and its mating flange shall be cleaned.
- 2.1.6 Tanks shall be mechanically ventilated with approved equipment for this purpose. Tanks shall be certified gas freed for safe entry and hot work. Copies of Certificates shall be provided to CGIA and they shall be kept valid as required by the regulations for the duration of the work. Contractor shall supply, operate, and maintain ventilation equipment.

- 2.1.7 The total calculated internal surface area for both tanks including internal stiffening = 325.5 m<sup>2</sup>. This breaks down as follows. The port tank has 115.0 m<sup>2</sup> of flat surface and 58.3 m<sup>2</sup> of stiffening for a total surface area of 173.3 m<sup>2</sup>. The stbd tank has 89.7 m<sup>2</sup> of flat surface and 62.5 m<sup>2</sup> of stiffening for a total surface area of 152.2 m<sup>2</sup>. Contractor shall include a separate cost for a total of 325.5m<sup>2</sup> of coatings in these tanks. This cost will be added to the bid price and prorated to a cost per m<sup>2</sup> and used for adjustment purposes.
- 2.1.8 The Contractor shall grit blast the entire tanks as described in line 2.1.7 to a SSPC-SP6 Commercial Blast standard.
- 2.1.9 The Contractor shall bid on taking 400 ultrasonic shots in total inside both the Port and Stbd fresh water tanks. The CGIA and the attending Lloyds surveyor will identify the areas where shots will be taken. The Contractor shall also include in his bid price a unit cost for 50 additional shots. The NDT (ultrasonic shots) shall be conducted by a level 11 or higher NDT certified technician.
- 2.1.10 There will be an allowance of \$25,000.00 in this specification for the Contractor to repair steel structure inside the tanks. There is no known steel to be replaced.
- 2.1.11 The internals of all tanks shall be washed down clean. All washing water and debris shall be removed and disposed of by Contractor in an approved manner according to all pertinent regulations.
- 2.1.12 After the washing is completed the Potable Water tanks shall be inspected by Lloyds Representative and CGTA. The Contractor shall inform CGTA 24 hrs. prior to the inspection as well as call in the services of Lloyds to inspect the tanks as part of Lloyds five (5) year survey.
- 2.1.13 The temperature and humidity of the tanks shall be adjusted by Contractor to meet the requirements for applying this coating. Building an enclosure and providing temperature control around the exterior tanks will be required. Temperature and humidity control in the internals of the tanks will be required. Sweating on tank walls will negatively affect the application of the coatings and must be prevented. Contractor shall include all costs associated with maintaining ideal coating conditions in their bid.

2.1.14 Contractor shall bid to apply the Royal Coating system to 325.6 m<sup>2</sup> including internal stiffeners. CCG will be providing a NACE inspector to oversee the application and testing of the Royal Coatings. The Contractor shall also provide their own Q&A. The Contractor shall apply the Royal coatings, Easy Prime and Easy Flex to both the Port and Stbd Fresh Water tanks are per manufacturers recommendations.

The Atlantic Canadian contact for Royal Coatings is:

Mike Bellefontaine, Marine and Industrial Coatings  
K&D Pratt  
21 Frazee Ave. Dartmouth N.S. B3B 1Z4  
DIRECT LINE 902-480-3039  
[mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

2.1.15 All vents (port side has 3 and stbd side has 2), fill lines, suction lines, and sounding pipes shall be proven clear and free on dirt and debris. All dirt and debris shall be removed ashore. New fine mesh brass screens shall be supplied and installed on all vents. The vents shall be re-installed c/w new neoprene gaskets.

2.1.16 Manhole covers shall be refitted using new contractor supplied neoprene gaskets.

2.1.17 The tanks shall be filled with a fresh water/chlorine solution of a concentrate of 50 PPM. Chlorine. (E.g. 1 L of 5% liquid bleach solution per m<sup>3</sup> of fresh water). Port tank will require 48.4 L of 5% liquid bleach and the stbd tank will require 54.6 L. Calcium hypochlorite powder can be used as an alternative. This shall be added via the tank sounding tubes located on the Main Deck aft at frame 22 in the Cross Alleyway. Chlorine mixing shall be accomplished by activation of the Potable circulating system.

2.1.18 Prior to installing the tank vents the Potable water tanks must be hydrostatically tested. This may be accomplished with the chlorinated water. The tanks shall be filled to deck level and let stand for one hour. The Contractor must contact Lloyds to witness this test and also informed the CGTA 24 hours prior to performing the test. See Section 4.2 Testing.

2.1.19 After the pressure tests have been accepted the tank levels shall be dropped down out of the vent pipes and allowed to stand for a minimum of four hours to ensure they are disinfected. Goose necks shall be replaced using new neoprene gaskets. Fasteners shall be buffed clean with power wire wheel and assembled with an anti-seize compound.

2.1.20 After the tanks have soaked, the fresh water supply from the yard shall be shut down so that the ship's system can be used to run the chlorinated water through the domestic water piping. Each tap (hot and cold water) in the vessel shall be opened up and water allowed to flow until chlorine can be smelt at each tap. The procedure will go much faster if the farthest piping runs are done first thus flooding the intermediate piping. The taps in the washroom in the Bridge Deck, the Seaman's, and the Cook's washrooms are run first. Ships staff will assist the Contractor with this flushing method.



- 2.1.21 After all piping has been flushed with chlorinated water the shipyard fresh water supply is to again be activated. The tanks are to be pumped dry and filled with fresh water. The tanks are to be emptied and filled twice more to flush the chlorine out of the tanks.
- 2.1.22 A 35% hydrogen peroxide solution is to be added to each tank via the sounding tubes to neutralise the chlorine. 4.3 L will be required for Port tank and 4.95 for the Stbd. This solution will be circulated using the ships circulation pumps for 4 hours to ensure the chlorine is completely neutralised. The circulating pumps are then to be shut down.
- 2.1.23 The tanks shall be drained via the Aft Grey Water tank as previous and filled with fresh water. The tanks shall be emptied and filled twice more to flush the chlorine out of the tanks.
- 2.1.24 Tanks are to be refilled and a provincial regulator shall take samples and perform testing. The tests shall show results for the following: E. Coli, Total coliform, Turbidity, Antimony, Barium, Boron, Cadmium, Chromium, Ethylbenzene, Nitrate/Nitrite, Mercury, Selenium, Uranium, Benzene, Xylenes, Fluoride, Lead, Copper, Iron, Manganese, pH, Color, Total Dissolved Solids, Sodium, Zinc, Toluene, Sulphates, Chloride and include testing for all volatiles contained in the coating product. If any values are in excess of the maximum values for Canadian Drinking Water Quality Guidelines the CGTA shall be advised immediately and Contractor will be responsible for correcting the problem, which will require the tanks to be drained, dried, the coatings allowed to cure, refilling, re-chlorinating, and retesting until a satisfactory result is obtained at Contractors expense.
- 2.1.25 Contractor shall arrange for fresh water samples to be provided to an approved laboratory for potable water testing. Approval certificates shall be turned over to the CGIA.
- 2.1.26 All work shall be completed to the satisfaction of the CGIA and the attending Lloyds Representative.

## 2.2 Location

2.2.1	<u>Tank</u>	<u>Location</u>	<u>Volume (m3)</u>
	Gasoline floatation Tank	Frames 12-21 Port	22.9
	Port Fresh Water Tank	Frames 9-23 Port	25.6
	Stbd Fresh Water Tank	Frames 9-23 Stbd	55.3

## 2.3 Interferences

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- xvi. HD-01 "DOCKING AND UNDOCKING"
- xvii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- xviii. HD-03 "BUTTS & SEAMS"
- xix. HD-06 "SACRIFICIAL ANODES"
- xx. HD-16 "AFT TRIM TANK STEEL REPAIRS"
- xxi. H-09 "UPPER DECK STEEL REPAIRS"
- xxii. H-27 "MAIN DECK FLOORING REPLACEMENT"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 Royal Coatings Easy Prime data sheets
- 3.1.2 Royal Coatings Easy Flex data sheets
- 3.1.3 Drawings #001 CCGS Hudson Manhole Locations Layout
- 3.1.4 Drawing #A-4 CCGS Hudson Capacity Plan

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS –No.47 – Part "B" Ship Building and Repair Quality Standard.

#### **3.3 Owner Furnished Equipment**

- 3.1.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

##### **4.1.1 Inspection Hold Points:**

- a. Hold point 1 – CGIA and the attending Lloyds Surveyor will inspect the Port and Stbd fresh water tanks upon completion of grit blasting and cleanup. This inspection will take place prior to UT shots being taken.
- b. Hold point 2 – Upon completion of visual inspection in Hold point 1 the CGTI and attending Lloyds Surveyor will identify areas for UT to take place.
- c. Hold point 3 – CGIA and attending Lloyds Surveyor shall witness all UT measurements being conducted.
- d. Hold point 4 – CGIA and the attending Lloyds surveyor will review all UT measurements and will advise if any steel repairs are necessary.
- e. Hold point 5 – If steel repairs are required the CGIA and attending Lloyds Surveyor shall

witness all fit-up and prep work prior to steel being securely welded.

- f. Hold point 6 – If steel repairs are required the CGIA and attending Lloyds Surveyor shall inspect all completed welds and witness all NDT conducted by the Contractor.
- g. Hold point 7 – CGIA and the NACE inspector shall inspect each completed coat of paint prior to the Contractor applying the following coat.
- h. Hold point 8 – CGIA and the NACE inspector shall witness paint testing as described in Section 4.2 upon completion of each coat of paint.
- i. Hold point 7 – CGIA shall witness each tank vent being secured. Any tank vent secured that is not witnessed by the CGIA shall be removed by the Contractor and re-secured with the CGIA present.
- j. Hold point 7 – CGIA shall conduct a final inspection of each tank just prior to the manhole covers secured to ensure no debris is remaining in the tanks. Once the manhole covers are secured they shall not be removed again unless the CGIA is notified and present during their removal.

4.1.2 If Applicable: All detected steel defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

## **4.2 Testing**

4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

4.2.2 Prior to installing the tank vents the Potable water tanks must be hydrostatically tested. This may be accomplished with the chlorinated water. The tanks shall be filled to deck level and let stand for one hour. The Contractor must contact Lloyds to witness this test and also informed the CGIA 24 hours prior to performing the test.

## **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.2 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

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2019 VLE DRY-DOCKING

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application report, two (2) paper copies and one (1) PDF copy to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.3 Copies of sign off documents from Lloyds Registry must be provided for the inspection and testing of each tank.
- 5.1.4 Copies of all water testing reports in a pdf format.

## **5.2 Spares**

N/A

## **5.3 Training**

N/A

# H-05 Fire Door Replacements

## 1. Scope:

The Intent of this specification is for the Contractor to remove twelve (12) existing Fire doors and install twelve (12) new owner supplied Fire Doors.

## 2. Technical Description:

### 2.1 General

2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crange, transportation, staging, cleaning, debris removal and disposal, etc.

2.1.2 All materials to be contractor supply unless otherwise stated.

2.1.3 A total of twelve (12) fire doors (GSM) are to be replaced at various locations on the vessel. Drawings of each door which show the external dimensions of the existing door casings, c/w locations are attached. The locations and identifying number (if applicable) for each door is indicated below.

<u>Identifying Number</u>	<u>Location</u>
Item # 11300-12	ENGINE CONTROL ROOM – aft to Engine Room
1	WHEELHOUSE – to Bridge Deck aft
6	MAIN DECK FWD – down to Fwd Work Area
9	GALLEY FWD – down to Refrigeration Flat
10	OUTER ENGINE ROOM PORT – to Main Deck
11	OUTER ENGINE ROOM STBD – to Main Deck
12	MAIN DECK – up to Sick Bay
13	MAIN DECK – down to Laundry Flat Aft
19	ENGINE ROOM ESCAPE – down from Sick Bay Flat
20	MAIN DECK – down to Laundry Flat Fwd
21	MAIN DECK – down to Lower Deck (near Canteen)
22	FWD LAB – To Upper Deck Stbd

- 2.1.4 In most cases the actual openings in the bulkhead where the existing doors are fitted is visible. Doors 1, 12, & 21 have the actual attachment arrangement hidden by interference items. The contractor shall include a unit cost for the following to allow the new doors to be secured to their respective locations.
- a) Supplying the materials for, fabrication of, and attachment of a ¼" thick mild steel flat bar flange. The flat bar width will be 1" wide. This work would be done at the contractor's facility. Transport out and back is to be in this unit cost.
  - b) Enlarging the bulkhead opening IWO the new door's location.
- 2.1.5 The requirement for either item 2a or 2b or neither will be known when the existing door is removed.
- 2.1.6 The installation of each door will be by welding the door frame or attached flat bar flange to the bulkhead opening. All welding will be continuous, but carried out in a sequence so as to not induce any distortion in the door frame which would not allow for proper closing and sealing of the door to the frame.
- 2.1.7 All adjacent spaces and the work areas are to be properly protected from hot work activities. There will be one (1) fire watch person assigned to work area during hot work activities and the cool down period as specified in the "General Notes" at these times. The contractor shall supply, operate, and maintain a suitable ventilation arrangement to exhaust fumes from the vessel's interior.
- 2.1.8 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below:
- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
  - iv A topcoat of Wasser MC Luster 100 White (DFT 3-5mil) on all surfaces.
- 2.1.9 All surfaces and equipment affected by the work including transit routes from the Hanger, to ashore, and to the installation site to be suitably protected from damage during the work. All damage caused by the work is to be rectified to the contractor's account.

## **2.2 Location**

2.2.1 The Door locations are indicated on the spreadsheet CCGS Hudson Fire Door Locations, Quantities and description.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in the conjunction with the following spec items:

- i. H-09 "UPPER DECK STEEL REPAIRS"
- ii. H-10 "GALLEY DECK STEEL REPAIRS"
- iii. H-12 "WHEEL HOUSE TOP DECK STEEL REPAIRS"
- iv. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vi. H-17 "GALLEY REFURBISHMENT"
- vii. H-27 "MAIN DECK FLOORING REPLACEMENTS"
- viii. E-03 "VENTILATION DUCTWORK & FAN CLEANING"
- ix. E-05 "FIXED FIRE FIGHTING SYSTEMS INSPECTIONS AND HYDRO TESTS"

## **3. Reference:**

### **3.1 Guidance Drawings/Nameplate Data**

3.1.1 Spreadsheet CCGS Hudson Fire Door Locations, Quantities and Description

3.1.2 CCGS Hudson Fire Door drawings, One (1) pdf.

### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS –No.47 – Part "B" Ship Building and Repair Quality Standard.

### **3.3 Owner Furnished Equipment**

3.3.1 All Twelve Fire Doors shall be GSM.

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a. Hold point 1 – CGIA and the attending Lloyds Surveyor shall witness the layout of each door prior to cutting any steel.
- b. Hold point 2 – CGIA and the attending Lloyds Surveyor shall witness the fitment and preparation of each door prior to welding the door securely in place.
- c. Hold point 3 – CGIA and the attending Lloyds Surveyor shall witness all NDT as described in Section 4.2.1.
- d. Hold point 4 – Testing of each door as described in Section 4.2.2 shall be confirmed for correct operations prior to any coatings being applied.
- e. Hold point 5 – CGIA shall witness all prep work prior to any coatings being applied.
- f. Hold point 6 – CGIA and the NACE inspector shall inspect each completed coat of paint prior to the Contractor applying the following coat.
- g. Hold point 7 – CGIA and the NACE inspector shall witness paint testing as described in Section 4.2 upon completion of each coat of paint.

4.1.2 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

### **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 The new fire door operations will be tested and witnessed by the CGIA.

4.2.3 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.



## 4.3 Certification

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## 5. Deliverables:

### 5.1 Reports, Drawings, and Manuals

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.3 Signed approvals as per section 4.3.

### 5.2 Spares

- 5.2.1 N/A

### 5.3 Training

- 5.3.1 N/A

# H-06 #2 D/B Fuel Tank Steel Repairs

## 1. Scope:

The intent of this specification is to remove damaged sections of transverse floors, fabricate and install new ones as described below in the Port and Starboard #2 D/B fuel tanks.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 Contractor shall take note that this specification shall be completed in conjunction with the Fuel Tank Survey spec #H-03. The accessing of the tanks, cleaning and testing are all carried out in spec # H-03.
- 2.1.6 Several transverse floors are buckled need repair. The buckled sections of plating shall be cropped out and replaced with new plating. The replacement sections shall be 5/16” plating and shall be welded in place using a full penetration butt weld to the existing floor plating, and a double continuous fillet weld at the shell and tank top plating. Replacement sections shall be properly scalloped in way of any existing welds. See the guidance drawing J18052-S01 for details.
- 2.1.7 Following is a brief description of each area of repair. Areas are approximate and shall be adjusted to encompass the full damage of each section of floor:
- 2.1.8 Floor Frame 117 Port – The entire floor from bottom shell to tank top from approximately 18’-2” off centerline outboard shall be removed and replaced. See Section 1-6D of guidance drawing.
- 2.1.9 Floor Frame 118 Port – The section of floor from bottom shell to 2’-8” above bottom shell between girder 10’-0” off centerline outboard to stiffener 16’-0” off centerline shall be removed and replaced. See Section 1-6B of guidance drawing.

- 2.1.10 Floor Frame 119 Port – The entire floor from bottom shell to tank top between girder 10'-0" off centerline outboard to stiffener 16'-0" off centerline shall be removed and replaced. See Section 1-6A of guidance drawing.
- 2.1.11 Floor Frame 120 Port – The entire floor from bottom shell to tank top between girder 10'-0" off centerline outboard to stiffener 16'-0" off centerline shall be removed and replaced. See Section 1-6A of guidance drawing.
- 2.1.12 Floor Frame 121 Port – The section of floor from bottom shell to 2'-8" above bottom shell between girder 10'-0" off centerline outboard to stiffener 16'-0" off centerline shall be removed and replaced. See Section 1-6B of guidance drawing.
- 2.1.13 Floor Frame 122 Port – The section of floor from bottom shell to 2'-7" above bottom shell from stiffener 16'-0" off centerline to approximately 19'-6" off centerline shall be removed and replaced. See Section 1-3D of guidance drawing.
- 2.1.14 Floor Frame 124 Port – The section of floor from bottom shell to 2'-7" above bottom shell from stiffener 16'-0" off centerline to approximately 19'-6" off centerline shall be removed and replaced. See Section 1-3D of guidance drawing.
- 2.1.15 Floor Frame 129 Stbd – The section of floor from bottom shell to approximately 2'-7" above bottom shell from stiffener 16'-0" off centerline to approximately 20'-0" off centerline shall be removed and replaced. See Section 1-3B of guidance drawing.
- 2.1.16 Floor Frame 130 Port – The section of floor from bottom shell to approximately 2'-7" above bottom shell from stiffener 16'-0" off centerline to approximately 20'-2" off centerline shall be removed and replaced. See Section 1-3A of guidance drawing.
- 2.1.17 Floor Frame 131 Port – The section of floor from bottom shell to approximately 2'-7" above bottom shell from stiffener 16'-0" off centerline to approximately 20'-2" off centerline shall be removed and replaced. See Section 1-3A of guidance drawing.
- 2.1.18 Floor Frame 132 Stbd – The section of floor from bottom shell to approximately 7" above bottom shell from approximately 16'-10" off centerline to approximately 18'-3" off centerline shall be removed and replaced. See Section 2-6D of guidance drawing.
- 2.1.19 Floor Frame 133 Port – The section of floor from bottom shell to approximately 14" above bottom shell from approximately 18'-1" off centerline to approximately 19'-8" off centerline shall be removed and replaced. See Section 2-6B of guidance drawing.
- 2.1.20 Floor Frame 133 Stbd – The entire floor from bottom shell to tank top from stiffener 16'-0" off centerline outboard to approximately 19'-9" off centerline shall be removed and replaced. See Section 2-6A of guidance drawing.

- 2.1.21 Floor Frame 134 Stbd – The section of floor from bottom shell to approximately 2'-0" above bottom shell from girder 16'-0" off centerline to approximately 20'-0" off centerline shall be removed and replaced. See Section 2-3D of guidance drawing.
- 2.1.22 Floor Frame 135 Stbd – The entire floor from bottom shell to tank top from approximately 19'-7" off centerline outboard shall be removed and replaced. See Section 2-3B of guidance drawing.
- 2.1.23 Floor Frame 136 Stbd – The entire floor from bottom shell to tank top from girder 16'-0" off centerline outboard shall be removed and replaced. See Section 2-3A of guidance drawing.
- 2.1.24 Floor Frame 140 Port – The entire floor from bottom shell to tank top between stiffener 5'-0" off centerline outboard to girder 10'-0" off centerline and from approximately 16'-10" to 20'-2" off centerline shall be removed and replaced. See Section 3-6D of guidance drawing.
- 2.1.25 Floor Frame 140 Stbd – The entire floor from bottom shell to tank top from stiffener 16'-0" off centerline outboard to approximately 19'-11" off centerline shall be removed and replaced. See Section 3-6B of guidance drawing.
- 2.1.26 Floor Frame 141 Port – The entire floor from bottom shell to tank top between stiffener 5'-0" off centerline outboard to girder 10'-0" off centerline and from approximately 16'-10" to 20'-2" off centerline shall be removed and replaced. See Section 3-6D of guidance drawing.
- 2.1.27 Floor Frame 142 Port – The entire floor from bottom shell to tank top between stiffener 5'-0" off centerline outboard to girder 10'-0" off centerline and from approximately 16'-10" to 20'-2" off centerline shall be removed and replaced. See Section 3-6D of guidance drawing.
- 2.1.28 The insert plate locations and sizes are detailed on guidance drawing J18052-S02. The corners are to have a minimum 4" radius, as per the IACS repair guidelines.
- 2.1.29 Several welds of the transverse floors to the bottom shell plating have deteriorated and require replacement. These welds shall be removed by grinding smooth to bare metal and re-welding. The replacement weld is to be a ¼" double continuous fillet. This problem is more relevant in the port side than starboard and is generally localized near damaged areas. The Contractor shall quote on re-welding 100 ft. on this type of weld in total for both tanks. This price shall be quoted separately but will be added to the bid price. The cost will then be prorated and used for adjustment purposes to provide a price per linear foot for any additional welds. The CGIA and the attending Lloyds Surveyor shall determine the exact amount of fillet weld required during a pre-work inspection of the tanks prior to any work being started, see Section 4.1 Inspections. Any changes to total amount of linear ft. will be adjusted up or down via a 1379 action upon written approval from the CGTA.
- 2.1.30 On completion of all welding inspection and testing the Contractor shall clean Port and Stbd #2 D/B tanks of all dirt, debris. Steam cleaning and coating the tanks with mineral oil shall be carried out as in Specification H-03 Fuel Oil Tanks Survey.

## **2.2 Location**

2.2.1 The #2 D/B Fuel tank is located between frames #121 and #143.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in conjunction with the following specification items:

- x. HD-01 "DOCKING & UNDOCKING"
- xi. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- xii. HD-03 "BUTTS & SEAMS"
- xiii. HD-06 "SACRIFICIAL ANODES"
- xiv. H-03 "FUEL TANKS SURVEY"
- xv. H-10 "GALLEY DECK STEEL REPAIRS"
- xvi. H-11 "MAIN FREEZERS REFURBISHMENT"
- xvii. E-07 "FUEL OIL TRANSFER PUMP REPLACEMENT"

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 Lengkeek Drawing J18052-S01-R0 No. 2 D/B Tank Floor Repairs
- 3.1.2 CCGS Hudson Drawing Tank Top Double Bottom #130.019
- 3.1.3 CCGS Hudson Drawing #A-4 CCGS Hudson Capacity Plan
- 3.1.4 CCGS Hudson Drawing #001 CCGS Hudson Manhole Locations

### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

### **3.3 Owner Furnished Material**

- 3.3.2 None

## 4. Proof of Performance:

### 4.1 Inspection

#### 4.1.1 Inspection Hold Points:

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 – The Contractor shall lay out and mark clearly all of the floor sections to be replaced prior to the CGIA and the Lloyds Surveyor conducting their inspection.
- c) Hold point 3 - CGIA and the attending Lloyds Surveyor will inspect the floors and will mark the transverse welds on the bottom shell to be repaired.
- d) Hold point 4 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new floors tacked in place prior to any finish welding commencing. As all floor sections cannot be removed at once this inspection may take place several times.
- e) Hold point 5 - CGIA and Lloyds Surveyor will inspect all removed transverse welds and prep work prior to welding that forms part of line 2.1.29.
- f) Hold point 6 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- g) Hold point 7-CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.

4.1.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the attending Lloyds Surveyor and the CGIA.

4.1.4 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Both Port and Stbd D/B Fuel tanks shall be hydro tested as described in Specification H-03 Fuel Tanks Survey.

## **4.3 Certification**

- 4.4.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.4.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.3 Contractor shall provide mill certs for Lloyds Grade "A" steel.
- 5.1.4 Signed approvals as per section 4.3.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## H-07 #4 D/B Tank Top Repairs

### 1. Scope:

The intent of this specification is to repair several areas of defective steel on the tank tops of the Port and Starboard #4 D/B fuels tanks.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 This scope of work must be completed concurrently with the specification H-03 Fuel Tank Survey. Contractor shall note that specification H-03 includes the cleaning and gas freeing of the Port & Stbd # 4 D/B tanks.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event a discrepancy occurs between this specification and the CCG Welding specification, the CCG Welding specification shall be rule.
- 2.1.5 There are several sections of various types of piping to be removed and reinstalled to perform the steel work in this specification. See Section 2.3 Interferences. It is expected that some sections of piping may require to be replaced. There will be an allowance in this specification of \$50,000.00 to replace corroded piping. The CGIA will determine which sections of piping will be replaced upon removal and inform the Contractor. This will be conducted through a PSPC 1379 action. The Contractor shall not replace any piping sections without the written approval of the CGTA.
- 2.1.6 The tank top plating at Double Bottom Fuel Oil Tanks No. 4 port and starboard has several areas of severe pitting that need to be repaired. A guidance drawing, CCGS Hudson H1017-01 No. 4 D/B Tank Top Repair- Pits, sht. 2, has been prepared in order to show the locations of the required repairs.
- 2.1.7 The contractor shall steam clean the entire bilge and tank top area and ensure the area is clear of all contaminates. The area shall be cleaned to a SSPC-SP3 standard and CGIA and NACE approval on cleaning shall be obtained and signed off prior to the application of any coatings.



- 2.1.8 As per guidance drawing, CCGS Hudson H1017-01 No. 4 D/B Tank Top Repair- Pits, sht 2, some localized deep pits are shown, as well as some areas of more widespread pitting. The contractor shall repair pitted areas of plating by bead on plate welding techniques using filler metal having comparable chemistry and strength as the base metal. Repaired areas must be ground flush with the surrounding base metal prior to inspections.
- 2.1.9 At locations, as indicated by guidance drawing, guidance drawing, CCGS Hudson H1017-01 No. 4 D/B Tank Top Repair- Inserts and Welds, sht 1, areas of severely corroded plating at the tank top, port and starboard, will be required to be fitted and replace with insert plates. The insert plates sizes and shapes are detailed on the guidance drawing, and the corners are to have a minimum 4" radius, as per the IACS repair guidelines. The insert plates shall be welded into place with a full penetration bevel groove weld to the existing tank top plating and with a double continuous fillet welds to the transverse floors below and any foundations above.
- 2.1.10 At the tank top plating, 15 meters of seam welds have corroded and need to be replaced. The contractor shall repair corroded welds shall be by grinding smooth down to bare metal and re-welded with full penetration welds.
- 2.1.11 The Contractor shall provide a separate rate for the 25 meters of welding. This rate shall include all surface prep, grinding and gouging required to prepare the area prior to or after welding. The rate shall also be inclusive of all welding passes required to build welds back up to an acceptable level. This rate will be added to the overall price of the bid, and prorated to a single meter of repair area. These rates shall apply to all steel repairs taken place inside the Vessel and will be use to adjust up or down, by 1379, the actual areas of repair. This rate will not be used for failed welds. All failed welds will be repaired at contactors expense.
- 2.1.12 On completion of all welding inspection and testing the Contractor shall clean Port and Stbd #4 D/B tanks of all dirt, debris. Steam cleaning and coating the tanks with mineral oil shall be carried out as in Specification H-03 Fuel tank survey.

2.1.13 Upon completion of welding, inspection and testing of tank tops on the Port and Stbd #4 D/B tanks shall be prepared and painted as per Wasser Coating system. All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached). The Contractor shall also follow the Wasser Moisture-Cured Urethane Ballast Tank Specification (attached). The Coating System be as described below:

- I. All surfaces shall be cleaned with HOLDTIGHT 102 to remove any remaining salts.
- II. One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- III. Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- IV. An intermediate coat of Wasser MC -TAR RED (DFT 6mil)
- V. A topcoat of Wasser MC- BALLAST COAT BEIGE (DFT 4mil)

2.1.14 The Contractor must adhere to all coating system requirements for the application of the coating system. Where ambient air temperatures or humidity may become a problem, the Contractor must take steps to ensure that the painting and complete curing of the coating system will be completed before the completion date of the contract

2.1.15 All work shall be carried out and completed to the satisfaction of CGIA and LLOYD’S Surveyor.

## **2.2 Location**

2.2.1 The location of the #4 D/B tanks is in the Engine Room between frames #70 to #91.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor’s expense and no extra allowances will be granted for removal and reinstallation of interference item.
- 2.3.2 There are several piping systems that are distributed on top of the #4 D/B tanks. These include, S/W cooling piping, ballast piping, lube oil piping, airline tubing and piping, potable water piping and electrical lines. CCG will assist the Contractor with the identification of piping and electrical lines.
- 2.3.3 The Contractor shall isolate and remove any and all piping, brackets, and electrical lines and other items that interfere with this scope of work.

- 2.3.4 The Contractor shall clearly mark/tag all piping and electrical lines prior to removal to ensure they are reinstalled in their same position on completion of the work. Markings shall consist of steel stamped tags wired to each section of piping and electrical lines. Each individual pipe shall be marked to indicate its system, its location and its order of removal.

Example:

2" Seawater Cooling line – Engine #3 -PORT

Location: Frame 75 running fwd/aft

Piece number 3 of 10

- 2.3.5 The Contractor shall make AutoCAD sketches of all removed piping and electrical lines which shall form part of a deliverable in Deliverables section 5.1.4.
- 2.3.6 On completion of all work, inspections and testing the Contractor shall reinstall all removed piping, electrical lines and other interference items. All new gaskets, compatible with the piping systems shall be fabricated and installed on all piping flanges.
- 2.3.7 All flanges, mating surfaces to be hand tool cleaned to a SSPC-SP3 standard prior to reassembly.
- 2.3.8 All fasteners shall be replaced with new ones as per original. All fasteners to be coated in anti-seize compound prior to assembly.
- 2.3.9 This work shall be completed in conjunction with the following specification items:

- xxiii. HD-01 "DOCKING AND UNDOCKING"
- xxiv. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- xxv. HD-04 "SEA BAYS AND SEA CHESTS"
- xxvi. HD-05 "MAIN SEA STRAINERS"
- xxvii. HD-06 "SACRIFICIAL ANODES"
- xxviii. H-06 "#2 D/B FUEL TANK REPAIRS"
- xxix. H-29 "ENGINE ROOM FRAME REPAIRS"
- xxx. E-07 "FUEL OIL TRANSFER PUMP INSTALLATION"
- xxxi. E-08 "MAIN AIR RECEIVER INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/nameplate data**

- 3.1.1 Guidance drawing, CCGS Hudson H1017-01 No. 4 D/B Tank Top Repair- Inserts and Welds. shts 1&2
- 3.1.2 CCGS Hudson Drawing Tank Top Double Bottom #130.019
- 3.1.3 Wasser MC-Tar 100 Product Data Sheet
- 3.1.4 Wasser MC-Ballast Coat 100 Product Data Sheet

3.1.5 Wasser MC-Miozinc 100 Product Description Sheet

3.1.6 Coatings- Wasser Paint Procedures

3.1.7 Holdtight 102 Product Description Sheets.

3.1.8 Surface Preparation Standards

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

## **3.3 Owner Furnished Material**

3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points

- a) Hold point 1- CGIA shall be notified to inspect the bilge cleaning prior to any welding.
- b) Hold Point 2 – CGIA shall be notified for inspection when all interference piping is properly identified and tagged to show its location and system as per section 2.3.4. CGIA shall approve proper Tagging prior to any removals.
- c) Hold point 3 - CGIA will inspect all removed piping and inform the Contractor of any pipe sections to be replaced as per Line 2.1.5 prior to the reinstallation of any piping sections.
- d) Hold point 4 - CGIA and Lloyds Surveyor shall inspect all prep work and fitment of inserts prior to welding.
- e) Hold Point 5 - CGIA and Lloyds Surveyor shall visually inspect all completed welds.
- f) Hold Point 6 – CGIA and Lloyds Surveyor shall be in attendance during all NDT of all welds

- g) Hold Point 7 - CGIA and NACE inspector must witness all paint thickness testing as per Section 4.2 Testing.
- h) Hold point 8- CGIA will inspect piping sections as they are reinstalled to ensure proper fitment.
- i) Hold point 9 - CGIA shall be notified and will witness all testing of piping sections as described in Section 4.2.2.

- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA at the contractors expense.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

- 4.2.1 Hydro testing of the Port and Stbd #4 D/B tank shall be carried out as described in specification H-03 Fuel Oil Tanks Survey. If addition testing is required due to defects in the Contractor's workmanship that testing shall be the responsibility and at the expense of the Contractor.
- 4.2.2 On completion of the reinstalled piping systems and when deemed practical by CGIA and the Contractor, the Contractor shall notify CGIA to witness the start-up and testing all of the systems that had been disturbed.
- 4.2.3 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.4 Upon completion of all coating applications the Contractor must take no less than 5 dry film spot thickness readings of the coating in each 10 m2. The dry film thickness measurements of must meet the numerical requirements of the SSPC PA 2 in attached data package. Readings must be recorded and be contained in the final report.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA and will make up a part of the deliverables package.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation off Lloyd's approval for all steel provided that is not Lloyds Grade "A".
- 5.1.4 The Contractor shall provide AutoCAD sketches of all piping sections removed to carry out this specification in both pdf and CAD format.
- 5.1.5 Signed approvals as per section 4.3

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## H-08 Aft Deep Tank Sounding Plug Repairs

### 1. Scope:

The Intent of this specification is to replace the sounding tube deck insert fittings for the Aft Stbd Deep Fuel Tank.

### 2. Technical Description:

#### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 Contractor shall remove the failed in service Sounding Tube deck insert from the top of the sounding tube. Contractor shall cut the sounding pipe at appropriate distance below the deck to remove the original threaded union connection and dress the pipe end for the fitting of a 2 inch MegaPress fitting with EPDM seal. Contractor will require the MegaPress Jaw system, vessel can supply Press tool and jaws.
- 2.1.4 Original sounding tube deck insert fitting to be removed by drilling out brass fasteners. New fittings are not drilled and shall be machined to accommodate the same bolt pattern found for each deck insert fitting location.
- 2.1.5 New 2" Pipe (seamless sch. 40) shall be installed between existing sounding tube and the new deck fitting. This spigot piece shall be threaded to accept the threads of the brass deck insert piece. Care is to be exercised when threading the new deck insert to the spigot pipe as the deck flange and threaded cylinder body are connected by means of silver solder joint. Teflon paste thread sealant for water shall be used for this threaded connection.
- 2.1.6 The deck plate under the insert flange shall be properly cleaned of all corrosion products and receive one coat of Wasser MC-MioZinc primer 3mil DFT. The deck fitting shall be properly bolted to the deck steel with new Buna-N rubber gasket (1/16" thick) between deck and brass fitting.
- 2.1.7 All disturbed and new steel including the MegaPress fittings shall be prepared to SSPC-SP3 standard and receive 2 coats of Wasser MIOZINC primer @ 3mil DFT per coat.

## **2.2 Location**

2.2.1 The location of the Stbd Aft Deep sounding tube deck insert is at frame #51 on the Upper Deck.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.

2.3.2 This work shall be completed in conjunction with the following specification items:

- i. H-03 "FUEL TANK SURVEY"
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-19 "CABIN DECKING REPLACEMENT"

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

3.1.1 CCGS Hudson Sounding Tube Drawing shts 1-6

3.1.2 Wasser MC-Miozinc 100 primer Product Information sheet.

### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard

### **3.3 Owner Furnished Material**

3.3.1 New sounding tube deck insert to be GSM (stock # 4730 - FA - C001607). Contractor to supply new brass fasteners to secure each head to the deck plate as per original fitted samples.



## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 – CGIA will inspect the newly fitted pipe for final fitment prior to the megapress fitting being installed and crimped.
- b) Hold point 2 – CGIA will inspect the fitted deck tube insert for proper fitment and to ensure all screws are countersunk.
- c) Hold point 3 – CGIA will be present for all testing as described in section 4.2 Testing.
- d) Hold point – CGIA conduct a final inspection to check coatings and ensure all work in this specification has been completed.

4.1.2 All work must be completed to the satisfaction of the CGIA.

### **4.2 Testing**

4.2.1 The Contractor shall notify CGIA on the completion of the installation of the new sounding plug deck insert for the following test. The Contractor shall insert an inflatable test plug in each sounding tube to extend below the repair area. This area shall then be filled with water for 15 minutes and all joints shall be checked for leaks. Any leaks shall be repaired by the Contractor and this test procedure conducted until all joints are confirmed tight.

### **4.3 Certification**

4.3.1 N/A

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 N/A

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

# H-09 Upper Deck Steel Renewal

## 1. Scope:

The intent of this specification is to remove all existing deck coatings on the Upper Deck, replace wasted and corroded deck areas with steel inserts and to apply new deck coatings.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor must erect an enclosure over the area of the upper deck where the work is being completed. The enclosure shall be used to prevent egress of foreign materials into the environment, prevent weather from entering the vessel where steel is removed and ensuring the required conditions are met for all welding and coatings as per manufacturer’s recommendations. Contractor shall consider provincial or federal containment requirements and weather conditions for that time of year. At the completion of all steel repairs, deck coatings and inspection the Contractor shall remove and dispose of the enclosures.
- 2.1.6 In a separate line the Contractor shall bid on taking 500 ultrasonic shots. This price will be added to the bid price and prorated to a “per 50 shots” rate and used for adjustment purposes.
- 2.1.7 The entire exterior deck surface of the Upper Deck including the deck area on top of the Pengo Winch Cab shall be grit-blasted clean to bare metal and recoated. Also included is all steel work intersecting the deck, such as, but not limited to the fish plate(s), boundary plate(s), brackets, struts, braces, and equipment mounting pads for a distance of 1.5” upwards from the deck. See Section 2.2 Coatings.
- 2.1.8 All deck machinery and equipment must be protected from damage at all times during this scope of work contained in this specification.

- 2.1.9 Upon completion of all deck coating removals, the Contractor shall lay out the areas to be repaired on the Upper Deck as per Lengkeek drawing J16017-S13\_R1 sheets 1 & 2. The CGIA and the attending Lloyds surveyor shall examine the deck in way of the repair areas and advise the Contractor where additional UT shots shall be carried out. See Inspections 4.1.
- 2.1.10 There is an allowance of \$50,000.00 to be used to correct any additional defects discovered during the scope of work in this specification. The Contractor shall not proceed with any additional work without the written authorization of the CGTA. This allowance will be adjusted via a PSPC 1379 action.
- 2.1.11 The Upper Deck of the vessel has suffered from corrosion, and a number of areas require replacement, utilizing areas of insert plating, equivalent to the thickness of the existing deck plate where it is being installed, and isolated areas of corrosion that can be repaired using a local insert plate, of 8" minimum diameter.
- 2.1.12 Forward of frame 90, there are approx. 35 locations requiring a local isolated repair, utilizing a 3/8" thick insert plate, and 2 locations requiring a 1/2" thick insert plate.
- 2.1.13 Aft of frame 90, there are approx. 38 locations requiring a local isolated repair, utilizing a 3/8" thick insert plate, and 5 locations requiring a 1/2" thick insert plate.
- 2.1.14 At the areas where a substantially larger insert plate is required, mostly along the port and starboard sides of the exposed deck, including several locations at the bow, the dimensions for the insert plate are provided for guidance only; these dimensions can be considered reasonably accurate, but an exact determination of the required length and width will have to be made at the ship by the Contractor, before the commencement of work.
- 2.1.15 In all cases, the replacement insert plating is to be fitted using a full penetration weld, and the existing stiffening structure at the underside of the deck is to be welded to the new insert plating with a double continuous fillet weld. Scallops are to be cut into the stiffeners at the appropriate locations where they pass under a weld of an insert plate to the existing deck plate.
- 2.1.16 As per guidance drawings, Lengkeek drawing J16017-S13\_R1 Upper deck steel sheet 1 and, Lengkeek drawing J16017-S13\_R1 Upper deck steel sheet 2, these areas of the Upper Deck must be cropped out and repaired with steel inserts. These drawings provide the positioning of the steel inserts.
- 2.1.17 Lengkeek Drawing XXX illustrates the cabins and areas below the deck that will be impacted by the steel inserts. The Contractor shall remove all deck-head panels, insulation and other interference items that is necessary to complete the work in this specification. The picture below illustrates a "typical" arrangement above the deck-head panels of wiring, piping and other interference items.



Typical deck-head arrangement

2.1.18 Upon completion of all steel work and coatings all removed insulation shall be replaced with new 4" thick mineral wool with foil backing and secured with welded 10-gauge steel pins and clips. All seams shall be taped with 4" wide foil tape. Existing pins may be used where possible.

2.1.19 All deck-head panels and other interference items shall be reinstalled in an as found condition.

## 2.2 General – Coating

2.2.1 Upon completion of welding, inspection, and testing of the upper deck steel repair, the entire upper deck and on top of the Pengo Winch Cab shall be prepared to an SSPC\_SP6 standard and coated with the Wasser coating system applied as per Manufacturers specifications.

2.2.2 Contractor will be responsible for refurbishing all materials required for the Wasser coating system for the Upper Deck areas.

- i. Wash down all decks with Holdtight to remove all remaining salts.
- ii. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- iii. One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- iv. One (1) intermediate coat of MC-Ferrox B 100 (DFT 3-5mil)
- v. One (1) Top Coat of MC-Trugrip 100 color (Red Oxide)

2.2.3 All new and disturbed steel under the Upper Deck previously coated shall be coated as per lines I to IV below and all areas under insulation shall be coated as per I to II below.

- I. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- II. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- III. An intermediate coat of MC-CR White (DFT 3-5mil)
- IV. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all structure normally painted white.

2.2.4 All existing deck tie down points on the Upper Deck shall be coated with one coat of Miozinc primer and two (2) coats of yellow paint.

2.2.5 Contractor shall prep and coat all mooring attachments located on the Upper deck as described in line 2.2.3. Top coat of mooring arrangements shall be MC-Luster Black.

2.2.6 The Contractor shall refer to the technical data sheets for the Wasser products included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canada Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

2.2.7 All steel inserts must be spot blasted to Sa2 ISO 8501-1 or SSPC SP6, surrounding coatings must be feathered back to a sound edge and coatings should be overlapped onto surrounding sound coatings by 2-3cms.

2.2.8 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will water blast the deck at 5000 PSI until the deck meets the required tolerances.

## 2.3 Location

2.3.1 The repair locations are located on the Upper Deck as described in Lengkeek drawings J1607-S13-R2 Upper Deck Structural Repairs pages 1 & 2.

## 2.4 Interferences

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 All insulation removed to carry out this scope of work shall be replaced on completion of work, inspections and testing.

2.4.3 This work shall be completed in conjunction with the following specification items:

- i GENERAL NOTES AND SERVICES
- ii HD-01 "DOCKING AND UNDOCKING"
- iii H-03 "FUEL OIL TANKS SURVEY"
- iv H-04 "POTABLE WATER TANKS SURVEY"
- v H-08 "STBD AFT DEEP SOUNDING PLUG DECK PLUG REPLACEMENT"
- vi H-13 "FLIGHT DECK STEEL REPLACEMENT"
- vii H-14 "HANGER TOP DECK STEEL REPLACEMENT"
- viii H-15 "AFT MAST REFURBISHMENT"
- ix H-19 "CABIN DECKING REPLACEMENT"
- x H-20 "CHIEF COOKS CABIN REBUILD"
- xi H-23 "WEATHER DOOR INSTALLATIONS"
- xii H-24 "NATURAL DECK VENT INSTALLATIONS"
- xiii H-27 "MAIN DECK FLOORING INSTALLATION"
- xiv E-03 "VENTILATION CUCTWORK AND FAN CLEANING"
- xv E-05 "FIXED FIRE FIGHTING SYSTEMS INSPECTIONS AND HYDRO TESTS"
- xvi E-06 "HAMPTON CRANE SURVEY"
- xvii E-12 "STEERING GEAR"
- xviii L-04 "FIRE DETECTION SYSTEM"

2.4.4 Lengkeek Drawing J16017-S13\_R3 highlights the cabins and spaces effected by steel deck repairs.

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 Lengkeek drawing J16017-A01\_R6 Key Plan Sheet 1 of 1
- 3.1.2 Lengkeek drawing J16017-S13\_R3 Upper deck steel sheet 1 of 3
- 3.1.3 Lengkeek drawing J16017-S13\_R3 Upper deck steel sheet 2 of 3
- 3.1.4 Lengkeek drawing J16017-S13\_R3 Upper deck steel sheet 3 of 3 indicates compartments below Upper Deck IWO plate removals.
- 3.1.5 VGAF2\_53C\_UPPER DECK PLATING
- 3.1.6 Wasser MC-Ferrox B 100 Product Data Sheet
- 3.1.7 Wasser MC-Trugrip 100 Product Data Sheet
- 3.1.8 Wasser MC-Miozinc 100 Product Description Sheet
- 3.1.9 Coatings- Wasser Paint Procedures
- 3.1.10 Wasser MC-Luster Product Description Sheet
- 3.1.11 Holdtight 102 Product Description Sheet
- 3.1.12 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA will inspect the upper deck area to ensure all equipment and machinery is adequately covered prior to the commencement of deck preparation.
- c) Hold point 3 - The CGIA and the attending Lloyds surveyor shall examine the deck in way of the repair areas and advise the Contractor where additional UT shots shall be carried out
- d) Hold point 4 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- e) Hold point 5 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.
- f) Hold point 6 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.
- g) Hold point 7 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- h) Hold point 8 - CGIA and NACE inspector shall witness the thickness readings of the primer coat and each additional coat of paint.
- i) Hold point 9 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulations and deck-head panels.
- j) Hold point 10 - CGIA will inspect the installation of the insulation removed during the scope of this specification prior to the metal perforated sheeting is installed.
- k) Hold point 11 - CGIA will inspect the installation of all interference items associated with this specification upon completion of work. This inspection shall be completed prior to a sign off on this specification as completed.



- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# H-10 Galley Deck Steel Repairs

## 1. Scope:

The intent of this specification is to carry out steel repairs to several areas of the Galley Deck and surrounding areas.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor shall perform this scope of work in conjunction with specification H-11 Freezer Room Deck Repairs and H-18 Main Freezer Refurbishment. The removal of all Galley equipment, linings, decking and insulation is covered in the H-17 Galley Refurbishment spec.
- 2.1.2 The Galley is situated over the, Port Deep, Stbd Deep, Center Deep and Flume Tk. These are all fuels tanks and the removal of fuel, gas free, cleaning of tanks and testing of tanks are all included in the H-03 Fuel Tank Survey Spec
- 2.1.3 New Galley coatings and flooring is covered in specification H-17 Galley Refurbishment.
- 2.1.4 There are also several cabins on the Port and Stbd sides of the galley that also requires deck repairs. This specification covers the steel repairs of these areas and interference items necessary to carry out the steel repairs. Underlayment removal and flooring removal and installation are covered under specification H-19 Cabin Decking Replacement. Lengkeek Drawing XXX Areas above deck repairs highlights the cabins and areas affected.
- 2.1.5 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.6 All materials to be contractor supply unless otherwise stated.
- 2.1.7 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.8 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.9 There are sixteen (16) areas that require either deck inserts. The repair areas, sizes and plate thickness is noted on the attached Lengkeek Drawing J18052-S-02 sht 1 of 2 Lower Deck Repairs IWO Deep F.O Tanks.

2.1.10 The Contactor shall cut out the existing deck areas indicated on the Lengkeek Drawing J18052-S-02 Lower Deck Repairs IWO Deep F.O Tanks. These areas are to be cut out and renewed with insert plates. The existing deck beams/girders are to be cut loose in way of the area of the plating to be replaced. These will need to be prepped where they have been removed from the plating and re-welded using a double continuous fillet weld to the new insert plates, once they have been installed. The insert plates are to be welded into place with full penetration bevel groove welds to the Lower Deck plating.

2.1.11 All work shall be completed to the satisfaction of CGIA/CGTA and Lloyds representative.

## **2.2 General – Coating**

2.2.1 Contractor shall note that all Galley Coatings and decking are included in Specification H-17 Galley Refurbishment.

2.2.2 Steel located inside fuel tanks shall not be painted but coated with mineral oil as described in specification H-03 Fuel Tanks Survey.

2.2.3 All new and disturbed steel other than that included in Specification H-17 and not located in fuel tanks shall receive 2 coats of Wasser Miozinc Primer as described below:

- I. Areas prepped to a minimum SSPC-SP3 standard.
- II. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- III. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas

## **2.3 Location**

2.3.1 The Work area is between frames #137 and #166 the entire width of the ship.

## **2.4 Interferences**

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 This work shall be completed in conjunction with the following specification items:

- i General Notes
- ii HD-01 "DOCKING AND UNDOCKING"
- iii HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv H-03 "FUEL TANK SURVEY"
- v H-10 "FREEZER ROOM DECK REPAIRS"
- vi H-17 "GALLEY REFURBISHMENT"
- vii H-18 "MAIN FREEZER REFURBISHMENT"
- viii H-19 "CABIN DECKING REPLACEMENT"
- ix H-27 "MAIN DECK FLOORING REPLACEMENT"
- x E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
- xi E-10 "MAIN REFRIGERATION SYSTEM REPLACEMENT"
- xii L-04 "FIRE DETECTION SYSTEM"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 Lengkeek Drawing: J18052-S02\_R1 shts 1 of 2 Lower Deck- Fridge Freezer Area Structural Repairs.
- 3.1.2 Lengkeek Drawing J18052-S02\_R1 sht 2 of 2 indicates compartments below Lower Deck IWO plate removals.
- 3.1.3 Hudson Drawing: Lower, Below Lower and Tank Top Decks
- 3.1.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements
- 3.1.5 Wasser Miozinc Primer Product Description Sheet
- 3.1.6 Coatings- Wasser Paint Procedures

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **3.3 Owner Furnished Material**

#### **3.3.1 None**

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 – CGIA will witness the layout of all areas to be renewed prior to any steel decking being cut.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new inserts in place prior to any finish welding commencing.
- d) Hold point 4 – CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- e) Hold point 5 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.
- f) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- g) Hold point 7 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- h) Hold point 8- CGIA will inspect the installation of all interference items to ensure they are reinstalled as per original.
- i) Hold point 9- CGIA will inspect all spaces upon completion of work to ensure spaces are cleaned.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE Inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 The testing of the Fuel tanks will be competed in specification H-03 Fuel Tank Survey. The Contractor shall not bid twice for the testing of all fuel tanks covered in this specification.
- 4.2.3 The Contractor shall be responsible for any additional Fuel Tank testing as a result of defects created during the scope of this work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.2 N/A



# H-11 Freezer Room Deck Repairs

## 1. Scope:

The intent of this specification is to carry out steel repairs to several areas of the deck in the lower freezer flats.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor shall perform this scope of work in conjunction with specification H-18 Main Freezer Refurbishment, and E-10 Main Refrigeration System Replacement. The removal of all bulkheads, linings, decking and insulation is performed in the H-18 Main Freezer Refurbishment spec.
- 2.1.2 Contractor shall also perform this work in conjunction with specification H-03 Fuel Tank Survey. Several of the steel inserts are in way of the Port Fuel tank which is beneath the Meat Room. All work to Fuel tanks are covered in the H-03 Fuel Tank Survey specification.
- 2.1.3 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.4 All materials to be contractor supply unless otherwise stated.
- 2.1.5 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.6 Any discrepancies found between this spec item and the Lengkeek Drawing: J16017-S06\_R2 Lower Deck- Fridge Freezer Area Structural Repairs, this spec will take precedent.
- 2.1.7 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.8 There are eight (8) areas that require either deck inserts. The repair areas, sizes and plate thickness is noted on the attached Lengkeek Drawing: J16017-S06\_R2 Lower Deck- Fridge Freezer Area Structural Repairs.
- 2.1.9 Lengkeek Drawing J16017-S06 sht 2 of 2 shows the deck below the work area.
- 2.1.10 The Contactor shall cut out the existing deck areas indicated on the Lengkeek Drawing: J16017-S06\_R2 Lower Deck- Fridge Freezer Area Structural Repairs.

2.1.11 These areas need to be cropped out and renewed with new insert plates. The existing deck beams/girders are to be cut loose in way of the area of the plating to be replaced. These will need to be prepped where they have been removed from the plating and re-welded using a double continuous fillet weld to the new insert plates, once they have been installed. The insert plates are to be welded into place with full penetration bevel groove welds to the Lower Deck plating.

2.1.12 All work shall be completed to the satisfaction of CGIA and Lloyds representative.

## **2.2 General – Coating**

2.2.2 Upon completion of all welding and inspections all Freezer room decks shall be prepared and coated. The coatings for the decks in the freezer spaces are included in Specification H-18 Main Freezer Refurbishment. The Contractor shall not quote and price this work twice.

2.2.3 All new and disturbed steel located on top a fuel tank shall not get coated, but oiled as per Specification H-03 Fuel Tank Survey.

2.2.4 All new and disturbed steel located on the underside of the Freezers previously painted white shall be prepared to an SSPC-SP6 standard recoated using the Wasser coatings as described in line 2.2.4. inclusive.

2.2.5 Contractor will be responsible for refurbishing all materials required for the Wasser coating system. Materials include:

- I. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- II. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- III. An intermediate coat of MC-CR White (DFT 3-5mil)
- IV. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all structure normally painted white

## **2.3 Location**

2.3.1 The Freezer area is located on the Lower Deck between Frames #137 and #166.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.4.2 This work shall be completed in conjunction with the following specification items:
- i General Notes
  - ii HD-01 "DOCKING AND UNDOCKING"
  - iii HD-02 "UNDERWATER AND ABOVE WATER HULL"
  - iv H-03 "FUEL TANK SURVEY"
  - v H-10 "GALLEY DECK STEEL REPAIRS"
  - vi H-17 "GALLEY REFURBISHMENT"
  - vii H-18 "MAIN FREEZER REFURBISHMENT"
  - viii E-10 "MAIN REFRIGERATION SYSTEM REPLACEMENT"

## 3. References:

### 3.1 Guidance Drawings/Vessel Drawings

- 3.1.1 Lengkeek Drawing: J16017-S06\_R2 sht 1 of 2 Lower Deck- Fridge Freezer Area Structural Repairs.
- 3.1.2 Lengkeek Drawing J16017-S06\_R2 sht 2 of 2 Lower Deck- Fridge Freezer Area Structural Repairs indicate compartments below deck IWO plate removals.
- 3.1.3 Hudson Drawing: Lower, Below Lower and Tank Top Decks
- 3.1.4 Coatings- Wasser Paint Procedures
- 3.1.5 Wasser MC-Luster Product Description Sheet
- 3.1.6 Wasser Miozinc Primer Product Description Sheet
- 3.1.7 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

## **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
  - b) Hold point 2 – CGIA and Lloyds Surveyor will witness the layout of all areas to be renewed prior to any steel decking being cut.
  - c) Hold point 3 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new inserts in place prior to any finish welding commencing.
  - d) Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
  - e) Hold point 5 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.
  - f) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
  - g) Hold point 7 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
  - h) Hold point 8- CGIA will inspect all spaces upon completion of work to ensure spaces are cleaned.

- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE Inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.3 The testing of the Fuel tanks will be completed in specification H-03 Fuel Tank Survey. The Contractor shall not bid twice for the testing of all fuel tanks covered in this specification.
- 4.2.4 The Contractor shall be responsible for any additional Fuel Tank testing as a result of defects created during the scope of this work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## **H-12 Wheelhouse top deck steel replacement and Coatings**

### **1. Scope:**

The intent of this specification is to remove all existing deck coatings on the Wheelhouse top deck, replace wasted and corroded deck areas with steel inserts and to apply new deck coatings.

### **2. Technical Description:**

#### **2.1 General – Prep and Steel Renewal**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor must erect an enclosure over the area of the Wheelhouse top deck where the work is being completed. The enclosure shall be used to prevent egress of foreign materials into the environment as well as ensuring the required conditions for coatings as per manufacturer’s recommendations. Contractor shall consider provincial or federal containment requirements and weather conditions for that time of year.
- 2.1.6 The Contractor must ensure that all items not being blasted or being painted shall be protected during the execution of this specification item. In particular, care must be taken to protect all deck machinery, cables, antenna, light fixtures, sidelights, scuttles etc. These must be identified and clearly marked and covered to protect them from the blasting process. All equipment protection must be removed at the completion of this specification item. Where blasting material and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor’s expense prior to the completion of the contract.
- 2.1.7 The Contractor must ensure no ingress of blasting material and/or overspray into the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting material and/or overspray. The Contractor must be responsible for the cleanup of all blasting material, debris and overspray from the vessel's interior and exterior decks. All grit blasting material and debris must be disposed of ashore in accordance with all Federal, Provincial and Municipal regulations in effect.

- 2.1.8 The entire exterior deck surface of the wheelhouse top including the deck within the stack and crow's nest tower base shall be grit-blasted clean to bare metal and recoated. Also included is all steel work intersecting the deck, such as, but not limited to the fish plate(s), boundary plate(s), bulwarks, brackets, struts, braces, hatch coamings, and equipment mounting pads for a distance of 1.5" upwards from the deck.
- 2.1.9 The area of the deck surface = approximately 269 m2 (2900 ft2). The length of boundary bar and fish plate involved in this work is approximately 104meters (400 feet).
- 2.1.10 The existing deck coatings are the International, Intershield 9G Epoxy deck coatings.
- 2.1.11 The Contractor shall remove all interference items including but not limited to joiner linings, deck head panels and insulation to complete this specification. Lengkeed Drawing J18052-S03 R2 sht 2 of 2 "compartments below Wheelhouse top IWO plate removals" highlights the spaces that will be effected by the steel repairs and areas in way of Washroom Exhaust Vent.
- 2.1.12 As per guidance drawings, Lengkeek drawing "J18052-S03 R2 sht 1 of 2 "WheelHouse Top Deck Repairs" areas of the Upper Deck must be cropped out and repaired with steel inserts. These drawings provide the positioning of the steel inserts.
- 2.1.13 The following requirements must be met for the steel repair:
- i Wheelhouse top deck steel, in way of area to be repaired, is to be removed.
  - ii Contractor must ensure that steel removed corresponds to the insert sizes detailed in the guidance drawings attached.
  - iii The plate insert must match the surrounding plate thickness.
  - iv Corners of the plate insert must have a minimum radius of 4".
  - v The plate insert must be fitted using full penetration continuous welds.
  - vi Existing structure on the underside of the deck is to be welded to the inserts using double continuous fillet welds.
  - vii Scallops must be cut in stiffening structure when they are in way of a weld for a plate insert.
  - viii The existing deck beams/girders are to be cut loose in way of the area of the plating to be replaced. These will need to be prepped where they have been removed from the plating and re-welded using a double continuous fillet weld to the new insert plates, once they have been installed. The insert plates are to be welded into place with full penetration bevel groove welds to the wheelhouse top plating.
  - ix Inspections shall be carried out as per Section 4.1 Inspections
  - x Testing shall be carried out as per Section 4.2 Testing.



- 2.1.14 The Contractor shall replace the washroom exhaust vent on the wheelhouse top as described in the attached Lengkeek Drawing J18052-S03 Rev 2 Sht 1 of 2 Detail 1-6B.”
- 2.1.15 Upon completion of all steel work, inspections, testing and coating the Contractor shall reinstall all the interference items remove to carry out this specification.
- 2.1.16 All insulation removed to carry out this scope of work shall be replaced with new insulation upon completion of steel work, inspections, testing and coatings. New insulation shall be 4” thick mineral wool with foil backing and secured with welded 10ga steel pins and clips. All seems shall be taped with 4” wide foil tape.

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing of the Wheel House Top deck steel repair, the repair location and entire deck area described in Section 2.1.8 shall be prepared and coated with the Wasser Coating system.
- 2.2.2 Entire deck area to be grit blasted to SSPC-SP6 standard.
- 2.2.3 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer’s acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.
- 2.2.4 All new and disturbed steel on the underside of the Wheelhouse top deck shall receive two (2) coats of Miozinc primer as described in Section 2.2.5 Lines 1 and 11.
- 2.2.5 Contractor will be responsible for refurbishing all materials required for the coating scheme. Materials include:
- vi. Wash down of all areas with Holdtight 102 as per manufactures specifications to remove all salts.
  - vii. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - viii. One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - ix. One (1) intermediate coat of MC-Ferrox B 100 (DFT 3-5mil)
  - x. One (1) Top Coat of MC-Trugrip 100

- 2.2.6 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.  
Atlantic Canada Distributor for all above products:  
K&D Pratt Limited  
55 Akerley Blvd  
Dartmouth NS B3B 1M3  
Ph: (902)468-1955  
Product representative: Mike Bellefontaine 902-480-3039  
Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)
- 2.2.7 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.

## 2.3 Location

- 2.3.1 Longitudinally the area to be worked is between frame 87 and frame 163.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.
- 2.4.2 This work shall be completed in conjunction with the following specification items:
- i. GENERAL NOTES
  - ii. HD-15 "INSTALLATION OF THE DOPPLER SPEED LOG"
  - iii. E-13 "SAILOR ANTENNA MOUNT REPLACEMENT"
  - iv. L-05 "BRIDGE WATCH NAVIGATION ALARM SYSTEM INSTALLATION"
  - v. L-07 "RADAR ECDIS INSTALLATION"
  - vi. L-08 "FIBER OPTIC GYROCOMPASS INSTALLATION"

## 3. References:

### 3.1 Guidance Drawings/Vessel Drawings

- 3.1.1 Lengkeek Drawing J18052-S03 Rev 2 sht 1 of 2 WheelHouse Top Deck Repairs
- 3.1.2 Lengkeek Drawing J18052-S03 Rev 2 sht 2 of 2 WheelHouse Top Deck Repairs. Drawing indicates the compartments below Wheelhouse top IWO plate removals.

- 3.1.3 CCGS Hudson Drawing Wheelhouse Top and Bridge Decks
- 3.1.4 Holdtight 102 Product Description Sheet.
- 3.1.5 Wasser Miozinc Primer Product Description Sheet
- 3.1.6 Wasser MC-Ferrox B 100 Product Data Sheet
- 3.1.7 Wasser MC-Trugrip 100 Product Data Sheet
- 3.1.8 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## **3.2 Standards and Regulations**

- 3.2.5 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.6 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.7 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.8 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

## **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a) Holdpoint 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
  - b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
  - c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
  - d) Hold point 4 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.

- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- g) Hold point 7 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulation.
- h) Hold point 8 - CGIA will inspect all insulation prior to the deck head panels being reinstalled.
- i) Hold point 9 - CGIA will inspect the reinstallation of all interference items not previously mentioned.

- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.2 N/A

## **H-13 Flight Deck Steel Replacement**

### **1. Scope:**

The intent of this specification is to remove the entire flight deck and replace it with new steel and coatings.

### **2. Technical Description:**

#### **2.1 General – Prep and Steel Renewal**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor must erect an enclosure around the entire flight deck area extending down to the main deck. The enclosure shall be used to prevent egress of foreign materials into the environment as well as ensuring the required conditions for coatings as per manufacturer’s recommendations above and below the flight deck area. Contractor shall consider provincial or federal containment requirements and weather conditions for that time of year. Under no circumstances will work be accepted if it is completed without an enclosure that is erected to the full satisfaction of the CGTA.
- 2.1.6 The Contractor must ensure that all items not being blasted or being painted shall be protected during the execution of this specification item. In particular, care must be taken to protect all deck machinery, cables, antenna, light fixtures, sidelights, scuttles etc. These must be identified and clearly marked and covered to protect them from the blasting process. All equipment protection must be removed at the completion of this specification item. Where blasting material and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor’s expense prior to the completion of the contract.

- 2.1.7 The Contractor must ensure no ingress of blasting material and/or overspray into the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting material and/or overspray. The Contractor must be responsible for the cleanup of all blasting material, debris and overspray from the vessel's interior and exterior decks. All grit blasting material and debris must be disposed of ashore in accordance with all Federal, Provincial and Municipal regulations in effect.
- 2.1.8 The Contractor shall replace two (2) fire hydrant spools located at frame #37 Port and Stbd sides. These will be cropped out to replace the deck. The Contractor shall fabricate, install and coat 2 new deck spools and flanges.
- 2.1.9 The Contractor shall note that the existing pipe spools have an addition flange a few inches up from the deck. The new spools may be a straight piece of pipe threaded at the top to receive the hydrant valves. The extra flange is not necessary. See picture below: Both the Port and Stbd hydrant spools are similar.



- 2.1.10 The fire main system will be shut down and locked out as required by the ship's crew. The contractor will give the Chief Engineer a minimum of four (4) hours' notice when this is required. The contractor will notify the Chief Engineer as soon as the system can be reactivated. As much work as possible is to be carried out during each phase of the project to minimize the down time of the system. The deck spools will be cut out of the deck and be made ready for immediate installation of blank flanges before the spools are actually let go off the flanges. The system can be reactivated once blanks are installed at the flanged pipe connection at the lower end of each spool. The system will not be left inoperable other than these two (2) fire stations over any break time in work (coffee, meals, overnight, fabrication, or leaving the site for any other reason).
- 2.1.11 The new deck spools piping sections will be fabricated from schedule 80 seamless steel piping. The flanges that will connect these to the fire main system will match the current bolt pattern configuration. They will be slip on style 150 psi rated flanges. A ¼" thick x 9" OD steel collar shall be fabricated from 44W steel and installed on the Flight Deck side of the joint to give added strength. The outboard edge of each collar may need to be trimmed to allow for welding to the deck as they are close to the fishplate.
- 2.1.12 The two (2) fire station deck spools shall be renewed back to the first flanged connections located in the deck heads of the GP lab. The contractor shall make ready suitable blank steel 150 psi rated flanges c/w gaskets for sea water service and new plated steel fastener arrangements. The existing deck spools are to have their attached hydrant fittings removed and turned over to the Chief Engineer. 2" NPT pipe caps are to be installed on the exposed piping. The deck spools are to be released from the deck and the flange connecting the deck spool to the fire main system let go. The steel blanks c/w gaskets are to be installed.
- 2.1.13 The spools will be fitted with a NPT pipe cap of the upper side. Once the spools are ready for installation the system will again be locked out. The blanks shall be removed and the spools secured to the fire main piping.
- 2.1.14 The new deck spools are to be welded into the Boat Deck after the steel IWO the installation is prepared for welding. The deck spool piping and collars are to be welded continuously, both sides.
- 2.1.15 Testing of spools shall be carried out as per Section 4.2.
- 2.1.16 The hydrant flange welded to the deck shall be coated as per line 2.2.2.
- 2.1.17 The hydrant piping shall be coated as per line 2.2.5.



- 2.1.18 The Contractor shall reinstall both the Port and Stbd Fire Hydrants upon completion of all work and prior to the final pressure test as described in Section 4.2.4 Testing.
- 2.1.19 The Contractor shall remove all railings around the Hanger. These shall be retained and used as templates for new railings the Contractor shall fabricate, coat and reinstall upon completion of all steel work, testing and coatings. All railings and galvanized chain shall be replaced as per original.
- 2.1.20 The forward portion of the Flight deck to be replaced is on top of the GP lab. See Lengkeek drawing J18052-S04 rev 2 sht 2 of 2 Flight deck Renewal. This drawing indicates the compartments below the Boat deck in way of plate removals. All interference items in way of the flight deck steel replacements shall be removed and reinstalled upon completion of all steel work, testing and coatings.
- 2.1.21 As per guidance drawings, Lengkeek drawing J8052-S04-R1 Sht 1 of 2, the Flight Deck must be cropped out and repaired with new steel plates. These drawings provide the positioning of the steel plates.
- 2.1.22 The following requirements must be met for the steel repair:
- i Flight deck steel shall be removed.
  - ii Contractor must ensure that steel removed corresponds to the area detailed in the guidance drawings attached.
  - iii The plate insert must match the surrounding plate thickness.
  - iv The plate insert must be fitted using full penetration continuous welds.
  - v Existing structure on the underside of the deck is to be welded to the inserts using double continuous fillet welds.
  - vi Scallops must be cut in stiffening structure when they are in way of a weld for a plate insert.
  - vii The entire Flight Deck plating from Frame 8 forward to Frame 40 shall be cropped and renewed with 5/16" thick plating.

- viii The existing deck beams/girders are to be cut loose in way of the area of the plating to be replaced. These will need to be prepped where they have been removed from the plating and re-welded to the new plating, once it has been installed.
- ix The entire perimeter curtain plate shall also be cropped and replace with 5/16" thick plate.
- x The deck beam at Frame 11 is buckled and needs repair and shall be replaced from one foot starboard of centerline to three feet port of centerline with 4"x3"x 5/16" angle bar
- xi All existing anchor pockets and attachments to the Flight deck shall be replaced as per original or otherwise stated.
- xii The entire exterior deck surface top and bottom of the flight deck shall be grit-blasted clean to bare metal and recoated. Also included is all steel work intersecting the deck, such as, but not limited to the fish plate(s), boundary plate(s), brackets, struts, braces, and equipment mounting pads for a distance of 1.5" upwards from the deck. See Section 2.2 Coatings.
- xiii All insulation removed to carry out this scope of work shall be replaced with new insulation upon completion of steel work, inspections, testing and coatings. New insulation shall be 4" thick mineral wool with foil backing and secured with welded 10ga steel pins and clips. All seems shall be taped with 4" wide foil tape. Insulation shall also be covered with galvanized perforated cladding as per original.
- xiv All interference items removed from the GP lab shall be reinstalled as per original.

## 2.2 General – Coating

- 2.2.1 Upon completion of welding, inspection, and testing of the Flight deck steel replacement, the entire exterior deck area shall be prepared to an SSPC-SP6 standard and coated with the Wasser Coating system as described in Section 2.2.2. as well as both newly installed fire hydrant spool flanges.
- 2.2.2 Contractor will be responsible for refurbishing all materials required for the Wasser coating system.
  - i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. One (1) intermediate coat of MC-Ferrox B 100 (DFT 3-5mil)
  - iv. One (1) Top Coat of MC-Trugrip 100

- 2.2.3 Upon completion of welding, inspection, and testing of the Flight deck steel repair, the underside area of the Flight Deck exposed to the weather, the new railings and the two (2) fire hydrant deck spools shall be prepared to a SSPC- SP6 standard and coated with the Wasser Coating system as described in Section 2.2.5.
- 2.2.4 The remaining area under the flight deck contained inside the GP Lab shall receive primer as described in Section 2.2.5. line items I. and II.
- 2.2.5 Contractor will be responsible for furnishing all materials required for the Wasser coating system. Materials include:
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all structure normally painted white.
- 2.2.6 All steel inserts must be spot blasted to Sa2 ISO 8501-1 or SSPC SP6.
- 2.2.7 The Contractor shall refer to the technical data sheets for the Wasser products included in the Technical Data Package for application and curing instructions of the coating system.  
Atlantic Canada Distributor for all above products:  
K&D Pratt Limited  
55 Akerley Blvd  
Dartmouth NS B3B 1M3  
Ph: (902)468-1955  
Product representative: Mike Bellefontaine 902-480-3039  
Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)
- 2.2.8 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.

## 2.3 Location

- 2.3.1 Longitudinally the area to be worked is between frames #8 and #40 on the Boat deck level.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.
- 2.4.2 This work shall be completed in conjunction with the following specification items:
- i HD-01 "DOCKING AND UNDOCKING"
  - ii H-09 "UPPER DECK STEEL REPAIRS"
  - iii H-14 "HANGER TOP DECK STEEL REPLACEMENT"
  - iv H-15 "AFT MAST REFURBISHMENT"

## 3. References:

### 3.1 Guidance Drawings/Vessel Drawings

- i Lengkeek Drawing J18052-S04-R1 Sht 1 of 2 Flight Deck Renewal
- ii Lengkeek Drawing J18052-S04-R1 Sht 2 of 2 Flight Deck Renewal: indicates the compartments below the boat deck IWO plate removals.
- iii Wasser MC-Ferrox B 100 Product Data Sheet
- iv Wasser MC-Trugrip 100 Product Data Sheet
- v Wasser MC-Miozinc 100 Product Description Sheet
- vi Coatings- Wasser Paint Procedures
- vii Wasser MC-Luster Product Description Sheet
- viii Holdtight 102 Product Description Sheet
- ix SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## 3.2 Standards and Regulations

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

## 3.3 Owner Furnished Material

- 3.3.1 None

## 4. Proof of Performance:

### 4.1 Inspection

#### 4.1.1 Inspection Hold Points:

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- g) Hold point 7 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulations and deck-head panels.
- h) Hold point 8 - CGIA will inspect the installation of the insulation in the GP lab prior to the metal perforated sheeting is installed.
- i) Hold point 9 - CGIA will inspect the installation of all interference items associated with this specification upon completion of work. This inspection shall be completed prior to a sign off on this specification as completed.

- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.
- 4.2.3 The Fire Hydrant spools shall be pressure tested at 120 psi prior to being welded in the deck.
- 4.2.4 A leak and performance test shall be conducted on the fire system upon completion of work. This may be completed in the Drydock by connecting a shore supply of water to the firemain and charging to 70 psi. Any leaks shall be corrected by the Contractor.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-14 Hanger Top Deck Steel Replacement

## 1. Scope:

The intent of this specification is to remove the entire Hanger Top Deck and replace it with new steel and coatings.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor must erect an enclosure over the area of the Hanger Top Deck where the work is being completed. The enclosure shall be used to prevent egress of foreign materials into the environment as well as ensuring the required conditions for coatings as per manufacturer’s recommendations. Contractor shall consider provincial or federal containment requirements and weather conditions for that time of year. Under no circumstances will work be accepted if it is completed without an enclosure that is erected to the full satisfaction of the CGTA.
- 2.1.6 The Contractor must ensure that all items not being blasted or being painted shall be protected during the execution of this specification item. In particular, care must be taken to protect all deck machinery, cables, antenna, light fixtures, sidelights, scuttles etc. These must be identified and clearly marked and covered to protect them from the blasting process. All equipment protection must be removed at the completion of this specification item. Where blasting material and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor’s expense prior to the completion of the contract.
- 2.1.7 The Contractor must ensure no ingress of blasting material and/or overspray into the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting material and/or overspray. The Contractor must be responsible for the cleanup of all blasting material, debris and overspray from the vessel's interior and exterior decks. All grit blasting material and debris must be disposed of ashore in accordance with all Federal, Provincial and Municipal regulations in effect.



- 2.1.8 The Contractor shall lock out all electrical equipment that is attached to the Hanger Top Deck that is to be removed as part of this specification. Hudson document “Hanger Top and Aft Mast Electrical Connections” will assist the Contractor on locating electrical connections. All existing lighting shall be removed and reinstalled upon completion of steel work.
- 2.1.9 All cabling removed/pulled back shall be noted and identified during strip out and a copy of this information shall be given to CGTA. All removed cables will be Labeled to be at ends of cable as well as on both side of any transit. Labelling shall be completed using stainless steel wire tags with punched identifiers as seen in Picture A1 below.



Picture A1

2.1.10 The Contractor shall remove all the deck attachments and penetrations and reinstall them upon installation of the new deck. The following is a list the deck attachments and penetrations to be removed prior to cutting away the deck. These attachments shall be cleaned and painted where applicable and reattached or replaced as per original: Contractor shall note that CCG has attempted to clearly identify all items. This should be used for guidance purposes only. The contractor is responsible to note all interference items including but not limited to vents, conduits, brackets, drains, wiring, insulation, hatches, trunking, ect. All interference items are to be confirmed by the Contractor prior to bidding. The contractor shall be responsible for ensuring all existing items that will interfere with the scoped work are removed, renewed and reattached.

- i Handrail that surrounds the perimeter of the hanger top.
- ii Two (2) forward deck drains Port and Stbd sides (To be Renewed)
- iii Two (2) center deck drains (To be Renewed)
- iv Two (2) aft deck drains (To be Renewed)
- v Two (2) forward securing brackets for the Aft Mast. (To be Renewed)
- vi The Aft Mast (Removal and refurbishment Spec #H-15)
- vii One (1) Escape hatch
- viii One (1) Washroom exhaust fan and exhaust trunking
- ix One (1) Flume hood exhaust fan and trunking (To be Renewed)
- x One (1) Science instrument device
- xi One (1) storage corral
- xii Ten (10) electrical kickpipes. (To be Renewed)

2.1.11 Line item #1: The Contractor shall remove the existing hand railing in its entirety around the perimeter of the Hanger Top. It may be cut in smaller sections to make handling easier. All railings are to be reused.

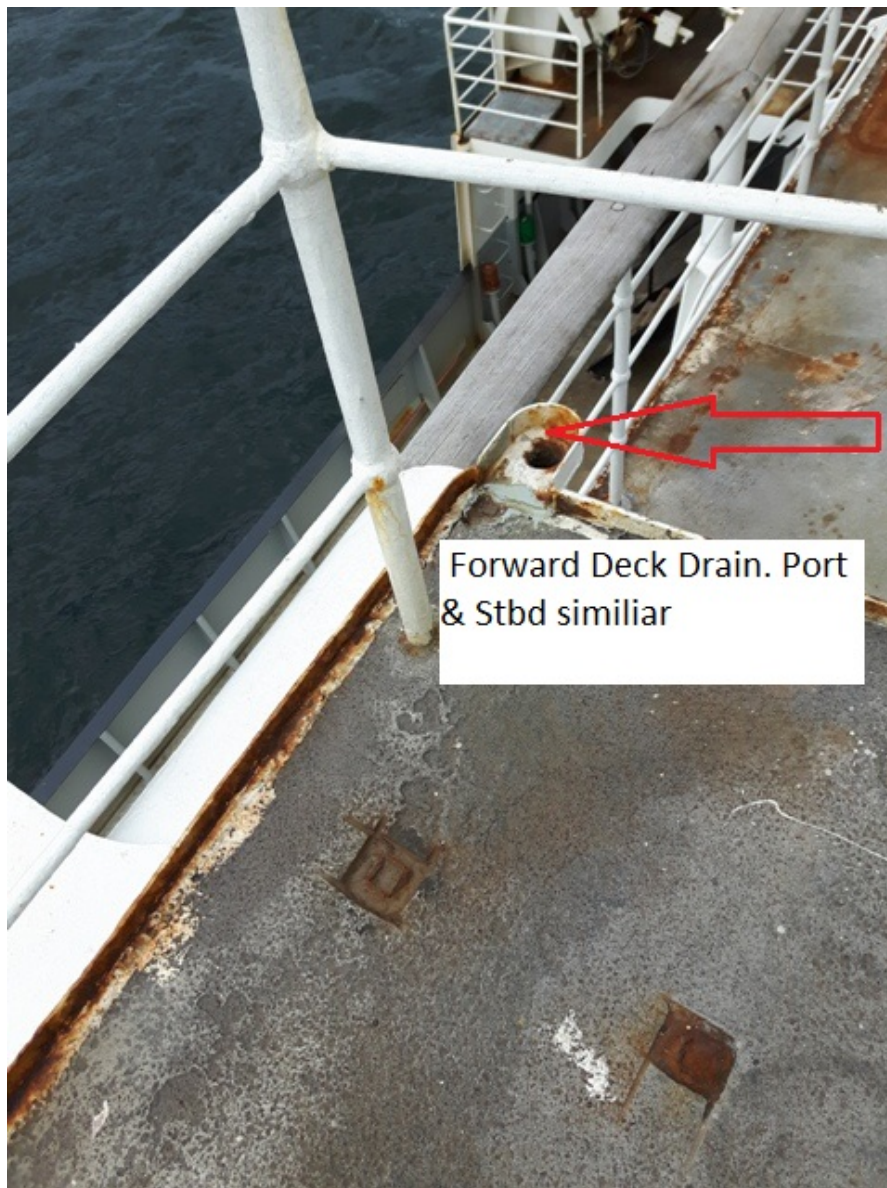
2.1.12 The Contractor shall grit blast the railings to an SSPC-SP6 standard and coat the railings with Wasser Coating System:

- I. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams
- II. Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all areas.
- III. An intermediate coat of MC-CR White (DFT 3-5mil) to all areas
- IV. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) to all areas

2.1.13 On completion of installation of the refurbished steel deck the deck railings are to be welded to the deck in their original locations as per original. Sections of railings previous cut shall be re-welded together. Uprights shall be welded to new 3 “diameter by 3/8” mounting plates as per original prior to welding them to the deck.

2.1.14 Any coatings disturbed during the installation shall be prepped and coated as indicated in Section 2.1.11.

- 2.1.15 Line Item #2, #3 and #4: There are six (6) deck drains located on the Hanger deck. All drains are to be replaced with new ones. These shall be replaced from the deck level down 12" and welded to the existing pipework. New drains shall be fitted with stainless steel grills. All piping shall be as per original.



- 2.1.16 Item #5. There are two (2) forward securing brackets for the Aft Mast that are welded to the deck. These are to be cut off and the Port one renewed. The stbd bracket can be reused and act as a template for the Port side.



- 2.1.17 Item #6: The aft mast shall be unsecured, lowered and removed from the Vessel. Contractor shall note the removal and re-installation of the Aft Mast is not part of this specification. See specification-15 Aft Mast Refurbishment. Contractor shall not bid twice for the Aft Mast removal an re-installation.



- 2.1.18 Item #7: The Escape Hatch and hatch door locking Mechanism shall be cut out, removed and later reinstalled. The Contractor shall replace the hatch door locking mechanism with a new one. The upright angle bar securing the locking mechanism shall also be replaced and coated. The existing hatch shall be prepared and coated as per Wasser coating system. The Contractor shall also replace the nameplates on the hatch as per original. See picture below.



- 2.1.19 Item # 8: Washroom Exhaust fan and trunking. The Contractor shall remove item #8 and upon completion of the steel deck reinstall it, as per original. The unit shall be prepped and painted using the Wasser Coatings as described in Section 2.2.3. See picture below.

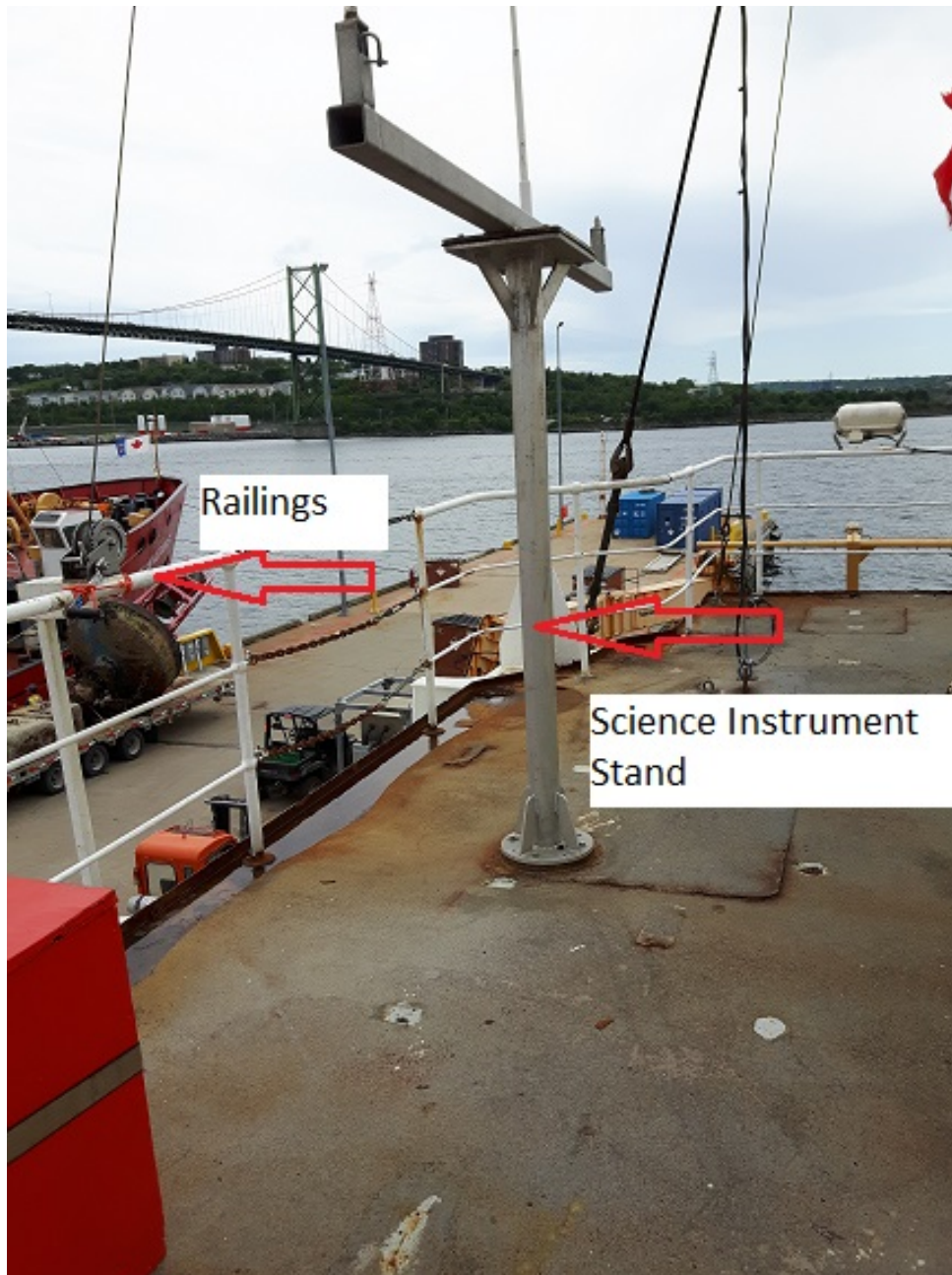


- 2.1.20 Item #9 Flume Hood Exhaust Fan and trunking. This unit shall be removed and disposed of. Contractor shall renew Flume Hood and Fan with GSM replacement:





- 2.1.21 Item #10 Science Stand: The Science stand shall be unbolted from the deck and secured in place where it will not get disturbed and damaged. The CGIA will inform the Contractor where to store it. Upon completion of the deck and mount replacement it shall be re-bolted to the base using new stainless steel hardware the same size as per original.





- 2.1.22 Item #11 Storage Coral: The existing storage coral shall be removed and re-secured as per original upon completion of the installation of the new deck. See picture below:



- 2.1.23 Item #12 Kick pipes: There are ten (10) Electrical kick pipes attached to the deck. The Contractor shall replace all existing kick pipes, glands and nuts with Lloyds approved stainless steel ones sized as per original.
- 2.1.24 On the underside of the Hanger top deck the Contractor shall remove all insulation, metal mesh and clips and all other interference items necessary to carry out the work described in this specification.

- 2.1.25 Contractor shall replace the entire Hanger Top steel deck as per Lengkeek guidance drawing J18052-S05-R1 Sht 1 of 2.
- 2.1.26 Lengkeek drawing J18052-S05-R1 sht 2 of 2. Highlights the compartments below the Hanger Top IWO plate removals.
- 2.1.27 All insulation removed to carry out this scope of work shall be replaced with new insulation upon completion of steel work, inspections, testing and coatings. New insulation shall be 4" thick mineral wool with foil backing and secured with welded 10ga steel pins and clips. All seems shall be taped with 4" wide foil tape. Insulation shall also be covered with galvanized perforated cladding as per original.
- 2.1.28 All remaining interference items on the underside of the deck are to be reinstalled as per original. See section 2.4 Interferences.

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing of the Hanger Top Deck steel repairs, the entire exterior deck area shall be prepared to an SSPC-SP6 and coated with the Wasser Coating system as described in Section 2.2.2.
- 2.2.2 Contractor will be responsible for refurbishing all materials required for the Wasser coating system. Materials include:
  - xi. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - xii. One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - xiii. One (1) Intermediate coat of MC-Ferrox B 100 (DFT 3-5mil)
  - xiv. One (1) Top Coat of MC-Trugrip 100

2.2.3 Upon completion of welding, inspection, and testing of the Hanger Top Deck steel repair, the underside area of all new and disturbed steel shall receive primer as described in Section 2.2.2. line items I. and II. The existing hatch, Flume Hood and Exhaust fan housing shall receive the following:

- V. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- VI. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- VII. An intermediate coat of MC-CR White (DFT 3-5mil)
- VIII. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all areas normally painted white and MC Luster Red for the outside of the hatch.

2.2.4 The Contractor shall refer to the technical data sheets for the Wasser products included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canada Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

2.2.5 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.

## 2.3 Location

2.3.1 Longitudinally the area to be worked is between frames #34 and frames #75 on the Bridge Deck.

## 2.4 Interferences

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 This work shall be completed in conjunction with the following specification items:

- xix HD-01 "DOCKING AND UNDOCKING"
- xx H-09 "UPPER DECK STEEL REPAIRS"
- xxi H-13 "FLIGHT DECK STEEL REPLACEMENT"
- xxii H-15 "AFT MAST REFURBISHMENT"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i Lengkeek Drawing J8052-S05-R1 sht 1 of 2 Hanger Top Deck Repairs
- ii Lengkeek drawing J18052-S05-R1 sht 2 of 2 Hanger Top Deck Repairs: Highlights the compartments below the Hanger Top IWO plate removals.
- iii CCGS Hudson document "Hanger Top and Aft Mast Electrical Connection"
- iv Wasser MC-Miozinc 100 Product Description Sheet
- v Coatings- Wasser Paint Procedures
- vi Wasser MC-Luster Product Description Sheet
- vii Holdtight 102 Product Description Sheet
- viii Wasser MC-Ferrox B 100 Product Data Sheet
- ix Wasser MC-Trugrip 100 Product Data Sheet
- x SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **3.3 Owner Furnished Material**

#### **3.3.1 None**

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Holdpoint 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing. This includes the reattachment of all items that were removed on the deck as per line 2.1.9.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2. This includes the reattachment of all items that were removed on the deck as per line 2.1.9.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of the primer coat and each addition coat of paint.
- g) Hold point 7 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulations and all interference Items.
- h) Hold point 8 - CGIA will inspect the installation of all interference items associated with this specification upon completion of work. This inspection shall be completed prior to a sign off on this specification as completed.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, PSPC and onsite NACE Inspector.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# H-15 – Aft Mast Refurbishment

## 1. Scope:

The intent of this specification is to remove the Aft Mast from the vessel correct all defects, grit blast and recoat using Wasser Coating System. Upon completion of all work the Contractor shall reinstall.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor shall perform this scope of work in direct conjunction with specification H-13 Hanger Top Deck Renewal.
- 2.1.2 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.5 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.6 The electrical connections to the mast are to be isolated, tagged, and disconnected. The Electrical panels feeding power to the mast are E13 and E14 which are located in the Bridge, starboard and port respectively. The attached CCG document “Electrical Equipment on Hanger Top and Aft Mast” contained in the TDP highlights these electrical items.

<u>Light</u>	<u>Panel</u>	<u>Circuit</u>	<u>Cable</u>
Upper Mast Head	EL3	3&4 (SW 2)	14/4
Mast Head - Upper Red	EL3	11 (SW 6)	14/6
Mast Head - Middle White	EL3	12 (SW 7)	14/6
Mast Head - Lower Red	EL3	13 (SW 8)	14/6
Flood Lights	EL4	4	14/2

- 2.1.7 The fiberglass shroud surrounding the base of the mast is to be carefully removed and stored for re-installation.



- 2.1.8 The aluminum mast is supported by seven (7) stay wires. Four (4) are 1" wire and three (3) are ½" wire. All are fitted with a turnbuckle, end eye, and shackle securing and adjusting arrangement.
- 2.1.9 The mast is to be suitably supported, stay wires released, and the hinge pin released. Mast is to be removed ashore for overhaul.
- 2.1.10 All stay arrangements are to be removed and stored at the Contractors facility to be used as templates for new ones. Below is a list of the existing arrangements to be replaced: All new Stay arrangements shall be Contractor supplied.

	Quantity	Item description
--	----------	------------------

- |      |  |  |
|------|--|--|
| I.   | 4 x One Inch (1")                        | wire rope steel core with thimble eyes on each end, length to be duplicated from original. |
| II.  | 3 x One Half Inch (1/2")                 | wire rope steel core with thimble eyes on each end, length to be duplicated from original. |
| III. | 8 x 13.5t Crosby Shackles                | – as per original.   |
| IV.  | 4 x 18" Turnbuckles Pin Closure each end | - suitable for One Inch (1") Wire as per original.   |
| V.   | 3 x 6" Turnbuckles Pin Closure each end  | - suitable for One Inch (1") Wire as per original.   |
| VI.  | 6 x 2t Crosby Shackles                   | – as per original.   |

- 2.1.11 The aft mast shall be unsecured, lowered and removed from the Vessel to the Contractors shop for refurbishment.
- 2.1.12 All removable fixtures on the mast are to be removed, cleaned up and inspected for defects. This includes the removable steel ladder.
- 2.1.13 There will be an allowance of \$10,000.00 in this specification to cover the costs on defects to the Aft Mast not covered in this specification. This allowance can be adjusted upon a PSPC 1379 action with written approval from the CGTA and proof of invoice where required.

- 2.1.14 All existing cabling from the lights to the Electrical Panels shall be removed. The type and length of the cable shall be noted during strip out and a copy of this information shall be given to CGTA. All removed cables will be disposed of and replaced with new, cables of the same type as indicated in "CCGS Hudson document - Hanger Top and Aft Mast Electrical Connection" as referenced section 3. All cables shall be supplied and installed by contractor. All affected transits are to be completely renewed and restored to original condition. The cable ends are to be labelled as to which circuit they feed. Labelling to be at both ends of cable as well as on both side of any transit. Labelling shall be completed using stainless steel wire tags with punched identifiers as seen in Picture A1 below. Marine armored cable shall be used. Cable to be secured as required by Lloyds regulations.



Picture A1

- 2.1.15 The complete mast and all attached fittings shall be sandblasted to bare metal and coated as per Section 2.2.
- 2.1.16 Upon completion of the Hanger steel deck replacement in specification H-14, the Contractor shall replace the steel base of the Aft Mast as per original. See figure "A" Aft Mast Base, and Picture "A" Aft Mast Base. The base shall be coated as part of H-14 Hanger Top Deck Replacement.



Picture "A" Aft Mast Base

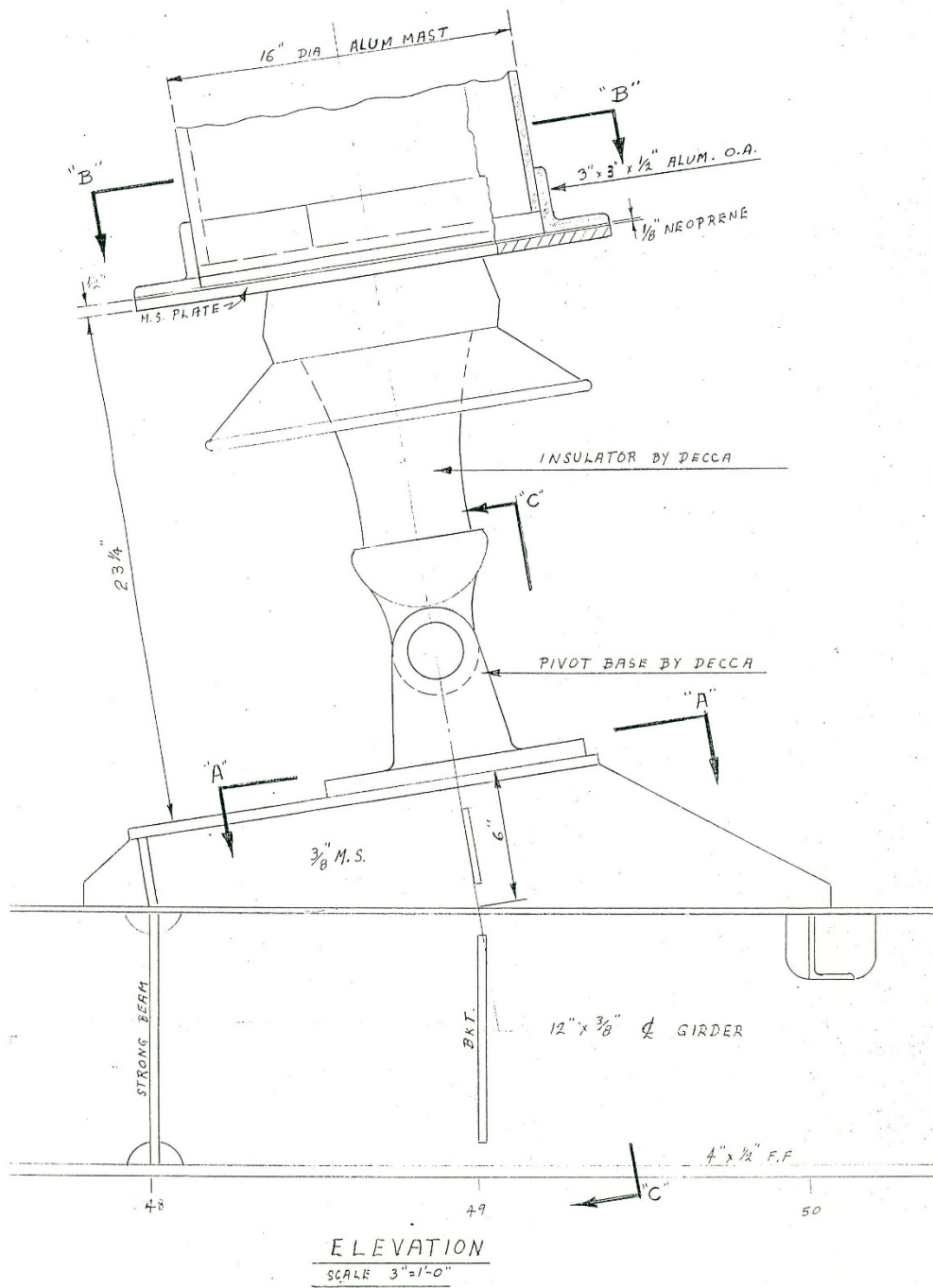


Figure "A" Aft Mast Base

- 2.1.17 The hinge pin arrangement shall be disassembled and laid out for inspection by CGIA. The allowance allotted for in section 2.1.13 shall cover any costs for repairs to the hinge pin arrangement.
- 2.1.18 Upon completion of all repairs and inspections the entire mast shall be prepped and coated as per Wasser coating systems as described in Section 2.2.
- 2.1.19 All fixtures shall be reinstalled with new stainless steel fasteners and hardware.
- 2.1.20 The Aft Mast shall be returned to the Vessel and reattached to the new base.
- 2.1.21 All stay arrangements shall be replaced with new ones as per original as described in Section 2.1.10. by the Contractor. See Picture “B” Aft Mast Stay Arrangement and Figure “B” Aft Mast Stay Arrangement.



Picture “B” Aft Mast Stay Arrangement

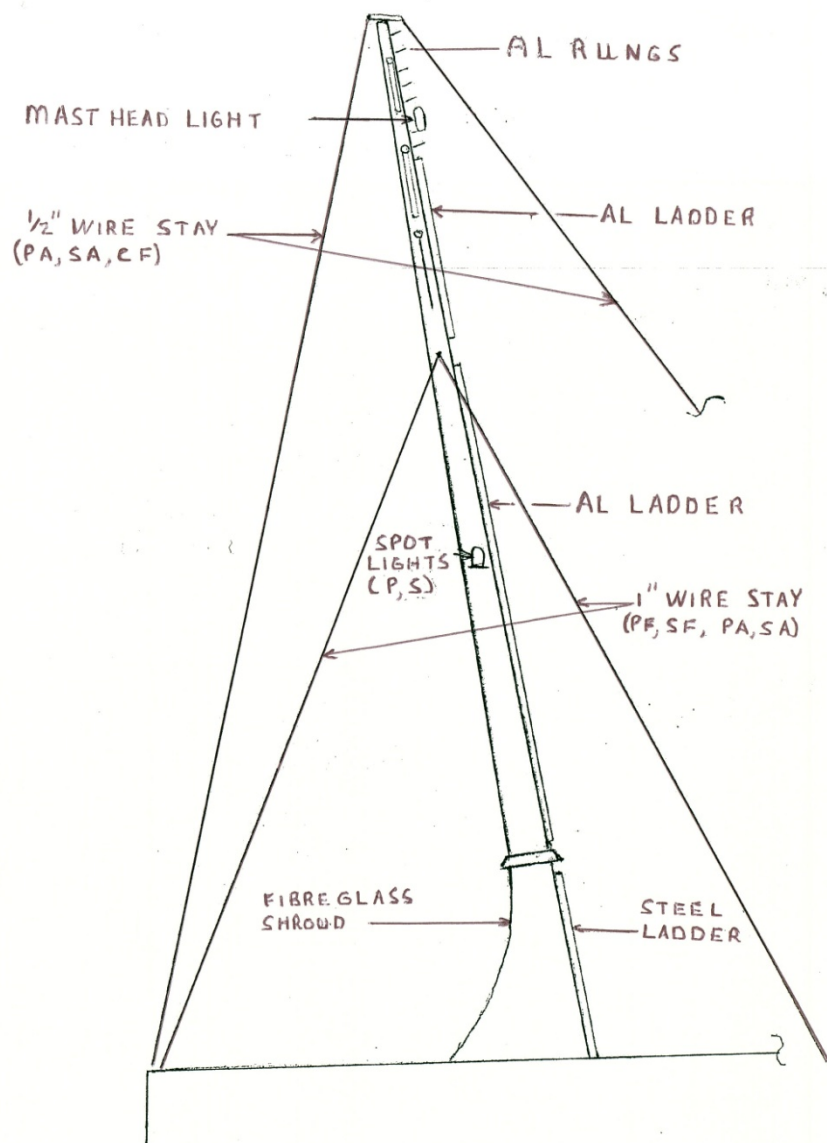


Figure "B" Aft Mast Stay Arrangement

2.1.22 The fiberglass base shroud and steel ladder shall be installed with new stainless steel fasteners.

2.1.23 All lights shall be tested as per Section Testing 4.2.3.

2.1.24 All work shall be completed to the satisfaction of CGIA, CGTA and Lloyds representative.

## 2.2 General – Coating

2.2.1 Upon completion of all welding and inspections the Aft Mast and all attachments shall be prepared to SSPC-SP6 standard and given the following surface application of Wasser coatings.

- I. Washdown of all surfaces with High pressure spray as per manufactures recommendations with Holdtight 102 to remove embedded salts.
- II. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- III. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- IV. An intermediate coat of MC-CR White (DFT 3-5mil)
- V. A topcoat of MC Luster 100 –RAL 070-7040 Buff (DFT 3-5mil)

2.2.2 The Contractor shall refer to the technical data sheets for the Wasser products included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canada Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

## 2.3 Location

2.3.1 The Aft Mast is located between frames #45-50 on the Hanger Top.

## 2.4 Interferences

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.



2.4.2 This work shall be completed in conjunction with the following specification items:

- i H-09 "UPPER DECK STEEL REPAIRS"
- ii H-13 "FLIGHT DECK STEEL REPLACEMENT"
- iii H-14 "HANGER TOP DECK STEEL REPLACEMENT"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- I. CCGS Hudson document" Hanger Top and Aft Mast Electrical Connection"
- II. Wasser MC-Miozinc 100 Product Description Sheet
- III. Coatings- Wasser Paint Procedures
- IV. Wasser MC-Luster Product Description Sheet
- V. Holdtight 102 Product Description Sheet
- VI. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None



## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Holdpoint 1 - CGTA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 –CGTA shall conduct a visual inspection for defects in the Aft Mast after all removable fixtures are removed.
- c) Hold point 3 - CGTA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new base tacked in place prior to any finish welding commencing.
- d) Hold point 4 - CGTA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- e) Hold point 5 -CGTA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.
- f) Hold point 6 - CGTA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- g) Hold point 7 - CGTA and NACE inspector shall witness the thickness readings of the primer coat.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, PSPC and onsite NACE inspector.

### **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.
- 4.2.3 All lights on the Aft Mast shall be tested for functionality upon completion of all work. Any defects shall be rectified by the Contractor.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-16 – Bridge Deck Steel Repairs and Coatings

## 1. Scope:

The intent of this specification is to remove all existing deck coatings on the Bridge deck, replace wasted and corroded deck areas with steel inserts and to apply new deck coatings. Contractor shall note that this specification shall be completed in conjunction with specification H-23 Weather Door replacements. The Drawing Room door that is being replaced is in contact with the repair areas of this specification.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor must erect an enclosure over the area of the Bridge deck where the work is being completed. The enclosure shall be used to prevent egress of foreign materials into the environment as well as ensuring the required conditions for coatings as per manufacturer’s recommendations. Contractor shall consider provincial or federal containment requirements and weather conditions for that time of year. Enclosure shall remain in place until all work on this specification is complete.
- 2.1.6 The Contractor must ensure that all items not being blasted or being painted shall be protected during the execution of this specification item. In particular, care must be taken to protect all deck machinery, cables, antenna, light fixtures, sidelights, scuttles etc. These must be identified and clearly marked and covered to protect them from the blasting process. All equipment protection must be removed at the completion of this specification item. Where blasting material and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor’s expense prior to the completion of the contract.

- 2.1.7 The Contractor must ensure no ingress of blasting material and/or overspray into the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting material and/or overspray. The Contractor must be responsible for the clean up of all blasting material, debris and overspray from the vessel's interior and exterior decks. All grit blasting material and debris must be disposed of ashore in accordance with all Federal, Provincial and Municipal regulations in effect.
- 2.1.8 The entire exterior deck surface of the Bridge deck shall be grit-blasted clean to bare metal SSPC-SP6 surface conditions and recoated. Also included is all steel work intersecting the deck, such as, but not limited to the fish plate(s), boundary plate(s), bulwarks, brackets, struts, braces, hatch coamings, and equipment mounting pads for a distance of 1.5" upwards from the deck.
- 2.1.9 Contractor shall replace the steel as described in the Lengkeek Drawing J18093-S03-R0 sht 1 and 2 Bridge Deck Steel Renewal IWO Drawing Room Office Doors.
- 2.1.10 The following requirements must be met for the steel repair:
- i Bridge deck steel, and superstructure steel in way of area to be repaired, shall be removed.
  - ii Contractor must ensure that steel removed corresponds to the insert sizes detailed in the guidance drawings attached.
  - iii The plate insert must match the surrounding plate thickness.
  - iv Corners of the plate insert must have a minimum radius of 4".
  - v The plate insert must be fitted using full penetration continuous welds.
  - vi Existing structure on the underside of the deck is to be welded to the inserts using double continuous fillet welds.
  - vii Scallops must be cut in stiffening structure when they are in way of a weld for a plate insert.
- 2.1.11 As per guidance drawings, Lengkeek Drawing J18093-S03-R0 sht 1 and 2 Bridge Deck Steel Renewal IWO Drawing Office Doors, areas of the Bridge deck and superstructure must be cropped out and repaired with steel inserts. These drawings provide the positioning of the steel deck and bulkhead inserts.
- 2.1.12 Lengkeek Drawing J18093-S03-R0 sht 1 and 2 Bridge Deck Steel Renewal IWO Drawing Office Doors highlights the spaces below the Bridge deck that will be disturbed to carry out this scope of work.

- 2.1.13 The Contractor shall remove the necessary deck-head panels and other interference items to carry out the scope of work in this specification.
- 2.1.14 All insulation removed to carry out this scope of work shall be replaced with new insulation upon completion of steel work, inspections, testing and coatings. New insulation shall be 4" thick mineral wool with foil backing and secured with welded 10 gauge steel pins and clips. All seems shall be taped with 4" wide foil tape. Insulation shall also be covered with galvanized perforated cladding as per original.
- 2.1.15 The Contractor shall reinstall all deck-head panels and all other interference items as per original upon completion of all steel work, inspections, testing, coatings and installation of new insulation.

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing of the Bridge deck steel repair, the repair locations and entire deck area described in Section 2.1.8 shall be prepared and coated with the Wasser Coating system as per manufacturers recommendations.
- 2.2.2 Contractor will be responsible for refurbishing all materials required for the Wasser coating schemes. Materials include the following for the Bridge Deck:
- i. All areas of the Bridge deck to be washed down with Holdtight to remove all salts.
  - ii. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - iii. One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iv. One (1) intermediate coat of MC-Ferrox B 100 (DFT 3-5mil)
  - v. One (1) Top Coat of MC-Trugrip 100
- 2.2.3 All repair areas on the Superstructure shall be coated with the Wasser Coating system as described below:
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all superstructure sides normally painted white.
- 2.2.4 All steel inserts must be spot blasted to Sa2 ISO 8501-1 or SSPC SP6.

- 2.2.5 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canadian Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

- 2.2.6 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.

## 2.3 Location

- 2.3.1 Contractor shall note that for the intent of this specification the Bridge deck is located between frames #74 to frame #138. The area above the Hanger frames #35 to frame # 74 is covered under spec item H-14 Hanger Top Deck Steel Replacement.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.4.2 All insulation removed to carry out this scope of work shall be replaced with new insulation on completion of steel work, inspections and testing. New insulation shall be 4" thick mineral wool with foil backing and secured with 10ga pins and clips. All seams shall be taped with 4" wide foil tape.

2.4.3 This work shall be completed in conjunction with the following specification items:

- i. GENERAL NOTES
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- iv. H-14 "HANGER TOP DECK STEEL REPLACEMENT"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vi. H-22 "PORT AND STBD FAN ROOM STEEL REPAIRS"
- vii. H-23 "WEATHER DOOR INSTALLATION"
- viii. E-11 "LIFEBOAT AND DAVIT INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. Lengkeek Drawing J18093-S03-R0 sht 1 and 2 Bridge Deck Steel Renewal IWO Drawing Office Doors.
- ii. CCGS Hudson Drawing H11-1051 Wheelhouse Top, Bridge and Boat Decks
- iii. Wasser MC-Ferrox B 100 Product Data Sheet
- iv. Wasser MC-Trugrip 100 Product Data Sheet
- v. Wasser MC-Miozinc 100 Product Description Sheet
- vi. Coatings- Wasser Paint Procedures
- vii. Wasser MC-Luster Product Description Sheet
- viii. Holdtight 102 Product Description Sheet
- ix. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### 3.3 Owner Furnished Material

#### 3.3.1 None

## 4. Proof of Performance:

### 4.1 Inspection

#### 4.1.1 Inspection Hold Points:

- a) Holdpoint 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.1.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- g) Hold point 7 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulations and deck-head panels.
- h) Hold Point 8 – CGIA shall inspect all fitted and completed insulation prior to any deck head panels being reinstalled.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE inspector



## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-17 Galley Refurbishment

## 1. Scope:

The intention of this specification is to upgrade galley equipment and in to install new galley flooring. The Contractor shall complete this specification in conjunction H-10 Galley Deck Steel repairs.

## 2. Technical Description:

### 2.1 General

- 2.1.1 The Contractor shall conduct this specification in direct conjunction with H-11 Freezer Room Deck Repairs and E-10 Main Refrigeration System Replacement. The Freezer Room strip-outs included in this spec must be completed prior to the Contractor starting H-11 Freezer Room Deck Repairs.
- 2.1.2 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 The removal of the Galley equipment and flooring must be completed by the Contractor prior to steel repairs completed as per specification H-10.
- 2.1.5 The Contractor shall follow the attached specification "C18-59 Hudson Galley Renewal" by Concept Naval.
- 2.1.6 Any discrepancies between this spec and the attached Concept Naval's specification the Contractor shall note this spec will take precedence.
- 2.1.7 There is an allowance in this specification of \$15,000.00 for the Contractor to call in the services of an authorized "FORBO" representative to oversee the installation of the Galley flooring. This allowance will be adjusted with proof of invoice via a PSPC 1379 action. This amount cannot be exceeded without written approval of the CGTA and PSPC.
- 2.1.8 The Contractor shall replace all missing or damaged stainless steel deck-head panels. The existing deck-head panels are 24" X 24" and replacement panels shall be as per original. A picture of the existing deck-head panels can be see on page 12 of the Concept Naval specification. The Contractor shall provide a separate bid on the replacement of 25 panels. This bid price will be added to the global cost and also prorated to a unit cost per panel replacement. The cost per panel replacement will then be used for adjustment purposes. The contractor and CGIA will complete a thorough inspection of the galley and the contractor will provide a written report to CGTA detailing the exact amount of panels required to be replaced. The contractor shall receive approval by 1379 action prior to the start of removals.

2.1.9 The Contractor shall permanently clearly mark all disconnected wires and cables required to perform the scope of work in this specification prior to or shortly after each piece of equipment is removed. The ships Electrical Officer will assist the Contractor locating and locking out any breakers or power sources.

2.1.10 All bulkheads in the Galley previously painted white shall be prepped to an SSPC-SP3 finish and coated with the Wasser Coating system:

- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- iii. An intermediate coat of MC-CR White (DFT 3-5mil)
- iv. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all areas normally painted white.

2.1.11 Upon reinstallation of Galley equipment, the Contractor shall ensure all new and existing equipment are secured properly in a manner which will prevent movement, vibration and chaffing while at sea. All equipment installations shall be completed to the satisfaction of the CGIA and CGTA.

## **2.2 Location**

2.2.1 The Galley is located on the Main Deck between frames # 115 and frame #152

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i GENERAL General Notes
- ii HD-01 "DOCKING AND UNDOCKING"
- iii HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv H-03 "FUEL TANK SURVEY"
- v H-10 "GALLEY DECK REPAIRS"
- vi H-11 "FREEZER ROOM DECK REPAIRS"
- vii H-18 "MAIN FREEZER REFURBISHMENT"
- viii H-19 "CABIN DECKING REPLACEMENT"
- ix H-27 "MAIN DECK FLOORING REPLACEMENT"
- x E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
- xi E-10 "MAIN REFRIGERATION SYSTEM REPLACEMENT"
- xii L-04 "FIRE DETECTION SYSTEM"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 See attached Concept Naval Specification "C18-59 Hudson Galley Renewal"

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.

4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.3 In addition to any tests and inspections specified in the attached Concept Naval spec the following tests and inspections shall be carried out.

#### 4.1.4 Inspection Hold Points

- a) Hold point 1- Prior to starting this specification the CGIA and the Contractor shall review the equipment to be removed and identify all components that will remain and those that will be discarded.
- b) Hold Point 2- CGIA will confirm all wiring and cabling is clearly marked prior to the removal of any equipment.
- c) Hold point 3- CGIA will inspect all new piping for the refurbished deck drains and plumbing to each fixture as per Section 8.1 of the Concept Naval Specification.
- d) Hold point 4- CGIA will witness all drain testing as described in Section 4.2.2 and 4.2.3. Test in section 4.2.2 must be completed prior to the application of the new flooring.
- e) Hold point 5- CGIA will inspect all prepped steel prior to the application of any coatings.
- f) Hold Point 6- CGIA and the NACE inspector will witness all testing as per section 4.2 Testing.
- g) Hold Point 7 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- h) Hold Point 8- CGIA will inspect the prepped deck prior to the installation of the “FORBO” flooring.
- i) Hold Point 9- CGIA will inspect “FORBO” flooring upon completion of installation for application as per manufacturer’s instructions.
- j) Hold Point 10- CGIA will confirm the exact locations for all equipment prior to being permanently secured to the bases.
- k) Hold Point 11- CGIA will inspect the securing arrangements for all equipment upon final installation.
- l) Hold Point 12- CGIA will witness all testing as per Section 4.2.6.

## 4.2 Testing

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.

- 4.2.2 The Contractor shall check each deck drain by blanking off the piping end, located in the engine room and filling each line flush to the deck with water. Each drain shall be tested for at least ten (10) minutes to ensure no leaks. Any leaks shall be corrected by the Contractor and the test performed again in the same fashion.
- 4.2.3 The Contractor shall check each sink and equipment drain by blanking off the piping end and filling each drain pipe flush with water. Each drain shall be tested for at least ten (10) minutes to ensure no leaks. Any leaks shall be corrected by the Contractor and the test performed again in the same fashion.
- 4.2.4 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.5 All Piping to be tested as per Section 8.1 New Piping, line 8. At 7.5 bar.
- 4.2.6 Upon completion of all installations the Contractor shall test each piece of equipment for correct operation and create a checklist for sign off from both the Contractor and the CGIA.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3

5.1.5 A PDF copy of the equipment checklist complete with signatures from the CGIA and the Contractor.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# H-18 Main Freezer Refurbishment and Equipment Removals

## 1. Scope:

The intention of this specification is the complete refurbishment of the ships Main Freezers space and to remove the existing Refrigeration equipment.

## 2. Technical Description:

### 2.1 General

- 2.1.1 This specification shall be completed concurrently with H-11 Freezer Room Deck Repairs and E-10 Main Refrigeration System Replacement. The Freezer Room strip-outs included in this spec must be completed prior to the Contractor starting H-11 Freezer Room Deck Repairs.
- 2.1.2 All staging, cramage, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 The Contractor shall follow the attached "Refrigeration Rooms System Renewal Specification C18-60-00-R0" by Concept Naval.
- 2.1.5 Any discrepancies between this spec and the attached Concept Naval's specification the Contractor shall note this spec will take precedence.

### 2.2 Location

- 2.2.1 The Refrigeration Freezers are located between frames #136 to #166 on the Lower deck.
- 2.2.2 The Refrigeration equipment is located on the Lower deck between frames #166 to frame #174.

### 2.3 Interferences

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.



2.3.2 This work shall be done in conjunction with the following Specification Items:

- I. GENERAL NOTES
- II. HD-01 "DOCKING AND UNDOCKING"
- III. HD-10 "CHAIN LOCKER"
- IV. H-03 "FUEL OIL TANKS SURVEY"
- V. H-10 "GALLEY DECK STEEL REPAIRS"
- VI. H-11 "FREEZER ROOM DECK REPAIRS"
- VII. H-27 "MAIN DECK FLOORING REPLACEMENT"
- VIII. H-21 "BOW THRUSTER IMPELLER SHAFT TUBE REPLACEMENT"
- IX. E-04 "BOW THRUSTER PUMP AND MACHINERY SURVEY"
- X. E-10 "MAIN REFRIGERATION SYSTEM REPLACEMENT"
- XI. L-01 "BOW THRUSTER MOTOR SURVEY"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

- 3.1.2 Concept Naval Specification "Refrigeration Rooms System Renewal Specification C18-60-00-R0"
- 3.1.3 CCG Drawing H11-1051 General Arrangement (Sheet 4/5 & 5/5)
- 3.1.4 CCG Drawing RS-01 Refrigeration System

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

#### **3.3 Owner Furnished Equipment**

- 3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

- 4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.
- 4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.3 In addition to any tests and inspections specified in the attached Concept Naval spec the following tests and inspections shall be carried out.

4.1.4 Inspection Hold Points

- a) Hold point 1- Prior to starting this specification the CGIA and the Contractor shall review the equipment to be removed and identify all components.
- b) Hold point 2- CGIA will inspect all freezers upon completion of the removal of decking, bulkheads and deck-head material as per Section 7.1 of the Concept Naval Spec.
- c) Hold point 3- CGIA will inspect all new drains installed in each fan room from the evaporators.
- d) Hold point 4- CGIA will inspect all new roughed in piping for the new deck drains.
- e) Hold point 5- CGIA will witness all drain testing as described in Section 4.2.2 and 4.2.3. These test must be completed prior to coatings being applied.
- f) Hold point 6- CGIA inspect all newly installed steel lugs welded in each freezer space. No coatings shall be applied until this inspection is completed and approved by the CGIA.
- g) Hold point 7- CGIA will inspect all prepped steel prior to the application of any coatings.
- h) Hold Point 8- CGIA and the and the NACE inspector will witness all testing as per section 4.2 Testing.
- i) Hold Point 9 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- j) Hold Point 10- CGIA will inspect each freezer space upon the completion of the spray foam insulation.
- k) Hold Point 11- CGIA will inspect each freezer space upon the completion of the installation of the Russian Plywood.
- l) Hold Point 12- CGIA will inspect each freezer space upon the completion of the stainless steel sheathing.

- m) Hold Point 13- CGIA will inspect the fitment of each drain to the newly installed deck in each Freezer space.
- n) Hold Point 14- CGIA will inspect each freezer space to ensure all decks are cleaned prior to the installation of the “Forbo” vinyl flooring.
- o) Hold Point 15 - CGIA will completed final inspection of all removed refrigeration equipment identified in hold point “A”.

## **4.2 Testing**

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 The Contractor shall check each evaporator drain by blanking off the piping end, located in the Asdic Space and filling each line flush to the deck with water. Each drain shall be tested for at least ten (10) minutes to ensure no leaks. Any leaks shall be corrected by the Contractor and the test performed again in the same fashion.
- 4.2.3 The Contractor shall check each deck drain by blanking off the piping end and filling each drain pipe flush to the deck with water. Each drain shall be tested for at least ten (10) minutes to ensure no leaks. Any leaks shall be corrected by the Contractor and the test performed again in the same fashion.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd’s regulatory requirements.
- 4.3.2 Lloyd’s approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# H-19 Master's Cabin Carpet Replacement

## 1. Scope:

The intent of this specification is to replace the existing underlayment and carpet in the Master's Night cabin and the carpet in the Master's Day cabin.

## 2. Technical Description:

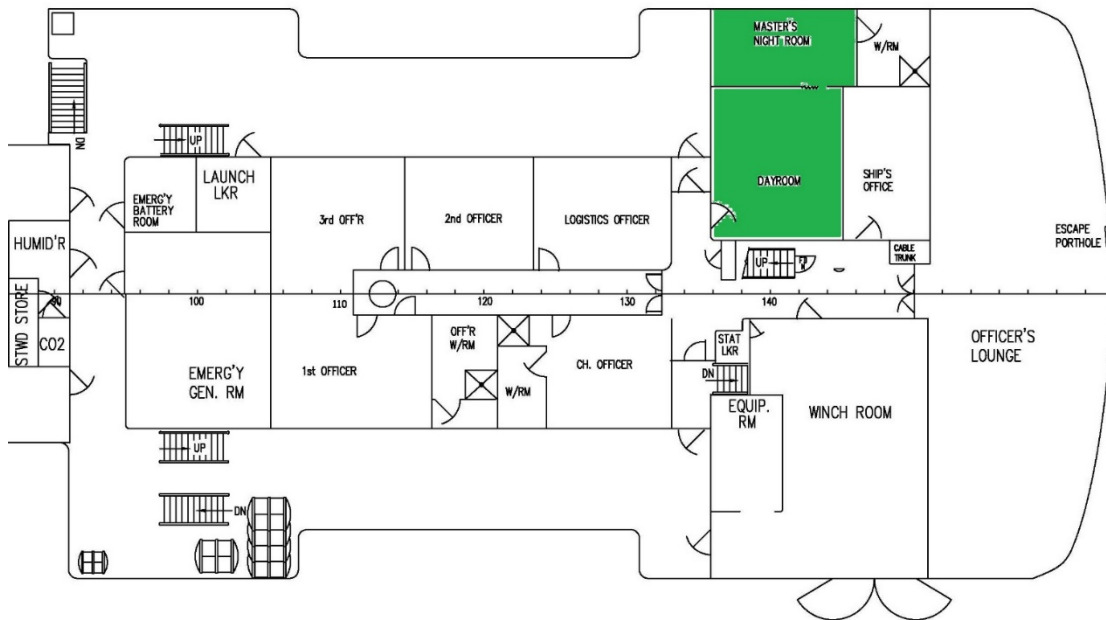
### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall take necessary measures to ensure all bulkheads, deck-heads, equipment and all items in way of the work area are adequately protected during this scope of work.
- 2.1.4 The Contractor shall relocate all removable furniture in the Master's Day cabin to the Officers lounge, located just forward of the Master's cabin and reinstall all furniture in an as found condition on the completion of carpet installations.
- 2.1.5 The Contractor shall provide and install Lloyds approved carpet in the Master's day and night cabins. The Contractor shall provide at a minimum ten (10) sample color choices. The CGIA will inform the Contractor in writing of the chosen color. Contractor shall provide certificates of Lloyds approved carpet and underlayment.
- 2.1.6 The Contractor shall remove and dispose of the existing underlayment base coaming and carpet in the Master's Night cabin and the carpet and coaming only in the Master's Day cabin.
- 2.1.7 All exposed steel in the Master's night cabin shall be prepared to an SSPC-SP3 standard and receive two (2) coats of Miozinc primer.
- 2.1.8 The Contractor shall install Dex-O-Tex Subkote 1 as the new underlayment in accordance with the Manufactures recommended installations instructions in the Master's night cabin.
- 2.1.9 The Contractor shall install the new carpet in the Master's Day and Night cabins.
- 2.1.10 New 4" rubber base (coaming) shall be installed in way of all new deck coverings. Excessive adhesive shall be removed and cleaned from the carpet and bulkheads.

- 2.1.11 The Contractor shall thoroughly clean the carpet and rubber base on completion of installation.
- 2.1.12 Upon completion of installation of all carpet all interference items and furniture shall be reinstalled in an as found condition.

## 2.2 Location

- 2.2.1 The Master's Day and Night cabins are located on the Boat Deck between frames #136 to #145 on the Port side. The locations are indicted in green on the diagram below



BOAT DECK

“Master’s Day and Night Cabins”

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be completed in conjunction with the following specification items:
- i GENERAL NOTES AND SERVICES
  - ii E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
  - iii L-04 "FIRE DETECTION SYSTEM"

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 N/A

### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1- CGIA shall inspect the prepped steel in the Master's Night cabin prior to primer being installed.
- b) Hold point 2 - CGIA shall inspect each coat of primer as per section 4.2 Testing.
- c) Hold point 3 - CGIA shall inspect the new underlayment after installation prior to the carpet being installed.
- d) Hold point 4 - CGIA shall inspect all newly installed coaming and carpet after installation is completed.
- e) Hold Point 5 – CGIA shall inspect all work areas on the completion of installation of all interference items and cleanup.

4.1.2 All surface preparations and primer coats must be approved by the NACE inspector prior to installing the underlayment.

4.1.3 All work must be completed to the satisfaction of the CGIA.

### **4.2 Testing**

4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

### **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.



## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.2 Certificates of the Lloyds approved carpet and products must be presented to the CGTA prior to the removal of any underlayment and carpet.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## **H-20 Chief Cooks Cabin Rebuild**

### **1. Scope:**

The intent of this specification is to fit out the Chief Cooks Cabin with new Contractor supplied furniture and finishes.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 There will be an allowance in this specification of \$25,000.00 for the Contractor to supply Lloyds approved furniture for the Chief Cooks Cabin. This allowance is for the purchase of the furniture only. All work described in this specification including the preparation for and installation of the furniture shall be done under the bid price of this specification. The furniture allowance shall be adjusted as per PSPC 1379 action upon proof of invoice.
- 2.1.4 The Chief Cooks cabin #138 is presently empty of all furniture and fixtures. New flooring has been installed. Also new bulkhead and deck-head panels have been installed.
- 2.1.5 The Contractor shall protect the flooring in this cabin during the scope of work specified. The existing flooring is new and any damage to the flooring shall be the responsibility of the Contractor to replace.
- 2.1.6 The Contractor shall make a proposal to the CGTA on what types of furniture is available in regards to fitment, material, color, texture, price etc. that is Lloyds approved and available in the time frames of this specification. Based upon information provided the CGTA will make the final decision and inform the Contractor in writing of the preferred options.
- 2.1.7 Once the options are selected the Contractor shall design an installation plan for the new furniture to be approved by the CGIA. The plan must be in the form of a CAD drawing. The installation plan shall consist of an accurate drawing showing the following:
  - I. All dimensions of all new furniture
  - II. Exact locations of all furniture inside the cabin
  - III. Methods of securing the furniture
  - IV. Drawings of new furniture bases to be scribed to the deck shear.

- 2.1.8 The layout of the furniture in the cabin is sketched out in the attached Drawing 'CCGS Hudson Chief Cooks Cabin' The Contractor shall note that all dimensions on the drawings are estimates and the Contractor shall confirm all measurements. The cabin shall be fitted with the following:
- I. Bunk with two (2) bottom drawers
  - II. Night table with one drawer
  - III. Chest of drawers
  - IV. Desk with drawer under the top
  - V. Book Case
  - VI. Wardrobe
  - VII. Sink, tapset and small vanity
  - VIII. Cabinet above sink
  - IX. All drawers shall have latches to prevent opening in rough seas.
- 2.1.9 The deck in the cabin is not level and is contoured to the shear of the deck. The Contractor shall fabricate and install bases where required to level the furniture.
- 2.1.10 All furniture shall be secured to the deck, bases and bulkheads in such a fashion to prevent movement and vibration during rough seas.
- 2.1.11 Any flooring disturbed or damaged during this process will be replaced with the same and shall be included in the bid price.
- 2.1.12 The Contractor shall ensure that the door in the cabin can open freely and does not contact any of the new furniture.
- 2.1.13 The existing drain and water supplies are presently in the cabin shall be reused. The hot and cold water lines shall be replaced from the deck to the new tap set using stainless steel flex lines and a shut off valve for each line. The drain line shall also be renewed from the deck to the sink using type "M" copper pipe and trap.
- 2.1.14 Upon completion of all work and inspections the protective floor covering shall be removed and disposed of and the cabin thoroughly cleaned.

## 2.2 Location

- 2.2.1 The Chief cooks cabin #138 is located on the Main Deck stbd side between frames #29-#36.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be completed in conjunction with the following specification items:
- i GENERAL NOTES
  - ii H-09 "UPPER DECK STEEL REPAIRS"
  - iii H-27 "MAIN DECK FLOORING REPLACEMENT"
  - iv L-04 "FIRE DETECTION SYSTEM"

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 CCGS Hudson Chief Cooks Cabin Layout Drawing
- 3.1.2 CCGS Hudson Drawing General Arrangement Upper and Main decks

### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

### **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 – CGTA will approve the furniture for the Cooks cabin prior to any furnishings being ordered by the Contractor.
- b) Hold point 2 - CGIA will approve the installation plan prior to the Contractor starting the fitment of the furniture.
- c) Hold point 3 - CGIA will inspect and ensure the furniture bases are securely fastened prior to the installation of the furniture.
- d) Hold point 4 -CGIA will inspect all furniture and fixtures upon completion of all work.

4.1.2 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

### **4.2 Testing**

4.2.1 N/A

### **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.2 All furniture shall have Lloyd's approval.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 A copy of all installation drawings as described in Section 2.1.7 must be in CAD and PDF format and delivered to the CGTA.

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.2.1 N/A

# H-21 Bow Thruster Impeller Shaft Tube Replacement

## 1. Scope:

The intent of this specification is to replace the existing Bow Thruster impeller shaft tube with a new one. The existing tube has been repaired, excessive corroded and requires full replacement.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 The Contractor shall perform this scope of work in conjunction with Specification E-04 Bow Thruster Pump and Machinery Survey. The work contained in this specification should only be started the space containing the Bow Thruster Impeller Shaft tube is opened up, emptied and gas freed as per E-04.
- 2.1.2 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.5 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule. The Lloyds approved welding procedure developed in line 2.1.8. will take precedent on all other procedures.
- 2.1.6 The Contractor shall cut out the existing Bow Thruster Impeller Shaft Tube extending from the bottom of Bow Motor Thruster Room deck to the top of the Bow Thruster tubes. The diagram and pictures below highlights the impeller shaft tube.
- 2.1.7 Due to inaccessibility, the exact dimensions of the tube are not known. For bidding purposes, the Contractor shall use Lloyds Grade “A” steel, with an 8” diameter, total length of 24” and a wall thickness of ½” for the tube section. These measurements shall be confirmed upon the removal of the existing tube. Final dimensions shall be as per original. The cost of material as stated above shall be quoted separately and will be added to the total bid. If dimensions prove to be different than those above, the new material requirement shall be adjusted by 1379 upon invoice. Contractor shall not order material for this work until actual dimensions

are verified. It is the contractors responsibility to gather this information in a timely fashion and proceed with all scoped worked without delay to the scheduled end date of the dry-dock.

- 2.1.8 The Contractor shall develop a welding procedure for the new tube and obtain Lloyds approval in writing for this repair. The type of material of the tube shall also meet Lloyds requirement. This repair may be completed in sections if Lloyds approved.

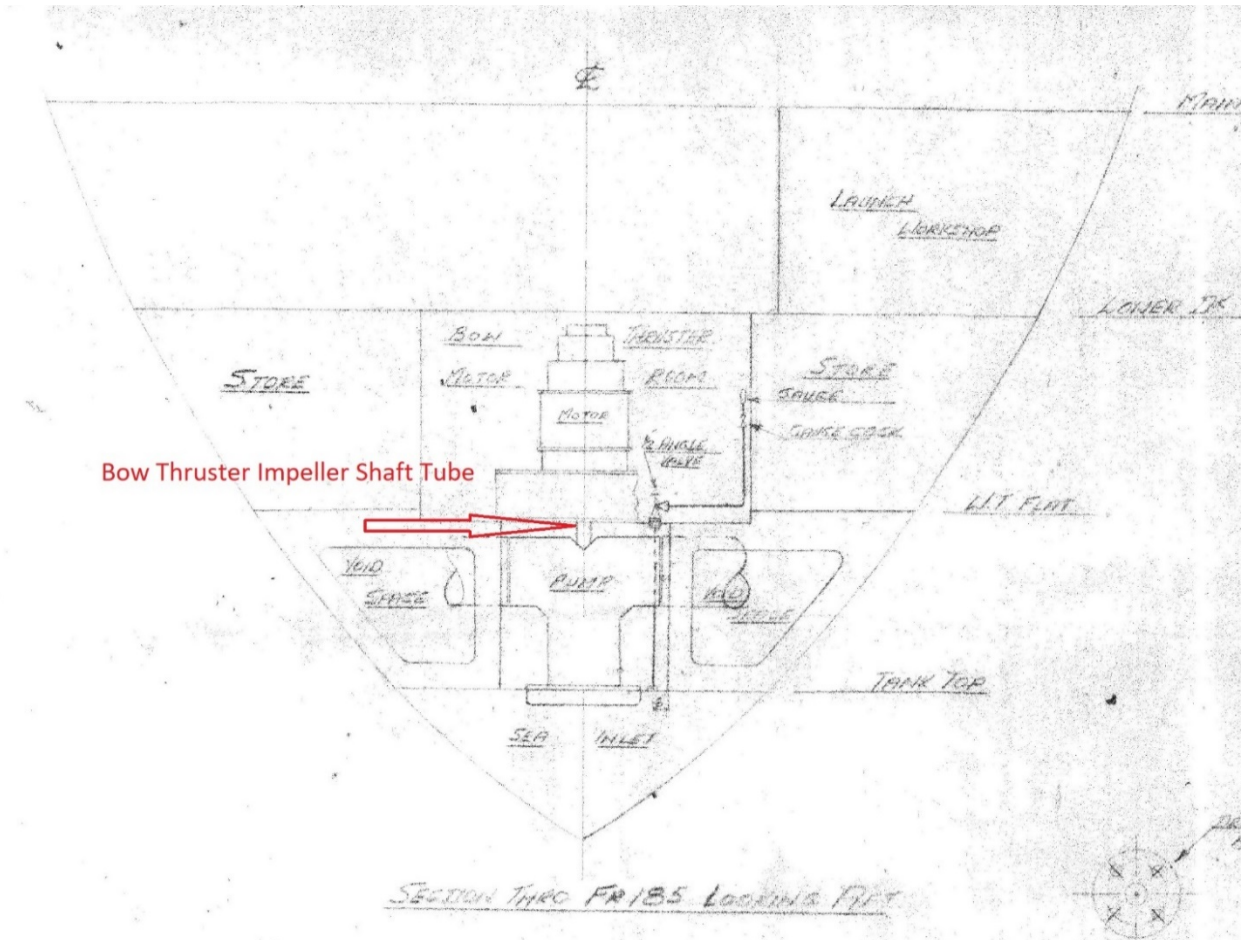
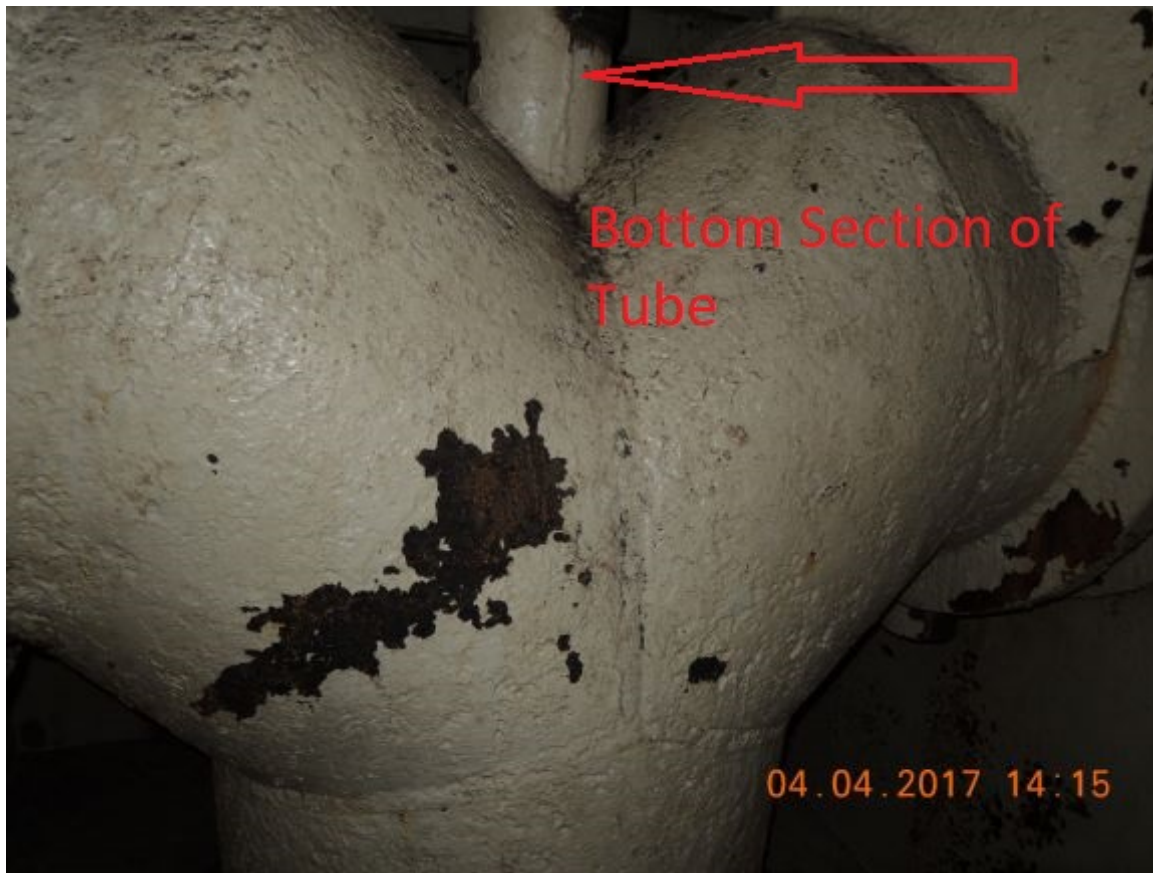
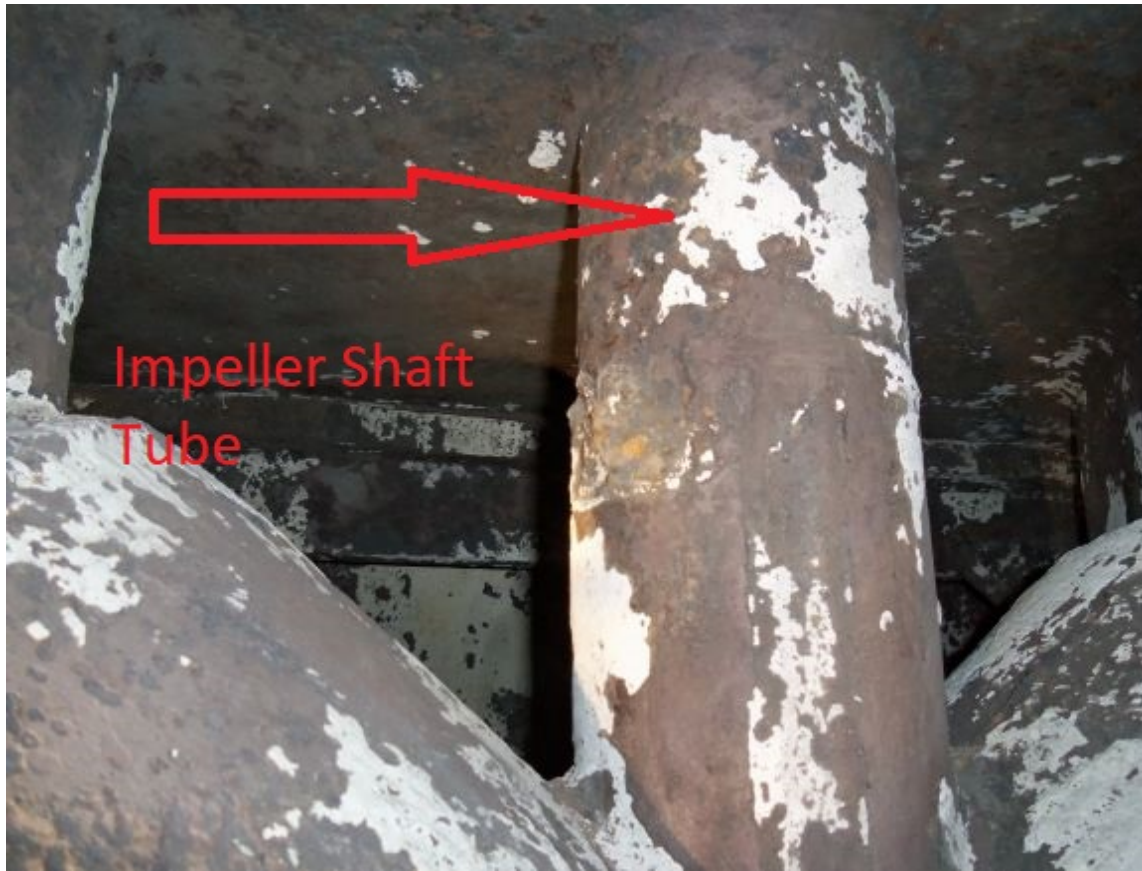


Diagram "A" Bow Thruster Impeller Shaft Tube



Picture "1" Bottom Section of Bow Thruster Impeller Shaft Tube





Picture "2" Bow Thruster Impeller Shaft Tube

2.1.9 All surfaces shall be prepped for welding and the new shaft tube welded in place using the Lloyds approved welding procedures.

2.1.10 2.1.10. Upon completion of welding inspections and testing shall be completed as per Sections 4.1 and

2.1.11 Upon completion of welding, inspection, and testing the new Shaft Tube and all disturbed steel shall be prepared to an SSPC\_SP6 standard and coated with the Wasser coating system applied as per Manufacturers specifications.

- i Wash down all decks with Holdtight to remove all remaining salts.
- ii One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- iii One (1) Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- iv One (1) Full Coat o Wasser MC- Tar (red) 5.0-7.0 mils DFT
- v One (1) Full Coat of BallastCoat (beige) 3.0-4.0 mils DFT

## 2.2 Location

2.2.1 The repair location is located in the Bow Thruster Pump compartment at frame #183.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in conjunction with the following specification items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING AND UNDOCKING"
- iii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv. HD-04 "SEA BAYS AND SEA CHESTS"
- v. HD-06 "SACRIFICIAL ANODES"
- vi. E-04 "BOW THRUSTER PUMP AND MACHINERY"
- vii. L-01 "BOW THRUSTER MOTOR"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 CCGS Hudson Drawing Bow Manoeuvring Compartment
- 3.1.2 Wasser MC-TAR 100 Product Data Sheet
- 3.1.3 Wasser MC-BALLAST COAT Product Data Sheet
- 3.1.4 Wasser MC-Miozinc 100 Product Description Sheet
- 3.1.5 Coatings- Wasser Paint Procedures
- 3.1.6 Holdtight 102 Product Description Sheet
- 3.1.7 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a. Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel and welding procedures provided for this specification prior to any steel being fitted.
- b. Hold point 3 - The CGIA and the attending Lloyds surveyor shall inspect the surface preparation upon the removal of the old tube and prior to tack welding the new tube section.
- c. Hold point 4 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- d. Hold point 5 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.
- e. Hold point 6 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.
- f. Hold point 7 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- g. Hold point 8 - CGIA and NACE inspector shall witness the thickness readings of the primer coat and each additional coat of paint.
- h. Hold point 8 - CGIA and NACE inspector shall witness the thickness readings of the primer coat and each additional coat of paint.
- i. Hold point 9 - CGIA shall complete a final inspection of the Bow Thruster Pumping Compartment prior to the manhole cover being secured. Upon completion of the inspection the manhole cover for the space must be secured by the Contractor. If for any reason the manhole cover is removed the CGIA must complete another inspection.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Signed approvals as per section 4.3

- 5.1.4 Lloyds stamped approved drawings for the weld procedure and repairs to the Bow Thruster Impeller Shaft Tube.

## **5.2 Spares**

- 5.2.1 N/A

## **5.3 Training**

- 5.3.1 N/A

# H-22 Port and Stbd Fan Rooms Steel Replacement

## 1. Scope

The intent of this specification is to replace deteriorated steel, coat and insulate the Port and Stbd Fan Rooms.

## 2. Technical Description

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 Contractor shall note that this specification shall be done in conjunction with Specification E-09 HVAC Fan Unit replacement. The scope of work described in specification E-09 deals with the removal of all HVAC related equipment in the Port and Stbd fan rooms. This equipment has to be removed before this specification can be started.
- 2.1.4 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.5 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.6 The Contractor must ensure that all items not being blasted or being painted shall be protected during the execution of this specification item. In particular, care must be taken to protect all deck machinery, cables, antenna, light fixtures, sidelights, scuttles etc. These must be identified and clearly marked and covered to protect them from the blasting process. All equipment protection must be removed at the completion of this specification item. Where blasting material and/or paint overspray damages equipment and/or other paint coatings, these defects must be rectified by the Contractor at the Contractor’s expense prior to the completion of the contract.
- 2.1.7 The Contractor must ensure no ingress of blasting material and/or overspray into the accommodation area of the vessel. All openings must be sealed or closed off to prevent the ingress of blasting material and/or overspray. The Contractor must be responsible for the cleanup of all blasting material, debris and overspray from the vessel's interior and exterior decks. All grit blasting material and debris must be disposed of ashore in accordance with all Federal, Provincial and Municipal regulations in effect.
- 2.1.8 The Contractor shall replace the entire decks in both the Port and Stbd Fan rooms as indicated on the Lengkeek drawing J18093 Stbd Fan Room and drawing J18093 Port Fan Room.

- 2.1.9 There are several sections of piping and electrical transits and wires running through the deck. CCG has compiled a spreadsheet identifying these interference items and locations where wires can be disconnected for removals. See CCG spreadsheet "Piping and Electrical connections".
- 2.1.10 The ships electrical Officer will assist the Contractor with identifying all electrical circuits to be locked out.
- 2.1.11 Prior to removal of any wires the contractor must identify all wires and cabling clearly with metal tags to ensure correct re-connections. The CGIA or his representative must be present to witness and confirm all identified cabling prior to removal. See Section 4.1 Inspections.
- 2.1.12 The following requirements must be met for the steel repair:
- i Fan rooms deck steel, in way of area to be repaired, is to be removed.
  - ii Contractor must ensure that steel removed corresponds to the insert sizes detailed in the guidance drawings attached.
  - iii The plate insert must match the surrounding plate thickness.
  - iv Corners of the plate insert must have a minimum radius of 4".
  - v The plate insert must be fitted using full penetration continuous welds.
  - vi Existing structure on the underside of the deck is to be welded to the inserts using double continuous fillet welds.
  - vii Scallops must be cut in stiffening structure when they are in way of a weld for a plate insert.
- 2.1.13 The Contractor shall remove all existing insulation and perforated sheet metal in both the Port and Stbd Fan rooms on all Bulkheads and deck-heads and discard.
- 2.1.14 The Contractor shall bid on having 300 UT shots taken in the Port and Stbd fan rooms (150 in each space). This price will be quoted separately and added to the over all bid price. A unit price per 20 shots shall will be prorated from this price and the actual number taken shall be adjusted via a PSPC 1379 action. A detailed report listing all shots shall be generated and presented to CGTA in type written form. The CGIA and the attending Lloyd's Surveyor will determine the total number of shots required.
- 2.1.15 There will be a \$30,000.00 allowance in this specification for any additional work required in the Port and Stbd fan rooms that is not contained in this specification. The CGTA will notify the Contractor in writing via a PSPC 1379 action if additional repairs are required.



- 2.1.16 All bulkheads and deck-heads in both fan rooms shall be prepared to an SSPC-SP3 standard and coated with Wasser primer as per described in lines 2.2.3 steps 1 and 11.
- 2.1.17 The Contractor shall install new insulation on all bulkheads and deck-heads in the Port and Stbd fan rooms upon completion of steel work, inspections, testing and coatings. New insulation shall be 4" thick mineral wool with foil backing and secured with welded 10-gauge steel pins and clips. All seems shall be taped with 4" wide foil tape. Insulation shall also be covered with galvanized perforated cladding as per original.
- 2.1.18 All removed trunking, electrical wires and other interference items removed shall be reinstalled in an as found condition.

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing all new and disturbed steel shall be prepared and coated with the Wasser Coating system as per manufacturers recommendations.
- 2.2.2 All new steel shall be spot blasted to Sa2 ISO 8501-1 or SSPC SP6 and all disturbed steel be prepared to an SSPC-SP11 standard and coated as per line 2.2.3
- 2.2.3 All repair areas and new and disturbed steel on the deck surface shall be coated with the Wasser Coating system as described below:
- I. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - II. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - III. An intermediate coat of MC-CR White (DFT 3-5mil)
  - IV. A topcoat of Wasser MC Luster 100, RAL 7042 Deck Grey, (DFT 3-5mil) for all internal Deck areas.
- 2.2.4 All new and disturbed steel shall be primed on the underside or backside with Wasser Miozinc primer as per lines 2.2.3 steps 1 and 11.

- 2.2.5 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canadian Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

- 2.2.6 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.

## 2.3 Location

- 2.3.1 Both Fan Rooms are located on the Boat Deck between frames #74 to frame 92. The fans rooms are indicated on CCGS Hudson Drawing General Arrangement H11-1051 as Port Fan Room #3 and Stbd Fan Room #2.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.4.2 All bulkheads and deck-heads in both the Port and Stbd Fan Room shall be insulation on completion of steel work, inspections, testing and coatings. New insulation shall be 4" thick mineral wool with foil backing and secured with 10 gauge pins and clips. All seams shall be taped with 4" wide foil tape. All insulation shall be covered with galvanized perforated cladding as per original.
- 2.4.3 This work shall be completed in conjunction with the following specification items:
- xiii GENERAL NOTES
  - xiv H-09 "UPPER DECK STEEL REPAIRS"
  - xv E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
  - xvi E-09 "HVAC FAN UNIT REPLACEMENT (3)"
  - xvii L-04 "FIRE DETECTION SYSTEM "

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. Lengkeek Drawings J18093 Stbd Fan Room and drawing J18093 Port Fan Room
- ii. CCGS Hudson spreadsheet “Piping and Electrical connections”
- iii. CCGS Hudson Drawing H11-1051 Wheelhouse Top, Bridge and Boat Decks
- iv. Wasser MC-Miozinc 100 Product Description Sheet
- v. Coatings- Wasser Paint Procedures
- vi. Wasser MC-Luster Product Description Sheet
- vii. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

- i. IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- ii. CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- iii. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

3.3.1 None

### **4. Proof of Performance:**

#### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA shall inspect and ensure all cabling is clearly labelled prior to the removal of any cabling and electrical lines.

- c) Hold point 3 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
  - d) Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
  - e) Hold point 5 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.1.
  - f) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
  - g) Hold point 7 - CGIA and attending Lloyds Surveyor will inspect the steel bulkheads in the Port and Stbd fan rooms and advise the Contractor where to take the UT shots. This inspection must be completed prior to the application of any coatings.
  - h) Hold point 8 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
  - i) Hold point 9 - CGIA will inspect all completed steel work and coatings prior to the installation of insulation and perforated sheet metal.
  - j) Hold Point 10– CGIA shall inspect all fitted and completed insulation prior to the fitment of the perforated galvanized steel.
  - k) Hold Point 11 – CGIA shall conduct a final inspection at the completion of all work. This inspection must be completed prior to this item being considered 100% complete.
- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd’s regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and NACE inspector.

## 4.2 Testing

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGIA and PSPC contract authority upon completion of work.
- 4.2.3 All electrical circuits and cabling that were isolated and disconnected to complete this specification shall be tested for correct operation in the presence of the CGIA after reconnecting.

## 4.3 Certification

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGIA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3

## **5.2 Spares**

5.2.2 N/A

## **5.3 Training**

5.3.2 N/A

## **H-23 Weather Door Installation**

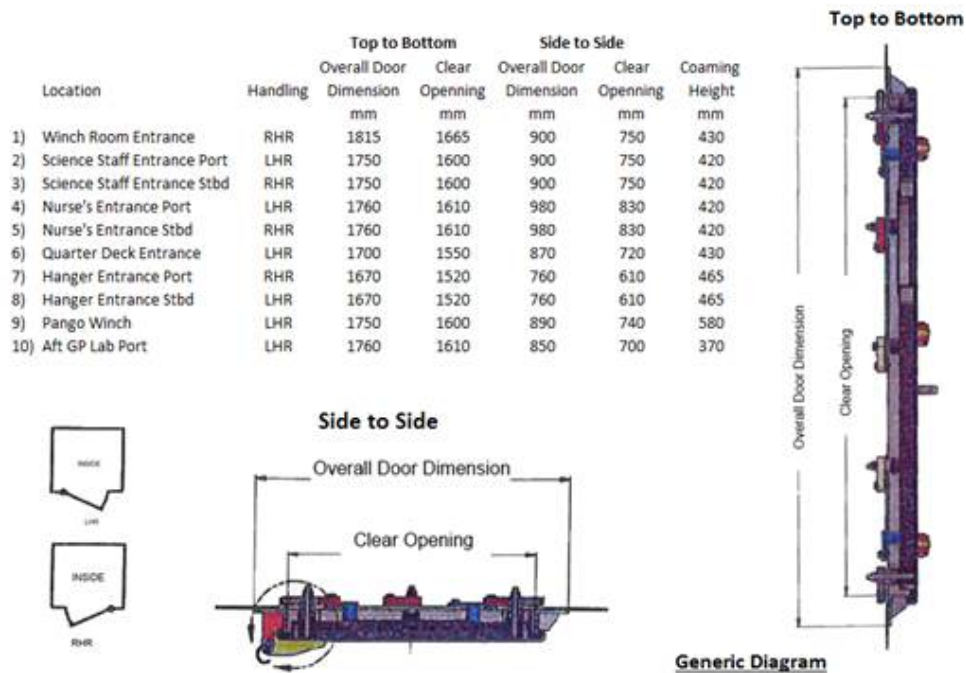
### **1. Scope:**

The intent of this specification is to remove ten (10) single weather doors and two (2) double weather doors and replace them with new GSM doors.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.4 Each new door is complete with weld in frames suited for each location.
- 2.1.5 Table 1 below indicates the Weather Doors the Contractor shall replaced:



Location	Handling	Height		Elevation		Coaming Height
		Overall Door Dimension	Clear Opening	Overall Door Dimension	Clear Opening	
		mm	mm	mm	mm	mm
1) Drawing Office Port		1760	1610	1680	1530	425
2) GP Lab Entrance Stbd		1965	1815	1660	1510	345

**Generic Diagram**

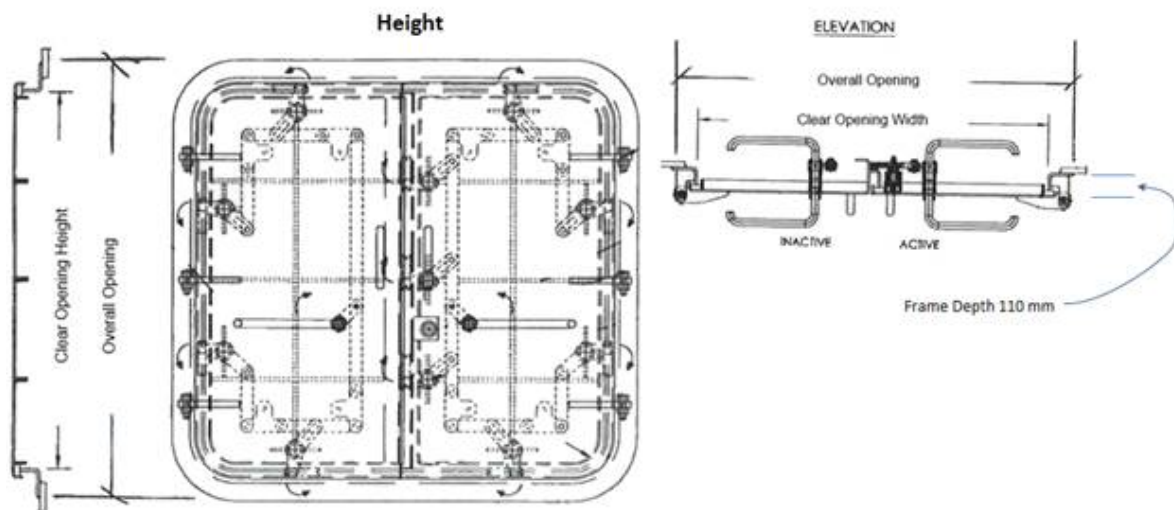


Table 1



- 2.1.6 Drawings of the new doors are included with the Technical Data Package.
- 2.1.7 The Contractor shall remove insulation on the inside of each door and any other interference items to be able to complete this scope of work.
- 2.1.8 The Contractor shall layout each existing door prior to cutting to ensure a proper fit of the new door and frame. CGIA will confirm the suggested layout as described in Section 4.1 Inspections.
- 2.1.9 There is an allowance of \$30,000.00 in this specification to accommodate structural changes in the door openings that are not included in this specification. This amount can be adjusted via a 1379 action. Prior to the Contractor carrying out any such changes the CGTA must provide the Contractor written approval.
- 2.1.10 The Contractor shall cut off and remove the existing Weather Doors indicated in table 1. and dispose of them.
- 2.1.11 The Contractor shall mechanically prep each new door frame and bulkheads to an SSPC-SP3 standard and tack weld in place. CGIA and the attending Lloyds representative will inspect each tack welded door as per Section 4.1 Inspections.
- 2.1.12 The installation of each door will be by welding the door frame to the bulkhead opening. All welding will be continuous, but carried out in a sequence so as to not induce any distortion in the door frame which would not allow for proper closing and sealing of the door to the frame.
- 2.1.13 All adjacent spaces and the work areas are to be properly protected from hot work activities. There will be one (1) fire watch person assigned to work area during hot work activities and the cool down period as specified in the "General Notes" at these times. The contractor shall supply, operate, and maintain a suitable ventilation arrangement to exhaust fumes from the vessel's interior.
- 2.1.14 On completion of all prep work and once each door is tacked in place the Contractor shall notify the CGIA and the attending Lloyds Surveyor to inspect the work prior to conducting final welding. See Section 4.1 Inspections.
- 2.1.15 All doors to be fillet welded continuously on the inside and outside of the door frame to bulkhead.
- 2.1.16 Weld tested shall be completed as described in Section 4.2 Testing.
- 2.1.17 Contractor shall apply coatings to doors and frames as described in Section 2.2 Coatings.
- 2.1.18 The Contractor shall install new insulation in all areas where it was removed. New insulation shall be 4" fiberglass with foil back. All seams to be taped using 4" foil tape and perforated galvanized mesh to be installed to match the existing material where applicable.

## 2.2 General – Coating

- 2.2.1 Upon completion of any welding, inspection, and testing all disturbed steel on the doors and frames shall be prepared and coated with the Wasser Coating system as per manufacturers recommendations.
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv. A topcoat of Wasser MC Luster 100, White, (DFT 3-5mil) on all surfaces.
- 2.2.2 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.

## 2.3 Location

- 2.3.1 All the weather doors are located as indicated below: All Frame #'s are approximate and used only for general reference:

Door to be replaced	Deck Level	Fr. #
Drawing Room (P)	Bridge Deck	108-112
Winch Room Entrance	Boat deck	138-141
Science Staff Entrance (P)	Upper Deck	149-151
Science Staff Entrance (S)	Upper Deck	142-144
Nurses Entrance (P)	Boat Deck	102-104
Nurses Entrance (S)	Boat Deck	102-104
Quarter Deck Entrance	Upper Deck	23
Hanger Entrance (P)	Boat Deck	41
Hanger Entrance (S)	Boat Deck	41
Door by Pengo Winch (P)	Upper Deck	165-167
GP Lab Entrance (P)	Upper Deck	37-39
GP Lab Entrance (S)	Upper Deck	38-42

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 This work shall be completed in conjunction with the following specification items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING AND UNDOCKING"
- iii. H-05 "FIRE DOOR INSTALLATION"
- iv. H-09 "UPPER DECK STEEL REPAIRS"
- v. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- vi. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vii. H-24 "NATURAL DECK VENT INSTALLATION"
- viii. E-06 "HAMPTON CRANE SURVEY"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. CCGS Hudson Profile Port Side
- ii. CCGS Hudson Profile Stbd Side
- iii. Manufacturers Door Drawings

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 Twelve (12) weather Doors as described in section 2.1.5.

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1- CGIA shall consult with the Contractor and all doors shall be positively identified prior to any work in this specification to be started.
- b) Hold point 2 – CGIA shall inspect the layout of each door to be fitted prior to the old door being removed.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall inspect each door after the doorframe and bulkhead is prepped and tacked welded in place and before final welding commences.
- d) Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of all coatings.
- g) Hold point 7 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.3.
- h) Hold point 8 - CGIA shall visually inspect the new insulation and interference items reinstalled for each newly installed door.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations and primer coats must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE Inspector.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.
- 4.2.3 Upon completion of all installations and inspections the Contractor shall perform a hose test to all doors and door seals. This test shall be conducted with a fire hose at 60 psi. Due to other scopes of work in way of these doors the Contractor shall arrange this test at the best suitable time. This specification shall not be signed off as completed until the hose test is performed.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation Lloyds approval for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## H-24 Natural Deck Vents Replacements

### 1. Scope:

The intent of this specification is to remove eleven (11) natural vents on the Upper Deck and replace them with new GSM supplied vents. This spec item shall be completed in direct conjunction with spec item HD-09 Upper Deck Steel Repairs.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.4 All the vents indicated in this specification are natural vents and do not extend into any tanks.
- 2.1.5 The table below indicates the vents the Contractor shall replace. Photos of each vent is located in the attached reference document "CCGS Hudson Natural Deck Vents to be replaced pages 1-4."

ITEM	DECK VENT TAG #
1	DECK VENT 60A
2	DECK VENT 60B
3	DECK VENT 54
4	DECK VENT 51
5	DECK VENT 47
6	DECK VENT 49
7	DECK VENT 46
8	DECK VENT 31
9	DECK VENT 3B
10	DECK VENT 3A
11	DECK VENT 9

Table 1

- 2.1.6 The Contractor shall remove insulation on the underside of each vent and any other interference items to be able to complete this scope of work.

- 2.1.7 The Contractor shall cut off and remove the existing vents indicated in table 1. and dispose of them.
- 2.1.8 The deck area and opening for each vent shall be mechanically cleaned and prepped to an SSPC-SP3 standard prior to tack welding the new vents.
- 2.1.9 The new GSM vents are coated with the Wasser coating system, MC-Luster. The Contractor shall remove enough of the coating at the bottom of each vent to be welded to the deck to the quality of the Welding standards specified in this specification.
- 2.1.10 The Contractor shall fit each vent to the opening and tack in place.
- 2.1.11 On completion of all prep work and once each vent is tacked in place the Contractor shall notify the CGIA and the attending Lloyds Surveyor to inspect the work prior to conducting final welding. See Section 4.1 Inspections.
- 2.1.12 Each vent shall be welded to the deck and underside using full penetration continuous welds.
- 2.1.13 Weld tested shall be completed as described in Section 4.2 Testing.
- 2.1.14 Contractor shall apply coatings to vents as described in Section 2.2 Coatings.
- 2.1.15 The Contractor shall install new insulation in all areas where it was removed. New insulation shall be 4" fiberglass with foil back. All seams to be taped using 4" foil tape and perforated galvanized mesh to be installed to match the existing material.

## **2.2 General – Coating**

- 2.2.1 Upon completion of any welding, inspection, and testing all disturbed steel on the vents shall be prepared and coated with the Wasser Primer as per manufacturers recommendations. Contractor shall note that any and all coatings to the deck is included in spec item HD-09 Upper Deck Steel Repairs.
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv. A topcoat of Wasser MC Luster 100, RAL 7042 Deck Grey, (DFT 3-5mil)
- 2.2.2 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.



## 2.3 Location

- 2.3.1 All the natural vents to be replaced are located on the Upper Deck between frames #1 to #200. The CCGS Hudson Drawing Upper Deck Vents sht.1/3 included in the Technical data package clearly indicates the vents to be replaced.

## 2.4 Interferences

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

- 2.4.2 This work shall be completed in conjunction with the following specification items:

- i. HD-01 "DOCKING AND UNDOCKING"
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-14 "HANGER TOP DECK STEEL REPLACEMENT"
- iv. H-15 "AFT MAST REFURBISHMENT"
- v. E-06 "HAMPTON CRANE SURVEY"

## 3. References:

### 3.1 Guidance Drawings/Vessel Drawings

- i. CCGS Hudson Natural Deck Vents to be replaced pages 1-4."
- ii. CCGS Hudson Drawing Upper Deck Vents sht. 1/3.
- iii. Manufacturers Drawings of each Vent.
- iv. Wasser MC-Miozinc 100 Product Description Sheet
- v. Coatings- Wasser Paint Procedures
- vi. Wasser MC-Luster Product Description Sheet
- vii. Holdtight 102 Product Description Sheet
- viii. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

### 3.2 Standards and Regulations

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **3.3 Owner Furnished Material**

3.3.1 Eleven deck vents as described in Section 2.1.5. will be GSM.

## **4. Proof of Performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Hold point 1- CGIA shall inspect the prepped steel deck prior to any of the vents being tack welded to the deck.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall inspect the vents on completion of tack welding in place and before final welding commences.
- c) Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- d) Hold point 5 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.
- e) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 7 - CGIA and NACE inspector shall witness the thickness readings of all coatings for each coat.
- g) Hold point 8 - CGIA shall visually inspect the new insulation and interference items reinstalled for each vent.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations and primer coats must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, PSPC and onsite NACE inspector.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report, in PDF, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3

## **5.2 Spares**

5.2.1 N/A

## 5.3 Training

5.3.1 N/A

# H-25 Engine Room Frame Survey and Repair

## 1. Scope:

The intent of this specification is to survey and replace any deteriorated Hull Plating and Frames located on the Port side of the Engine room between frames #82-87.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade "A" or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor shall conduct a steel survey on the Port side of the Engineroom between frames #82 to #87 inclusive. The Survey will extend up 1 meter from the deck level and down 1 meter from deck level. A general cross sectional view of the structure is indicated on the Lengkeek drawings J18052-S06 R0 shts 1 -3 Structural Sections in Engine Room.
- 2.1.6 There are two (2) hot water heaters in way of the survey area that will have to be removed in order to gain access. The Contractor is responsible for the removal and reinstallation of both hot water heaters, piping and associated interference items.
- 2.1.7 The Contractor shall lock out both hot water heaters, electrically and mechanically prior to disconnecting them. CCG will assist the Contractor with lockouts.
- 2.1.8 The Contractor shall remove all rust and debris from the survey area and prepare to do Ultrasonic Testing.
- 2.1.9 The Contractor shall survey the hull and frames identified in the Lengkeek drawing???? The Contractor shall provide a separate cost for a total of one hundred (100) UT shots of the areas described. This number will be added to the bid price and prorated per 10 shots for adjustment up or down via a PSPC 1379 for the actual number of shots required. Additional shots that will exceed the 100 shots priced, will only be actioned upon written approval from the CGTA.

- 2.1.10 The CGIA and the attending Lloyds Surveyor will instruct the Contractor on the exact location where to take the UT shots.
- 2.1.11 The Contractor shall present the results of all Ultrasonic testing as soon as possible upon the completion of taking the shots.
- 2.1.12 The CGIA and attending Lloyds Surveyor shall review the readings and inform the Contractor if any repairs are necessary.
- 2.1.13 The Contractor shall include his bid on this specification an allowance of \$50,000.00 to address any defects noted in the Survey. The Contractor shall not start any new work until priced and written approval of the CGTA and CA is received. This allowance shall be adjusted via a PSPC 1379 action.
- 2.1.14 Upon completion of all steel repairs inspections, testing and coatings the Contractor shall reinstall the both Hot Water heaters and all interference items in an as found condition.
- 2.1.15 The Electrical shall be reconnected and checked by the Contractor for correct voltage.

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing all frames and hull steel in the survey area shall be prepared and coated with the Wasser Coating system as per manufacturer's recommendations.
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.

## **2.3 Location**

- 2.3.1 The survey area is located on the Port side of the Engineroom between frames #82 - #87.

## **2.4 Interferences**

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.4.2 This work shall be completed in conjunction with the following specification items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING AND UNDOCKING"
- iii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv. HD-04 "SEA BAYS AND SEA CHESTS"
- v. HD-05 "MAIN SEA STRAINERS"
- vi. HD-06 "SACRIFICIAL ANODES"
- vii. H-06 "#2 D/BFUEL TANK REPAIRS"
- viii. H-07 "#4 D/B TANK TOP REPAIRS"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. Lengkeek drawings J18052-S06 R0 shts 1 -3 Structural Sections in Engine Room.
- ii. Wasser MC-Miozinc 100 Product Description Sheet
- iii. Coatings- Wasser Paint Procedures
- iv. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None

### **4. Proof of Performance:**

#### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a) Holdpoint 1 - CGIA and Lloyds Surveyor shall inspect the survey area upon removal of interference items and preparation of steel. The Contractor will be informed after this inspection where to conduct the Ultrasonic testing.

- b) Hold point 2 –The CGIA and Lloyds Surveyor shall lay out and confirm the steel areas to be repaired if required.
- c) Hold point 3 – If required the CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates and frames tacked in place prior to any finish welding commencing.
- d) Hold point 4 – If required the CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2
- e) Hold Point 5 – If required the CGIA and Lloyds Surveyor shall witness the testing of all welds as described in section 4.2.1.
- f) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- g) Hold point 7 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- h) Hold point 8 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of the Hot Water Heaters and associated interference items.
- i) Hold point 9 - CGIA will witness The Contractor verifying the voltage available at each Hot Water heater upon re-establishing power.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.



- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

### **5.2 Spares**

- 5.2.2 N/A

### **5.3 Training**

- 5.3.2 N/A

## **H-26 Black and Grey Water Overboard Valve Replacement**

### **1. Scope:**

The intent of this specification is to replace the Black and Grey Water overboard valves and the short spool sections connected from the valves to the hull.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crange, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall ensure that both the Black water and Grey water systems are mechanically and electrically isolated prior to starting this spec item. CGIA will assist the Contractor when required to isolate these systems. Contractor shall give the CGIA 24 hr notice prior to the commencement of this work.
- 2.1.4 New valves are GSM - Milwaukee 3" Bronze Globe Check Valves.
- 2.1.5 Contractor shall remove and dispose of the existing valves.
- 2.1.6 Contractor shall remove the existing steel spool pieces that extend from the discharge side of each valve to the hull. See picture under Section 3.1.
- 2.1.7 New steel spool pieces shall be fabricated and installed. The exact length shall be adjusted as required for the new valves. The new spool pieces shall be fabricated from 3" schedule 160 ASTM A53 Grade B steel. The flange shall be a slip on 4-bolt hole 150# ANSI steel flange. Each spool section is approximately 12" long.
- 2.1.8 The flanges shall be fitted to align with the new valves and continuously welded both sides. The spool piece shall be continuously welded on the inside and outside as per Lloyds standards.
- 2.1.9 Contractor shall mechanically clean all existing flanges.
- 2.1.10 Upon removal of the old valves the Contractor shall notify the CGIA to conduct a visual inspection on the existing flanges and associated pipework. See Section 4. Proof and Performance.

2.1.11 The Contractor shall install the new Grey water and Black water valves using new gaskets and fasteners. Grade 5 bolts shall be used. Gaskets to be replaced with Durlon 8500 gasket material. Hand wheels for both valves must be in an upright position upon installation. Anti-seize compound shall be used on all fasteners.

2.1.12 Upon completion of all work and inspections the valves shall be tested as per Section 4.2.

## **2.2 General – Coating**

2.2.1 Existing piping sections extending from each valve flange to the next adjoining flange shall be prepped to an SSPC-SP# standard and primed with Wasser Miozinc primer applied as per manufacturers recommendations.

2.2.2 Upon completion of all work, inspections and testing all new and disturbed steel shall be coated as in line 2.2.1. above.

## **2.3 Location**

2.3.1 Both the Grey water and Black water overboard discharge valves are located in the shaft tunnel port side at frame #27.

## **2.4 Interferences**

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.

2.4.2 This work shall be completed in conjunction with the following specification items:

- i. HD-01 Docking & Undocking
- ii. H-02 Sewage Vacuum Tank Replacement
- iii. E-02 Intermediate shafts and Bearings

### 3. References:

#### 3.1 Guidance Drawings/Vessel Drawings

3.1.1 Dimensional drawing of the new Milwaukee check valve Drawing #1063NSC 2.5" to 4"

3.1.2 Picture of the Black and Grey water valves in situ shown below:



#### 3.2 Standards and Regulations

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard

#### 3.3 Owner Furnished Material

3.3.1 Both the Grey water and Black water valves will be CCG supplied.

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## **4. Proof of Performance:**

### **4.1 Inspection**

4.1.1 All work shall be completed to the satisfaction of the CTIA and the attending Lloyds Inspector.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 Inspection Hold Points:

- a) Hold point 1 – CGIA shall be notified to inspect the flanges and piping after the old valves are removed.
- b) Hold point 2 – CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new spool pieces and flanges tacked in place prior to any finish welding commencing.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- d) Hold point 4 -CGTA and Lloyds Surveyor confirm the type of pressure test to the spool prior to the test being conducted.
- e) Hold point 5 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.
- f) Hold point 6 - CGIA and shall witness the paint preparation of all steel prior to priming.

### **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 Upon completion of valve installation both valve spools shall be blanked on the inside and a vacuum test conducted to ensure the integrity of the welds. An alternative water pressure test at 80 psi may be substituted. The actual test shall be confirmed between the CGIA and the Contractor prior to starting the test.

4.2.3 With the vessel in the water the Contractor shall run up both the black and grey water systems and check for leaks around each valve. Any defects shall be rectified by the Contractor.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.3.3 Lloyd's approval and sign off document shall be completed and presented to CGIA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 Contractor to provide document to confirm the spool material.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-27 Main Deck Flooring Replacement

## 1. Scope:

The intent of this specification is to remove the existing underlayment and deck coverings on areas of the Main Deck and apply new underlayment and deck coverings.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall take necessary measures to ensure all bulkheads, deck-heads, equipment and all items in way of the work area are adequately protected during this scope of work.
- 2.1.4 Contractor shall note that this specification directly effects specification H-09 Upper Deck Repairs.
- 2.1.5 The Contractor shall remove and dispose of the existing underlayment, flooring (tiles and carpet), base combing and adhesive on the Main Deck as outlined in CCGS Hudson Drawing H11-1051 General Arrangement Upper Deck and Main Deck dwg #H11-1051 sht 4 of 5. The Main Deck areas to be covered are highlighted in green on this drawing.
- 2.1.6 The Contractor shall mechanically prep the entire steel deck as well as all connecting bulkheads a height of 4" above the deck in way of the base combing to an SSPC-SP-3 standard.
- 2.1.7 Upon completion of steel preparation, the Contractor shall notify CGIA who will carry out an inspection as indicated in Section 4.1 Inspections.
- 2.1.8 In a separate line the Contractor shall bid on taking 200 ultrasonic shots. This price will be added to the bid price and prorated to a "per 50 shots" rate and used for adjustment purposes.

- 2.1.9 The Contractor shall include in this specification an allowance of \$50,000 for any steel work that may be required to the Main Deck steel once the underlayment is removed. No steel work shall commence without the written approval of the CGTA. This allowance may be adjusted up or down via a 1379 action and only upon written authorization from the CGTA.
- 2.1.10 On completion of all inspections and potential steel repairs the Contractor shall coat the deck and bulkheads as described in Section 2.2 General-Coatings.
- 2.1.11 The Contractor shall install Dex-O-Tex Subkote 1 as the new underlayment in accordance with the Manufactures recommended installations instructions. In the event that Dex-O -Tex Subkote is not compatible with the tiles to be installed the Contractor may substitute the underlayment upon written approval of the CGTA.
- 2.1.12 The final height of the underlayment and tile shall be similar to existing height. The Contractor shall ensure the final height of the underlayment and tiles is flush with the existing sounding tube deck fittings, extended spindle deck fittings and other flush mounted fittings.
- 2.1.13 Upon installation and inspections of underlayment the Contractor shall install new Marine Grade Lloyds approved 12" X 12" vinyl composite deck tiles as per manufactures recommended installation procedures. The Contractor shall give CCG the option of at least 10 colours to choose from for both the tiles and the 4" rubber base. CGIA must give the Contractor written approval for the tile selection prior to the purchase of any tile and base.
- 2.1.14 There will be an allowance of \$60,000.00 for underlayment and tiles in this specification. The Contractor must provide proof of invoice. This allowance can be adjusted upon a PSPC 1379 action upon written approval of the CGTA.
- 2.1.15 The Contractor shall install the new tiles in accordance with the Manufactures recommended installations instructions.
- 2.1.16 New 4" rubber base shall be installed in way of all new deck coverings. Excessive adhesive shall be removed and cleaned from the deck tiles and bulkheads.
- 2.1.17 The Contractor shall thoroughly clean all tiles and rubber base on completion of installation.
- 2.1.18 The Contractor shall supply and apply three (3) coats of Manufactures approved sealer and three (3) coats of wax as per manufacturer's recommendations.
- 2.1.19 Upon completion of installation of all tiles all interference items shall be reinstalled in an as found condition.



- 2.1.20 The Contractor shall provide CCG with one hundred (200) spare tiles. Tiles to be handed over to the Chief Engineer.

## **2.2 General – Coating**

- 2.2.1 Upon completion of any welding, inspection, and testing all areas of the decks where the underlayment has been removed shall be prepared to an SSPC-SP3 standard and primed as specified below:

- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- ii. One (1) Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated.

- 2.2.2 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.

## **2.3 Location**

- 2.3.1 The areas of the Main Deck to apply the new deck coverings extend from Frames #5 to #193 on the Main Deck and indicated on CCGS Hudson Drawing H11-1051 General Arrangement Upper Deck and Main Deck dwg #H11-1051 sht 4 of 5. The Main Deck areas to be covered are highlighted in green on this drawing.

## **2.4 Interferences**

- 2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 This work shall be completed in conjunction with the following specification items:

- i GENERAL NOTES AND SERVICES
- ii H-04 "POTABLE WATER TANKS SURVEY"
- iii H-05 "FIRE DOOR REPLACEMENTS"
- iv H-08 "STBD AFT DEEP SOUNDING PLUG DECK PLUG REPLACEMENT"
- v H-10 "GALLEY DECK STEEL REPAIRS"
- vi H-17 "GALLEY REFURBISHMENT"
- vii H-20 "CHIEF COOKS CABIN REBUILD"
- viii H-28 "GEOCHEM LAB STEEL DECK REPAIRS"
- ix E-03 "VENTILATION CUCTWORK AND FAN CLEANING"
- x E-12 "STEERING GEAR SURVEY"
- xi L-04 "FIRE DETECTION SYSTEM"
- xii L-06 "TV DISTRIBUTION BACKBONE"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. CCGS Hudson Drawing H11-1051 General Arrangement Upper Deck and Main Deck dwg #H11-1051 sht 4 of 5.

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1- CGIA and Lloyds Surveyor shall inspect the prepped steel to determine if any UT shots and steel deck inserts are required. If no inserts are required Hold Points #2, #3 and #4 can be omitted.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- d) Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of the primer coat.
- g) Hold point 7 - CGIA shall inspect the newly install tile and base for fitment.
- h) Hold Point 8 – CGIA shall inspect the deck tiles and base after cleaning.
- i) Hold Point 9 – CGIA shall inspect all deck tiles after each coat of sealer and wax. The Contractor shall not go to the next coat of either the sealer or the wax until CGIA has completed their inspection and instruct the Contractor to do so.
- j) Hold Point 10 – CGIA shall inspect all work areas on the completion of installation of all interference items and cleanup.

- 4.1.2 All surface preparations and primer coats must be approved by the NACE inspector prior to installing the underlayment.

- 4.1.3 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

## 4.2 Testing

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.

## 4.3 Certification

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

# 5. Deliverables:

## 5.1 Reports, Drawings and Manuals

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

## 5.2 Spares

- 5.2.1 The Contractor shall provide CCG two hundred (200) spare tiles in the color designated by the CGIA.

## 5.3 Training

- 5.3.1 N/A

# H-28 Geo-Chem Lab Steel Deck Repairs

## 1. Scope:

The intent of this specification is to replace deteriorated steel and coat the new steel with the Wasser coating system located in the Geo-Chem Lab.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.
- 2.1.4 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.5 The Contractor shall replace the deteriorated sections of deck in the Geo-Chem Lab as per Lengkeek drawing J18093-S04 R0 shts 1 and 2 Main deck Renewal IWO Geo-Chem Lab.
- 2.1.6 The location of the deck insert is under the existing cabinetry in the Geo-Chem Lab along the forward end and Port side. The existing cabinetry and interference items in way of the repair area shall be removed and reinstalled on completion of all steel work.
- 2.1.7 The Contractor shall cut away the existing steel base that the cabinetry is secured to. The base is welded to the existing deck.

2.1.8 The following requirements must be met for the steel repair:

- i Geo-Chem Lab deck steel, in way of area to be repaired, is to be removed.
- ii Contractor must ensure that steel removed corresponds to the insert sizes
- iii detailed in the guidance drawings attached.
- iv The plate insert must match the surrounding plate thickness.
- v Corners of the plate insert must have a minimum radius of 4".
- vi The plate insert must be fitted using full penetration continuous welds.
- vii Existing structure on the underside of the deck is to be welded to the inserts using double continuous fillet welds.
- viii Scallops must be cut in stiffening structure when they are in way of a weld for a plate insert.

2.1.9 As per guidance Lengkeek drawing J18093-S04 R0 shts 1 and 2 Main deck Renewal IWO Geo-Chem Lab. The Geo-Chem Lab deck shall be cropped out and repaired with steel inserts. These drawings provide the positioning of the steel inserts.

2.1.10 Upon completion of all welding, inspections and testing the Contractor shall reinstall the cabinetry base that was originally removed. The base must be installed in such a fashion to ensure all new and disturbed steel is coated as per line 2.2.1. The base will have to be installed in sections.

2.1.11 All remaining interference items are to be installed as per original.

## 2.2 General – Coating

2.2.1 Upon completion of welding, inspection, and testing all new and disturbed steel shall be prepared and coated with the Wasser Coating system as per manufacturers recommendations.

- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- iii. An intermediate coat of MC-CR White (DFT 3-5mil)
- iv. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for the underside of the deck located in the Electrical Store Room.

- v. A topcoat of Wasser MC Luster 100, RAL 7042 Deck Grey, (DFT 3-5mil) for deck areas located in the Geo-Chem Lab.

2.2.2 All steel inserts must be spot blasted to Sa2 ISO 8501-1 or SSPC SP6.

2.2.3 The Contractor shall refer to the technical data sheets for this product included in the Technical Data Package for application and curing instructions of the coating system.

Atlantic Canadian Distributor for all above products:

K&D Pratt Limited

55 Akerley Blvd

Dartmouth NS B3B 1M3

Ph: (902)468-1955

Product representative: Mike Bellefontaine 902-480-3039

Email: [mike.bellefontaine@kdpratt.com](mailto:mike.bellefontaine@kdpratt.com)

## 2.3 Location

2.3.1 The Geo-Chem Lab is located on the Main Deck between frames #30 and #51. See Hudson Drawing General Arrangement Upper Deck and Main Deck.

2.3.2 The insert areas are indicated on the Lengkeek drawing J18093-S04 R0 shts 1 and 2 Main deck Renewal IWO Geo-Chem Lab.

## 2.4 Interferences

2.4.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.4.2 This work shall be completed in conjunction with the following specification items:

- i GENERAL NOTES
- ii H-03 "FUEL TANK SURVEY"
- iii H-04 "POTABLE WATER TANKS SURVEY"
- iv H-09 "UPPER DECK STEEL REPAIRS"
- v H-19 "CABIN DECKING REPLACEMENT"
- vi H-27 "MAIN DECK FLOORING REPLACEMENT"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. Lengkeek drawing J18093-S04 R0 shts 1 and 2 Main deck Renewal IWO Geo-Chem Lab.
- ii. CCGS Hudson Drawing H11-1051 General Arrangement Upper Deck and Main Deck dwg #H11-1051 sht 4 of 5.
- iii. CCGS Hudson Drawing H11-1051 General Arrangement Lower & Tank Top Decks dwg #H11-1051 sht 5 of 5.
- iv. Wasser MC-Miozinc 100 Product Description Sheet
- v. Coatings- Wasser Paint Procedures
- vi. Wasser MC-Luster Product Description Sheet
- vii. Wasser MC-CR white Product Description Sheet
- viii. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 None

### **4. Proof of Performance:**

#### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a) Holdpoint 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.



- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.1.
- e) Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- f) Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of each coat of paint.
- g) Hold point 7 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of any interference items.
- h) Hold point 8 - CGIA will inspect all areas upon completion of installation of all interference items.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-29 Wheelhouse Top Hatch Installation

## 1. Scope:

The intent of this specification is to replace the existing flush mount hatch on the Wheelhouse top with a new GSM Hatch and deck ring.

## 2. Technical Description:

### 2.1 General – Prep and Steel Renewal

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 All welding in this specification shall be carried out as per CCG Welding Specification n-eng CT-043-eq-eg-001-E. In the event of a discrepancy between this specification and the CCG Welding Specification, the CCG Welding Specification shall be rule.
- 2.1.4 The Contractor shall perform this specification in correlation with specification H-12 Wheelhouse Top Deck Repairs and HD-13 Transducer Shaft Support Re-fabrication.
- 2.1.5 The existing hatch is a steel round hatch, 32 inches in diameter and is a two (2) dog hatch. It is raised a few inches off the deck. The new GSM hatch will be of similar size and type.
- 2.1.6 The Contractor shall remove all interference items in way of the Hatch located on the Wheel house Top deck and Drawing Room and protect the areas from water ingress, smoke, sparks and damage.

2.1.7 The Contractor shall cut out the existing hatch. The two (2) pictures below show a top and bottom view of the hatch.



Hatch on top of Wheel house Deck



Hatch on Wheelhouse Top Deck (view from underneath in the Drawing Room)

- 2.1.8 The area in way of the hatch opening shall be measured and all measurements confirmed for the fitment of the new GSM hatch. The deck opening shall be modified to accommodate the new hatch and the steel be prepared to a SSPC-SP3 standard prior to welding.
- 2.1.9 The new hatch deck ring shall be fitted and tacked welded in place and inspections carried out by the CGIA and the attending Lloyds Surveyor. See inspections section 4.1.
- 2.1.10 The new Hatch shall be welded in place at the top and bottom. Welding procedures are to be taken into account to minimize distortion. Upon completion of welding inspections shall be carried out as per section 4.1. Testing shall be completed as per section 4.2.

2.1.11 Upon completion of all satisfactory inspections and testing all new Hatch and deck ring shall be coated on the top and bottom as described below lines 1 to 1V. All disturbed deck steel shall receive two (2) coats of miozinc primer as described in line 1 and 11 below. Final coatings around the hatch are covered under specification H-12 Wheelhouse Top Deck Repairs.

- I. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
- II. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
- III. An intermediate coat of MC-CR White (DFT 3-5mil)
- IV. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil)

2.1.12 Upon completion of all steel work inspections, testing and coatings all removed insulation shall be replaced with new 4" thick mineral wool with foil backing and secured with welded 10-gauge steel pins and clips. All seams shall be taped with 4" wide foil tape. Existing pins may be used where possible.

2.1.13 All deck-head panels and other interference items shall be reinstalled in an as found condition.

## **2.2 Location**

2.2.1 The Hatch is located on the Wheelhouse top deck between frames #112 to #114 centerline.

2.2.2 CCGS Hudson Drawing General Arrangement Wheelhouse Top H11-1051 Sht 3 of 5 that is included in the Technical Data Package indicates the location of the hatch.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 All insulation removed to carry out this scope of work shall be replaced on completion of work, inspections and testing.

2.3.3 This work shall be completed in conjunction with the following specification items:

- I. GENERAL NOTES AND SERVICES
- II. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- III. H-12 "WHEELHOUSE TOP DECK STEEL REPAIRS"

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- i. CCGS Hudson Drawing General Arrangement Wheelhouse Top H11-1051 Sht 3 of 5.
- ii. Wasser MC-Miozinc 100 Product Description Sheet

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

#### **3.3 Owner Furnished Material**

- 3.3.1 The new Hatch will be GSM.

### **4. Proof of Performance:**

#### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a) Hold point 1 - CGIA will inspect the Wheel house top deck area to ensure all equipment and machinery is adequately covered prior to removal of the existing hatch.
  - b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new hatch deck ring tacked in place prior to any finish welding commencing.
  - c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.
  - d) Hold point 4 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.
  - e) Hold point 5 - CGIA and NACE inspector shall witness the thickness readings of the primer coat and each additional coat of paint.

- f) Hold point 6 - CGIA will inspect all completed steel work and coatings prior to the reinstallation of insulations and deck-head panels.
- g) Hold point 7 - CGIA will inspect the installation of all interference items associated with this specification upon completion of work. This inspection shall be completed prior to a sign off on this specification as completed.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGTA.

4.1.4 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 Signed approvals as per section 4.3



## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# H-30 Obsolete Transducer Valve Removal & Inserts

## 1. Scope:

The CCGS Hudson requires a total of Six transducer valves to be removed from their positions inside the vessel and all of their associated valve gear and spools to be removed from the hull. These valves will be replaced with Inserts in the hull at each location as well as inserts in the tank tops where spools extended through.

All material indicated in this specification for removal shall be completely removed from the vessel by the contractor and go to scrap.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 CCG has included Lengkeek Guidance Drawing J16017-S03 Shell Plate Insert. This drawing is to be used for reference only and provides general guidance for the inserts.
- 2.1.4 The following is a table to state Position number, location and insert thickness. The thickness of shell plating in each location has been gathered from shipboard drawings and shall be used to formulate bids, but the contractor must consider that repairs to a 55 yr old vessel have allowed thicker or thinner plating in some areas and so final shell plate thickness must be gauged at time of repair.

Position No.	Location	Hull Insert thickness	Tanktop insert thickness
35	Stbd of Centerline, FR153 – Asdic space	1.125" Lloyds Gr D plate	3/8" Lloyds Gr A plate
37	Port of centerline , FR153 –Asdic space	1.125" Lloyds Gr D plate	3/8" Lloyds Gr A plate
67	Port of centerline , Fr96 – engine room	5/8" Lloyds Gr A plate	13/32" Lloyds Gr A plate
68	Stbd of centerline , FR100 –engine room	5/8" Lloyds Gr A plate	13/32" Lloyds Gr A plate
65	Port of centerline , Fr178 –cargo hold	1.25" Lloyds Gr D plate	3/8" Lloyds Gr A plate
66	Stbd of centerline, Fr178 –Cargo hold	1.25" Lloyds Gr D plate	3/8" Lloyds Gr A plate

- 2.1.5 All position numbers are based on the SEA CONNECTIONS drawing as provided from the ships own drawing library, which was made to easily represent all sea connections for the vessel.

- 2.1.6 At locations where the new insert plate thickness differs from the adjacent plating, a 3:1 bevel must be provided prior to welding.
- 2.1.7 **Valve 35** is located in the Asdic space and consists of one 8 inch gate valve mounted directly to a flange on the tank top. Contractor shall remove the valve and then remove the spool within the double bottom tank and then perform a fully seal welded insert at the tank top level. A full seal welded insert at the hull shall be completed. These actions will require gas free for hotwork of the number one starboard double bottom fuel tank.
- 2.1.8 **Valve 37** consists of a 16 inch gate valve which is located within its own cofferdam at frame 153. Prior to removal of the soft patch the contractor must enter and disconnect the valve from the spool on the underside of the soft patch cover. This can be accomplished by manholes provided for entry into this space. Contractor shall remove the bolted soft patch cover and then remove the gate valve and all associated extended spindles and handwheel arrangements from within this cofferdam and from the cover.
- 2.1.9 The 42" high spool piece attached to the top of the soft patch cover shall be removed and the soft patch cover given an insert to fully seal weld the cover. The penetration for the handwheel spindle shall be prepared for insert and be provided with an appropriate sized insert plate to seal the cover at this position. Any spools within the cofferdam connected to the hull plate must be removed and the hull be given an insert plate that is full seal welded.
- 2.1.10 The entire interior of the cofferdam For valve 37 shall be prepared to SSPC-SP11 Standard and given two coats of Wasser MC-MIOZINC primer at 3mil DFT per coat and then a single topcoat of Wasser MC-TAR RED at 6mil DFT. For the purposes of bidding this work, contractor shall bid separately to coat 30 m<sup>2</sup> of surface area in this cofferdam to meet all of the manufactures recommendations. This price will be then added to the over bid price and also prorated to a unit rate per 1 m<sup>2</sup> . This unit rate will then be used for adjustments up or down by 1379 once actual areas are known.
- 2.1.11 Prior to sealing the cofferdam at valve position 37 the contractor shall supply new Neoprene gaskets (1/4" thickness) for any manholes taken off and also the gasket for the soft patch shall be renewed in its entirety. All new nuts and washers shall be applied to the studs which secure the soft patch and these shall be grade five with a zinc- dichromate coating.
- 2.1.12 **Valve 67** is an 8 inch gate valve located in the bilge inboard of the chiller compressors within the engine room of the vessel. It is mounted on top of a 20 inch spool that is connected to the tank top.
- 2.1.13 Contractor shall remove the 8 inch gate valve at position 67 as well as the spool above the tank top and the spool within the tank. An insert shall be performed at the tank top as well as at the hull location. The spool passes through the number 3 double bottom port fuel tank.

- 2.1.14 **Valve 68** is an 8 inch gate valve located in the bilge between the ship service generators at frame 100 and it is mounted to the top of an 18 inch spool connected to the tank top of the number three double bottom stbd .
- 2.1.15 Contractor shall remove the 8 inch gate valve at position 68 as well as the spool above the tank top and the spool within the tank. An insert shall be performed at the tank top as well as at the hull location. The spool passes through the number 3 double bottom starboard fuel tank.
- 2.1.16 Contractor is reminded that the engine room bilge must be gassed freed for the work at valve position 68 and 67.
- 2.1.17 Valve 65 and 66 are both 8 inch gate valves located in the cargo hold at the tank top at the forward end of the cargo hold. They are respectively located on the port and starboard side of centerline aft of frame 178, which is aft of the manholes to the bow thruster sea chest. Both valves are mounted on 7 inch high spools directly connected to the tank top. Leading up from both valves are 8 inch diameter transducer tubes that run continuous to the exterior deck at the forward end of the vessel. Approximately 11 feet above the valves there is a Victaulic coupling in both transducer tubes.
- 2.1.18 Contractor shall remove both valves and then remove the 11 foot section of transducer tube to the Victaulic coupling connection. The remaining 4 foot section of transducer tube from this point to the cargo hold deckhead is to be blanked off with a Victaulic cap of the same model as currently fitted --these shall be CSM.
- 2.1.19 Both spool pieces above the tank top shall be removed and both spool pieces passing through the bow thruster sea chest shall be removed. New inserts shall be installed in the hull for both penetrations and new inserts shall be installed for the tank top for both penetrations.
- 2.1.20 Contractor is extended the option to install one large insert being rectangular in nature to act as the insert for both of these penetrations at the tank top.
- 2.1.21 Contractor is reminded that gas free of number one port and number one starboard double bottom fuel tanks shall be required for this repair as the boundary with the fuel tank is very close to this work area.
- 2.1.22 New and disturbed areas of steel within the Bowthruster seachest that result from this work, shall be power-tool-cleaned to SSPC-SP-3 standard, and given two (2) coats of Amercoat 235, each of contrasting colour.
- 2.1.23 The gaskets for the Bow thruster seachest manholes which must be removed for this work activity shall be replaced with new neoprene ¼" thick gasket material –CSM.

- 2.1.24 Any gaskets for manholes removed for the number one or number three double bottom fuel tanks as a result of this specification shall be renewed with ¼ inch thick Buna N- Nitrile gaskets, which is CSM.
- 2.1.25 The contractor shall provide a price for the renewal of 50 new manhole studs or soft patch studs which may be broken in the course of this specification. This price shall be separate , but added to the overall bid price. It shall then be prorated, and used to adjust up or down based on actual requirements. All repairs will be pre approved by CGTA, CGIA and the CA and adjusted using 1379 action prior to work progressing.
- 2.1.26 After all testing is completed the Contractor shall prepare and coat the exterior of the newly installed hull inserts as per the coating application Spec provided in HD-02 Underwater Hull.
- 2.1.27 The interior tank top inserts shall receive two (2) coats of Wasser Miozinc Primer applied as per manufactures coating procedures 3mil DFT per coat to their topside surface. And then a single topcoat of Wasser MC luster 100 Grey –RAL Colour code 7004 3mil DFT.
- 2.1.28 Any coatings that were disturbed in the Asdic space or the cargo hold as a result of this work shall receive the same coating application as line 2.1.24 of this specification. CGIA and contractor to agree on any coating repairs prior to any application of coatings within the Asdic space or the cargo hold.
- 2.1.29 All work to be performed to the full satisfaction of CGIA and the attending Lloyds surveyor.

## **2.2 Location**

- 2.2.1 See chart noted at line 2.1.4 of this specification.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.3 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING AND UNDOCKING"
- iii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv. HD-03 "BUTTS & SEAMS"
- v. HD-04 "SEA BAYS AND SEA CHESTS"

- vi. HD-05 "MAIN SEA STRAINERS "
- vii. HD-06 "SACRIFICIAL ANODES"
- viii. HD-07 "CATHODIC & SEA BAY ANODES"
- ix. HD-08 "SEA CONNECTIONS"
- x. HD-11 "TRANSDUCER INSPECTIONS"
- xi. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- xii. H-03 "FUEL OIL TANKS SURVEY"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

- 3.1.2 CCGS Hudson Docking plan.
- 3.1.3 Sea Connection Dwg –shipboard generated dwg –not to scale.
- 3.1.4 Lengkeek Guidance drawing J16017-S03-R0 Shell Plate Insert
- 3.1.5 CCGS Hudson Profile and Decks dwg (original)
- 3.1.6 CCGS Hudson Drawing Shell Expansion (original)
- 3.1.7 Wasser MC-Miozinc 100 Product Description Sheet
- 3.1.8 Wasser MC-Luster 100 Product Description sheet
- 3.1.9 Coatings- Wasser Paint Procedures
- 3.1.10 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings thickness Requirements

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **4. Proof of performance:**

#### **4.1 Inspection**

- 4.1.1 Inspection Hold Points:

- a) Hold point 1 - All valve and spool material removed from each specified location
- b) Hold point 2 - Preparation of all edges to be witnessed prior to the welding of any inserts
- c) Hold point 3 - The fit of all inserts shall be observed by CGIA and ABS surveyor
- d) Hold point 4 - All defects noted shall be properly re- inspected by CGIA and ABS surveyor
- e) Hold point 5 - All Surfaces noted for coating application shall be witnessed by CGIA for degree of cleanliness.
- f) Hold point 6 - Any damaged coatings in the Asdic space or cargo hold to be inspected and agreed for area prior to repair as stated within the **2.0 technical description** portion of this specification
- g) Hold point 7 - All coatings applied shall be accompanied by a coatings application report and contractor shall allow CGIA to witness the application of primer coats prior to application of any topcoat .
- h) Hold point 8 - CGIA to witness the removal and cleanliness of the work site to ensure that all materials are removed from any tank or cofferdam

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, Lloyds Surveyor and onsite NACE inspector.

## 4.2 Testing

4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

4.2.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

### **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 All steel plate used for this specification shall be accompanied by mill certs. Lloyds Grade A or D or an agreed upon equivalent by the attending Lloyds Surveyor .

5.1.2 The Contractor must provide a coating application report, in PDF, to the Inspection Authority and the CGIA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the hull the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.

5.1.3 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.4 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.5 Signed approvals as per section 4.3

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A



# H-31 Sewage Buffer tank replacement

## 1. SCOPE:

The Intent of this specification is to fabricate and install a new buffer tank within the Sewage Treatment Plant compartment of the vessel. The tank will be secured to the framing/stringers at the outboard, forward end of the compartment between frames 32 & 36.

## 2. TECHNICAL DESCRIPTION:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crange, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be Contractor supply unless otherwise stated.
- 2.1.3 The vessel has a requirement to replace its failed in service Sewage Buffer tank. The tank is to be installed in the Sewage treatment Compartment within the Lower Deck area of the vessel, port side, between frames 32 and 36
- 2.1.4 Vessel engine staff shall pump down the old tank until suction is lost. Vessel engine staff will shut and isolate the existing piping at the valves, and isolate the level probe connections electrically. Contractor shall be responsible for disconnection and re-connection of all pipes, fittings and valves to the tank. Contractor shall fit blanks to any pipe openings.
- 2.1.5 The contractor shall be responsible for having the tank pumped out and flushed prior to cutting up the old tank. Contractor shall quote, on a separate line, on one (1) cubic meter of water for disposal which will be added to the bid price. This unit cost will be prorated and used for 1379 adjustment purpose.
- 2.1.6 The currently fitted buffer tank shall be considered as the template for fabrication. The contractor shall verify all dimensions and create a re-assembly plan as the tank must be re-built in sections. All tank ports witnessed on the "AS Fitted" tank with respect to location and size for piping and/or control fittings shall remain the same for the replacement tank. The drawing provided with this specification is not to scale and has only been provided so that the contractor may make accurate quotation decisions. BUF-R1-2018 is provided with the technical data package.
- 2.1.7 The contractor shall verify all dimensions. This tank was fabricated in place during the 2010 Drydock experience of this vessel.

- 2.1.8 The fitted buffer tank shall be dismantled and disconnected from all current piping and bracing connections. The currently fitted tank cradle and support structure shall remain in place such that ease of re-alignment for all piping connections is facilitated upon final re-assembly. The cradle shall be inspected by CGIA and contractor for any defects. If defective steel is found, it shall be reported immediately to the CGTA/CGIA. The contractor include an allowance of \$20,000.00 to conduct all repairs to all defects found which are deemed as necessary for repair by the CGTA. All repairs shall be approved by PSPC 1379 action with concurrence from CGTA. The contractor/CGIA may choose to reuse the currently fitted braces for the tank to various frames and stiffeners or replace with new.
- 2.1.9 Contractor shall remove all existing fittings that provide communication with the buffer tank pumps and any control accessories for the fitted tank. This includes the sightglass and level probe. Care shall be taken to store these items for future re-install onto the new tank. Any defects found as a result of contractor interaction in these saved fittings shall be responsibility of contractor to replace with devices/fittings approved by CG Inspection Authority.
- 2.1.10 The Probe attachment cover and the Inspection cover shall be retained by the Contractor for re-use with the new tank. These pieces shall not require too be re-fabricated. All stainless wing nuts used to secure these covers shall be retained by the contractor and reused.
- 2.1.11 All pipe spool connections to the tank shall be considered in good condition and will not be required for re-fabrication unless CGIA inspection reveals much interior wastage. PSPC 1379 action will be utilized to fabricate any tank connections spools.
- 2.1.12 Contractor shall use extreme care to protect the pumps, control stations and chlorine dosing equipment within the sewage compartment. Pictures of all components shall be taken prior to work commencement in this space to compare to the condition once all work is performed. These pictures to be submitted to CGIA prior to work starting in this space.
- 2.1.13 It is suggested that wooden plywood boxes be fabricated to give maximum protection to the components listed above.
- 2.1.14 Contractor shall make every effort to contain hotwork activity to the sewage treatment compartment. Preferred method of exhaust is the utilization of the escape trunk from the lower deck to the main deck and then out the porthole of Cabin 138 or 136 on the stbd side of the vessel.

- 2.1.15 The old tank is to be cut up, removed from the vessel, and disposed of in an approved manner. The removal route will be as follows. Deviations from this routing must be approved by CGIA.
- a) Out through the entrance, of the Sewage Treatment Compartment
  - b) Up the stairwell to the main deck.
  - c) Into the Central Stores compartment at FR 27-29 stbd side (locked space and contractor shall sign out keys from CGIA).
  - d) Up to the Upper Deck, stbd side, through the Stores hatch at frames 26-28
- 2.1.16 The subcomponents of this tank shall be fabricated off-site and then brought into the ship for assembly. The sub sections complete with all fittings and stiffeners are to be fabricated at shipyard metal fabrication shop and tacked together for inspection. Once approved by the CGIA, the contractor shall break down the new tank for transport. As much welding as possible shall be done at shipyard metal fabrication shop prior to the preparation for coatings as described below.
- 2.1.17 All material for tank sections, unless otherwise stated, shall be chosen from either of the two preferred choices stated here:
- 1) First preference -- Minimum 5/16" ASTM A283, or
  - 2) Second Preference -- Minimum 5/16" CSA 300W
- 2.1.18 The tank surfaces will be reinforced externally with 1 1/2" x 1 1/2" x 1/8" mild steel angle bar, scarfed at the ends. The locations are shown on the sketch. These will be stitch welded to the tank. The stitch pattern will be 2" with a 6" gap, alternating sides
- 2.1.19 All fittings shall be continuously seal welded both sides. All flanges shall be ANSI 150 steel of a bolt pattern and size to match existing piping connections. Grade 5 zinc dichromate coated UNC threaded studs of appropriate size for each pipe spool flange connection on the tank shall be installed into threaded holes for each flange connection. Bolts shall not be accepted for this connection of pipe spool to tank flange.
- 2.1.20 Contractor shall take every precaution to prevent damage to vessel passageways, alleyways, and bulkhead linings when transporting new and old tank sections. All damage to equipment, cabling, structure, and coatings is to be corrected to CGIA's satisfaction up to existing standards by the contractor and to their account.

- 2.1.21 Contractor shall fabricate two cover attachment rings (measure of 27.25" x 21" x 1" to match covers) that shall be installed for the new tank and shall be of the same opening dimensions as the original raised angle coamings. The saved inspection cover and probe cover must fit these rings. The currently fitted raised angle coamings shall not be acceptable for cover attachment on the new tank. The thickness of the rings shall be a minimum of 3/8" mild steel plate, both rings being full seal welded all around for their connection to the top plate of the tank.
- 2.1.22 The studs of the inspection and probe covers shall be 3/8" UNC, grade 316 stainless steel, and of a suitable length to include a 1/4" thick neoprene gasket. The studs are to be fixed to the attachment ring by UNC threaded attachment in blind holes and not by welding. The rings shall be drilled and tapped out to allow for the install of studs to secure the covers. Each cover will have 20 CSM grade 316 stainless steel –wing nut/stud assemblies. The two CSM 1/4" thick neoprene gaskets shall be cut to cover only the top surface of the attachment rings.
- 2.1.23 The tank sections with the required connections are to be fabricated off-site. All sections are to be approved upon completion by CGIA and once so, are to be abrasive blasted as per specification SSPC-SP10, "Near-White Blast Cleaning", to a profile depth of 1.5 - 2.0 mils.
- 2.1.24 Tank sections are to be transported back to the vessel and reassembled. Contractor shall assemble the new sections in the Sewage Treatment Compartment ensuring all piping alignments as being correct. Any changes in piping alignment shall be at the contractor's expense. The tank sectional panels shall be welded together using an appropriate full penetration process.
- 2.1.25 Once all welding has been completed, the tank openings are to be sealed off and the tank pneumatically tested at 2 psi for one (1) hour. The contractor is to supply all equipment required to carry out the test. CGIA is to be notified a minimum of four (4) hours prior to the start of the test.
- 2.1.26 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements. All defects to be corrected by contractor at contractor expense.
- 2.1.27 Upon completion of welding, inspection and testing of the new Buffer tank, all internal surfaces shall be prepared and painted as per Wasser Coating system. All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached). No Weldable primers shall be accepted as part of this coating application. The Contractor shall also follow the Wasser Moisture-Cured Urethane Ballast Tank Specification (attached). The Coating System is described below:

- a) One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- b) Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- c) An intermediate coat of Wasser MC -TAR RED (DFT 6mil)
- d) A topcoat of Wasser MC- BALLAST COAT BEIGE (DFT 4mil)

2.1.28 The exterior surfaces of the tank, including pipe connections, manhole, new/disturbed steel and the attachment points of the tank to the legs shall be prepared to a surface prep of SSPC-SP6 as applicable or as a minimum SSPC-SP3 prior to coating with the following paint schedule:

- a) One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams
- b) Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas
- c) One top coat of Wasser MC Luster 100, RAL 9003 White, (DFT 3-5mil) for the areas that are normally painted white

2.1.29 Once all coatings have fully cured the contractor shall reconnect any new and retained piping as well as the sight glass and level probe. Any retained fittings and covers shall now be re-installed. Contractor shall reconnect all valves, lines, fittings, and piping back to original with new suitable gaskets of DURALON 8500 as preferred material. Any threaded connections to the tank shall receive Thread sealant which is approved by CGIA, such as Loctite® 565 PST Threaded Pipe Sealant w/PTFE. Ship's crew will re-connect electrically the sewage probes, and reopen any valves that are required for commissioning.

2.1.30 All work shall be carried out to the satisfaction of the CGIA.

## 2.2 Location

2.2.1 The current fitted tank is located in the Sewage Treatment Compartment, forward end, between frames 32 & 36, Lower Deck level.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item.

2.3.2 This work shall be completed in the conjunction with the following spec items:

- i. GENERAL NOTES
- ii. H-04 "POTABLE WATER TANKS SURVEY"
- iii. H-09 "UPPER DECK STEEL REPAIRS"
- iv. H-27 "MAIN DECK FLOORING REPLACEMENT"
- v. H-28 "GEOCHEM- LAB STEEL DECK REPAIRS"
- vi. E-18 "VENTILATION MODIFICATIONS AND UPGRADES"

## 3. REFERENCES:

### 3.1 Guidance Drawings/Nameplate Data

3.1.1 The attached sketches are for guidance and bidding purposes only. The contractor shall verify all dimensions to ensure tank can be assembled in place and installed.

- a. CCGS Hudson Drawing BUF-R1-2018
- b. CCGS Hudson General arrangement drawing package
- c. Wasser Coatings Application Guidance package

### 3.2 Standards and Regulations

3.2.1 See General Notes-- references to Welding.

3.2.2 CCG Welding Specification n-eng CT-043-eq-eg-001-E

3.2.3 IACS –No.47 – Part "B" Ship Building and Repair Quality Standard.

3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.

### **3.3 GSM Furnished Equipment**

3.3.1 N/A

## **4. PROOF OF PERFORMANCE:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 – Upon removal of the existing tank CGIA shall witness all steel preparation prior to any fitment of new steel. Proper protection to components in sewage space applied by contractor
- b) Hold point 2 – CGIA inspection of tank cradle and pipe spools for defects prior to being approved for any re-use.
- c) Hold point 3 – CGIA shall witness the preparation and fitment of the steel tank sections at contractor facility prior to the tank being welded.
- d) Hold point 4 – Tank is welded and then CGIA shall witness testing as per Section 4.2 prior to work continuing.
- e) Hold Point 5 - Repair of noted defects. Apply another air test as required.
- f) Hold point 6 – CGIA shall inspect the inside of the tank prior to any coatings being applied.
- g) Hold point 7 - CGIA shall inspect the exterior surface prior to any coatings being applied
- h) Hold point 8 – Proper re-install of all fittings retained by contractor for re-use on new tank. These include the sightglass, tank probe, wing nuts and covers.
- i) Hold point 9 – Inspection of all components in the Sewage treatment compartment that were protected from contract work. Any defects noted to be brought forward to PSPC contract authority for negotiation on selected method of repair or replacement.

4.1.2 The Contractor shall use the Welding Test and Inspection plan as laid out in the CCG Welding Specification Section 5.6.

4.1.3 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.4 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

## **4.2 Testing**

- 4.2.1 Contractor shall complete NDT testing as per Para 2.1.26 of this specification
- 4.2.2 Contractor shall complete pneumatic air test of the tank to 2 psi as detailed at line 2.1.25.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 All NDT shall be carried out by a Level 11 or higher NDT certified technician

## **5. DELIVERABLES:**

### **5.1 Reports, Drawings, and Manuals**

- 5.1.1 Photos of work area to be taken prior to any work commencing in the space and given to CGIA in electronic format with Date stamp included on each photo.
- 5.1.2 All drawings created for the purposes of fabricating the replacement tank shall become the property of the Crown upon completion of this work package. Drawings to be presented in electronic format of both AutoCAD (read-write capable) and PDF versions
- 5.1.3 All steel plate used for this specification shall be accompanied by mill certs
- 5.1.4 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.5 The Contractor must provide a coating application report, in PDF format, to the Coast Guard Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the tank that the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.

### **5.2 Spares**

### **5.3 Training**

N/A



# HD-01 – Docking and Undocking

## 1. Scope

The intention of this specification is safely dock and undock the CCGS Hudson allowing access to the underwater hull section of the vessel and facilitate the work package included in this document.

## 2. Technical Description:

### 2.1 General

- 2.1.1 The vessel shall NOT be docked with any other ship for any part of the contract period in such a way that will interfere with its scheduled re-floating.
- 2.1.2 A docking plan shall be provided to the successful Contractor if required. The vessel's principal particulars are as follows:

#### **VESSEL PARTICULARS**

Length, Overall	90.4 m
Length, Between Perpendiculars	80.8 m
Breadth, Moulded	15.4 m
Depth, Moulded	9.1 m
Mean Draft, Extreme	6.3 m
Displacement, Light Op's Arrival	3766.55 L. Tons
Displacement, Extreme	4773 L. Tons

It is estimated that the drafts will be 6 meters aft and 5.7 meters fwd. at the time of docking

- 2.1.3 Contractor shall prepare blocks and necessary shoring to maintain true alignment of the vessel's hull and machinery throughout the work period.
- 2.1.4 Contractor shall prepare blocking to ensure that the vessels hull is a minimum of five (5) ft. above the dock at all points. This minimum height is required to allow adequate room for CCG Technicians to work on transducers and CGIA and Lloyds Representatives to carry out inspections.
- 2.1.5 The vessel shall be docked so that all docking plugs, transducers, anodes and sea inlet grids are clear and accessible. Contractor's Docking Master shall note the position of the transducers and drain plugs as noted on the Docking Plan drawing provided in order to avoid these from coming in contact with the keel and/or bilge blocks. If any hull fittings are covered, Contractor

shall be responsible for all labour and materials required for making corrective arrangements to drain tanks or move blocks to gain access to areas of specified work.

2.1.6 The Contractor shall be responsible for the safe transfer of the ship during all movements between berthing locations and docking blocks. During docking and undocking of the ship, radio contact is to be maintained between the vessel's Commanding Officer and the Contractor's Docking Master. Contractor shall include in their pricing the cost of any tug and/or pilot services required to safely complete this requirement.

#### 2.1.7 Tank Soundings

- (a) Prior to docking, the contractor shall complete sounding on all tanks. These sounding shall be witnessed by CGIA and the results recorded.
- (b) Prior to undocking all fuel tanks will be returned to the same levels as at the time of the original docking. When this has been completed, the tanks shall be sounded and recorded.
- (c) In each case, a Ship Condition Report shall be prepared by Contractor and signed-off by the Commanding Officer (or his representative), the CGIA and the Contractor's Docking Master. In each case, two (2) copies of the signed-off Ship Condition Report shall be given to Commanding Officer and CGIA for retention on the vessel, and one (1) copy is to be given to CGTA. A digital copy of this signed report shall be included in the deliverables package.
- (d) During the docking period, all fluid movements shall be noted and recorded. This record will be kept by CGIA, and signed by CGIA and a representative of the Contractor as events occur. At all times, Contractor shall give CGTA/CGIA a minimum of four (4) hours' notice of movement of fluids to/from the ship's tanks

2.1.8 Within two (2) hours of docking completion, Contractor shall commence cleaning the entire ship's hull and underwater appendages by high-pressure **fresh** water washing [Class 1: 345 Bar (5000 psi) maximum] to remove all marine growth and salt deposits, and allow preliminary inspection. This high pressure cleaning shall extend vertically from the keel to a line 7.6 meters (25 feet) above the keel, to the level of the Main Deck [Surface Area = 1695.5 m<sup>2</sup> (18,250 ft<sup>2</sup>)]. Once started, cleaning shall carry on continuously until completed.

2.1.9 TRANSDUCER FACES: All transducer faces on the underwater hull shall be effectively protected from damage using plywood cut outs to completely cover the face. These plywood cut outs shall be attached in such a way that it will withstand any sand blasting or ingress of foreign materials, but be easily removed without damage to coatings, transducer face or any of the adhesion surfaces. All protective covers shall remain in place for the duration of the dry-docking period unless they are required to be removed for scheduled work (HD-14 Transducer Inspections). Prior to re-floating, all coverings shall be removed and transducers shall be washed off with a mild liquid detergent / water solution to rid them of all contaminants and adhesive materials. After washing, Contractor shall rinse with clean fresh water to remove all soap residues.

2.1.10 Upon completion of the specified work, the vessel shall be undocked and moved to a safe berth. The vessel will require tugs for this movement.

## 2.2 Location

2.2.1 N/A

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- xxxii. HD-02 "UNDERWATER HULL"
- xxxiii. HD-03 "BUTTS & SEAMS"
- xxxiv. HD-04 "SEA BAYS AND SEA CHESTS"
- xxxv. HD-05 "MAIN SEA STRAINERS "
- xxxvi. HD-06 "SACRIFICIAL ANODES"
- xxxvii. HD-07 "CATHODIC & SEA BAY ANODES"
- xxxviii. HD-08 "SEA CONNECTIONS"
- xxxix. HD-09 "ANCHORS AND CHAINS"
- xl. HD-10 "CHAIN LOCKER"
- xli. HD-11 "TRANSDUCER INSPECTIONS"
- xl.ii. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
- xl.iii. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- xl.ii. HD-14 "RUDDER "
- xl.ii. H-03 "FUEL OIL TANKS SURVEY"
- xl.ii. H-04 "POTABLE WATER TANK TANKS SURVEY"
- xl.ii. H-06 "#2 D/BFUEL TANK REPAIRS"
- xl.ii. H-07 "#4 D/BFUEL TANK REPAIRS"
- xl.ii. H-10 "GALLEY DECK STEEL REPAIRS"
- l. H-11 "FREEZER ROOM DECK REPAIRS"
- li. H-21 "BOW THRUSTER VOIDS-STEEL REPAIRS"
- lii. H-25 "ENGINE ROOM FRAME REPAIRS"
- liii. H-26 "INSTALLATION OF BLACK AND GREY WATER O/B VALVES"
- liv. E-01 "PORT & STBD THRUST BLOCKS"
- lv. E-02 "INTERMEDIATE SHAFTS AND BEARINGS"
- lvi. E-04 "BOW THRUSTER PUMP AND MACHINERY"
- lvii. L-01 "BOW THRUSTER MOTOR SURVEY"

## 3. References

### 3.1 Guidance Drawings/Nameplate data

3.1.1 Drawing #E-G CCGS Hudson Docking Plan

3.1.2 Drawing #A-4 CCGS Hudson Capacity Plan

## **3.2 Standards and Regulations**

3.2.1 N/A

## **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 CGIA will require inspection of Block placement and all protected areas once underwater hull is exposed. Incorrect placement of blocks, inadequate height/clearance above dock or inadequate protective measures will be corrected at the contractor's expense.

4.1.2 CGIA will inspect the underwater hull on completion of cleaning as described in Para 2.1.8.

4.1.3 CGIA will inspect covering of transducer faces as per Para 2.1.9

### **4.2 Testing**

4.2.1 N/A

### **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables**

### **5.1 Reports, Drawings and Manuals**

5.1.1 Contractor shall provide the Ship Condition Report as described in Section 2.1.7 Tank Soundings section (c).

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

## HD-02 – Underwater and Above Water Hull

### 1. Scope

The intention of this specification is to perform a complete Hull inspection of the underwater and above water hull. All areas with defective coatings shall be prepped and painted as required.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 All staging, crange, screens, heaters, and other environmental control equipment, lighting and other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor.
- 2.1.2 As noted in paragraph 2.1.8 of Specification Item HD-01, the entire underwater hull shall be cleaned of all marine growth and salts by high-pressure fresh water washing. This work shall be scheduled to commence within 2 hours of completing the initial dry-docking.
- 2.1.3 After completion of cleaning, the underwater hull area shall be inspected by the CGTI and the attending Lloyds Surveyor. See Inspections section 4.1. This will be a general hull inspection for condition of hull steel, condition of butts and seams and coating deterioration. The Contractor shall provide a manlift and operator to allow the CGTI and the attending Lloyds inspector access to the higher areas of the Hull. The Contractor shall bid on sixteen (40) hours of manlift time for CGTA/CGIA and Lloyds to complete their inspections for this spec item. This cost will be broken out separately and added to the overall bid price. This cost will then be prorated to a per hour rate and used for adjustment up or down depending on the actual hours used.
- 2.1.4 The Contractor and the CGTA/CGIA shall discuss and agree upon a percentage of Hull to be blasted and coated prior to any work commencing. It is expected that several small areas of the Hull coatings will be negatively effected during internal tank and steel work. These areas will also be added to the total percentage.
- 2.1.5 Prior to painting, contractor shall Repair any damaged corroded areas to an SSPC –SP 10, feather the edges to min 2” to promote adhesion of the new coating. Any exposed epoxy in good condition should have a sweep blast to ensure the new coatings have anchor profile to adhere to.
- 2.1.6 Contractor shall utilize a **Quality Assurance (QA)** system during all phases of the specified work. As a minimum, this QA system shall include the measurement and/or recording of the following data:

- a) The batch numbers of all coatings with corresponding dates of manufacture.
- b) The type and quantity of any solvents added.
- c) The ambient conditions during all phases of coatings application.
- d) Surface profile measurements taken after completion of surface preparation.
- e) Surface contamination measurements, particularly chloride (salt) readings.
- f) Details of spray tips and pressures.

2.1.7 In addition to the specified QA system, Contractor shall note that CGTA will be using a third party NACE inspector who will be contracted directly by CG and will act as a Technical Representative for Canada for all surface preparation and coating application. The contractor shall provide 1 week notice to CGTA prior to the start of all painting so NACE inspector can be on site prior to the beginning of the paint application. NACE inspector shall monitor surface preparation, application and ensure complete, consistent coverage as well as monitor product storage and mixing to ensure manufacturers recommendations are being adhered to. Any rework required due to unacceptable preparation, application or failure to provide adequate notice for attendance will be corrected at the contractors expense.

2.1.8 All shell areas containing loose paint and/or bared steel shall be abrasive blasted to bare steel (SSPC-SP10) using copper slag, edges feathered back to a minimum of 150 mm, and blown clean with compressed air. Surface profile shall have a minimum roughness of 3 mils.

2.1.9 Underwater hull is defined by a straight line connecting a forward draft of 4.3 meters (14 ft.) to an aft draft of 5.5 meters (18 ft.). Contractor shall bid on abrasive blasting to bare steel and re-coating 180 meter<sup>2</sup>, which is approximately 10% of the underwater hull, up to the 5.5 meter waterline.

2.1.10 The bid price for items 2.1.9 and 2.1.20 shall be broken out as separate line items. These costs will be added to the global price and be prorated to a square meter price and used for PSPC 1379 adjustment purposes, the bid amount will be prorated to a square meter price and used for adjustment purposes.

2.1.11 On completion of abrasive blasting, the affected areas (m<sup>2</sup>) shall be surveyed by a Contractor's Representative and CGIA/CGTA. The surface area of bared steel shall be agreed upon, recorded and signed-off by all parties with copies of the document for each. See Section 4.1 Inspections.

2.1.12 All water inlet grid holes for the main sea bay system and the bow thruster inlets shall be reamed out clean. After cleaning all debris, including blasting grit, is to be removed from the sea chest and sea bays areas. This includes the main system and the bow thruster system. All surfaces of the inlet grids shall be painted, all over, as per the external underwater hull.

**FIRST COAT:** Contractor to quote on applying one coat of Intershield 300 Bronze @ 6mils to all bare metal (180 m<sup>2</sup>) of the hull area as described in Section 2.1.9 of this Specification Item.

**SECOND COAT:** Contractor to quote on applying one (1) coat of Intershield 300 Aluminium @ 6 mils, to all spots previously coated with Interhshield 300 Bronze, and areas of exposed epoxy that were given a sweep blast as per paragraph 2.1.1 of this specification. The bid shall be for 25% (450 m<sup>2</sup>) of the hull area and will included in the global price as well as priced separately. This price shall be prorated and be adjusted up or down once exact area is known.

**THIRD COAT:** Contractor to quote on applying one (1) coat of Intergard 263@ 3 mils to all areas coated with Intershield 300 Aluminium.

**FOURTH COAT:** Contractor to quote on applying one (1) spot coat of Interspeed 6200 @ 4mils to all areas coated with Intergard 263

**FIFTH COAT:** Contractor to quote on applying one (1) overall full coat of Interspeed 6200@ 4 mils to the Total underwater hull area 450 m<sup>2</sup>

- 2.1.13 New coatings shall be applied in full compliance with manufacturer's requirements to provide a finished coat of no less than 26 mil D.F.T. overall. Any shelters and heating required to meet the coating manufacturer's specifications shall be supplied by the Contractor and included in the bid price.
- 2.1.14 All draught marks, load line marks, and other underwater hull markings (e.g.: Transverse Bulkhead Frame Numbers) shall be given a fresh coat of white paint (CGSB # 513-101), INTERFINE 979 or, depending on weather conditions, an International Paints approved alternative.
- 2.1.15 All hull-mounted equipment such as anodes, reference electrodes, echo sounders, speed log, transducers, etc. shall be suitably protected against damage during cleaning of the hull and application of the coatings. Contractor shall be responsible for repair/replacement of any damaged items to the satisfaction of CGIA.
- 2.1.16 Contractor shall take measures to ensure that no damage, unnecessary cleaning or repairs, result from abrasive blasting and/or the application of coatings. Grit used for blast cleaning shall not be permitted to enter into any part of the vessel or its equipment. Contractor shall ensure that each and every opening into the vessel where sand or grit may gain ingress and potentially cause damage shall be suitably protected.
- 2.1.17 Measures shall be taken to ensure that application of coatings does not take place to surfaces or equipment other than those areas specified, and that the coating shall not block any inlets or discharges in the shell. All deck machinery shall be protected against grit, dust, overspray, and coatings.

- 2.1.18 Contractor shall plug deck scuppers and discharges and take any measures necessary to prevent water or other liquids from contaminating the areas of plating being coated or prepared for coating.
- 2.1.19 Contractor shall install and connect drain lines from the ship's sewage and grey water discharges. If ambient temperature is below freezing during the docking period, Contractor will ensure that these drains do not freeze. Electric heat trace tape or steam lines will be so employed to accomplish this.
- 2.1.20 In addition to the underwater hull prep and coatings as described in sections 2.1.1 to 2.1.19 the Contractor shall include in this specification the prepping and coating of 200 square meters of the above water Hull. The above water line will be determined from the defined underwater hull described in section 2.9 to the top of the bulwarks.
- 2.1.21 CGTI will determine the areas of the above water line to be coated as per Section 4.1 Inspections.
- 2.1.22 The above water Hull shall be prepared and coated, inspected and tested as in the under water Hull. Topcoat shall be Interthane 990 Coast Guard Red.
- 2.1.23 All work shall be to the satisfaction of CGIA and International Paints Rep.

## **2.2 Location**

- 2.2.1 Entire Exterior Underwater Hull

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items
- 2.3.2 This work shall be done in conjunction with the following Specification Items:
- i. HD-01 "DOCKING & UNDOCKING"
  - ii. HD-03 "BUTTS & SEAMS"
  - iii. HD-04 "SEA BAYS AND SEA CHESTS"
  - iv. HD-06 "SACRIFICIAL ANODES"
  - v. HD-07 "CATHODIC & SEA BAY ANODES"
  - vi. HD-09 "ANCHORS AND CHAINS"
  - vii. HD-11 "TRANSDUCER INSPECTIONS"
  - viii. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
  - ix. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"



- x. HD-14 "RUDDER "
- xi. H-03 "FUEL OIL TANKS SURVEY"
- xii. H-06 "#2 D/BFUEL TANK REPAIRS"
- xiii. H-07 "#4 D/BFUEL TANK REPAIRS"
- xiv. H-29 "ENGINE ROOM FRAME REPAIRS"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Drawing H-11-051 Sht 1 of 5 Profile STARBOARD SIDE

3.1.2 CCGS Hudson Drawing H-11-051 Sht 2 of 5 Profile PORT SIDE

3.1.3 Drawing #E-G CCGS Hudson Docking Plan

#### **3.2 Standards and Regulations**

3.2.1 All cleaning and painting shall be completed in compliance with the referenced NACE standards.

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance**

#### **4.1 Inspection**

4.1.1 The Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 24-hour notice prior to all testing and inspections.

4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA and the attending Lloyds Surveyor shall survey and inspect all Butts and Seams and clearly identify the areas to be repaired by the Contractor. The Butts and Seams repairs will be carried out in spec item HD-03 Butts and Seams.
- b) Hold point 2- CGIA will confirm all areas of the under water and above water Hull to be blasted and coated before the commencing of any such work.
- c) Hold Point 3- CGIA and NACE inspector will witness all steel under water and above Hull blasting and prep work prior to any coatings being applied.
- d) Hold Point 4 – CGIA and NACE inspector will witness thickness readings of each layer of coatings as identified in Section 4.2 Testing.

## **4.2 Testing**

- 4.2.1 Wet Film Thickness (WFT) gauge readings shall be taken on a regular basis during coatings application. A minimum of fifty (50) well distributed WFT paint thickness measurements shall be taken between each coat. The WFT measurements shall be recorded with locations referenced to a sketch of the ship. Un-witnessed measurements will not be accepted.
- 4.2.2 Dry Film Thickness (DFT) gauge readings: a minimum of fifty (50) DFT paint thickness measurements shall be taken between each coat as directed and witnessed by the Coast Guard Technical Authority (or delegate). The DFT measurements shall be recorded with locations referenced to a sketch of the ship. Un-witnessed measurements will not be accepted.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 All recorded information shall be typewritten in report form by Contractor. Two (2) copies of the Painting QA Report in pdf form shall be given to Chief Engineer, and one (1) copy shall be given to CGTA.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# HD-03 Butts and Seams

## 1. Scope

The intention of this specification is to repair the Butts and Seams on the ships Hull that are identified in the Under Water Hull Inspection as described in spec item HD-02 Underwater Hull section 2.1.3.

## 2. Technical Description

### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor.
- 2.1.2 Hull plate welding butts and seams shall be repaired as determined at the time of the hull plating survey by the Lloyd's Surveyor and the CGIA. The Hull Survey forms part of specification HD-02 Underwater Hull.
- 2.1.3 Eroded butts and seams shall be grit blasted and carbon arc gouged to sound metal and brought up to original level by welding using LLOYD'S approved welding techniques and materials.
- 2.1.4 The completed weld repair build up to ensure that the weld reinforcement does not exceed 3mm, that there are no valleys or grooves between individual weld beads (stringer technique), and that the weld toe blends smoothly into the base metal without undercut or overlap.
- 2.1.5 Contractor shall include a separate bid price for 1,500 single pass bead meters (4,921 bead feet). Contractor shall include in their bid all preparation required to complete the above work in the base price. This cost will be added to the bid price and prorated to a separate unit rate per bead meter for all gouging, surface preparation and repair welding inclusively PSPC 1379 adjustment purposes. Coatings shall be completed in conjunction with HD-02.
- 2.1.6 The Contractor shall ensure this work is completed prior to the painting outlined in spec item HD-02 Underwater Hull.
- 2.1.7 Contractor shall prime all bare areas as per Spec Item HD-02 Underwater Hull paint scheme.
- 2.1.8 Any tanks that require Tank Entry for this scope of work not already included in this specification, shall be LLOYD'S surveyed for inspection and accredited for 5 year survey.
- 2.1.9 Contractor shall use the unit cost to strip out the fuel tanks as specified in "H-03 FUEL TANKS".
- 2.1.10 Butts and seams shall be repaired in way of any fuel tanks will require these tanks to be emptied, cleaned, gas-freed and certified safe for hot work. Contractor shall provide a unit price for Gas-freeing "Safe for Entry" and "Safe for Hot Work" that will be included in the bid price. Cleaning,

gas freeing and certifying of tanks, if required for tanks other than those identified in specification H-03 will be unscheduled work.

2.1.11 Butts and seams shall be repaired in way of any ballast or void tanks will require interior paint work to be touched up in way of damage. Contractor shall use line item 2.1.10 unit costs for "Hot-Work" and "Safe for Entry". Contractor shall also provide a unit price per square meter for internal coating repairs and recoating. This unit cost will be multiplied by 30 m2 and added to the bid price. The unit costs shall include all surface prep and coatings required to meet the Wasser coating manufacture recommendations for ballast tank coatings. Adjustments will be made by 1379 once actual requirement are known.

## **2.2 Location**

2.2.2 N/A

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items.

- i. HD-01 "DOCKING & UNDOCKING"
- ii. HD-02 "UNDERWATER HULL"
- iii. HD-04 "SEA BAYS AND SEA CHESTS"
- iv. HD-06 "SACRIFICIAL ANODES"
- v. HD-11 "TRANSDUCER INSPECTIONS"
- vi. H-03 "FUEL OIL TANKS SURVEY"
- vii. H-04 "POTABLE WATER TANK TANKS SURVEY"
- viii. H-06 "#2 D/BFUEL TANK REPAIRS"
- ix. H-07 "#4 D/BFUEL TANK REPAIRS"
- x. H-25 "ENGINE ROOM FRAME REPAIRS"

### **3. References**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 Shell expansion drawing H-11-1051 Rev. 7 page 1

3.1.2 Shell Expansion Drawing No. 40

3.1.3 CCGS Hudson Drawing H-11-051 Sht 1 of 5 Profile STBD SIDE

3.1.4 CCGS Hudson Drawing H-11-051 Sht 2 of 5 Profile PORT SIDE

#### **3.2 Standards and Regulations**

3.2.1 N/A

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance**

#### **4.1 Inspection**

4.1.1 Contractor shall arrange for inspection as per the section 1.7.2 of the General Notes of this specification.

##### Inspection Hold Points

- a) Hold point 1- Contractor shall confirm the butts and seams to be rewelded with the CGIA/CGTA and the Lloyds Surveyor prior to any work being started. The actual Butts and Seams to rewelded will be identified during the Hull Survey conducted in Spec item HD-02 Underwater Hull.
- b) Hold point 2- CGIA and the attending Lloyds Surveyor shall inspect all gouging of existing welds prior to any welding being carried out.
- c) Hold Point 3- CGIA and the attending Lloyds Surveyor shall assess after the gouging is completed and verify with the Contractor the number of passes that will be required on each repair area.
- d) Hold Point 4 – CGIA and the attending Lloyds Surveyor shall visually inspect all completed weld repair areas upon completion of welding and prior to NDT.
- e) Hold Point 5 - CGIA and the attending Lloyds Surveyor shall witness all testing as per Section 4.2.

## **4.2 Testing**

- 4.2.1 The Contractor shall visually inspect all welds for proper size, contour, good appearance and freedom from excessive porosity.
- 4.2.2 The Contractor shall conduct NDT on all repair areas using Magnetic Particle Inspection method. All detected defects shall be cut out, re-welded and re-tested.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

# **5. Deliverables**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor will clearly identify locate any newly welded butts and seams on the Shell expansion drawing H-11-1051 Rev. 7 page 1 and provide CGTA one (1) copy in pdf.
- 5.1.2 Contractor shall provide the CGTA a pdf copy of all NDT results in report form clearly indicating the location of all tested areas by way of pictures and a minimum of 2 fixed measurement reference points.

## **5.2 Spares**

- 5.2.1 N/A

## **5.3 Training**

- 5.3.1 N/A

# HD-04 Sea Bays & Sea Chests

## 1. Scope:

The intention of this specification is to open up the Sea Bays and Sea Chests for LLOYD'S Survey and apply coatings as required by the CGIA and the attending Lloyds Surveyor.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Main Sea Bay and Sea Chests shall be opened up for LLOYD'S Survey.
- 2.1.2 Total volume of system is approximately 26.5 m<sup>3</sup>. Each Sea Chest, located port and starboard, are approximately same size, 6.6 m<sup>3</sup> each. Sea Bay, located between Sea Chests has a volume of approximately 13.3 m<sup>3</sup>. Total external measurements of combined spaces is 15.25m Width x 1.82m Height x 1.15m Length. Total internal area is approximately 250 m<sup>2</sup> including internal stiffeners.
- 2.1.3 Bow Thruster Sea Chest and discharge tunnels shall be opened up for survey by Lloyd's. Internal volume is approximately 10m<sup>3</sup>. Internal area is approximately 40m<sup>2</sup>.
- 2.1.4 All above Sea Chests and Main Sea Bay shall be opened up, scraped, and cleaned of all marine growth, scale, rust, and any deposits resulting from "Cathodic" protection system. Contractor shall remove and dispose of all dirt, debris, mud, scale, and other residue. Contractor shall be responsible for providing steam as required to effectively clean Sea Chests and Sea Bay and shall remove water which may freeze due to cold weather.
- 2.1.5 All holes in gratings shall be mechanically reamed-out. 100% of the surfaces in the sea bays and sea chests shall be prepared and painted as per Specification Item HD-02, "UNDERWATER HULL". This includes all grates
- 2.1.6 Bared areas of steel in Sea Chests and Sea Bay, including that found after de-scaling, shall be power-tool-cleaned to SSPC-SP-3 standard, and given two (2) coats of Amercoat 235, each of contrasting colour.
- 2.1.7 After all work is completed to satisfaction of CGIA and LLOYD'S Surveyor, access manhole covers to Bow Thruster Sea Chest, and between Starboard Sea Chest and Main Sea Bay shall be re-installed complete with new neoprene gaskets. Access grids shall be re-installed and their fasteners secured as per original method.

## 2.2 2.2 Location

2.2.1 Main Sea Bay and Sea Chests are located at (Frames 91 – 94) in the Engine room.

2.2.2 Access to Sea Chests is through grids located port and starboard. Access to Sea Bay is through a manhole located on inboard bulkhead of Starboard Sea Chest.

2.2.3 Bow Thruster Sea Chest are located at (Frames 176 – 186) in the Cargo Hold.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with the following Specification Items:

- i. HD-02 "UNDERWATER HULL"
- ii. HD-03 "BUTTS & SEAMS"
- iii. HD-04 "SEA BAYS AND SEA CHESTS"
- iv. HD-05 "MAIN SEA STRAINERS "
- v. HD-06 "SACRIFICIAL ANODES"
- vi. HD-07 "CATHODIC & SEA BAY ANODES"
- vii. HD-08 "SEA CONNECTIONS"
- viii. HD-11 "TRANSDUCER INSPECTIONS"
- ix. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
- x. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- xi. H-03 "FUEL OIL TANKS SURVEY"
- xii. H-06 "#2 D/BFUEL TANK REPAIRS"
- xiii. H-07 "#4 D/BFUEL TANK REPAIRS"
- xiv. E-08 "MAIN AIR RECEIVER INSTALLATION"
- xv. E-04 "BOW THRUSTER PUMP AND MACHINERY"
- xvi. L-01 "BOW THRUSTER MOTOR SURVEY"



### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 Drawing #E-G CCGS Hudson Docking Plan

#### **3.2 Standards and Regulations**

3.2.1 As per the requirement of the attending Lloyd's surveyor.

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 The Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 24-hour notice prior to all testing and inspections.

##### **4.1.2 Inspection Hold Points**

- a) Hold point 1- CGIA and the attending Lloyds Surveyor shall be notified for an inspection upon completion of descaling and cleaning of the Sea Chests and Sea Bays and prior any coatings being applied.
- b) Hold point 2- CGIA and attending NACE inspector shall conduct an inspection between each coat of coatings and witness all testing as described in section 4.2.
- c) Hold point 3- CGIA shall conduct a final inspection of the sea bays and sea chests upon completion of all applied coatings and testing. On the completion of this final inspection the Contractor shall immediately install the sea chest grates on each area and no further entry into these spaces should take place. In the event the sea chest grates are removed another final inspection shall take place.

#### **4.2 Testing**

4.2.1 Dry Film Thickness (DFT) gauge readings: a minimum of fifty (50) DFT paint thickness measurements shall be taken between each coat as directed and witnessed by the Coast Guard Technical Authority (or delegate). The DFT measurements shall be recorded with locations referenced to a sketch of the ship. Un-witnessed measurements will not be accepted.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 All recorded information shall be typewritten in report form by Contractor. Two (2) copies of the Painting QA Report in pdf form shall be given to CGIA, and one (1) copy shall be given to CGTA.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# HD-05 Main Sea Strainers

## 1. Scope:

The intent of this specification is to clean, prep and paint the Main Sea strainers and housings.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Two Main Sea Suction Strainers shall be opened up for survey by Lloyd's onsite inspector.
- 2.1.2 Each Main Sea Suction Strainer chamber is approximately 30" wide x 38" long x 32" deep, for an approximate internal volume of 21 ft<sup>3</sup>, each. Access to each is by a bolted cover located on top.
- 2.1.3 Strainer chambers shall be opened up, scraped, and cleaned of all marine growth, scale, rust, and any deposits resulting from "Cathodic" protection system. Contractor shall remove and dispose of all dirt, debris, mud, scale, and other residue.
- 2.1.4 Inlet and outlet piping, from Main Sea Suction Strainers to adjacent valves, shall be cleaned as described in line 2.1.3.
- 2.1.5 All holes in both strainer baskets shall be mechanically reamed-out, and baskets shall be cleaned as described in line 2.1.3.
- 2.1.6 Each Main Sea Suction Strainer chamber cover is secured by thirty-six (36) studs. Contractor shall note that one on the port side and five on stbd side are oversize from the original size which is 2" x ½" NC. Studs and securing nuts shall be cleaned and inspected for defects.
- 2.1.7 All bared areas of steel in way of strainer chambers, baskets, covers and adjacent piping, including that found after de-scaling, shall be power-tool-cleaned to SSPC-SP-3 standard, and given two (2) coats of Apexior Number 3® - Suitable for Submersion in Seawater.
- 2.1.8 Upon completion of all inspections as described in section 4.1 Inspections the Contractor shall, reinstall the strainer baskets and strainer covers shall be re-secured with new 3/16"-thick neoprene gaskets. Threads on fasteners shall be coated with anti-seize compound prior to re-assembly.

### 2.2 Location

- 2.2.1 These strainers are located beneath deck plates, forward of main engines, at frames 91 ½ and 93 ½. Port strainer is transversely located between #1 and #2 main engines, and starboard strainer is positioned between #3 and #4 main engines.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with the following Specification Items.

- i. HD-02 "UNDERWATER HULL"
- ii. HD-04 "SEA BAYS AND SEA CHESTS"
- iii. HD-05 "MAIN SEA STRAINERS "
- iv. HD-06 "SACRIFICIAL ANODES"
- v. HD-07 "CATHODIC & SEA BAY ANODES"
- vi. HD-08 "SEA CONNECTIONS"
- vii. H-03 "FUEL OIL TANKS SURVEY"
- viii. H-07 "#4 D/BFUEL TANK REPAIRS"
- ix. H-29 "ENGINE ROOM FRAME REPAIRS"
- x. E-08 "MAIN AIR RECEIVER INSTALLATION"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

3.1.1 N/A

### **3.2 Standards and Regulations**

3.2.1 N/A

### **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection:**

4.1.1 Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 24-hour notice prior to all inspections and testing.

#### 4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA and the attending Lloyds Surveyor shall survey and inspect the Main Sea Strainers upon completion of cleaning of strainers and prior to any applied coatings.
- b) Hold point 2- CGIA shall inspect the Main Sea Strainers upon completion of 1<sup>st</sup> coat of coatings. The Contractor shall not apply the 2<sup>nd</sup> coat of coatings until he receives written confirmation from the CGIA that the 1<sup>st</sup> coat is satisfactory.
- c) Hold Point 3- CGIA shall inspect the Main Sea Strainers upon completion of 2<sup>nd</sup> coat of coatings.
- d) Hold Point 4 - CGIA shall witness and confirm all fasteners are securely fastened on strainer covers prior to floating the ship.

4.1.3 Once the dock is flooded the Contractor shall complete a visual inspection along with CGIA to ensure all covers are watertight.

### 4.2 Testing

4.2.1 N/A

### 4.3 Certification

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

5.1.1 N/A

### 5.2 Spares

5.2.1 N/A

### 5.3 Training

5.3.1 N/A

# HD-06 Sacrificial Anodes

## 1. Scope:

The intent of this specification is to replace the bolt on and weld on anodes located on the ship's Hull.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor shall quote on installing thirty (30) 22 lb. zinc anodes, type Z 22 (11/2" thick x 14" long x 6 1/2" wide).
- 2.1.2 In addition, Contractor shall quote on installing fifteen (15) bolt on anodes. Anodes shall be "ALCHEMY" # P5B2 zinc bar anodes, bolt on type (2 strap) 24" x 3" x 1.25" (approx. 23.5 lbs each). These bolt-on anodes shall be installed exclusively in way of fuel tanks, to replace existing units. After completion of hull coating applications, all bolt-on anodes shall be secured in place following removal of protective materials from threads. Stainless steel 5/8" Diameter locknuts, SS lock-washers and SS plain washers shall be used to secure the anodes in way of each stud, with anti-seize compound applied to all threads.
- 2.1.3 Price of removal of existing anodes, surface preparation and painting of all disturbed steel prior to installation of new anodes shall be included in bid price. In addition, the contractor shall provide a unit price for supply, removal of existing, surface preparation and painting, and installation of one new anode of each specified type. This price shall be used to adjust up or down the cost of installations once actual amount required are confirmed.
- 2.1.4 Anodes located in Bow Thruster Tunnel will require removal of a grating. Grating shall be re-installed and fasteners secured upon completion of work.
- 2.1.5 Anodes required to be renewed shall be removed flush with hull. Disturbed area shall be ground smooth and clean. Removed anodes shall be disposed of by Contractor.
- 2.1.6 Anode with straps, or mounting studs as applicable, shall be welded in place.
- 2.1.7 Hull areas disturbed by removal and installation shall be re-coated as required by Specification Item # HD-02 "UNDERWATER AND ABOVE WATER HULL".
- 2.1.8 Anodes shall be protected during all painting and blasting. Upon completion of work all anodes shall be uncovered / cleaned prior to undocking of vessel.

## 2.2 Location

2.2.1 As a guide, the anodes shall be distributed, port and starboard, according to the following list:

<u>QUANTITY</u>	<u>LOCATION</u>
10	Bow Thruster
26	Rudder and Sternframe
24	Beneath line of removed Bilge Keels

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with following Specifications.

- i. HD-01 "DOCKING AND UNDOCKING"
- ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iii. HD-03 "BUTTS & SEAMS"
- iv. HD-04 "SEA BAYS AND SEA CHESTS"
- v. HD-05 "MAIN SEA STRAINERS "
- vi. HD-07 "CATHODIC & SEA BAY ANODES"
- vii. HD-10 "CHAIN LOCKER"
- viii. HD-11 "TRANSDUCER INSPECTIONS"
- ix. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
- x. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- xi. HD-14 "RUDDER "
- xii. H-03 "FUEL OIL TANKS SURVEY"
- xiii. H-06 "#2 D/BFUEL TANK REPAIRS"
- xiv. H-07 "#4 D/BFUEL TANK REPAIRS"
- xv. H-22 "BOW THRUSTER VOIDS-STEEL REPAIRS"
- xvi. H-29 "ENGINE ROOM FRAME REPAIRS"
- xvii. E-04 "BOW THRUSTER PUMP AND MACHINERY"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Drawing H-11-051 Sht 1 of 5 Profile STBD SIDE

3.1.2 CCGS Hudson Drawing H-11-051 Sht 2 of 5 Profile PORT SIDE

3.1.3 Drawing #A-4 CCGS Hudson Capacity Plan

#### **3.2 Standards and Regulations**

3.2.1 N/A

#### **3.3 Owner Furnished Equipment**

3.3.1 All Anodes will be CCG supplied.

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 12-hour notice prior to all inspections and testing.

4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA and attending Lloyds Surveyor shall inspect the Hull anodes and inform the Contractor which ones to change. This inspection may form part of the underwater Hull inspection. The Contractor shall not remove any anodes without approval from the CGIA.
- b) Hold point 2- CGIA and the attending Lloyds Surveyor shall inspect all newly installed anodes to ensure that all are in the properly located and secured.

#### **4.2 Testing**

4.2.1 N/A

#### **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.



## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 N/A

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

# HD-07 Cathodic and Sea Bay Anodes

## 1. Scope:

The intentions of this specification are to service the Cathodic Anodes and replace the Sea Bay Anodes.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Anodes in vessel's "CATHELCO" anti-fouling system shall be serviced and the sacrificial anodes within Main Sea Bay and Sea Chests shall be renewed.
- 2.1.2 Contractor shall obtain the services of a qualified "Cathelco" Field Service Representative. Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work on the "Cathelco" anodes under the direction and guidance of the FSR. Contractor shall include an allowance of \$5,000 for to cover expenses of a "Cathelco" FSR. The FSR will be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work. Allowance shall form part of the overall bid and shall be adjusted by 1379 action upon proof of final invoice. Contractor shall not exceed the \$5000 allowance unless written approval has been granted by the CTGA.
- Suggested FSR  
Jastram Technologies  
22 Trider Cres.  
Dartmouth N.S. B3B 1R6  
902-468-6450
- 2.1.3 "CATHELCO" system consists of two each MG120/610 anodes, and two each TC 120/610 anodes.
- 2.1.4 When the vessel is floated, FSR shall re-commission system and perform initial set-up as outlined in Section 4.1.
- 2.1.5 Contractor shall bid to install 10 (10) sacrificial zinc anodes, 26 lbs. One each, in port and starboard sea chests, one in each cell. Remaining anodes in Main Sea Bay shall be left as-is. Contractor shall quote a unit rate to install these anodes for PSPC 1379 Adjustment purposes.
- 2.1.6 Anodes required to be renewed shall be removed flush with the sea chest surface and the area to be ground smooth and clean to the standard described in item HD-04 "SEA BAYS AND SEA CHESTS". Removed anodes shall be disposed of by Contractor.
- 2.1.7 All Anodes shall be welded in place.

- 2.1.8 Area disturbed by removal and installation shall be re-coated as required by Specification Item # HD-04 "SEA BAYS AND SEA CHESTS".
- 2.1.9 All anodes shall be protected during all painting and blasting. Upon completion of work all anodes shall be uncovered / cleaned prior to undocking of vessel.

## **2.2 Location**

- 2.2.1 "CATHELO" are accessible at tank top in Engine Room, IWO ship's main sea bay at Frames 91-94.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be done in conjunction with Specification Items:
- i. HD-01 "DOCKING AND UNDOCKING"
  - ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
  - iii. HD-03 "BUTTS & SEAMS"
  - iv. HD-04 "SEA BAYS AND SEA CHESTS"
  - v. HD-05 "MAIN SEA STRAINERS "
  - vi. HD-06 "SACRIFICIAL ANODES"
  - vii. HD-11 "TRANSDUCER INSPECTIONS"
  - viii. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
  - ix. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
  - x. H-07 "#4 D/BFUEL TANK REPAIRS"
  - xi. E-08 " MAIN AIR RECEIVER INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 N/A

#### **3.2 Standards and Regulations**

3.2.1 N/A

#### **3.3 Owner Furnished Equipment**

3.3.1 All anodes shall be GSM

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 12-hour notice prior to all inspections and testing.

4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA and attending Lloyds Surveyor shall inspect the Sea Bay anodes and inform the Contractor which ones to change. This inspection may form part of the underwater Hull inspection. The Contractor shall not remove any anodes without approval from the CGIA.
- b) Hold point 2- CGIA and the attending Lloyds Surveyor shall inspect all newly installed anodes to ensure that all are in the properly located and secured and not painted over.
- c) Hold point 3- The FSR for the Cathelco Anodes shall remove and perform an inspection of all Anodes and reinstall them back in their relative locations prior to the ship being refloated and undocked.

4.1.3 The Cathelco FSR shall complete an in water assessment of the Cathodic Protection System once the vessel is undocked and in the water.

#### **4.2 Testing**

4.2.1 As required by FSR

### **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 FSR shall provide a written report outlining that cathodic protection has been adequately serviced and that the vessel is fully protected.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# HD-08 Sea Connections

## 1. Scope:

The intention of this specification is to overhaul and test several, sea suction and overboard valves as outlined below.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 Suction, discharge, de-icing and storm valves shown on the attached lists and sketch shall be opened up for inspection. Valves shall be surveyed by LLOYD'S are those that have a LLOYD'S field number beside them.
- 2.1.3 All valves shall be identified with brass metal stamped tags. Where applicable, the locations they are removed from shall be labeled with a similar tag while they are out for work. Valves shall also be identified as to orientation in which they are now fitted. Upon re-installation of valves, metal tags which were used to mark locations shall be turned over to CGIA. Tags fitted to valves shall remain affixed to valves after installation. Tags shall be secured with baling wire or equivalent.
- 2.1.4 Where applicable, according to paragraphs 2.1.1 and 2.1.2 of this specification item, valves shall be removed to Contractor's shore facilities, where they shall be disassembled, internally de-scaled, all components cleaned (both internal and external), and laid out for inspection. Each valve's components shall be effectively kept separated so that they cannot be mixed-up. Two 20" valves may stay aboard in lieu of removal from vessel.
- 2.1.5 Contractor shall bid on skimming valve seats and discs, and lapping them in, for all valves that are opened up for LLOYD'S survey.
- 2.1.6 The contractor include an allowance of \$5,000.00 to conduct any repairs to valves that have not been identified in this specification. This amount will be adjusted by a PSPC 1379 action. Repairs shall only be conducted by the Contractor with written authorization by the CGTA.
- 2.1.7 Ferrous internals of all valves shall be coated with a bitumastic compound, applied so as not to interfere with the operation of valve.
- 2.1.8 All disassembled valves shall be re-assembled in good working order with new packing and gaskets suitable for salt water service. All valve stem packing shall be coated with an anti-seize compound prior to installation.

- 2.1.9 All valves shall be re-installed in their original locations and orientations using new gaskets, suitable for salt water service. New cadmium plated fasteners shall be used to re-install valves after protective tape has been removed from mating flanges. Anti-seize compound shall be applied to threads of all fasteners.

## 2.2 Location

- 2.2.1 As seen in Table 3.1.1a and figure 3.1.1b below

## 2.3 Interferences

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

- 2.3.2 This work shall be carried out in conjunction with the following Specification Items:

- i. HD-01 "DOCKING AND UNDOCKING
- ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iii. HD-04 "SEA BAYS AND SEA CHESTS"
- iv. HD-05 "MAIN SEA STRAINERS "
- v. HD-06 "SACRIFICIAL ANODES"
- vi. HD-07 "CATHODIC & SEA BAY ANODES"
- vii. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
- viii. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- ix. H-03 "FUEL OIL TANKS SURVEY"
- x. H-07 "#4 D/BFUEL TANK REPAIRS"
- xi. H-29 "ENGINE ROOM FRAME REPAIRS"

### 3. References:

#### 3.1 Guidance Drawings/Nameplate data

##### 3.1.1 List of valves and a guidance drawing for locations to assist Contractor

SHIP #	FIELD #	DESCRIPTION AND LOCATION	SIZE
1	3LL110-01	SUCT – PORT MAIN BEFORE STRAINER – PORT – FR 93	20"
4	3LL110-02	SUCT – STBD MAIN BEFORE STRAINER – STBD – FR 93	20"
7	3LL110-03-1	SUCT – #1 ME – ENG RM – PORT – FR 92	6"
8	3LL110-03-2	SUCT – #2 ME – ENG RM – PORT – FR 90	6"
9	3LL110-03-3	SUCT – #3 ME – ENG RM – STBD – FR 91	6"
10	3LL110-03-4	SUCT – #4 ME – ENG RM – STBD – FR 90	6"
11	3LL110-04-1	SUCT – #1 SS – ENG RM – STBD – FR 95	4"
12	3LL110-04-2	SUCT – #2 SS – ENG RM – STBD – FR 97	4"
14	3LL110-04-3	SUCT – PROP MOTORS – CTR – FR 90	4"
38	3LL110-10-10	OVBD – STBD ME – PORT AFT – FR 66	6"
39	3LL110-1-9	OVBD – PORT ME – PORT AFT – FR 67	6"
41	3LL110-16	OVBD – SS GEN – PORT – FR 93	5"

Table 3.1.1



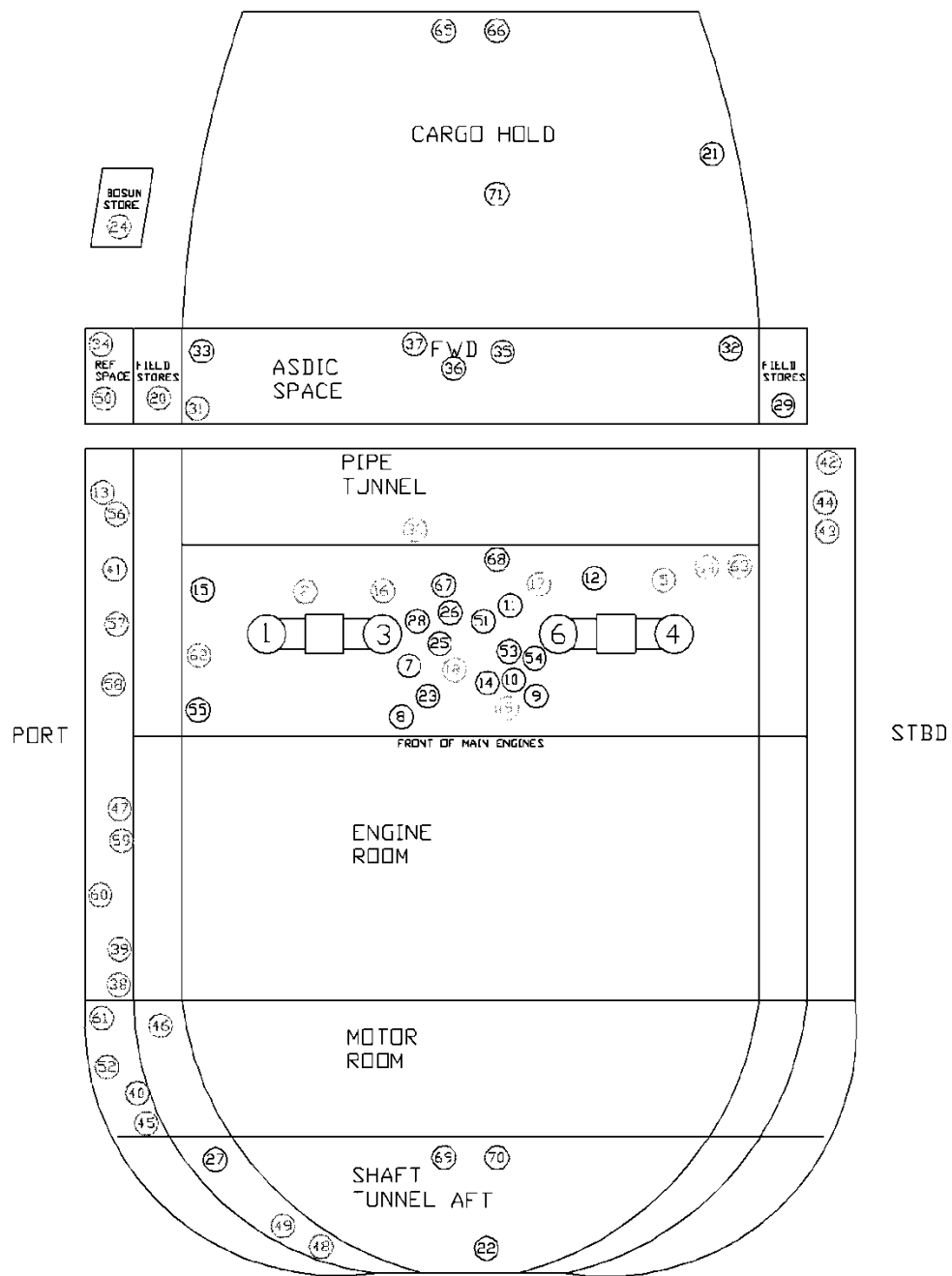


Figure 3.1.1b

## **3.2 Standards and Regulations**

3.2.1 All work is to be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor.

## **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 12-hour notice prior to all inspections and testing.

4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA will confirm that all valves are properly tagged as to their field number and location prior to removal from their location on the ship.
- b) Hold point 2- CGIA and the attending Lloyds Surveyor will inspect all disassembled valves and associated parts at the Contractors facilities prior to any valves being reassembled. The CGIA and the attending Lloyds Surveyor will instruct to the Contractor the recommended repairs for each valve during this inspection.
- c) Hold Point 3- CGIA and the attending Lloyds Surveyor will confirm all repairs completed prior to or after valves are reassembled as per required.
- d) Hold Point 4- CGIA will witness all testing as per 4.2 prior to any valves being reinstalled in the ship.
- e) Hold Point 5- CGIA will witness the correct installations of all valves with new gaskets and hardware as described in line 2.1.8. including the torquing of all bolt, studs and nuts.
- f) Hold Point 6- CGIA will witness with the Contractor an inspection of all valves as the dock is being flooded to ensure there are no leaks in the valves.

### **4.2 Testing**

4.2.1 All re-assembled valves shall be pressure tested to 4 bar (60 psi). CGTA shall be notified a minimum four (4) hours before testing begins. Each pressurized valve must be shown to hold test pressure for a minimum period of fifteen minutes.

4.2.2 Valves shall be tested for correct function during undocking and sea trials. All costs resulting from repair of a failed valve shall be Contractor's responsibility.

## 4.3 Certification

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

- 5.1.1 Each valve shall have a separate work sheet generated. All inspection notes, repairs, etc. shall be indicated on the work sheet. Contractor shall note how many turns of packing are removed from each valve. All work sheets shall be turned over to CGTA, in typewritten pdf form, upon completion of the work.

### 5.2 Spares

- 5.2.1 N/A

### 5.3 Training

- 5.3.1 N/A

# HD-09 – Anchor and Cable (Survey)

## 1. Scope:

The intention of this specification is to lay out the ships anchor and cables for Lloyd's inspection and survey credit.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 Contractor shall note the Chain Lockers HD-10 are also being surveyed and coated and should coordinate this spec item accordingly.
- 2.1.3 The contractor shall lower both the anchors and cables to the dock. Bitter ends shall be let go and cable ranged in the dock. Port anchor cable has ten (10) shots of chain and the starboard has eleven (11) shots. Contractor shall make arrangements for Lloyd's inspector to attend as per the "General Notes" and complete a survey of the cables and anchors for inspection credit.
- 2.1.4 The shot of chain presently attached to each anchor shall be unshackled from the anchors and the chain and shifted to the chain locker bitter end. This cost is to be included with the contractors bid. Contractor shall also include a unit price of removing and installing 4 joining shackles. This cost will be added to the global bid price in the Pricing data sheet and adjusted up or down depending on requirements after inspection.
- 2.1.5 Once all changes are made, the anchors and cables shall be completely sand-sweep for profile.
- 2.1.6 The Contractor shall measure the chain as per Lloyds requirement. All measurements shall be recorded in imperial form and a copy of all measurements taken shall be presented to CGTA/CGIA as per section 4. Inspections of this specification.
- 2.1.7 Chains shall be given one coat of preservative oil (both sides). The joining shackles and links that shall be painted for shot indication are not to be coated with oil. Painting to be done shortly after grit-blasting before chain can rust. These joining shackles and links shall be wrapped to prevent oil from covering them.
- 2.1.8 Both anchors shall be given two (2) coats of marine primer and two (2) coats of black marine gloss paint. Anchors shall be painted shortly after grit-blasting before chain can rust. Thickness measurements shall be taken between each coat of paint as per Section 4.2 Testing.

- 2.1.9 Bitter ends shall be re-secured and cable brought onboard. The CGIA is to be given 24-hour notice prior to bringing the anchor chain and anchors aboard. The Ship's crew will assist to operate the windlass and direct the stowing of the chain in the chain lockers. The contractor will provide the labor to stow the chain(s).
- 2.1.10 All work shall be carried out and completed to the satisfaction of CGIA, NACE and Lloyd's inspectors.

## **2.2 Location**

- 2.2.1 The shot of chain presently attached to each anchor in the chain locker.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be done in conjunction with the following Specification Items:
- i. GENERAL NOTES
  - ii. HD-01 "DOCKING / UNDOCKING"
  - iii. HD-02 "UNDERWATER HULL"
  - iv. HD-10 "CHAIN LOCKER"
  - v. HD-12 SEA CHEST GRATE ATTACHMENT RENEWAL"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 N/A

### **3.2 Standards and Regulations**

- 3.2.1 Inspection shall be completed to meet current Lloyd's requirements

### **3.3 Owner Furnished Equipment**

- 3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall arrange for inspection as per the section 1.7.2 of the General Notes of this specification.

#### **4.1.2 Inspection Hold Points**

- a) Hold point 1- CGIA and the attending Lloyds Surveyor shall inspect the anchor and chains after they are laid out on the dock as per line 2.1.2. This inspection shall take place prior to sand sweeping.
- b) Hold Point 2- CGIA and the attending Lloyds Surveyor shall review the measurements after the cables and anchors are sand swept. and re-inspect the chains and anchors.
- c) Hold Point 3- CGIA shall witness the chain being oiled as it is brought aboard as described in line 2.1.3.
- d) Hold Point 4- CGIA shall witness the rejoining of any shackles prior to the chain being brought aboard.
- e) Hold Point 5- CGIA and the NACE inspector shall witness the coating and thickness measurements of both anchors after each coat is applied as per 2.1.8.
- f) Hold Point 6- CGIA shall witness the joining of each anchor chain in the chain locker as described in line 2.1.9. prior to additional chain being brought aboard.

### **4.2 Testing**

4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work and in the final refit deliverables package.

### **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.2 Signed approvals as per section 4.3.1.

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

## HD-10 – Chain Lockers (Survey)

### 1. Scope:

The intention of this specification is to open up two (2) chain Lockers (Frames 195 – 200) for Lloyd's Inspection, survey and coatings.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall open up two (2) chain Lockers (Frames 195 – 200) for Lloyds Inspection, survey and coatings.
- 2.1.3 Prior to entering or working in the chain lockers, Contractor shall obtain the necessary gas-free certificates for entry or hot work as appropriate. These certificates shall be renewed in compliance with the Provincial regulations. At all times, copies of the certificates shall be posted at the point of entry to chain lockers with a second sheet given to CGIA.
- 2.1.4 The false bottoms of the chain lockers shall be removed and relocated as necessary to provide access to the work area. All items shall be re-stowed in good order on completion of the inspection and any re-coating.
- 2.1.5 The Contractor shall remove the false bulkhead panels in the chain lockers during the steel preparation and coating period. The panels shall be marked with metal tags wired to the panels prior to removal to ensure proper placement and orientation. Once the coatings have been applied and approved by CGIA the false panels are to be re-secured to their original placement. The panels are secured by bolts. Contractor shall apply never-seize to all fasteners upon re-installation. All bolts and fasteners to be replaced with new ones.
- 2.1.6 Contractor shall bid on steel preparation and coating for 100% of the total internal surface area of the two (2) Chain Lockers, removal bulkheads and the false bottoms identified in line 2.1.4. The total surface area of both Chain Lockers and false bottoms equals approximately 150 M<sup>2</sup>. Contractor shall prepare the steel to a standard of SSPC-SP10 Near- White Blast Cleaning. Contractor shall bid, as a separate line item that will be added to the global cost, on 150 sq meters of surface prep and coating. This cost will be prorated and used as a unit cost per M<sup>2</sup> for PSPC 1379 Adjustment up or down purposes once the actual amount of area to be dealt with is known.



- 2.1.7 All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached). The Contractor shall also follow the Wasser Moisture-Cured Urethane Ballast Tank Specification (attached). The Coating System is described below:
- All surfaces shall be cleaned with HOLDTIGHT 102 to remove any remaining salts.
  - One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - An intermediate coat of Wasser MC -TAR RED (DFT 6mil)
  - A topcoat of Wasser MC- BALLAST COAT BEIGE (DFT 4mil)
- 2.1.8 Following completion of all coating applications, the paint system is to be allowed to fully cure. The finished thickness is to be measured and recorded by the Contractor and witnessed by the CGIA or his delegated NACE inspector. The attending NACE inspector will also be taking readings to ensure adequate thickness is achieved. Measurements that are not witnessed by CGIA or delegated NACE inspector will not be accepted. Copies of all readings are to be given to the CGIA.
- 2.1.9 All surfaces and equipment affected by the work shall be suitably protected from damage during the work.
- 2.1.10 All dirt, debris etc. shall be removed and disposed of by Contractor in an approved manner.
- 2.1.11 Upon completion of inspections identified in section 4.1 the Contractor shall reinstall all previously removed bulkheads and false bottoms.
- 2.1.12 All fasteners shall be replaced with new fasteners as per original. Current bolts are grade 5.

## 2.2 Location

- 2.2.1 The Chain Lockers are located on the lower deck Port and Starboard between frames 200 and 195 as shown in drawing “5 Lower, Below Lower & Tank Top Decks” in TDP

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.1 This work shall be done in conjunction with the following Specification Items:

- vii. GENERAL NOTES
- viii. HD-01 - DOCKING/UNDOCKING
- ix. HD-02 - UNDERWATER AND ABOVE WATER HULL
- x. HD-03 - BUTTS & SEAMS
- xi. E-10 - MAIN REFRIGERATION SYSTEM REPLACEMENT

## **3. 3. References:**

### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Drawing, General Arrangement, Lower, Below Lower & Tank Top Decks drawing # H11-1051 sht. 5/5

### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

### **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

- 4.1.1 Contractor shall arrange for inspection as per the section 1.7.2 of the General Notes of this specification.
- 4.1.2 All work must be completed to the satisfaction of the CGIA and NACE inspector.
- 4.1.3 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.4 The contractor is responsible to obtain Lloyd's inspector sign off on the survey of the chain locker.

#### 4.1.5 Inspection Hold Points

- a) Hold point 1- CGIA will confirm that all bulkhead panels are properly identified prior to them being removed.
- b) Hold Point 2- CGIA, and the attending Lloyds Surveyor will inspect the chain locker after it is cleaned out and prior to surface preparations. The removable bulkheads and false bottom panels are to be removed prior to this inspection.
- c) Hold Point 3- CGIA, the attending Lloyds Surveyor and NACE inspector will inspect the chain lockers, removable bulkheads and false bottoms upon completion of steel preparation and prior to any coatings being applied.
- d) Hold Point 4- CGIA and the NACE inspector will inspect each layer of paint and witness all thickness measurements before the Contractor proceeds to the next coat of paint.
- e) Hold Point 5- CGIA and the NACE inspector will inspect the Chain lockers upon completion of installation of removable bulkheads and false bottoms prior to the anchors being stowed. Any coatings damaged during the installation of these items shall be repaired at the Contractors expense.

## 4.2 Testing

4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.

## 4.3 Certification

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer and NACE inspector.
- 5.1.2 Signed approvals as per section 4.3.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# HD-11 Transducer Inspections

## 1. Scope:

The Intention of this specification is to clean the Transducers and to provide Dockyard workers to assist DFO Science personnel to conduct their inspections of the Transducers.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 Contractor shall start this work within the first week of docking as DFO Science technical personnel shall provide guidance to Contractor in this spec item.
- 2.1.3 Contractor shall lower by chain falls and hand & power tool clean SSPC-SP2&3 the Vessel-mounted Acoustic Doppler Current Profiler (ADCP) Transducer (75KHZ). This ADCP transducer is mounted on a dedicated ram in Asdic Space. Transducer needs to be inspected by DFO Science personnel.
- 2.1.4 Contractor shall lower and hand & power tool clean SSPC-SP2&3 the Teledyne Benthos Acoustic Release Transducer (12KHZ). This transducer needs to have anodes renewed and be inspected by DFO Science technical personnel.
- 2.1.5 DFO Science shall return Transducers for re-installation one week before undocking is scheduled.
- 2.1.6 Contractor shall quote on a separate line, a cost for supplying two personnel for ten weekdays (8 AM to 5 PM) labour for cleaning, lowering, removing transducers and reinstall on an as requested bases for DFO Science technicians. This cost will be added to the global price and prorated to a per day rate for adjustment up or down by 1379 as required.
- 2.1.7 Contractor shall note that the recessed area where the transducers are located will be treated as part of the Hull and will be cleaned and coated as in HD-02 Underwater Hull.

### 2.2 Location

- 2.2.1 Acoustic Doppler Current Profiler (ADCP) Transducer (75KHZ), located between frames 151 and 156.
- 2.2.2 The Teledyne Benthos Acoustic Release Transducer (12KHZ). transducer is mounted on Main Ram between frames 111 and 121

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be carried out in conjunction with the following Specification Items:
- i. HD-02 "UNDERWATER AND ABOVE WATER HULL"
  - ii. HD-03 "BUTTS & SEAMS"
  - iii. HD-04 "SEA BAYS AND SEA CHESTS"
  - iv. HD-05 "MAIN SEA STRAINERS "
  - v. HD-06 "SACRIFICIAL ANODES"
  - vi. HD-07 "CATHODIC & SEA BAY ANODES"
  - vii. HD-08 "SEA CONNECTIONS"
  - viii. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
  - ix. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
  - x. HD-15 "INSTALLATION OF DOPPLER SPEED LOG"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 Drawing #E-G CCGS Hudson Docking Plan

### **3.2 Standards and Regulations**

- 3.2.1 N/A

### **3.3 Owner Furnished Equipment**

- 3.3.1 CCG will supply any Transducer related parts required for this spec item.

## **4. Proof of performance:**

### **4.1 Inspection**

- 4.1.1 The Contractor shall give the CGIA at least twelve (12) hours' notice prior to any inspections.
- 4.1.2 This inspection will form part of CCG test and inspection plan.
- 4.1.3 Work to be carried out to the satisfaction of the CGIA and the attending DFO Science Personnel.

#### 4.1.4 Inspection Hold Points

- a) Hold point 1- The Contractor shall notify CGIA for a visual inspection after the Vessel-mounted Acoustic Doppler Current Profiler (ADCP) Transducer (75KHZ) is cleaned as described in line 2.1.3.
- b) Hold point 2- The Contractor shall notify CGIA for a visual inspection after the Teledyne Benthos Acoustic Release Transducer (12KHZ) is cleaned as described in line 2.1.4.

### 4.2 Testing

4.2.1 N/A

### 4.3 Certification

4.3.1 N/A

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

5.1.1 N/A

### 5.2 Spares

5.2.1 N/A

### 5.3 Training

5.3.1 N/A

# HD-12 Sea chest grate attachment renewal

## 1. Scope:

The CCGS Hudson requires a total of five sea chest grates to have their threaded attachment lugs renewed as all are failing and threads have worn away.

## 2. Technical Description:

### 2.1 General

2.1.1 All staging, crange, heaters, and other environmental control equipment, lighting and other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.

2.1.2 The following is a table to state function and location of all sea chest grates that must have their attachment lug connection points replaced with new threaded lugs.

Function	Location	Number of lugs
Water quality Package sea suction	Fr 26 –stbd side –tank top level	4
Asdic Space Cooling Port	Fr 155 port side	4
Asdic Space Cooling Stbd	Fr 155 stbd side	4

2.1.3 At each location listed for 2.1.2, contractor shall remove the fitted sea chest grates and then proceed to remove all attachment lugs and prepare the surface for welding of a new lug.

2.1.4 The Contractor shall provide gas free for hot-work zones in the Shaft tunnel bilge area and the Asdic space of the vessel. Proper fire watches to be maintained in these areas when torch or welding work is being completed on the exterior hull.

2.1.5 It is not known at this time the particular thread specification for new threaded lugs but for bidding purposes –contractor shall consider that all lugs are to be threaded for a Standard NC thread of ½ inch diameter.





- 2.1.6 Contractor shall fabricate new threaded lugs from Lloyds Grade A plate or equivalent to match the hull steel.
- 2.1.7 All lugs shall be fitted by tack weld and the position of the grate inspected for its flushness with the hull by CGIA. Any defect in the fit shall be corrected by the contractor at this time.
- 2.1.8 All newly fabricated lugs shall be attached by full seal welding to exact locations to meet the original placement of lugs so that grates can be easily mounted with no requirement to modify the grates to fit the newly mounted lugs.
- 2.1.9 All grates must be inspected by CGIA once welding is completed for each individual position to re-confirm that the sea grates have attained acceptable position and that fasteners can be easily threaded into each lug.
- 2.1.10 All fasteners for all grates (including main sea chest grates) shall be renewed at this time as per original sample. For bidding purposes, contractor shall consider 36 counter sunk style head, 316 stainless,  $\frac{1}{2}$  NC, at 3.0" length. Allen Key actuation for turning the fastener shall be the only style accepted by CGIA. Actual size dimensions of the sea grate fasteners to be determined at time of removal of grates as the lengths and thread size may require an alteration to this suggested bidding size.
- 2.1.11 Once the final fit of the grates has gained approval –all lugs to receive MPI testing by qualified Level 2 NDT technician and report generated. Any weld defects found shall be corrected by contractor at contractor expense.
- 2.1.12 The main sea chest grates shall be lowered for survey of the threaded stand-off connections as indicated in the following table.

Function	Location	Number of Stand-offs
Main sea chest grate Stbd	Fr 91-94 –hull bottom plating Stbd	12
Main sea chest grate Port	Fr 91-94 –hull bottom plating Port	12



- 2.1.13 Contractor shall assess the condition of threads in each threaded stand-off for the main sea chest grate attachments and determine in conjunction with CGIA the total number of threaded stand-offs that require replacement. Contractor shall bid to replace 12 of these threaded stand-offs as per original sample –it is suggested that these attachment stand-offs are threaded  $\frac{1}{2}$  NC. Any additional stand-offs to be replaced shall be carried out by PSPC 1379 action.
- 2.1.14 Material for these threaded stand-offs shall be Lloyds Grade A steel or equivalent.
- 2.1.15 The stand-offs that are replaced shall be inspected for fit-up prior to full seal welding being applied to any stand-off. The fit of main grates must be inspected by CGIA once welding is completed for each individual position to re-confirm that the sea grates have attained

acceptable position and that fasteners can be easily threaded into each threaded stand-off without any requirement to alter the hole alignment of the main sea chest grates. See section 4.1 Inspections.

- 2.1.16 These stand-offs shall only receive full visual inspection of weld by Shipyard weld inspector and CGIA –any noted defects to be corrected by contractor.
- 2.1.17 All new and disturbed steel (this shall include any touch ups to the sea grates that were disturbed during removals) shall be prepared to SSPC-SP3 surface condition and the following coatings applied:
- i. FIRST COAT: Contractor to apply one coat of Intershield 300 Bronze @ 6mils to all prepared areas.
  - ii. SECOND COAT: apply one (1) coat of Intershield 300 Aluminium @ 6 mils, to all spots previously coated with Interhsield 300 Bronze
  - iii. THIRD COAT: apply one (1) coat of Intergard 263@ 3 mils to all areas coated with Intershield 300 Aluminium.
  - iv. FOURTH COAT: apply one (1) spot coat of Interspeed 6200 @ 4mils to all areas coated with Intergard 263
  - v. FIFTH COAT: apply one (1) overall full coat of Interspeed 6200@ 4 mils to the prepared areas of this work package for external new and disturbed steel.
- 2.1.18 All sea grates shall now be re-mounted to the hull and the stainless steel fasteners hardened up with marine grade never-seize applied to the threads. Each head of every fastener to be given a spot weld of Stainless weld to retain the fastener into final position.
- 2.1.19 Final inspections by the CGIA will be completed as per Section 4.1 Inspections.

## **2.2 Location**

- 2.2.1 See chart noted at line 2.1.1 of this specification.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Docking Plan Drawing #E-G-177

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 Contractor shall arrange for inspection as per the section 1.7.2 of the General Notes of this specification.

4.1.2 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

4.1.3 The contractor is responsible to obtain Lloyd’s inspector sign off on the survey of the chain locker.

4.1.4 Inspection Hold Points

- a) Hold Point 1- CGIA, and the attending Lloyds Surveyor will inspect all the stand offs after they are tacked in place as per line 2.1.7.
- b) Hold Point 2 - CGIA, and the attending Lloyds Surveyor will inspect all the stand offs after welded is completed and fitment is checked on all standoffs.
- c) Hold Point 3- CGIA, and the attending Lloyds Surveyor will witness all testing procedures as per Section 4.2 Testing before the Contractor proceeds with any additional work. Each test represents a Hold Point.
- d) Hold Point 4- CGIA and the attending NACE inspector will check each layer of coating after it is applied and before the Contractor proceeds to the next coat.
- e) Hold Point 5 - CGIA will witness the torqueing of all bolts upon completion of welding, inspections, testing and coatings.

- 4.1.5 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001.
- 4.1.6 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the CGIA.

## **4.2 Testing**

- 4.2.1 Contractor shall complete fit/alignment testing of the lugs and stand-offs prior to finalizing any seal welding to the hull.
- 4.2.2 Contractor shall complete NDT testing and visual testing as per Para 2.1.11 and para 2.1.16 of this specification

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 All steel plate used for this specification shall be accompanied by mill certs. Lloyds Grade A or equivalent.
- 5.1.2 The Contractor must provide a coating application report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.3 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

## **5.2 Spares**

- 5.2.1 N/A

## **5.3 Training**

- 5.3.1 N/A

# HD-13 Transducer Shaft Support Re-fabrication

## 1. Scope:

The CCGS Hudson requires a replacement shaft support system to be fabricated for the variable depth main pod transducer. In particular, the stuffing box that seals the main extension ram for the main pod has suffered excessive corrosion. As well, the flange that provides outer diametrical contact for the stainless turn buckles must be cropped off and renewed.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crange, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The vessel has a requirement to replace its failing in service support system for the main ram transducer package and must rely on a reference dwg from 1969 to describe most of this work. Contractor shall expect a certain level of unforeseen work to arise from this specification item as information to rebuild or the method to approach the work is not known to CGTA.
- 2.1.4 All known details of the work specified for this work package and "Item #'s" are derived from DWG title: Assembly & Installation Variable Depth Transducer C.S.S. Hudson (ME-4541) with a date of 24 Feb 1969.
- 2.1.5 The keel blocking clearances shall be met as per HD-01 Docking and Undocking in para 2.1.4 and are required to allow this work to progress. Contractor must ensure that the ship is positioned in a drydock with the maximum height of hull blocks. A minimum of a five foot clearance under the keel plate is required.
- 2.1.6 Once the vessel has received washdown on the hull, DFO Science technicians will assist the contractor to lower the main ram such that the transducer pod can be totally removed from the ram.
- 2.1.7 With CGIA present, the contractor shall record the time for the lower/raise operations to be completely performed –these times will be used as a comparison during the final operational testing of the unit for acceptance purposes.
- 2.1.8 The #3 DB fuel tanks and the Echo Sounder space (Frame Fr115 to Fr123) shall be made gas free for hotwork and maintained in this state for the entirety of this work.

- 2.1.9 Contractor shall clean within the hull cavity with fresh water applied by pressure washer to clean the steady arrangement of the ram and all surfaces within the hull cavity so that work may progress. Contractor must always use extreme care during cleaning to prevent damage to the transducer faces. Any damage incurred to transducer faces by negligent contractor involvement shall be repaired to meet approval of the CGTA or replaced at the contractors expense. Contractor shall take high definition pictures of all faces prior to commencement of any work in this area. CGIA will take pictures to compare for the completion of the work package.
- 2.1.10 Contractor shall assist DFO Science Technicians with the removal of the pod as shown in the reference drawing. The ram shall be lowered and the contractor shall build a supporting structure for the ram that shall remain in place while the pod is transported to the contractors machine shop. Contractor shall ensure the pod is placed in a clean work environment such that new transducers may be mounted in the pod and other modifications be completed prior to re-install of the unit. DFO science technicians will be responsible for releasing all electrical cables from the pod and ensuring that guidance is provided to shipyard staff so that proper handling of electrical cabling is performed throughout this process.
- 2.1.11 Additional to all scoped work in this specification, the contractor shall quote on supplying two personnel for and extra eight weekdays (8 AM to 5 PM) to assist with labour for cleaning, lowering, removing and reinstalling this main pod for DFO Science technicians. The cost of the contractors personnel will be calculated using the hourly rate as set out in the Pricing data sheet and included in the overall bid price. Any adjustments up or down shall use this hourly rate for assistance.
- 2.1.12 Once the main pod is safely out of the work zone for this spec, contractor shall remove all 12 stainless steel turn buckle steady gear in their entirety from the ring attachment between the shaft support assembly (item #5) and the attachment flange to the hull (item #4).
- 2.1.13 The contractor shall now raise the main ram as far into the vessel as possible to allow shaft support assembly (item #5) to be unbolted from the flange (Item #2) and thus be lowered to the dock. The packed glands on each side of the shaft support assembly (item #5)) shall be cleared at this time.
- 2.1.14 Access to the topside of the ram and all internal components is from the Officers Pantry on the Upper deck of the vessel, frame 112 to 114, centerline of vessel. Contractor shall open up this machinery space and make safe for hotwork. Contractor shall be responsible to remove all water in the base of the transducer well to allow access to the bottom of the well. Contractor shall include a separate cost for the removal of 5m3 of water for this action. This cost will be prorated and used for adjustment purposes. The Contractor shall include proper disposal of this water in their bid. If additional water is present a disposal certificate must be provided for adjustments.

- 2.1.15 DFO science technicians shall instruct the contractor on proper hydraulic, safety cable locks and electrical system disconnects from the ram such that the ram may be raised by crane hook being lowered through successive hatch openings from Wheel house top all the way down to the Officers pantry. Proper lock-out tag out procedure to be utilized for all isolated systems from the ram.
- 2.1.16 All hydraulic hoses shall be replaced for the entire hydraulic circuit to the power ram as well as all JIC connections to the power ram and all hydraulic valve or block components that are mounted below the second hatch of the transducer well. For bidding purposes the contractor shall be granted a \$5000.00 allowance to replace hoses, fittings and valve blocks for this system to be proven by invoice action. All new fittings shall be wrapped in DENSO tape upon install and re-assembly.
- 2.1.17 It is unknown at this time the proper method to raise the main ram and so every effort shall be undertaken to dismantle the ram system with the intention of safely for lifting the ram into a position where it shall be free and clear of the (#5 item).
- 2.1.18 Bolt Studs (item#33) must be removed from the packed interior gland and replaced with new 316 stainless steel for all 8 bolt studs, nuts and lock washers associated with this arrangement. The bolts with nuts and lock washers (at Item #28) shall be replaced with new 316 stainless steel fasteners.
- 2.1.19 Three Steady forks (at Item #68) must be removed to release the very top of the hydraulic power ram assembly. All steady forks shall be retained and stored and are to be used for re-installation. All fasteners for these connections (6 points in total) shall be replaced with 316 stainless clevis pins and 316 stainless cotter.
- 2.1.20 The contractor shall free the access hatch on the wheelhouse top. This hatch is unused and is currently corroded into position and painted over. This hatch requires replacement and the Contractor shall replace it as described in spec item H-29 Wheelhouse top Hatch Replacement. At the discretion of the Contractor this hatch may be removed prior to this specification being started.
- 2.1.21 All other hatches on the bridge, boat and upper deck level shall be opened to allow the main ram to be lifted with the hydraulic ram. A shore crane hook shall be lowered into the vessel through the hatch that is accessed on the Wheelhouse top..



- 2.1.22 The transducer ram assembly shall be totally removed from the vessel and sent to an accredited Chrome re-surfacing facility for repair of all gouges noted on the ram. Once gouges are repaired the ram shall be re-chromed. Contractor shall use care in the transport of this ram assembly and provide full support while the unit is secured to flatbed trailer so that no flexion of the ram is allowed to occur. Once at Chrome re-surfacing facility the transducer ram shall be separated from the hydraulic ram. Both the transducer ram and the hydraulic ram shall undergo re-chroming process.
- 2.1.23 The hydraulic seals of the power cylinder shall be inspected by accredited Hydraulic repair company and the power cylinder receive full overhaul as per original sample. Testing of the hydraulic power cylinder by performing operational shop test to normal system pressure shall be witnessed by CGIA prior to return of the ram assembly to the ship yard. System pressure to be determined by accredited Hydraulic technician as this data does not exist at this time for this system.
- 2.1.24 A \$30,000 allowance will be given to cover paragraphs 2.1.22 and 2.1.23 of this specification, as well as any other seal replacements, parts and/or other potential repairs. Contractor shall not exceed any allowances without written approval from the CGTA. All repairs that are extra to this specification shall be preapproved by the CGTA/CGIA prior to proceeding. Allowances will be settled by 1379 using invoicing provided by the sub-contractor.
- 2.1.25 The cylinder of the Hydraulic ram shall be totally stripped and prepared for paint. All fasteners for the cylinder shall be replaced with 316 stainless steel at this time. The cylinder shall receive the exact same coatings application as per the Transducer well below the level of the second hatch as seen at para 2.1.29.
- 2.1.26 The fasteners that secure Item #5 to the Item #2 flange shall all be released. All bolt stud arrangements as shown in detail "F" shall be replaced for all 24 locations with 316 stainless as per original sample dimensions. Contractor to note that 48 thread seals must be replaced for these bolt studs upon re-assembly.
- 2.1.27 The gasket removed from the face of Item #2 flange shall be replaced with 3/32 Garlock 3510 EPX Off-White sheeted gasket material (no exceptions) as supplied from TTL Supply of Dartmouth, NS.

Head Office: 78 Burbridge Avenue  
Dartmouth, Nova Scotia  
Canada B3B 0G7  
Toll-Free: 1.800.295-3365  
Local: 902.468.5202

2.1.28 Upon completion of steel preparation as described in line 2.1.29 but prior to coatings the Contractor shall take carry out NDT of the transducer well. In a separate line the Contractor shall bid on taking 100 ultrasonic shots. This price will be added to the bid price and prorated to a “per 20 shots” rate and used for adjustment purposes. The CGIA shall identify the exact areas where shots are to be taken. NDT shall be carried out by a Level 11 or higher NDT certified technician and final report shall clearly state the total number of shots taken.

2.1.29 The contractor shall prepare for painting, the entire surface area of the of the transducer well below the level of the second hatch (deck of Hydraulic equipment space). This surface prep and coatings shall include the ladder and all items attached in this space unless otherwise directed by CGIA. All surfaces shall be prepared to SSPC-SP6 and given the following surface application of coatings.

- a) Washdown of all surfaces with High pressure spray as per manufactures recommendations with Holdtight 102 to remove embedded salts
- b) One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- c) Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- d) A intermediate coat of Wasser MC -TAR Black (DFT 6mil)
- e) A top coat of Wasser MC-TAR Red (DFT 6mil)

2.1.30 The shaft support assembly is now ready for inspection and CGIA must be allowed to view all defects prior to any repair or fabrication proceeding. Contractor shall bid to replace the entire shaft support as per original sample dimensions and referenced with DWG ME-4556. All fabricated parts shall be constructed from Lloyds Grade A steel and seamless steel pipe for marine use. Contractor shall be extended the option to repair defective sections only. As an example, if inspection reveals that defects are localized to the lower end only, the repairs to the sections deemed to be still serviceable can be omitted and a credit will be negotiated by 1379. CGTA reserves the right to replace the unit in its entirety if they so deem fit regardless of inspection results. A detailed drawing of the Shaft Support can be referenced on DWG – ME4556-Shaft Support Variable Depth Transducer CSS Hudson.

2.1.31 Seamless steel pipe of appropriate wall thickness for marine use shall be used to repair any cylindrical segment of Item #5 or to replace the entire central tube of the shaft support. The pipe section must have appropriate wall thickness to allow machining of landing that positions the bearing in the upper and lower ends of the central tube. As per DWG ME4556 –the tube is stated to be 7.5” O.D. x 6” I.D.

2.1.32 All welding of the Shaft support section shall receive full visual and MPI non-destructive testing with a report generated. Any defects noted to be repaired at contractor expense.

2.1.33 Both bearings, one in the upper section and one in the lower section of Item #5 (see detail "D" and "C" of DWG ME-4541) shall be replaced with equivalent material, CGIA suggests Thordon XL bearing material sized appropriately for the ram.

2.1.34 The packing for each stuffing box of the Item #5 shall be replaced with ANTI-KEystone packing style 106 as per original dimensions. CGIA suspects 5/8 by 5/8 by 20 feet for bidding purposes.

2.1.35 Local Supplier of Anti-Keystone packing can be found by contacting the OEM as listed below:

New England Braiding Co Inc  
**Telephone:** 800-AKWORKS (800-259-6757)  
**Alt. Telephone:** 603-669-1987  
**Fax:** 603-669-4121  
**Email:** nebco@anti-keystone.com  
**Billing Address:**  
610 Gold Street, Manchester, NH 03103

2.1.36 The entire ring as indicated by Item #4 of the ref dwg shall be removed and a new unit fabricated for install from Lloyds GR A plate. Contractor shall pay attention to DWG note #1 that states "the Flange shall be held level within 1/8" at two diametrically opposite points". The flange will need to be fabricated in segments to fit into the cavity in the hull.

2.1.37 Item #4 shall not be welded into position until final fitment of Item #5 is achieved and all the steady arrangement turnbuckles are able to be attached in a concentric spoke pattern as per original. CGIA shall witness the fit-up of the components prior to any full penetration welding being applied to any area or piece.

2.1.38 Once the main ram is returned to the ship yard, contractor shall re-install into the vessel as per reverse order of disassembly and using all indicated new fasteners and gaskets.

2.1.39 Once the main ram is positioned into the Shaft support Item #5; contractor shall take all necessary steps to ensure proper fit and alignment of all pieces of the steady arrangement system. Once proper fit is achieved and witnessed by CGIA, then contractor must remove all the turn buckles so that welding is applied as per notation given on DWG ME-4541 to Flange Item #4.

2.1.40 Perform all welding of the flange Item #4 and then perform full visual and MPI inspection of the welding with a report generated. Any defects to be repaired at contractor expense

2.1.41 Contractor shall now attach 4 of type Z-22 zinc anodes (11/2" thick x 14" long x 61/2" wide ) within the hull cavity and not in way of the fully stowed position of the main transducer head and protect the zinc faces from coatings application.

2.1.42 All new and disturbed steel for external components shall receive the following coating application after preparation to SSPC-SP6 condition –the ram to be withdrawn or suitably protected so that chrome surface is not subjected to blast media:

- i FIRST COAT: Contractor to apply one coat of Intershield 300 Bronze @ 6mils to all prepared areas
- ii SECOND COAT: apply one (1) coat of Intershield 300 Aluminium @ 6 mils, to all spots previously coated with Interhsield 300 Bronze
- iii THIRD COAT: apply one (1) coat of Intergard 263@ 3 mils to all areas coated with Intershield 300 Aluminium.
- iv FOURTH COAT: apply one (1) spot coat of Interspeed 6200 @ 4mils to all areas coated with Intergard 263
- v FIFTH COAT: apply one (1) overall full coat of Interspeed 6200@ 4 mils to the prepared areas of this work package for external new and disturbed steel.

2.1.43 Any disturbed coating in the Echo Sounding Void area of the vessel shall receive the following coating application after preparing to SSPC-SP11 surface condition:

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii A top coat of Wasser MC -TAR RED (DFT 6mil)

2.1.44 All stainless steady gear can now be re-installed into position between the flange of the shaft support and the flange of the hull. All new 316 stainless cotter pins shall be used to secure the stainless clevis pins (Item#18) of each Rod Eye piece (Item #17 & Item #62)The upper and lower glands can now be re-packed with Anti-keystone packing style 106 and tightened appropriately as per direction of DFO Science staff.

2.1.45 The main ram is be lowered by DFO Science staff to the position for re-attachment of the transducer head and the yard shall assist with the re-attachment as required.

2.1.46 Full operational test of the ram is to be witnessed by CGIA and DFO Science Staff. Any noted defects to be corrected by contractor until the ram is witnessed to be functioning correctly. Final time to lower and raise shall be compared to original recorded measure.

## 2.2 Location

- 2.2.1 The main ram assembly is located on the centerline of the vessel at frame 112 to frame 114. It can be accessed from the Officers Pantry on the Upper deck level to allow workers passage all the way to the attachment of the of the shaft support and the internal packed gland.
- 2.2.2 The controls to raise and lower the ram are located within the Equipment space for this main transducer ram appliance at the top of the Transducer well space.

## 2.3 Interferences

- 2.3.1 This work shall be done in conjunction with the following Specification Items:
- i. HD-01 #DOCKING & UNDOCKING"
  - ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
  - iii. HD-04 "SEA BAYS AND SEA CHESTS"
  - iv. HD-06 "SACRIFICIAL ANODES"
  - v. HD-07 "CATHODIC & SEA BAY ANODES"
  - vi. HD-11 "TRANSDUCER INSPECTIONS"
  - vii. H-03 "FUEL OIL TANKS SURVEY"
  - viii. H-06 "#2 D/BFUEL TANK REPAIRS"
  - ix. H-29 "WHEELHOUSE TOP HATCH INSTALLATION"
- 2.3.2 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference item
- 2.3.3 All hatches that are required to be removed for lifting of the main ram shall be properly marked and barriers erected to prevent personnel from falling.

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

- 3.1.1 Guidance drawings of for this Transducer appliance work package are as follows
- a. DWG ME-4541
  - b. DWG ME-4556
  - c. DWg No.40 Shell Expansion
  - d. DWG No. 33 Profile and Decks

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS –No.47 – Part “B” Ship Building and Repair Quality Standard.

3.2.3 Contractor shall note that the transducer well for the location of the Main transducer ram and the Echo Sounding Compartment are both considered confined spaces by Coast Guard Safety Management.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a. Hold point 1 – Prior to disconnecting and isolating the Transducer Ram the Contractor shall record the time to lower and raise the ram with the CGIA and the attending DFO technician witnessing the test. These times shall be recorded and form part of the deliverables as per Section 5.
- b. Hold point 2 – CGIA will inspect the transducer Hull cavity after it is cleaned and witness the Contractor taking pictures of the ram and area prior to removal, as per line item 2.1.9.
- c. Hold point 3 – Prior to removal of the ram the Contractor shall confirm with the CGIA and the attending DFO technician upon completion of the transducer pod is safely removed and all hydraulic and electrical disconnects are completed.
- d. Hold point 4 – The CGIA will inspect the transducer ram and hydraulic ram once removed from the ship and laid out in the Contractors shop for inspection. At this time the CGIA will confirm the required repairs.
- e. Hold point 5 – CGIA will confirm all NDT completed before any coatings are applied as per line 2.1.27.
- f. Hold point 6 – CGIA and the attending NACE inspector shall witness all prep work prior to any coatings being applied. This shall be the case in all areas where coatings are applied.
- g. Hold point 7 – CGIA and the NACE inspector shall inspect each completed coat of paint prior to the Contractor applying the following coat. This shall be the case in all areas where coatings are applied.
- h. Hold point 8 – CGIA will inspect the shaft support assembly as per line 2.1.29.
- i. Hold point 9 – CGIA will witness all NDT of completed welds as per line 2.1.31.

- j. Hold point 10 – CGIA will witness the fit-up of all components as per line 2.1.35. prior to securely welding in place.
  - k. Hold point 11 – CGIA will confirm all anodes are securely installed as per line 2.1.39.
  - l. Hold point 12 – CGIA and the NACE inspector shall witness paint testing as described in Section 4.2.4 upon completion of each coat of paint.
  - m. Hold point 13– Upon completion of all work and inspections the Ram shall be functionally tested with the CGIA present as described in line 2.1.44.
- 4.1.2 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the attending Lloyds Surveyor and the CGIA.
- 4.1.3 All work shall be carried out to the satisfaction of the CGIA.

## **4.2 Testing**

- 4.2.1 The Contractor shall time the lowering and raising of the ram as described in Hold Point #1.
- 4.2.2 A full operational test of the main ram witnessed by CGIA and DFO Science staff once all re-assembly is completed.
- 4.2.3 The hydraulic ram shall be overhauled with new seals and tested in the Contractors overhaul facilities as per line 2.1.23.
- 4.2.4 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work. The testing of paint and application thickness shall be carried out in all areas of this specification where coatings are applied.
- 4.2.5 Contractor shall fill the equipment compartment with fresh water –up to the top level of the Algonquin Valve casing and inspect the flange and bolt thread seals from the exterior of the hull for the bolted connection of the Item#5 to Item #2 flange. Contractor shall repair any leakage found and remove the test water ashore once all testing is complete then apply heating fans to dry out the internal equipment space for the main ram. Contractor to bid on the removal of 5m<sup>3</sup> of water involved with this test.

## 4.3 Certification

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

- 5.1.2 All drawings created for the purposes of fabricating or repairing any portion of this Transducer assembly shall become the property of the Crown upon completion of this work package. Drawings to be presented in electronic format of both AutoCAD (read-write capable) and PDF versions.
- 5.1.3 All steel plate used for this specification shall be accompanied by mill certs. Lloyds Grade A is the suggested steel plate for this fabrication process.
- 5.1.4 The Contractor must provide a coating application report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.5 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.6 A complete Bill of Materials of all gaskets and hardware used to re-assemble this system shall be created for submission to CGTA.

### 5.2 Spares

- 5.2.1 N/A



## 5.3 Training

5.3.1 N/A

# HD-14 RUDDER – SURVEY ITEM

## 1. Scope:

The intention of this specification is to release the rudder from the vessel and transport back to the contractor's machine shop for inspection by Lloyd's inspector for survey credit.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Rudder shall be removed from the vessel to Contractor's machine shop. Its components shall be cleaned, measured as required, and laid out for inspection by Lloyds Surveyor and the CGIA.
- 2.1.3 Contractor shall fabricate and install four (4) steel eye pads on the ship's hull (1" thick, minimum), each suitable for supporting the weight of the rudder (approximately 12 L. Tons). The attached Hudson Drawing "Propeller and Rudder Lifting Arrangement" indicates the location for these eyes. The fabrication and installation and removal of all four eye pads shall be costed as a separate line item and will be included in the bid price. This costing will be prorated to a single eye pad installation and use for adjustment or credit by 1379 as required.
- 2.1.4 Prior to any hot work commencing, the After Peak Tank shall be certified gas-free.
- 2.1.5 The wrenches required for the palm bolts and pintle nuts shall be supplied by CGIA who shall sign them out to Contractor.
- 2.1.6 Prior to Contractor starting work, the rudder stock is needed to be zero helm from the Steering Gear Compartment. This testing procedure is described in Section 4.2 Testing.
- 2.1.7 Within 24 hours of being docked, the rudder drain plug shall be removed to check for the presence of water inside the rudder. The drain plug threads shall be cleaned up, coated with a suitable sealant and re-installed after the check for water has been completed.
- 2.1.8 Fairing cement around the top and bottoms of the six (6) rudder palm bolts shall be removed and renewed after reinstallation of rudder. The palm bolts, nuts, and their locations shall be marked prior to removal to ensure that they are re-installed in their original location.
- 2.1.9 Upper and lower rudder fairing plates shall be removed and stored, complete with securing hardware, in a safe location. Rudder guards in way of the three (3) pintle arrangements shall be similarly removed and stored.

- 2.1.10 Vertical gudgeon and pintle clearances shall be taken and recorded. Copies of the original, hand-written results of these measurements shall be turned over to Chief Engineer immediately and, in typewritten form with neat supporting sketches, as soon as possible thereafter.
- 2.1.11 Upper pintle locking arrangement and nut shall be removed, and the pintle shall be withdrawn. All parts shall be labeled as to location and removed to Contractor's shop, to be cleaned, and laid out for inspection.
- 2.1.12 Rudder shall be swung hard over to port and secured prior to removal of the palm bolts. The palm bolt securing devices shall be removed, then the nuts and bolts shall also be removed. All parts shall be labeled as to location and removed to the Contractor's shop, to be cleaned, and laid out for inspection.
- 2.1.13 Rudder shall be carefully turned to starboard by Contractor until the rudder's palm flange is clear of the rudder stock palm flange.
- 2.1.14 Two (2) lifting bars are required to support and lift the rudder. The lifting holes in the rudder are 4" Nominal Dia. pipe (I.D. = 3.152"). Lifting bars shall have a sliding fit within the rudder's lifting holes and have adequate strength to safely take the rudder's weight. The length of the bars shall be determined by the thickness of the rudder in way of the lifting holes (approximately 8" and 24", to be confirmed at ship in dock), and the method used to attach them on either end to lifting arrangements. Contractor shall supply the lifting bars which shall be turned over to CGIA upon completion of work.
- 2.1.15 Rudder shall be lifted clear of the lower two gudgeons and lowered to the dock. The rudder shall then be transported from the dock to the machine shop.
- 2.1.16 An air test shall be carried out to verify the watertight integrity of the rudder. The test shall be to a maximum of 2.5 psi gauge using an open ended manometer. The connection point will be the drain plug opening. The test shall be done for a period of 1 hour. Contractor shall notify the CGIA and the attending Lloyds Surveyor a minimum of 24 hours ahead of the time of the test so that it can be witnessed.
- 2.1.17 After a successful air test the rudder internals shall be coat with "FLOW COAT" Nox-Rust 9300 or CGTA approved equivalent. Coating shall be applied according to the manufacturer's instructions to attain a minimum thickness of 0.05 mil DFT. The temperature of the rudder shall be verified as being within the coating manufacturer's instructions by CGIA prior to the coating being applied. CGIA shall be given 24 hours notice of when the coat is to be applied. The internal surface area of the rudder is 32 M2. Coating product shall be put in the rudder drain plug, the drain plug installed, and the rudder rotated to allow the coating product to flow over all surfaces. The rotation of the rudder to coat all the internals shall happen immediately after the coating is put in the rudder and the drain plug reinstalled. After the rotation operation is complete and soaking time (as per manufacturer's instructions) has elapsed, the excess coating shall be drained from the rudder. The male and female threads of the drain

plug/recess arrangement shall be cleaned and a suitable sealant applied. Drain plug is then to be re-installed to seal the rudder internals.

- 2.1.18 Locking devices shall be removed from the lower two pintles which shall be removed after they are identified as to location. All parts shall be labeled as to location and removed to Contractor's shop, to be cleaned, and laid out for inspection.
- 2.1.19 Diameters of the gudgeons, and the pintles in way of gudgeons, shall be inspected and measured. Copies of the original, hand-written results of these measurements shall be turned over to the CGIA immediately. The results shall be provided in typewritten form, with neat supporting sketches. These sketches shall also be added to the final digital deliverables package in PDF and CAD format.
- 2.1.20 Once all inspections, measurements, and repairs are complete, all components shall be returned to the vessel and reassembled, as per their original locations, in good working order.
- 2.1.21 All securing devices shall be re-installed. CGIA/CGTA shall be notified when the securing devices are installed so they can be viewed.
- 2.1.22 Rudder guards and fairing plates shall be returned from storage and securely re-installed.
- 2.1.23 All rudder palm bolts shall be securely re-installed and cemented, top and bottom. All eye pads and temporary lifting arrangements shall be removed from the hull and rudder and returned, where required, to CGIA along with all tools issued to Contractor.
- 2.1.24 All disturbed paint work on the rudder and hull shall be power-tool-cleaned (minimum) and the entire rudder painted as per Underwater Hull specification HD-02.
- 2.1.25 On completion of the foregoing work, Rudder shall be functionally tested to ensure correct operation, and subjected to sea trials prior to the signing of the final acceptance document.

## **2.2 Location**

- 2.2.1 As per drawing

## **2.3 Interferences**

- 2.3.1 To be determined by contractor at vessel viewing prior to bidding. Any interference items are to be removed at contractor's expense and no extra allowances will be granted for removal of interference item.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. HD-01 "DOCKING & UNDOCKING"
- ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iii. HD-03 "BUTTS & SEAMS"
- iv. HD-04 "SEA BAYS AND SEA CHESTS"
- v. HD-06 "SACRIFICIAL ANODES"
- vi. HD-12 "SEA GRATE ATTACHMENT RENEWAL"
- vii. E-12 "STEERING GEAR"

### 3. References:

#### 3.1 Guidance Drawings/Nameplate data

3.1.1 See picture Fig. 1 below.



Figure 1

3.1.2 CCGS Hudson Drawing No.41 Rudder and Sternframe.

3.1.3 CCGS Hudson Drawing "Propeller and Rudder Lifting Arrangement"

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

## **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall arrange for inspection as per the section 1.7.2 of the General Notes of this specification.

4.1.2 All work must be completed to the satisfaction of the CGIA and attending Lloyds Surveyor.

4.1.3 The contractor is responsible to obtain Lloyd’s inspector sign off on the survey of the chain locker.

4.1.4 Inspection Hold Points

- a) Hold Point 1- CGIA, and the attending Lloyds Surveyor will inspect the Rudder and all components once cleaned up and prepared for inspection by the Contractor.
- b) Hold Point 2 - The Contractor shall notify the CGTI two (2) hours prior to the removal of the drain plug in the rudder. CGTI will witness the drain plug removal to check for the presence of any water. This check must be completed within 24 hours of docking
- c) Hold Point 3- CGIA, and the attending Lloyds Surveyor will witness all testing procedures as per Section 4.2 Testing before the Contractor proceeds with any additional work. Each test represents a Hold Point.
- d) Hold Point 4- CGIA will witness the application of the Flow Coat as per line 2.2.17.
- e) Hold Point 5- CGIA, the attending Lloyds Surveyor shall witness the measurement of the gudgeons, and the pintles as described in line 2.1.19. before any components are reassembled.
- f) Hold Point 6 – CGIA will witness the torquing of all bolts associated with the Rudder assembly.

- g) Hold Point 7- CGIA will inspect the cement box surrounding the palm bolts and the attachment of all guards upon completion of work.
- h) Hold Point 8- The Contractor shall return all tools borrowed from CCG for this spec item. CGIA will inform the Contractor in writing upon acceptance of the tools. This spec item shall not be considered completed until all tools are returned.

## **4.2 Testing**

- 4.2.1 Prior to Contractor starting work, the rudder stock is needed to be zero helm from the Steering Gear Compartment. The corresponding actual rudder position outside the vessel shall be sighted and measured by Contractor. The Contractor shall also time the rudder movement, mid-ships to Stbd and back to mid-ships and mid-ships to Port and back to mid-ships in seconds. A minimum of 4 hours' notice shall be given to CGIA prior to this measurement and CGIA shall be present while measurements are being taken. Copies of the original, handwritten results of both measurements shall be turned over to CGIA immediately and, in typewritten form, as soon as possible thereafter. All results shall be provided in digital pdf format as described in per Section 5 Deliverables
- 4.2.2 As per para 2.1.16 an air test at a maximum pressure of 2.5 psi shall be carried out for a period of 1 hour to verify the watertight integrity of the rudder.
- 4.2.3 Upon completion of all work and inspections the Contractor, with the assistance of CCG personnel will conduct a function test of the Rudder and take the same measurements as taken in line 4.2.1.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 All measurements and test results taken in this specification shall be recorded in type written format, imperial measurements and the results are to be turned over to CGTA in PDF format. Measurements and readings taken in the following line items shall form this report.
  - i Line 2.1.10 "Vertical gudgeon and pintle clearances shall be taken and recorded."
  - ii Line 2.1.19 "Diameters of the gudgeons, and the pintles in way of gudgeons, shall be inspected and measured"
  - iii Results of all testing as per Section 4.2.
- 5.1.2 Signed approvals as per section 4.3.1

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A



# HD-15 Installation of the Doppler Speed Log

## 1. Scope:

The intention of this specification is to replace the Sperry SRD 331 Speed Log installed onboard the CCGS Hudson. The Sperry SRD 331 has exceeded its lifetime and is no longer supported by Sperry.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached T1 Spec (Speed Log) included in the Technical Data Package (TDP).
- 2.1.3 Any discrepancies between this spec and the attached T1 spec the Contractor shall note this spec will take precedence. In the event of a discrepancy the contractor shall inform CGTA immediately and before any work is undertaken.
- 2.1.4 The Contractor shall note that the T1 spec has reference to the Chief Engineer. The word “Chief Engineer” shall be substituted in all cases to the CGIA.
- 2.1.5 All equipment removed by the Contractor as directed in this specification shall be handed over to the CGIA. The Contractor shall prepare a sign off sheet for this equipment and it shall be signed by both the Contractor and the CGIA upon hand over to CCG.
- 2.1.6 There will be a CCG Technical Representative available for assisting the Contractor in confirming equipment locations and identifying cabling and cable runs. The Contractor shall still go through the CGIA for any changes to the spec and through the CGTA for 1379's.
- 2.1.7 This spec contains an allowance not to exceed \$5,000.00 for the services of an FSR of the Naviknot 450 D System for testing as described in Section 4.2 Testing. This 1379 may be adjusted upon the CGTA approval and proof of invoicing.

2.1.8 Upon completion of all inspections and testing, all new and disturbed steel shall be prepared and Coatings shall be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below: External coatings shall be completed as per spec HD-02 Underwater and above Water Hull.

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

2.2.1 See T1 spec attached.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- I. GENERAL NOTES
- II. HD-01 - DOCKING/UNDOCKING
- III. HD-02 - UNDERWATER AND ABOVE WATER HULL
- IV. HD-03 - BUTTS & SEAMS
- V. HD-04 – SEA BAYS AND SEA CHESTS
- VI. H-10 - WHEELHOUSE TOP DECK REPAIRS
- VII. H-21 - BOW THRUSTER VOIDS STEEL REPAIR
- VIII. E-10 - MAIN REFRIGERATION SYSTEM REPLACEMENT

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 Dwg. 685-142-WD (Science GPS Data Distribution – Existing System)
- 3.1.2 Dwg. 685-145-WD (Old SRD 331 – Being Removed)
- 3.1.3 Dwg. 685-193-WD (Sailor GMDSS 6000 – Existing System)
- 3.1.4 Dwg. 685-198-WD (Danelec S-VDR – Existing System)
- 3.1.5 Dwg. 685-199-WD (New Furuno Radar/ECDIS – Installed this Refit)
- 3.1.6 Dwg. 685-203-WD (New Naviknot 450 D Speed Log – Installed this Refit)

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.
- 3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships
- 3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

#### **3.3 Owner Furnished Equipment**

- 3.3.1 See Section T1-13 of the T1 spec.

### **4. Proof of performance:**

#### **4.1 Inspection**

- 4.1.1 All work must be completed to the satisfaction of the CGIA and the CCG Technical Representative.
- 4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

#### 4.1.3 Inspection Hold Points

- a) Hold point 1- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.
- b) Hold Point 2- CGIA and the attending Lloyds Surveyor will inspect all weld through penetrations upon completion of welding and prior to any cables being run.
- c) Hold Point 3- CGIA and the attending Lloyds Surveyor will inspect the spool piece and new transducer sea chest when fitted and tacked welded in place. Final welding shall not start until this inspection is completed and approved by the above bodies.
- d) Hold Point 4- CGIA and the onsite CCG Technical Representative will witness the proper seating of the transducer and witness the measurement as indicated on line 15 on the excerpt from the Gate Valve Manual page 6 of 7.
- e) Hold Point 5- CGIA and the onsite CCG Technical Representative will witness the proper seating of the transducer and witness the final measurement after the transducer clamp is installed as indicated on line 20 on the excerpt from the Gate Valve Manual page 7 of 7.
- f) Hold Point 6- CGIA and the attending Lloyds Surveyor will inspect the final welding of the spool piece and transducer sea chest and witness all NDT as indicated in Section 4.2 Testing.
- g) Hold Point 7- All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- h) Hold Point 7- CGIA and the onsite CCG Technical Representative must be present to witness all testing and inspections completed by the FSR in Section 4.2 Testing.

## 4.2 Testing

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 The Contractor shall arrange for an OEM FSR to complete set to work, commissioning and calibration of the Naviknot 450 D system. Initial power up is to be performed by the FSR.
- 4.2.3 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.2 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer and NACE inspector.
- 5.1.2 Signed approvals as per section 4.3.
- 5.1.3 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# H-16 Aft Trim Tank Steel Modifications

## 1. Scope:

The intention of this specification is to make structural modifications to the Aft Trim tank to allow access to replace deteriorated sections of ballast piping and apply coatings.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall follow the attached specification "Structural Modifications to Improve Aft Trim Tank Access" by Lengkeek Engineering.
- 2.1.4 Any discrepancies between this spec and the attached Lengkeek specification the Contractor shall note this spec will take precedence.
- 2.1.5 The Contractor shall follow the attached Lengkeek spec and drawings to complete this scope of work.
- 2.1.6 Forward access to the trim tank is through a manhole cover in the aft end of the Aft Cofferdam.
- 2.1.7 Contractor shall make the Aft Trim Tank and Aft Cofferdam accessible by removing four (4) manhole cover(s). Inside of manhole covers and mating flanges shall be power tooled clean to a SSPC-SP3 standard. All Manhole cover studs shall be examined for defects; all defects shall be brought to the attention of CGIA.
- 2.1.8 Aft Trim Tank and Aft Cofferdam shall be mechanically ventilated with approved equipment. Tank shall be ventilated and certified as gas-free and "Safe for Entry and Hot work". Exhaust from venting tank shall NOT be ventilated inside the vessel. Contractor shall supply, operate, and maintain fans.
- 2.1.9 Contractor shall provide copies of all gas free and safe Entry and Hot work certificates to CGIA as well as be clearly displayed at all tank entry sites.
- 2.1.10 Prior to Dry-docking the Aft Trim Tank will be pumped down to minimum levels by Ships Staff. There will be 1m<sup>3</sup> of seawater remaining that will have to be removed by the Contractor. CCG suggests the Contractor remove this water as soon as practical once the Ship is in the Dry-dock to mitigate the chance of freezing. The Contractor is responsible for this removal of water regardless

if it is frozen or not. Contractor is responsible for all costs associated with the removal including but not limited to pumping, heating and/or treatment of frozen water.

- 2.1.11 The Contractor shall thoroughly clean and wipe down the tank to remove any and all grit, dirt, debris, or liquid contamination that may be present to enable the steel work to be carried out.
- 2.1.12 All insert sizes are approximate and the Contractor shall confirm all sizes prior to cutting and fitment. For bidding purposes, the Contractor shall bid on sizes as stated in this specification. Changes to insert sizes shall be adjusted with a PSPC 1379 action on approval from the CGIA.
- 2.1.13 The tank vent for the Aft Trim tank is located on drawing CCGS Hudson Drawing HUD-Vents Version "0". This vent is to be removed to perform the hydrostatic test. Upon completion of testing the afore mentioned vent shall be re-installed using new neoprene gasket material. All fasteners shall be mechanically cleaned and a marine grade anti-seize compound shall be applied to all fasteners.
- 2.1.14 Once the hydrostatic test is completed as per Lengkeek specification and to the satisfaction of CGIA and Lloyds Inspector, the Contractor shall empty, open up, re-ventilate, recertified gas-free and remove all remaining water from the tank. All removed water shall be disposed of by the Contractor in accordance with provincial environmental requirements.
- 2.1.15 Upon completion of welding, inspection and testing of the Aft Trim Tank all internal surfaces shall be prepared and painted as per Wasser Coating system specification guidelines for tanks available in the data package of this specification. All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached). The Contractor shall also follow the Wasser Moisture-Cured Urethane Ballast Tank Specification (attached). The Coating System is described below:
- i. All surfaces shall be cleaned with HOLDTIGHT 102 to remove any remaining salts.
  - ii. One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - iii. Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - iv. An intermediate coat of Wasser MC -TAR RED (DFT 6mil)
  - v. A topcoat of Wasser MC- BALLAST COAT BEIGE (DFT 4mil)
- 2.1.16 Contractor shall remove and reinstall manhole covers as required to complete the scope of work in this specification. On re-installation all manhole covers shall be power tool cleaned and receive new gasket material. All reinstalled fasteners shall be coated in anti-seize compound.
- 2.1.17 Upon completion all work is complete CGIA shall be given the opportunity to complete a final inspection. See section 4.1 Inspections.

## 2.2 Location

- 2.2.1 The location of the Aft Trim Tank is between frames #0 and #13 on the Main deck.
- 2.2.2 The manhole access is in the Steering Gear Compartment at frame #3.
- 2.2.3 Manhole locations are indicated on Drawing #001 CCGS Hudson Manhole Locations Layout.
- 2.2.4 Tank Vent locations are indicated on CCGS Hudson Drawing HUD-Vents Version "0"

## 2.3 Interferences

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be done in conjunction with the following Specification Items:
  - vii GENERAL General Notes
  - viii HD-01 "DOCKING AND UNDOCKING"
  - ix HD-02 "UNDERWATER AND ABOVE WATER HULL"
  - x HD-03 "BUTTS AND SEAMS"
  - xi HD-06 "SACRIFICIAL ANODES"
  - xii HD-14 "RUDDER SURVEY"
  - xiii H-02 "SEWAGE VACUUM TANK REPLACEMENT"
  - xiv E-02 "INTERMEDIATE SHAFTS AND BEARINGS"
  - xv E-12 "STEERING GEAR SURVEY"

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

- 3.1.1 See attached Lengkeek specification J18053 XXX
- 3.1.2 See Lengkeek Drawing Structural Modifications to Improve Aft Trim Tank Access J18053 XXX
- 3.1.3 CCGS Hudson Drawing After end Framing 120.16
- 3.1.4 CCGS Hudson Drawing #001 Manhole Locations Layout
- 3.1.5 CCGS Hudson Drawing HUD-Vents Version "0"
- 3.1.6 Wasser MC-Miozinc 100 Product Description Sheet



3.1.7 Wasser MC-Tar 100 Product Description Sheet

3.1.8 Wasser MC-Ballast Coat Product Description Sheet

3.1.9 Coatings- Wasser Paint Procedures

3.1.10 Holdtight 102 Product Description Sheet

3.1.11 Easy Prep Technical Data Sheet

3.1.12 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements.

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.

4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.3 In addition to any tests and inspections specified in the attached Concept Naval spec the following tests and inspections shall be carried out.

#### 4.1.4 Inspection Hold Points

- a) Hold point 1 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new plates tacked in place prior to any finish welding commencing.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.2.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness all weld testing as per Section 4.2
- e) Hold point 5 -CGIA and Lloyds Surveyor shall witness hydrostatic testing as per Section 4.2.3.
- f) Hold point 6 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.
- g) Hold point 7 - CGIA and NACE inspector shall witness the thickness readings of each coat of paint.
- h) Hold point 8 -CGIA and Lloyds Surveyor shall witness hydrostatic testing as per Section 4.2.3.
- i) Hold point 9 - Upon completion all work is complete CGIA shall be given the opportunity to complete a final inspection prior to the re-installation of manhole covers. Once final inspection is complete, contractor shall install new neoprene gaskets of original thickness and manhole cover shall be re-installed. If for any reason the manhole covers are removed the CGIA must complete another inspection

## 4.2 Testing

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.3 Upon completion of all inspection, testing and coatings the contractor shall perform an hydrostatic test with fresh water to the Aft Trim tk. In accordance to Lloyds requirements. All tests must be witnessed by the attending Lloyds Surveyor and the CGTI.

### **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is Lloyds Grade "A" or equivalent.

5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

## E-01 – Thrust Blocks (Survey Item)

### 1. Scope:

The intention of this specification is to open the port and starboard Thrust Blocks for inspection by attending Lloyd's surveyor and CGIA.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall obtain the services of an authorized Mitchell Bearing technician to oversee the work in this specification. The Contractor shall work under their guidance. There is a \$15K allowance for Mitchell Services with proof of invoice. This amount can be adjusted via a 1379 action upon written approval from the CGTA. See suggested contact info for Mitchell below:
- Guy Hickey  
Mitchell Bearings  
Sales Director  
001.717.792.6565 Direct dial  
Guy.Hickey@mitchellbearings.com
- 2.1.4 In addition to provide guidance and oversee the survey of the thrust blocks the Mitchell Representative shall provide a detailed report of all findings, measurements, inspections and testing. See Section 5. Deliverables.
- 2.1.5 The port and starboard Thrust Blocks are to be opened up for inspection by Lloyd's surveyor and CGIA.
- 2.1.6 Using Tool # 499C696 DK Gr. 1 (GSM), the contractor shall remove all oil scraper covers and oil scrapers.
- 2.1.7 In the presence of the CGIA and Lloyd's surveyor, all bearing wear down measurements shall be taken and recorded.
- 2.1.8 All oil scrapers and covers shall be cleaned and stored in a secure place until re-installed.
- 2.1.9 The top cover of each Thrust block shall be removed and secured in a safe area while the following work is done.

- 2.1.10 The internals and joining flanges are to be cleaned with lint-free wiping material and a suitable cleaning solvent. Particular attention shall be paid to the area in way of the top journal bearing housings.
- 2.1.11 The top and bottom halves of the journal bearings, along with the thrust pads, shall be removed as described in the instructions in the excerpt from the GE manual that is included with the TDP for this specification item. Components are to be identified as to location and orientation and witnessed by the CGIA during removal. A copy of identification documentation to be turned over to CGIA immediately upon completion of the removals.
- 2.1.12 All removed items shall be cleaned with lint-free wiping material and a suitable cleaning solvent. Components to be laid out for inspection and protected from contamination and damage while out of the casing.
- 2.1.13 Contractor to cover bases with clear plastic and the pressure lube oil systems are to be run, to verify correct operation. Any flow restrictions or leaks are to be noted and the CGIA informed.
- 2.1.14 The contractor will bid on the removal and disposal of 45 Imperial Gallons of Oil from the bases of each bearing. This oil shall be pumped out and disposed of ashore by the Contractor using a contractor supplied pump.
- 2.1.15 The surfaces of the shafts, including the thrust faces and oil slingers, and the internals of the bases are to be cleaned.
- 2.1.16 The oil seal drain holes are to be cleared and sealing face flanges shall be cleaned.
- 2.1.17 All dirt and debris shall be removed from the vessel and disposed of ashore by the Contractor. All cleaning shall be done with lint-free cleaning materials and suitable solvents.
- 2.1.18 The cooling coils shall be disconnected and removed from the bases. The coils shall be cleaned externally and internally. The internals shall be cleaned with SAF-ACID or similar CGTA approved product and be done by a loop flushing system. The flushing agent manufacturer's instructions are to be carried out fully. Unrestricted flow of water through the coil shall be demonstrated to the CGIA. The coils shall be pressure tested to 40 psi for one hour. The coils shall be re-installed with new seals, and reconnected in good order to the cooling water supply and discharge lines.
- 2.1.19 Corrosion Control: During all the foregoing work, all surfaces of disassembled parts shall be protected against corrosion with a suitable corrosion inhibitor. The Contractor shall note that any corrosion inhibitor applied must be completely removed prior to re-assembly.
- 2.1.20 The Contractor shall notify CGTA/CGIA and Lloyd's Surveyor a minimum of 24 hours prior to the units being ready for inspection.
- 2.1.21 On approval all bearings and components shall be reassembled in good order, according to the GE instructions supplied.

- 2.1.22 All surfaces must be completely cleaned of corrosion inhibitor, and all bearing surfaces shall be pre-oiled prior to assembly.
- 2.1.23 The alignment of all oil seals, locating dowel pins, and top covers to bearing housings is critical, and should be done with extreme caution. If failure occurs due to improper installation the contractor shall repair, replace and reassemble any failed components at their own expense.
- 2.1.24 Contractor to fill bearing sump with 45 Imperial Gallons of CCG-supplied Esso Terreso 68 oil.
- 2.1.25 The entire shaft lines, including thrust blocks, shall be tested and proven correct during the Sea Trials.
- 2.1.26 All work shall be carried out and completed to the satisfaction of the CGIA, CGTA and Lloyd's Surveyor.

## **2.2 Location**

- 2.2.1 The port and Stbd Thrust Blocks are located in the Lower Motor Room.

## **2.3 Interferences**

- 2.3.1 This work shall be done in conjunction with the following Specification Items
  - i. HD-01 "DOCKING & UNDOCKING"
  - ii. HD-08 "SEA CONNECTIONS"
  - iii. HD-11 "TRANSDUCER INSPECTIONS"
  - iv. H-02 "SEWAGE VACUUM TANK REPLACEMENT"
  - v. H-03 "FUEL TANK SURVEY"
  - vi. E-02 "INTERMEDIATE SHAFTS AND BEARINGS"
- 2.3.2 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 Technical information is attached. See sections 2.9, 15, and 16 of the GE manual, along with applicable drawings and photos.

## **3.2 Standards and Regulations**

3.2.1 Inspection shall be completed to meet current Lloyd's requirements.

## **3.3 Owner Furnished Equipment**

3.3.1 Tool # 499C696 DK Gr. 1

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Hold point 1 – Prior to disassembly in the presence of the CGIA and Lloyd's surveyor, all bearing wear-down measurements shall be taken and recorded.
- b) Hold point 2 – Prior to disassembly in the presence of the CGIA and Lloyd's surveyor, thrust clearances on both the Port and Stbd Thrust blocks must be taken prior to disassembly and again upon completed assembly. These readings are to be confirmed and witnessed by the CGIA and attending Lloyds Surveyor. Readings to be recorded and form part of final report as described in Section 5. Deliverables.
- c) Hold point 3 - The top and bottom halves of the journal bearings, along with the thrust pads, shall be removed as described in the attached instructions. Components are to be identified as to location and orientation and witnessed by the CGIA during removal. Pictures and supporting documentation to be recorded form part of final report as described in Section 5. Deliverables.
- d) Hold point 4 - The internals of the cooling coils shall be cleaned with SAF-ACID or similar CGTA approved product and be done by a loop flushing system. The flushing agent manufacturer's instructions are to be carried out fully. Unrestricted flow of water through the coil shall be demonstrated to the CGIA.
- e) Hold point 5 – Prior to reassembly The Contractor shall notify CGTA/CGIA and Lloyd's Surveyor a minimum of 24 hours prior to the units being ready for inspection.
- f) Hold point 6 – Prior to reassembly The Contractor shall notify CGTA/CGIA and Lloyd's Surveyor a minimum of 24 hours prior to the units being ready for inspection

4.1.2 The contractor is responsible to obtain Lloyd's inspector sign off on the survey of the Thrust Blocks.

## **4.2 Testing**

- 4.2.1 The Bearings shall be tested, approved and receive Lloyd's credit during sea trials. Trials will consist of an operation run-up and checking of all temperatures and pressures during the dock trials and Sea trials at various loads as required by the Mitchell FSR.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.2 The Mitchell FSR must be an authorized technician for Mitchell Bearings.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 Contractor shall provide the CGTA a complete FSR report in pdf form consisting of all findings, inspections, measurements, parts replaced, testing and any recommendations for future work for both the Port and Stbd thrust bearings.
- 5.1.2 Signed approvals as per section 4.3.1

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A



## **E-02 – Intermediate Shafts and Bearings – Survey Item**

### **1. Scope:**

The intention of this specification is to have both Forward and after Intermediate Shafts and bearings, on both the port and Starboard sides, opened up and made ready for Lloyd's inspection.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 The Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crantage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall carry out this specification in direct correlation with Spec Item E-17 Muff Coupling Fitted Bolt Replacement.
- 2.1.4 Contractor shall remove two (2) Muff coupling guards (port and starboard) These guards shall be marked for location and orientation and once removed, the Guards shall be placed in a secure storage area and protected from damage until reinstallation.
- 2.1.5 Prior to the any couplings or flanges in this specification being "released", all coupling bolts and nuts shall be identified to correspond with the holes in each half of the coupling. Failure to properly identify coupling fitted bolts and nuts may result in the requirement to machine new ones. If this happens, all new bolts and nuts shall be fitted and machined at the contractors expense. CGIA shall witness all marked bolts to verify their position prior to removal.
- 2.1.6 Prior to the forward and after intermediate shafts being released they shall be suitably supported by use of wide nylon straps. This strapping shall allow them to hang free from couplings but still be accessible for CGIA and Lloyds surveyor inspections.
- 2.1.7 The contractor shall release the Muff coupling (at frame 30) between the tail shaft and after intermediate shaft of each side. The Contractor shall remove all fitted bolts on both the Port and Stbd Muff couplings to release the intermediate shafts. Contractor shall exercise caution not to disturb the fitted Muff coupling on the Tail shaft. See picture below



- 2.1.8 The Contractor shall remove the Port and Stbd flange guards that are situated at frames #43 and #56 on each side, four (4) in total. These guards shall be marked for location and orientation and protected from damage.
- 2.1.9 The Contractor shall mark all fitted bolts and nuts connecting the shafting flanges together prior to removal. The CGIA shall witness all markings prior to any bolts being removed. See Section 4.1 Inspections.
- 2.1.10 The Contractor shall then remove all fitted bolts on the shaft flanges located at frames #43 and #56 on both the Port and Stbd shafts. The picture below shows the aft section of the Stbd Intermediate shaft.
- 2.1.11 Flanges between the forward intermediate shaft and the propulsion motor shaft of each side are to be "released".



- 2.1.12 Bulkhead packing glands located on the after bulkhead (frame 51) of the Motor Room shall be opened up, cleaned, and laid out for inspection by LLOYDS Survey.
- 2.1.13 All fitted bolts and nuts on the Port and Stbd shaft flanges shall be inspected by the CGIA and attending Lloyds inspector. The Contractor shall include in his bid price an allowance of \$5000.00 for bolt refurbishment or replacement. This price can be adjusted via a PSPC 1379 action upon written approval of the CGTA.
- 2.1.14 Top covers of the four (4) COOPER SPLIT ROLLER BEARINGS (11½" shaft diameter) shall be permanently marked to show position and alignment. CGIA shall witness this marking prior to cover removal, and the method of identification shall be turned over to CGTA in typed PDF document. . Upon approval from CGIA, the top covers shall be removed. The bottom halves of the bearing housings are not to be disturbed as the alignment is presently good.
- 2.1.15 Top and bottom bearing halves shall be separated, the top halves lifted clear, and the bottom halves rolled out. As described in paragraph 2.1.9 of this specification, each bearing half is to be permanently marked as to its location and orientation. CGIA shall be present during the disassembly. Contractor shall mark the bearing halves at the first opportunity that presents itself during the disassembly. The method of identification shall be turned over to CGTA in typed PDF Document.
- 2.1.16 All internal components of the bearings shall be removed to Contractor's facility and completely cleaned of all grease, dirt, and debris using lint-free wiping material. Once cleaned,

they shall be laid out for inspection and suitably covered and protected from damage and contamination until they are re-installed.

- 2.1.17 The bearing surfaces and the surfaces of the shafts shall be given a light coat of corrosion inhibitor. They shall then be suitably wrapped and stored in an area that will prevent damage and corrosion while they are out of the bearing housings.
- 2.1.18 Contractor shall arrange for LLOYDS and CGIA inspection when suitable.
- 2.1.19 Once all inspections have been completed, all components shall be returned to the vessel and re-installed in good working order, as per the original installation. If there is any delay in returning the bearings to the vessel, the contractor shall proceed to protect them as per para 2.1.12 while they are stored waiting for installation.
- 2.1.20 Approximately nine (9) cartridges of new grease shall be required for Contractor to repack each bearing. Contractor shall inform the CGIA prior to application of the new grease for a final inspection of the components. The new grease shall GSM
- 2.1.21 Top covers shall be re-installed in good order, as per original. All coupling bolts shall be re-installed and witnessed by CGIA to be in their proper location. Once approved, all coupling bolts shall be hardened up and torqued to the appropriate pressure. All securing devices shall be installed and witnessed by CGIA.
- 2.1.22 Bulkhead packing glands shall be re-assembled with new packing material that has been approved by the CGTA.
- 2.1.23 All dirt, debris, grease, solvents, and cleaning supplies shall be removed by the Contractor and disposed of ashore.
- 2.1.24 Entire shaft lines shall be tested and proven correct during the Sea Trials.

## **2.2 Location**

- 2.2.1 Intermediate shafts and bearings are located at both port and starboard sides of the engine room/motor room between frames 55 and 30.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING & UNDOCKING"
- iii. HD-08 "SEA CONNECTIONS"
- iv. HD-11 "TRANSDUCER INSPECTIONS"
- v. H-02 "SEWAGE VACUUM TANK REPLACEMENT"
- vi. H-03 "FUEL TANK SURVEY"
- vii. E-01 "PORT & STBD THRUST BLOCKS SURVEY"
- viii. HD-16 "AFT TRIM TANK STEEL REPAIRS"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 N/A

#### **3.2 Standards and Regulations**

3.2.1 Inspection shall be completed to meet current Lloyd's requirements

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Hold point 1 - CGIA shall witness all fitted bolts are adequately marked to show their position prior to removal. This includes the Port and Stbd Muff coupling bolts and all shaft flange bolts.
- b) Hold point 2 - Bulkhead packing glands located on the after bulkhead (frame 51) of the Motor Room shall be inspected by CGIA and Lloyd's once opened, cleaned and laid out for inspection.
- c) Hold point 3 - Top covers of the four (4) cooper split bearings shall be marked and witnessed by CGIA prior to being removed.
- d) Hold point 4 – CGIA shall be present during the disassembly of the four (4) cooper split bearings
- e) Hold point 5 – Contractor shall arrange for inspection by CGIA and Lloyd's surveyor for all bearings, components and shafts. This includes are shaft flangenuts and fitted bolts.

- f) Hold point 6 – CGIA shall be present for the repacking of all bearings
- g) Hold point 7 – The reinstallation of all fitted bolts shall be witnessed by CGIA prior to being torqued. Actual torquing of bolts shall be witnessed by CGIA

4.1.2 The contractor is responsible to obtain Lloyd’s inspector sign off on the survey of the Intermediate shafts and bearings

## **4.2 Testing**

4.2.1 Testing of all components shall take place during sea trials and final approval and acceptance shall be granted by CGIA/CGTA at that time

## **4.3 Certification**

4.3.1 Lloyd’s approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

5.1.1 Signed approvals as per section 4.3.1

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

## E-03 Ventilation Ductwork, Galley Exhaust and Fan Cleaning

### 1. Scope:

The intention of this specification is for the Contractor to clean all ductwork, fans, intake plenums, recirculation plenums, louvers and dampers associated with the following shipboard ventilation systems described below.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 Contractor shall note that the three (3) Accommodation Supply fans #1, #2 and #3 are being replaced as described in spec. item H-09 HVAC Fan Unit Replacement. Cleaning described in this spec will cover all aspects of the ventilation system except for the new HVAC units. The new units will be cleaned as part of spec. item H-09.
- 2.1.3 CCG will assist the Contractor to lock out all systems prior to work commencing.
- 2.1.4 The Contractor shall schedule the work in this specification to happen in the last two weeks of the Refit period. Contractor shall ensure all interference specifications included this Refit package are complete prior to the start of this specification.
- 2.1.5 The following Ventilation Systems shall be cleaned:

Fan	Location
Accommodation Supply Fan #1	Bridge Deck Port Frames 90-93
Accommodation Supply Fan #2	Boat Deck Port Frames 76-82
Accommodation Supply Fan #3	Boat Deck Starboard Frames 76-82
Crew's Laundry Supply Fan #8	Main Deck Aft
Galley & Pantry Supply Fan #9	Lower Deck Starboard Frames 136-140
Toilet Exhaust Fan, Main & Lower Deck	Bridge Deck Frame 40-42
Toilet Exhaust Fan, Upper, Boat & Bridge Deck	Wheel House Deck Frames 125-127
Laundry Exhaust Fan #15	Aft Deck Frames 4-5
Galley and Pantry Exhaust Fan #14	Upper deck Starboard Frames 104-106
Paint Locker Exhaust Fan	Lower Deck Port Frames 181-183
Galley Range hood and Exhaust	Main Deck Frames 111 to 132

Table E-03-1

- 2.1.6 Ductwork between heaters and space outlets shall be cleaned as well as all other ductwork associated with the above noted systems. The three (3) accommodation fans

located on Bridge and Boat Decks supply all the ships' accommodation air supply. Each of these units has an electric heating system and a cooling system, which run off chillers

- 2.1.7 All intake and discharge fixtures shall be removed and cleaned
- 2.1.8 All re-circulating air intake plenum intake screens shall be removed and cleaned.
- 2.1.9 All re-circulating and fresh air intake louvers shall be cleaned and free operation proven. All louver gates shall be lubricated with suitable aerosol product. Any defects with operation of the gates shall be brought to the attention of CGIA.
- 2.1.10 Operation of all fire dampers, in all ductwork, shall be proven correct and witnessed by CGIA. Signage for each fire damper shall be verified as correctly identifying open and closed position of each respective damper.
- 2.1.11 All galley exhaust, range hood, ductwork, and fan, shall be completely degreased by suitable means. Any removed sludge/residues shall be properly disposed of by Contractor. Fan shall be electrically isolated, disconnected and removed from air ducting to facilitate cleaning and inspection.
- 2.1.12 Existing access patches in ductwork shall be used. If additional access openings are required to enable a full and proper job, Contractor will be responsible for making same. All new and disturbed openings in ductwork, on completion of cleaning, shall be closed and sealed with approved fire rated materials. Plastic plugs and/or flammable sealants shall not be used. Any existing, non-fire rated materials found in use for such applications shall be replaced with proper, approved materials by Contractor.
- 2.1.13 During all phases of the cleaning operation, Contractor will provide supervisory personnel to accompany employees at all times while working in vessel's accommodation areas and cabins.
- 2.1.14 All accumulated dirt, debris, and cleaning materials and solvents shall be removed from the vessel and disposed of in an approved manner according to applicable regulations.

## **2.2 Location**

- 2.2.1 Fans units are Located in locations as stated in Table E-03-1 of section 2.1.1 of this specification.



## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with the following Specification Items:

- i. H-09 "UPPER DECK STEEL REPAIRS"
- ii. H-10 "GALLEY DECK STEEL REPAIRS"
- iii. H-12 "WHEEL HOUSE TOP DECK STEEL REPAIRS"
- iv. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vi. H-17 "GALLEY REFURBISHMENT"
- vii. H-19 "CABIN DECKING REPLACEMENT"
- viii. H-20 "CHIEF COOKS CABIN REBUILD"
- ix. H-22 "PORT & STBD FAN ROOM STEEL REPAIRS"
- x. H-24 "DECK VENT INSTALLATION"
- xi. H-27 "MAIN DECK FLOORING REPLACEMENTS"
- xii. H-28 "ELECTRICAL STOREROOM STEEL REPAIRS"
- xiii. E-03 "VENTILATION DUCTWORK & FAN CLEANING"
- xiv. E-05 "FIXED FIRE FIGHTING SYSTEMS INSPECTIONS AND HYDRO TESTS"
- xv. E-09 "HVAC FAN UNIT REPLACEMENT"
- xvi. L-05 "FIRE DETECTION SYSTEM ANNUAL INSPECTION"

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

3.1.1 Mechanical HVAC Arrangements Drawing #219098-501-S001

3.1.2 Mechanical HVAC Arrangements Drawing #219098-501-S002

3.1.3 Mechanical HVAC Arrangements Drawing #219098-501-S003

### 3.2 Standards and Regulations

3.2.1 All ductwork shall be cleaned by a combination of mechanical/pneumatic/vacuum methods in full conformance with applicable industry standards, NADC 2002 or better.

### **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 The Contractor shall give the CGTI at least twelve (12) hours' notice prior to any inspections.

4.1.2 All inspection will form part of CCG test and inspection plan.

4.1.3 Inspection Hold Points

- a) Hold point 1- The Contractor shall notify CGIA for a visual inspection of each of the ventilation and exhaust systems identified in this specification after cleaning is completed and before any system is sealed up.

### **4.2 Testing**

4.2.1 N/A

### **4.3 Certification**

4.3.1 N/A

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 N/A The Contractor shall provide a Report on completion of all work indicating the Systems that were cleaned, method of cleaning, the state of cleanliness of each system, and any defects noted and corrected during the scope of work. Two (2) copies of this Report in paper format and one (1) copy in a PDF format shall be provided to CGTA.

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

## **E-04 Bow Thruster Pump and Machinery Survey**

### **1. Scope:**

The intent of this specification is to open up and Survey the Bow Thruster pump and associated machinery. The scope of work also includes a small deck insert and coatings in the Bow Motor Compartment.

### **2. Technical Description:**

#### **2.1 General – Prep and Steel Renewal**

- 2.1.1 The Contractor shall perform this scope of work in conjunction with Specification H-21 Bow Thruster Impeller Shaft Tube Replacement and L-01 Bow Thruster Motor Survey. Contractor shall note that testing of this machinery as described in Section 4.2 Testing must take place prior to the vessel docking while the ship is alongside.
- 2.1.2 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 Immediately after Drydocking the Vessel the Contractor shall remove the manhole cover for the Bow Thruster Pumping Compartment and pump out and dispose of the remaining sea water that is in the space. It is estimated that there will be approximately 2m<sup>3</sup> of sea water remaining.
- 2.1.5 Prior to entering or working in spaces, Contractor shall obtain necessary gas-free certificates for Safe for Entry or Hot Work as appropriate. At all times, copies of certificates shall be posted at point of entry to tanks with a second copy given to CGIA. These certificates shall be renewed in compliance with LLOYD'S and provincial regulations.
- 2.1.6 The Contractor shall coat the Bow Motor compartment as per Section 2.2 General Coatings. The exact timing for the coatings will be determined between the Contractor and the CGIA prior to the commencing of this specification.
- 2.1.7 The Contractor shall remove a redundant gauge valve located in the Bow Thruster Motor compartment just forward of frame # 180 and at the base of the ladder leading to the space.
- 2.1.8 The Contractor shall cut out and install an 8" X 8" steel insert in way of the removed valve. Plate thickness shall be as per original which is thought to be 5/8" Grade Lloyd's A. The approximate location of the insert is shown in the picture below. The CGIA will indicate the exact location of the insert upon removal of the redundant valve.

2.1.10 All steel to be Lloyds Grade “A” or equivalent. Contractor to provide mill certs for all steel.

2.1.11 The Contractor shall prep, fit and weld in the insert using full penetration welds. Corners of the plate insert must have a minimum radius of 4”.



2.1.12 The thruster is a 32” Dominion Engineering axial flow pump arrangement. It is driven by a variable speed DC electric motor. Two (2) 30” butterfly valves provide directional flow of the pump discharge as required. Operation of the valves is provided by an electric motor. The valves spindles are joined with a connecting rod so that when one valve is open the other is closed.

2.1.1 Access to the Bow Thruster Motor Space, valve actuating equipment, valve spindles, and valve and pump packing glands is through a watertight portable plate (7'L x 11'W, approximately) located on the centerline of the Lower Deck between Frames 180 and 186 to starboard of the Bosun's Workshop.

2.1.2 The Contractor shall open portable plates and manholes as required, and close-up same upon completion of work with new Contractor-supplied neoprene gaskets.

- 2.1.4 The Contractor shall quote on supplying and renewing forty (40)  $\frac{3}{4}$ " Dia. UNC x  $2\frac{1}{4}$ " Lg. stainless steel studs, complete with stainless steel nuts and lock-washers for the manholes. This price shall be quoted separately but will be added to the bid price. The cost will then be prorated and used for adjustment purposes to provide a price per stud for adjustment up or down depending on the actual requirement. The bid price must include removal of old stud, bottom tapping-out of hole, supply of new stud, and complete installation with nut and lock-washer.
- 2.1.5 The connecting rod arrangement joining the two valves is to be permanently marked as to relationship with the valve shafts. The connecting rod assembly is then to be removed and secured against damage.
- 2.1.6 Valve discs shall be removed after being identified as to location and orientation, taken ashore, completely cleaned, and laid out for inspection.
- 2.1.7 Valve packing glands shall be removed, packing rings withdrawn, and valve shafts pulled. Gland collars, and shafts to be removed ashore, completely cleaned, and laid out for inspection.
- 2.1.8 Stuffing boxes shall be completely cleaned for inspection.
- 2.1.9 Contractor to remove existing gland collar securing pins. New stainless steel pins, eye bolts, washers, and self-locking nuts are to be supplied and installed. Eye bolts are  $\frac{3}{4}$ " Dia. - 10 UNC, with an approximate overall length of 6" with a 1" diameter eye hole for the hinge pin.
- 2.1.10 Thrust bearings on bottom of valve shafts to be marked as to location and orientation, and removed.
- 2.1.11 Bow thruster pump impeller to be removed, packing gland removed, packing rings and gland ring withdrawn, and pump shaft pulled. Impeller, gland collar, gland ring, and pump shaft to be removed ashore, completely cleaned, and laid out for inspection. Stuffing box to be completely cleaned for inspection.
- 2.1.12 All bearings shall be cleaned for inspection. The I.D. of bearings shall be measured at  $\frac{1}{2}$ " from the top and bottom, in the longitudinal, and transverse directions. Shafts shall be removed ashore for complete cleaning. Shafts to be measured for O.D. at locations corresponding to where the bearings have been measured. Shafts shall be set up in a lathe, and out-of-round and run-out measurements shall be made and recorded. All readings to be recorded. Copies of the original, hand-written results shall be turned over to the Chief Engineer immediately and, in typewritten form, as soon as possible thereafter.
- 2.1.13 After all inspections, measurements, and required corrective action has been completed, all components are to be returned to the vessel and re-assembled as in good working order as per the original installation.

- 2.1.14 Contractor to supply and install eight (8) stainless steel  $\frac{5}{8}$ " Dia., UNC self-locking nuts and taper pins to secure valve discs to shaft. All fasteners to be secured with locking arrangements as directed by CGIA.
- 2.1.15 The internal surfaces of the three (3) stuffing boxes shall be coated with tallow prior to new packing material being installed. Packing shall be GSM and installed when all components are reassembled back in the ship. The CGIA will witness the installation of packing for all three (3) shafts.
- 2.1.16 When final close up is being done, new 3/16" thick rubber gaskets shall be installed that are suitable for the application. Contractor shall wire brush clean and examine all manhole studs for wastage and other defects. All defects found shall be brought to attention of CGIA. A marine grade anti-seize compound is to be applied to all stud threads prior to final closing up.
- 2.1.17 Testing shall be completed as per Section 4.2.1

## **2.2 General – Coating**

- 2.2.1 Upon completion of welding, inspection, and testing of the steel insert in the Bow Thruster Motor compartment the entire deck area and two (2) feet up from the deck on all bulkheads shall be prepared and coated with the Wasser Coating system.
- 2.2.2 Entire deck and bulkheads extending two (2) ft from the deck shall be prepared to an SSPC-SP6 standard and coated as per line 2.2.4.
- 2.2.3 Prior to application of primer to the repair locations the NACE inspector shall be called in to ensure that any flash rust is within the manufacturer's acceptable tolerances. If the flash rust is deemed to be excessive the Contractor, at their own expense, will prepare the areas until the deck meets the required tolerances.
- 2.2.4 Contractor will be responsible for refurbishing all materials required for the coating scheme. Materials include:
- i. Wash down of all areas with Holdtight 102 as per manufactures specifications to remove all salts.
  - ii. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - iii. One (1) Full Prime coats of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iv. One (1) intermediate coat MC-TAR Red (DFT 3-5mil)
  - v. One (1) Topcoat MC-Luster Gray (DFT 3-5mil)

## 2.3 Location

2.3.1 Longitudinally the area to be worked is between frames #180 and frame 186.

## 2.4 Interferences

2.1.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.1.2 This work shall be completed in conjunction with the following specification items:

- i. GENERAL NOTES
- ii. HD-01 "DOCKING AND UNDOCKING"
- iii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iv. HD-04 "SEA BAYS AND SEA CHESTS"
- v. HD-06 "SACRIFICIAL ANODES"
- vi. H-21 "BOW THRUSTER IMPELLER SHAFT TUBE REPLACEMENT"
- vii. L-01 "BOW THRUSTER MOTOR"

## 3. References:

### 3.1 Guidance Drawings/Vessel Drawings

- i. CCGS Hudson Drawing Lower, Below Lower and Tank Top Decks H11-1051 sht 5 of 5
- ii. Holdtight 102 Product Description Sheet.
- iii. Wasser Miozinc Primer Product Description Sheet
- iv. Wasser MC-TAR Product Data Sheet
- v. Wasser MC-LUSTER Product Data Sheet
- vi. SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

### 3.2 Standards and Regulations

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

### **3.3 Owner Furnished Material**

3.3.1 Packing for the three (3) shaft glands will be GSM.

## **4. Proof of Performance:**

### **4.1 Inspection**

#### **4.1.1 Inspection Hold Points:**

- a) Hold point 1 - CGIA will witness the marking of the connecting rod arrangement as per line 2.1.14. prior to dismantling.
- b) Hold point 2 – CGIA and the attending Lloyds Surveyor will inspect the packing gland and shafts as per line 2.1.16.
- c) Hold point 3 - CGIA and the attending Lloyds Surveyor will inspect the stuffing boxes as per line 2.1.17.
- d) Hold point 4 - CGIA and the attending Lloyds Surveyor will witness the marking of thrust bearings as per line 2.1.18.
- e) Hold point 5 – CGIA and the attending Lloyds Surveyor will inspect all remaining parts when laid out for inspection.
- f) Hold point 6 – CGIA and the will inspect the completed installation of all items and the Contractor shall confirm the final positioning of the connecting rod arrangement.
- g) Hold point 7 - CGIA and Lloyds Surveyor shall be provided copies of all mill certs and documentation for all steel provided for this specification prior to any steel being fitted.
- h) Hold point 8 - CGIA shall indicate to the Contractor the exact location for the insert.
- i) Hold point 9 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new insert tacked in place prior to any finish welding commencing.
- j) Hold point 10 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1.
- k) Hold point 11 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.



- l) Hold point 12 - CGIA and NACE inspector shall witness the thickness readings of all coats of paint.
- m) Hold point 13 – CGIA and attending Lloyds surveyor will witness all testing as per Section 4.2.
- n) Hold point 14- CGIA will inspect the reinstallation of all interference items not previously mentioned.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and onsite NACE inspector.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 Prior to docking of the vessel, the ship's crew shall conduct a bow thruster performance trial, during which the bow thruster will turn the vessel 360 degrees in both directions. This trial shall be timed taking note of draft and trim, wind speed and sea conditions which shall be noted for reference. A Contractor's Representative shall be onboard to witness and verify the trial results by signature. Copies of the signed-off results shall be distributed by the CGIA.

4.2.3 Bow Thruster operation to be verified during sea trials. The unit shall be tested for one (1) hour at various loads and flow direction changes. Upon completion of the endurance trial, the bow thruster test described in Section 4.2.1 of this specification item shall be repeated. The vessel's trim and draft shall be the same as in the previous test; the wind speed and sea conditions shall be recorded. Again, a Contractor's Representative shall be onboard to witness and verify the trial results by signature. Copies of the signed-off results shall be distributed by the CGIA. The performance of the bow thruster shall be equal to or better than the previous results.

- 4.2.4 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## E-05 Fixed Fire Fighting Systems Inspections

### 1. Scope:

The intention of this specification is for the Contractor to perform the Annual Inspection and certification of the vessels fixed firefighting systems. A hydro test is also required on the CO2 cylinder for the Hydraulic Crimper Room.

### 2. Technical Description:

#### 2.1 General

2.1.1 Contractor shall provide all materials, crange, Labour, equipment, and transportation to accomplish this work unless other wise specified.

2.1.2 The systems to be serviced are comprised of the following:

Cylinder Location	Space Protected	Type / Quantity	Time Delay Release Unit	Last Hydro	Next Hydro
CO2 Room	Main E/R	CO2 26 x 75 lb.	Bridge (Delay) CO2 Room (Delay)	2015	2027
	Motor Rm				
	Hangar				
Galley Main Deck.	Galley Range	Wet Chem 4 gallon	Alleyway outside Galley (Manual)	2011	2023
Paint Locker (Fwd. Work Area)	Paint Locker	CO2 1 x 20 lb.	Outside space (Manual)	2015	2027
Paint Stores (Field Stores)	Paint Stores	CO2 1 x 75 lb.	Local Alleyway by fridges	2015	2027
Hydraulic Crimper Room	Hydraulic Crimper Room	CO2 1 x 10 lb.	Outside space (Manual)	2007	2019
MCR	Generators / Motors	CO2 3 x 75 lb.	Local	2011	2023
Boat Deck Locker	Emergency Generator Room	CO2 1 x 75 lb.	Cross Breezeway at cylinder	2015	2027
	Battery Room	CO2 1 x 15 lb.	Cross Breezeway at cylinder	2016	2028

- 2.1.3 **CO2 Room (Engine Room, Motor Room, and Helicopter Hanger)** – 26 x 75 lb. CO2. Pull cords, electric alarms, pressure operated sirens, time delays, directional valves, stop valves, piping and nozzles shall be inspected, proven clear, and tested. Dry compressed air or nitrogen is to be used.
- 2.1.4 **Galley** – 1 x 4 IG WHDR 400. The pull cord and appliance shut down shall be inspected and tested. Five new (01) fuse links shall be supplied and installed. Piping and nozzles shall be inspected and proven clear with dry compressed air or nitrogen.
- 2.1.5 **Paint Locker (fwd. work area)** – 1 x 20 lb. CO2. The explosive squibb, pressure switch, siren, and heat detector shall be inspected and tested as per requirements. The piping and nozzles shall be inspected and tested with dry compressed air or nitrogen.
- 2.1.6 **Paint Locker (field Stores)** – 1 x 20 lb. CO2. The explosive squibb, pressure switch, siren, and heat detector shall be inspected and tested as per requirements. The piping and nozzles shall be inspected and tested with dry compressed air or nitrogen.
- 2.1.7 **Hydraulic Workshop** – 1 x 15 lb. CO2. The pull cord is to be tested as per requirements. The piping and nozzle is to be inspected and tested with dry compressed air or nitrogen. This cylinder is also due for a hydro test.
- 2.1.8 **MCR, Propulsion Motors and propulsion Generators** – 3 x 75 lb. CO2. The electric solenoid, electrical directional valves, pressure switch, heat detectors, piping, and nozzles shall be inspected, proven clear, and tested. Dry compressed air or nitrogen is to be used.
- 2.1.9 **Emergency Generator Room** – 1 x 75 lb. CO2. The pull cord, pressure switch, and 30 second time delay, and siren shall be inspected and tested as per requirements. The piping and nozzles shall be inspected and tested with dry compressed air or nitrogen.
- 2.1.10 **Battery Room** – 1 x 20 lb. CO2. The pull cord is to be tested as per requirements. The piping and nozzle is to be inspected and tested with dry compressed air or nitrogen.
- 2.1.11 Contractor shall notify the CGIA prior to each system being disabled for servicing and inspection. Contractor will also advise the CGIA when each system is back in service.
- 2.1.12 A ship's representative will be assigned to Contractor to aid in system and component location and to witness the service and testing. Contractor shall give the CGIA 24 hours' notice prior to beginning of work so that a ship's representative can be planned for.
- 2.1.13 The Contractor shall notify CGTA of any defects. On CGTA approval all defects shall be repaired under PSPC 1379 Adjustment. There will be a \$5000,00 allowance in this specification for any addition work.

## 2.2 Location

- 2.2.1 **C02 Room** – Located on the Main Deck Starboard Side between Frames 15 – 20.
- 2.2.2 **Galley** – Located on the Main Deck amidships between Frames 125-131.
- 2.2.3 **Paint Locker (fwd. work area)** – Located on the Lower Deck Starboard side between Frames 183 188.
- 2.2.4 **Hydraulic Workshop** – Located on the Lower Deck Port side between frames 136 – 143.
- 2.2.5 **MCR** – Located in the Engine Room fwd. between frames 102 – 115.
- 2.2.6 **Emergency Generator Room** – Located on the Boat Starboard side between frames 95-105.
- 2.2.7 **Battery Room** – Located on the Boat Deck Port side between frames 95 – 100.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with the following Specification Items:

- i. H-10 "GALLEY DECK STEEL REPAIRS"
- ii. H-12 "WHEEL HOUSE TOP DECK STEEL REPAIRS"
- iii. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- iv. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- v. H-17 "GALLEY REFURBISHMENT"
- vi. H-22 "PORT & STBD FAN ROOM STEEL REPAIRS"
- vii. H-27 "MAIN DECK FLOORING REPLACEMENTS"
- viii. H-28 "ELECTRICAL STOREROOM STEEL REPAIRS"
- ix. E-03 "VENTILATION DUCTWORK & FAN CLEANING"
- x. E-09 "HVAC FAN UNIT REPLACEMENT"
- xi. L-02 "PROPULSION GENERATOR CLEANING"
- xii. L-03 "PROPULSION GENERATOR BEARING REPLACEMENT"
- xiii. L-04 "FIRE DETECTION SYSTEM ANNUAL INSPECTION"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Drawing H-11-051 sht 3 of 5 Wheelhouse top, Bridge and Boat decks

3.1.2 CCGS Hudson Drawing H-11-051 sht 4 of 5 Upper and Main Decks

3.1.3 CCGS Hudson Drawing H-11-051 sht 5 of 5 Lower, below Lower and Tank Top decks

#### **3.2 Standards and Regulations**

3.2.1 N/A

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA and the attending Lloyds Surveyor at least a 12-hour notice prior to all inspections and testing.

4.1.2 Inspection Hold Points:

- a) Hold point 1- The Contractor shall bring to the attention of the CGIA any defects as soon as possible once discovered. The Contractor shall not proceed with any repairs without written consent of CGTA.
- b) Hold point 2- CGIA and the attending Lloyds Surveyor shall witness final testing on all systems.

#### **4.2 Testing**

4.2.1 Testing shall be carried out as described in lines 2.1.3 to 2.1.10.

4.2.2 All testing and repairs shall form part of the final Report.

#### **4.3 Certification**

4.3.1 Contractor and or sub-contractor working on the Fixed Fire Fighting Systems Inspections must be licensed and certified as an approved Authorized representative.

- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 All service results, repairs, reports and Certificates shall be recorded in type written and pdf format, and the results shall be turned over to CGTA.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

**E-06 – THIS ITEM HAS BEEN REMOVED**

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## **E-07 Fuel Oil Transfer Pump Installation**

### **1. Scope:**

The intent of this specification is to replace the forward and aft fuel oil transfer pumps with new CCG supplied pumps. The new pumps are not identical to the old ones and foundation and piping modifications will have to be made.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall follow the attached specification "J17063-R01-R0 New Fuel Transfer Pumps Installation Specification" prepared by Lengkeek Engineering.
- 2.1.4 Any discrepancies between this document and the Lengkeek spec, this document will take precedent.
- 2.1.5 The ships Electrical Officers and the CGIA will assist the Contractor with identifying equipment and lockouts.
- 2.1.6 The Contractor shall pump out and dispose of the used waste oil presently in the waste oil tank where the two (2) fuel pumps are presently mounted. The CGIA will ensure the waste oil tank is pumped out prior to the Contractor starting this job. There will be approximately 100 litres in the tank the Contractor shall dispose of.
- 2.1.7 The Contractor shall remove the remaining 100 litres of waste oil and steam clean the tank to allow hotwork to be conducted on the tank top. Contractor is responsible for gas freeing the tank and all certificates.
- 2.1.8 Upon fabrication and installation of the new pump seats identified in Section 5.2 of the Lengkeek spec the Contractor shall prepare the new pump seats for both pumps and entire tank top to an SSPC-SP3 standard.

2.1.9 The Contractor shall coat the pump seats, entire tank top, and all new and disturbed steel and piping sections with the Wasser coating system. All surfaces shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached)

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, back to back angle and weld seams.
- ii One (1) Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas
- iii A top coat of Wasser MC – Luster 100 Ral 7042 Deck Grey (DFT 6mil) to all primed areas.

2.1.10 All work shall be carried out and completed to the satisfaction of CGIA and the attending LLOYD’S Surveyor.

## **2.2 Location**

2.2.1 The location of the Fuel Oil transfer pumps is in the Engine Room forward between frames #109 and #114.

2.2.2 The Hudson Drawing, Machinery Arrangements Plans View gives a good overview as to the location of the pumps in reference to other machinery.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor’s expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in conjunction with the following specification items:

- i HD-05 “MAIN SEA STRAINERS”
- ii H-03 “FUEL TANKS SURVEY”
- iii H-07 “#4 DB FUEL TANK TOP REPAIRS”
- iv E-08 “MAIN AIR RECEIVER INSTALLATION”

## **3. References:**

### **3.1 Guidance Drawings/nameplate data**

3.1.1 Guidance Drawing: J17063-M01-R0 Fuel System Modifications Diagram

- 3.1.2 Guidance Drawing: J17063-M02-R0 New Fuel Transfer Pump Piping Arrangement
- 3.1.3 J17063-R01-R0 New Fuel Transfer Pumps Installation Specification
- 3.1.4 Guidance Drawing: J17063-S01-R0 New Transfer Pump Seats
- 3.1.5 Hudson Drawing: Machinery Arrangements Plans View

## **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS –No.47 – Part “B” Ship Building and Repair Quality Standard.
- 3.2.3 All Electrical work shall be completed in accordance with TP 127E.

## **3.3 Owner Furnished Material**

- 3.3.1 Two (2) SPX Flow T70-3SL c/w Variable Frequency Drive pump sets.

## **4. Proof of Performance:**

### **4.1 Inspection**

- 4.1.1 The Contractor shall use the Welding Test and Inspection plan as laid out in the CCG Welding Specification Section 5.6 and the Welding guide Section 3 and section 4.
- 4.1.2 Inspection Hold Points
  - a) Hold point 1- CGIA shall be notified to witness steel preparation of the new pump seats after they are tacked in place and prior to final welding.
  - b) Hold point 2- CGIA and attending Lloyds Surveyor shall be notified and witness NDE and NDT of all final welding on pump seats and piping sections.
  - c) Hold Point 3- CGIA shall be notified to witness the steel preparation prior to any coatings applied.
  - d) Hold Point 4 – CGIA shall be notified to witness all thickness measurements between application of each coating.
  - e) Hold Point 5- CGIA shall confirm the actual location for all new mechanical and Electrical equipment prior to being securely positioned.
  - f) Hold Point 6- CGIA shall witness all test as described in Section 4.2.

## **4.2 Testing**

- 4.2.1 All new and modified piping sections shall be hydrostatically pressure tested to 100 psi for 30 minutes and must be witnessed by the CGIA.
- 4.2.2 On completion of all work a performance and leak test and flow test will be conducted on each pump and associated piping. CCG will assist the Contractor as required for these tests. Any leaks shall be repaired by the Contractor. Contractor shall note that these tests will require fuel in the Deep tanks which will be empty most of the Refit period. Testing is suggested once the ship is afloat and fuel delivery has been made.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application report, two (2) paper copies and one (1) PDF copy to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.2 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## E-08 Main Air Receiver Installation

### 1. SCOPE:

The Intent of this specification is for the Contractor to remove two (2) existing Main Starting Air Receivers and replace with three (3) new GSM ones.

### 2. TECHNICAL DESCRIPTION:

#### 2.1 General

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 All materials to be contractor supply unless otherwise stated. New air receiver base material shall be ½" thick plate.
- 2.1.3 Contractor shall "NOTE" that the exact positioning of the air receivers cannot be determined until they are positioned on the new seats. At that time the CGIA will determine the final position for the receivers.
- 2.1.4 The ship's crew shall shut down, isolate, and lock out all sources of compressed air energy to the existing air receivers. The crew shall also drain the air receivers of all compressed air in the tanks at that time. The contractor shall remove the supply and discharge piping connected to the existing bottles back to where new piping will be installed for the new bottles. The existing inlet and discharge manifolds complete with the fitted safety valves and pressure gauges shall be turned over to the CGIA. The flanges at these exposed joints will be fitted with steel blanks and gaskets suitable for 300 PSIG compressed air.
- 2.1.5 The Engine Room bilges IWO the work area shall be pressure washed clean, all debris and cleaning materials removed, and certified safe for entry and hot-work.
- 2.1.6 The existing two (2) air receivers shall be removed from their locations (Engine Room, stbd side, Tank Top Level, frames 95 – 100) and moved to an area where they will not interfere with the new installations or other work. This will require the removal of the strapping arrangements. The existing units shall be retained intact, until the new arrangement is installed, connected, tested, and certified as required by LR and TCSSB. Once the new installations have been certified as operational by the required authorities the old receivers shall be cut up in suitable sized pieces to allow for removal from the vessel via the same route as the new receivers will be transported through for installation.
- 2.1.7 The existing securing arrangements for the old receivers will be removed. The two (2) seats and strapping arrangements shall be removed and retained with the intact existing air receivers as noted in 2.1.6. The attached points for the strapping and the removed seats shall be prepared for the new installation.

- 2.1.8 The existing base which is secured to the tank top below shall be expanded forward to frame 102 to allow for the installation of the three (3) new receivers. . It shall follow the same longitudinal line as the current base. The new addition shall be fabricated and installed to the scantlings and construction procedures as the existing section between frames 100-105.
- 2.1.9 The new receivers are 24" in diameter while the existing ones are 30" in diameter. A minimum of six (6)" inches of separation will be required between the new units. With the support expanded the new air receivers can have up to twelve (12") of separation between them. As separations increase you lose room on either end. The optimal distance will have to be determined once the air inlet and outlet valves and associated fittings are sorted out. Verify the maintenance envelope, access to hand holes, where the inlet and discharge valve(s) are to be fitted. CCG has included Plan and Elevation View drawings of various degrees of separation to illustrate the various configurations. See Section 3.1 Guidance Drawings.
- 2.1.10 The new air receivers will be orientated to allow for maintenance and access to all fittings and inspection ports. New securing strapping arrangements will be fabricated and installed to tie the new receivers into the same stringer that the existing receivers are secured to. The final securing shall be completed prior to the final fitting of the modified piping runs that connect to the new receivers to reduce undue stress being introduced into the piping. Securing straps shall prevent vibration and must not be a metal to metal contact with the tanks.
- 2.1.11 The Contractor shall note that the exact piping arrangements for the following piping systems can not be confirmed until final fitment of the receivers are known. The following existing piping systems will require modification: A number of systems have piping that will require some renewals and re-routing as a result of the new air receiver installation. The contractor shall submit a proposal to the CGIA for each item so as to obtain approval prior to commencement of work. The contractor shall route all new piping so as to be accessible for operation and maintenance, and so as to not impede maintenance on existing equipment and systems. The contractor shall supply all materials to connect the new installation to the existing systems and to reroute other affected systems around the new installation. All piping, supports, insulation, pipe identification and fittings shall be to the standard as required by Lloyds for the application, location, and pressure rating the system will operate at. All pick-up points for each system will be flanged fittings between the existing remaining piping and the new/re-routed piping. The notes below will give the Contractor some specifics as to the system requirements but the Contractor is responsible for routing the new and modified piping sections.
- I. Exhaust piping: Emergency Diesel Air Compressor (Engine Room, Stbd side, Deck Plate level, frames 105-108) will be modified to accommodate the installation of the forward most new receiver. The existing exhaust will be in the way of the new receiver installation.
  - II. Compressed air: New connections will be required to and from various equipment due to the new air receivers. The affected systems are indicated below.

- a) Supply line from the Emergency Diesel Air Compressor to the air receivers.
- b) Compressed air inlet from compressors to air receivers.
- c) Relocate the condensate water drain currently IWO the fwd most new air receiver to a location where it will be accessible.
- d) Starting air from the new receivers to the main engines and ship service diesels.
- e) Service air to the distribution system from the air receivers.
- f) Air for instrumentation in the MCR Gauge Board.

III. Sea water Supply: The supply line for the Reverse Osmosis units will require modifications due to the installation of the fwd most air receiver.

- a) The flanged connection under the deck plates at frame 95 will be let go. The fwd end will be let go at the NPT connection approximately 5" above the deck plate level.
- b) The new pipe turn 90° fwd and will run fwd under the deck plates fwd to a point fwd of the fwd most new receiver, where it can turn to stbd and then up to the NPT fitting previously let go. A flanged connection will be fitted into the NPT connection. This will be the fwd termination of the new SW supply line section.

2.1.12 There will be an allowance of \$10,000.00 in this specification to deal with piping modifications. The new arrangement will be agreed on by the CGIA and contractor and a firm price negotiated with the CGTA and PSPC CA prior to the start of the piping replacement.

2.1.13 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The three (3) new air receivers shall also be coated. The Coating System is described below: Coatings shall be applied to the bases prior to the installation of the air receivers.

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- iv A topcoat of Wasser MC Luster 100 White (DFT 3-5mil) on all surfaces

2.1.14 All removed piping sections shall have new gaskets installed upon reassembly suited for the piping systems.

## 2.2 Location

- 2.2.1 The existing Main Air Receivers are located on the Stbd side of the engine room between frames 95 and 100. The existing structural support is 20 ¼' above the tank top of #3 Double Bottom Stbd Fuel/Ballast Tank. This tank is currently used as a dump tank for the Flume Stabilization system and therefore fuel residue and gases will be present in the tank. The Contractor shall extend the existing structural support will be retained and extended from its existing forward extremity at frame 100 to frame 102 to allow for the installation and support of the third air receiver. This will follow the longitudinal line that currently forms the inboard extremity of the existing support. The support will be tied into the #3 DB Fuel Tank Top, the ship's stbd side shell, and frame structures at locations 101 and 102 in the same manner as the original is secured to existing ship's structure. The scantlings of the materials used to construct the support extension will be as per original located between frames 95-100.

## 2.3 Interferences

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be completed in the conjunction with the following spec items:
- i. HD-05 "MAIN SEA STRAINERS"
  - ii. H-03 "FUEL OIL TANKS SURVEY"
  - iii. H-07 "#4 D/B TANK TOP REPAIRS"
  - iv. E-07 "FUEL OIL TRANSFER PUMP REPLACEMENT"

## 3. REFERENCES:

### 3.1 Guidance Drawings/Nameplate Data

- 3.1.1 CCGS Hudson Drawing E-08-01 Sectional views at Frame 100
- 3.1.2 CCGS Hudson Drawing E-08-02 Sectional views at Frame 95
- 3.1.3 CCGS Hudson Drawing E-08—03 Original Plan and Elevation Views
- 3.1.4 CCGS Hudson Drawing E-08—04 Plan and Elevation Views 6" apart
- 3.1.5 CCGS Hudson Drawing E-08—05 Plan and Elevation Views 8" apart
- 3.1.6 CCGS Hudson Drawing E-08—06 Plan and Elevation Views 10" apart
- 3.1.7 CCGS Hudson Drawing E-08—07 Plan and Elevation Views 12" apart



- 3.1.8 Wasser MC-Miozinc 100 Product Description Sheet
- 3.1.9 Coatings- Wasser Paint Procedures
- 3.1.10 Wasser MC-Luster Product Description Sheet
- 3.1.11 Wasser MC-CR White Product Description Sheet
- 3.1.12 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS –No.47 – Part “B” Ship Building and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

## **3.3 Owner Furnished Equipment**

- 3.3.1 The three (3) new Manchester air receivers are GSM.

# **4. PROOF OF PERFORMANCE:**

## **4.1 Inspection**

- 4.1.1 Inspection Hold Points:
  - a. Hold point 1 – CGIA will inspect the area where the new receivers will be installed upon removal of the existing air receivers.
  - b. Hold point 2 – CGIA will inspect the new bases upon fitment and tack welded in place.
  - c. Hold point 3 - CGIA and Lloyds Surveyor shall witness the preparation of all steel and the fitment of the new air receiver bases tacked in place prior to any finish welding commencing.
  - d. Hold point 4 - CGIA and Lloyds Surveyor shall conduct a visual inspection of all completed welds prior to testing carried out as per Section 4.2.1
  - e. Hold point 5 - CGIA and NACE inspector shall witness the paint preparation of all steel prior to priming.

- f. Hold point 6 - CGIA and NACE inspector shall witness the thickness readings of each coat of paint.
- g. Hold point 7 - CGIA will review with the Contractor the piping arrangements for each piping section as described in line 2.1.11. 11. This review will confirm the exact route for any piping changes.
- h. Hold point 8 - CGIA and the attending Lloyds Surveyor will inspect the newly installed air receivers and all reinstalled interference items upon completion of work.
- i. Hold point 9 -CGIA and Lloyds Surveyor shall witness all testing as per Section 4.2.3.

4.1.2 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

## **4.2 Testing**

4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

4.2.3 Upon completion of all work and inspections the three (3) receivers and all new and disturbed piping sections shall be tested for leaks, vibration. This will be completed through a run up of the compressors to pump up the system. CCG staff will assist the Contractor with the startup of machinery.

## **4.3 Certification**

4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician

## **5. DELIVERABLES:**

### **5.1 Reports, Drawings, and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as dry and wet bulb temperatures, relative humidity, and dew point at the time any coatings are applied and at which areas on the superstructure the coating was applied. Also to be included in the report must be the temperature of the product at application time as well as wet and dry film thickness gauge readings.
- 5.1.3 Signed approvals as per section 4.3.

## **5.2 Spares**

- 5.2.1 N/A

## **5.3 Training**

- 5.3.1 N/A

## **E-09 HVAC Fan Unit Replacement**

### **1. Scope:**

The intention of this specification is to replace the three (3) Main HVAC units with new GSM supplied units.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 The Contractor shall conduct this specification in direct conjunction with CCG specification H-22 Port and Stbd Fan Room Steel Repairs. The Contractor shall note that the removal of the existing three (3) fan units contained in this spec must be completed prior to the steel repairs in H-22.
- 2.1.2 All items contained in this specification pertains to all three (3) HVAC units although they may not be specified on each line.
- 2.1.3 All staging, cramage, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.4 All materials to be contractor supply unless otherwise stated.
- 2.1.5 The Contractor shall follow the attached three (3) specifications by Allswater.
  - i. HVAC System Replacement Fan Room #1 Bridge Deck
  - ii. HVAC System Replacement Fan Room #2 Boat Deck
  - iii. HVAC System Replacement Fan Room #3 Boat Deck
- 2.1.6 Any discrepancies between this spec and the attached Allswater Specifications the Contractor shall note this spec will take precedence.
- 2.1.7 There is an allowance in this specification of \$30,000.00 for any unknown steel work that may be required in Fan Room #1 located on the Bridge Deck. The Contractor shall not start any unscheduled steel repairs without the written approval of the CGTA and PSPC via a 1379 action.

- 2.1.8 There is an allowance in this specification of \$40,000.00 for any unknown pipework and electrical work that may be required that is not already covered in the three (3) attached specifications. The Contractor shall not start any unknown work or repairs without the written approval of the CGTA and PSPC via a 1379 action.
- 2.1.9 There is an allowance in this specification of \$30,000.00 for an OEM to oversee the installation of the three (3) HVAC units. This price will be adjusted on proof of invoice and upon the approval of the CGTA and PSPC representative via a 1379 action. The contractor shall give CGTA 48 hours notice before the OEM FSR is brought onsite. The Contractor shall make every effort to minimize wait time for the FSR once onsite.
- 2.1.10 The Contractor shall permanently clearly mark all disconnected wires, cables and piping required to perform the scope of work in this specification prior to or shortly after each piece of equipment is removed. The ships Electrical Officer will assist the Contractor locating any breakers or power sources. The CGIA will assist with identifying piping.
- 2.1.11 All new and disturbed steel, piping, brackets and any other items shall be prepped to an SSPC-SP3 finish and coated with the Wasser Coating system:
- i. One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii. Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii. An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv. A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all areas normally painted white.
- 2.1.12 The Contractor shall secure all new and existing equipment to prevent movement, vibration and chaffing.
- 2.1.13 The Contractor shall remove and reinstall all interference items in an as found condition to complete the scope of work in this specification.

## **2.2 Location**

- 2.2.1 The #1 Upper Fan Room is located on the Bridge Deck between frames #87 to #93.
- 2.2.2 The #2 Stbd Fan Room is located on the Boat Deck between frames #75 to #91.
- 2.2.3 The #3 Port Fan Room is located on the Boat Deck between frames #75 to #91.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- iv. H-22 "PORT & STBD FAN ROOM STEEL REPAIRS"
- v. E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
- vi. L-04 "FIRE DETECTION SYSTEM "

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 Guidance Drawings/Nameplate data
- 3.1.2 See attached three (3) Allswater Specifications, HVAC System Replacement Fan Room #1 Bridge Deck, HVAC System Replacement Fan Room #2 Boat Deck and HVAC System Replacement Fan Room #3 Boat Deck.
- 3.1.3 CCGS Hudson Drawing Wheelhouse Top, Bridge and Boat Decks Drawing H11-1051 sht. 3 of 5.

### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.
- 3.2.5 Other applicable Standards as indicated in the attached three (3) Allswater Specifications.

### **3.3 Owner Furnished Equipment**

3.3.1 The three (3) HVAC units will be GSM.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.

4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.

4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and NACE inspector

4.1.6 In addition to any tests and inspections specified in the attached three (3) Allswater Specifications the following tests and inspections shall be carried out.

4.1.7 Inspection Hold Points

- a. Hold point 1- Prior to starting this specification the CGIA and the Contractor shall review the equipment to be removed and identify all components that will remain and those that will be discarded.
- b. Hold Point 2- CGIA will confirm all wiring and cabling is clearly marked prior to the removal of any equipment.
- c. Hold Point 3- CGIA and Contractor will inspect all existing wiring required for the installation of the new HVAC units and determine if any deteriorated wiring or cable requires replacement. If wiring replacement is required, it will be replaced or renewed via a PSPC 1379 process as described in line 2.1.8.

- d. Hold Point 4- CGIA will inspect the new base for each HVAC unit after it is tack welded in place and prior to final welding.
- e. Hold point 5- CGIA will inspect all prepped steel prior to the application of any coatings.
- f. Hold Point 6- CGIA and the and the NACE inspector will witness all testing as per section 4.1 Testing.
- g. Hold Point 7 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- h. Hold Point 8- CGIA and the and the NACE inspector will witness all testing as per section 4.1 Testing
- i. Hold Point 9- CGIA and the and the attending Lloyds Surveyor will witness all testing as per section 4.2.2 and 4.2.3 and 4.2.4 Testing.
- j. Hold Point 10- CGIA will inspect the installed HVAC units when set in place and unsecured to ensure proper clearances are required for accessibility and maintenance.
- k. Hold Point 11 - CGIA will inspect the securing arrangements for all equipment upon final installation.
- l. Hold Point 12- CGIA will inspect the installation of all interference items that were removed to complete this specification.
- m. Hold Point 13- CGIA and the attending Lloyds Surveyor will witness all testing as per Section 4.2.4.

## **4.2 Testing**

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.



- 4.2.3 All new piping sections shall be hydrostatically tested at 1.5 times working pressure.
- 4.2.4 Insulation and continuity testing shall be completed on all wiring. Emergency stop or shutdowns tested on each HVAC unit upon completion of installation.
- 4.2.5 Upon completion of all installations the Contractor and OEM Representative shall test each piece of equipment for correct operation and function. This test procedure shall be developed by the OEM and form part of the deliverables in Section 5.

### **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 Signed approvals as per section 4.3
- 5.1.3 A complete report from the OEM representative in pdf format showing all test results and completed inspections, complete with dates and signatures. All readings to be in imperial measurements.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## **E-10 Main Refrigeration System Replacement**

### **1. Scope:**

The intention of this specification is to replace the two (2) Main Domestic Refrigeration Systems with new GSM supplied units.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 The Contractor shall conduct this specification in direct conjunction with CCG specification H-18 Main Freezer Refurbishment.
- 2.1.2 All staging, cramage, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 The Contractor shall follow the attached specification from Concept Naval C18-60 Refrigeration Room and System Renewal. Section 6 of this specification pertains to the removal and installation of the Refrigeration Systems.
- 2.1.5 Any discrepancies between this spec and the attached Concept Naval's Specification the Contractor shall note this spec will take precedence.
- 2.1.6 There is an allowance in this specification of \$20,000.00 for any unknown pipework and electrical work that may be required that is not already covered in Concept Naval specification. The Contractor shall not start any of these repairs without the written approval of the CGTA and PSPC via a 1379 action.
- 2.1.7 There is an allowance in this specification of \$30,000.00 for an OEM to oversee the installation of the 2 new Refrigeration Systems. This price will be adjusted on proof of invoice and upon the approval of the CGTA and PSPC representative via a 1379 action. The contractor shall give CGTA 48 hours notice before the OEM FSR is brought onsite. The Contractor shall make every effort to minimize wait time for the FSR once onsite.

- 2.1.8 The Contractor shall permanently clearly mark all disconnected wires, cables and piping required to perform the scope of work in this specification prior to or shortly after each piece of equipment is removed. The ships Electrical Officer will assist the Contractor locating any breakers or power sources. The CGIA will assist with identifying piping.
- 2.1.9 All new and disturbed steel, piping, brackets and any other items shall be prepped to an SSPC-SP3 finish and coated with the Wasser Coating system:
- i One (1) Stripe coat of Wasser primer – MC MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, rivets, back to back angle and weld seams.
  - ii Spot/Full Prime coat of Wasser primer – MC MIOZINC (DFT 3-5mil) to all bare metal areas and previously Stripe coated areas.
  - iii An intermediate coat of MC-CR White (DFT 3-5mil)
  - iv A topcoat of MC Luster 100 –RAL 9003 White (DFT 3-5mil) for all areas normally painted white.
- 2.1.10 The Contractor shall secure all new and existing equipment to prevent movement, vibration and chaffing.
- 2.1.11 The Contractor shall remove and reinstall all interference items in an as found condition to complete the scope of work in this specification.

## **2.2 Location**

- 2.2.1 The two Refrigeration compressor systems are located in the Refrigeration Machinery Room Lower Deck between Frames #166 and #174 Port Side.
- 2.2.2 Evaporators are located in the Refrigeration rooms on the Lower Deck between Frames #136 and #166.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- I. GENERAL NOTES
- II. HD-01 "DOCKING AND UNDOCKING"
- III. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- IV. H-03 "FUEL TANK SURVEY"
- V. H-10 "GALLEY DECK STEEL REPAIRS"
- VI. H-11 "FREEZER ROOM DECK REPAIRS"
- VII. H-17 "GALLEY REFURBISHMENT"
- VIII. H-18 "MAIN FREEZER REFURBISHMENT"
- IX. L-04 "FIRE DETECTION SYSTEM "

### **3. References:**

#### **3.1 Guidance Drawings/Vessel Drawings**

- 3.1.1 Guidance Drawings/Nameplate data
- 3.1.2 See attached Concept Naval C18-60 Refrigeration Room and System Renewal Specification.
- 3.1.3 CCGS Hudson Drawing Lower Below Lower and Tank Top Decks Drawing H11-1051 sht. 5 of 5.

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation
- 3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.
- 3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.
- 3.2.4 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings.
- 3.2.5 Other applicable Standards as indicated in the attached Concept Naval's Specification.

#### **3.3 Owner Furnished Equipment**

- 3.3.1 The two (2) new Refrigeration Systems will be GSM.

## **4. Proof of performance:**

### **4.1 Inspection**

- 4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.
- 4.1.2 All welds must be inspected as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.1.3 All detected defects shall be cut out, re-welded and re-tested to the satisfaction of the Lloyds Surveyor and CGIA.
- 4.1.4 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.5 All work must be completed to the satisfaction of the CGIA, attending Lloyds Surveyor and NACE inspector
- 4.1.6 In addition to any tests and inspections specified in the attached Concept Navals Specification the following tests and inspections shall be carried out.
- 4.1.7 Inspection Hold Points
  - a. Hold point 1- Prior to starting this specification the CGIA and the Contractor shall review the equipment to be removed and identify all components that will remain and those that will be discarded.
  - b. Hold Point 2- CGIA will confirm all wiring and cabling is clearly marked prior to the removal of any equipment.
  - c. Hold Point 3- CGIA will inspect the positioning of the new Refrigeration units in the Refrigeration machinery space prior to being secured to the deck.
  - d. Hold Point 4- CGIA will inspect the positioning of the new evaporators in each Fridge space prior to being permanently secured.
  - e. Hold point 5- CGIA will inspect all prepped steel prior to the application of any coatings.
  - f. Hold Point 6- CGIA and the and the NACE inspector will witness all testing as per section 4.1 Testing.

- g. Hold Point 7 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- h. Hold Point 8- CGIA and the and the NACE inspector will witness all testing as per section 4.1 Testing
- i. Hold Point 9- CGIA and the and the attending Lloyds Surveyor will witness all testing as per section 4.2.2 and 4.2.3 and 4.2.4 Testing.
- j. Hold Point 10- CGIA will inspect the installed HVAC units when set in place and unsecured to ensure proper clearances are required for accessibility and maintenance.
- k. Hold Point 11 - CGIA will inspect the securing arrangements for all equipment upon final installation.
- l. Hold Point 12- CGIA will inspect the installation of all interference items that were removed to complete this specification.
- m. Hold Point 13- CGIA and the attending Lloyds Surveyor will witness all testing as per Section 4.2.4.

## **4.2 Testing**

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.3 All new piping sections shall be hydrostatically tested at 1.5 times working pressure.
- 4.2.4 Insulation and continuity testing shall be completed on all wiring. Emergency stop or shutdowns tested on each Refrigeration unit upon completion of installation.
- 4.2.5 Upon completion of all installations the Contractor and OEM Representative shall test each piece of equipment for correct operation and function. This test procedure shall be developed by the OEM and form part of the deliverables in Section 5.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 Signed approvals as per section 4.3
- 5.1.3 A complete report from the OEM representative in pdf format showing all test results and completed inspections, complete with dates and signatures. All readings to be in imperial measurements.

### **5.2 Spares**

- 5.2.2 N/A

### **5.3 Training**

- 5.3.2 N/A

**E-11 – THIS ITEM HAS BEEN REMOVED**

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# E-12 Steering Gear Survey

## 1. Scope:

The intent of this specification is for the Contractor to remove the rudder stock, carrier bearing and support bearing for Lloyds survey and to provide the services of MMH Marine to oversee the work and perform a full inspection and test of all steering gear and rudder stock and bearings.

## 2. Technical Description:

### 2.1 General

- 2.1.1 Due to the unknowns with regards to the condition of the rudder carrier bearing, the contractor shall start work on this specification no later than 3 weeks from contract start date.
- 2.1.2 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 It should be noted that CCG will be bringing in a technical expert (TE) to over see work, make recommendations and provide technical guidance. During this time the TE provided by the CG will be acting as the inspection authority and will report back to the CGIA with all findings. The presence of the onsite TE in no way changes the contractors responsibilities with respect to reporting, workmanship or final deliverables. Any disagreements between the TE and the contractor will be brought to the attention to the CGTA and CGIA immediately. CGTA/CGIA will have the final approval on all work and all contractual procedures/practices must be adhered to at all times.
- 2.1.5 The contractor will communicate directly with the TE to make arrangements as necessary to have them onsite as needed.
- 2.1.6 There is an allowance of \$30,000.00 in this specification to cover any unknown defects or repairs that may arise from the test and inspections. No additional repairs shall be carried out without written approval from the CGTA under a PSPC 1379 action.
- 2.1.7 The Contractor shall complete this specification in conjunction with specification HD-14 Rudder Survey.
- 2.1.8 The Contractor shall remove the carrier bearing, support bearing and rudder stock under the direction of the MMH representative. Inspections shall be carried out as per 4.1 Inspections.
- 2.1.9 The procedure below lines 2.1.9 to 2.1.22 is a general procedure for the Rudder carrier bearing removal and installation. The MMH representative will direct the Contractor as required for the actual removal and installation.

- 2.1.10 Rudder assembly vertical position shall be verified. Contractor shall record clearances at each of forward and aft crosshead assemblies. Dimensions “A” and “B” shall be recorded.
- 2.1.11 Weight of rudder and stock assembly shall be lifted by means of suitable jacking devices, in the steering gear compartment. Total height of lift to be approximately 1/8”.
- 2.1.12 Weight of assembly, once lifted, shall be adequately supported by means of suitable steel posts fitted between tiller crosshead assembly and deck. Jacks are to be released.
- 2.1.13 Spacer plate between tiller and spacing collar shall be removed.
- 2.1.14 Spacing collar fitted on top of upper half of carrier assembly shall be removed.
- 2.1.15 Upper half of split carrier assembly, including packing gland ring and packing shall be released, lifted clear of bearing seat and laid out for inspection.
- 2.1.16 All bearing components shall be cleaned, all grease removed.
- 2.1.17 Thickness of carrier bearing seat, dimension “X”, shall be determined and recorded in four locations.
- 2.1.18 Upper half of carrier assembly shall be reassembled.
- 2.1.19 Bearing working contact area shall be determined. Upper carrier assembly is to be blued and reinstalled. Spacing collar and shim plate shall be installed and weight of rudder/stock lowered onto bearing.
- 2.1.20 Assembly shall be rotated back and forth by means of emergency steering pump and then removed to allow assessment of bearing contact area.
- 2.1.21 Carrier bearing assembly shall be reassembled, with ample lubricant applied and vertical position of rudder/stock assembly set to desired arrangement. This is determined at crosshead assembly
- 2.1.22 Packing gland is to be reassembled.
- 2.1.23 All grease supply lines to steady bearing are to be proven clear and in working order.
- 2.1.24 Weight of rudder/stock is to be lowered onto carrier bearing and steering gear function tested
- 2.1.25 MMH will conduct the following inspections and tests and make note of any leaks or deficiencies that will require rectification.
- 2.1.26 Test and inspection plan to be conducted as follows:

- I. Full operational test of the steering gear system from the Bridge console and local at the steering gear.
- II. Emergency steering test
- III. Full telemotor control test.
- IV. Visual inspection of all seals, glands, and moving components
- V. Check and adjust the pump stroke of the port and Stbd pumps.
- VI. Adjust as required the local pump control lever and telemotor control stops.
- VII. Visual inspection of all steering gear components.
- VIII. Inspection of all hold down and securing arrangements.
- IX. Inspection of rudder carrier bearing, support bearing and measurements for wear.
- X. Final test of all components upon reassembly.

## **2.2 Location**

2.2.1 The steering gear and rudder stock is located in the Steering Gear compartment on the Main Deck between frames #-12 to frame # 4.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be completed in conjunction with the following specification items:

1. GENERAL NOTES
2. HD-01 "DOCKING & UNDOCKING"
3. HD-02 "UNDERWATER AND ABOVE WATER HULL"
4. HD-03 "BUTTS & SEAMS"
5. HD-04 "SEA BAYS AND SEA CHESTS"
6. HD-06 "SACRIFICIAL ANODES"
7. HD-14 "RUDDER SURVEY"

## **3. References:**

### **3.1 Guidance Drawings/Vessel Drawings**

3.1.1 CCGS Hudson Donkin Steering Gear Manual

3.1.2 CCGS Hudson Drawing General Arrangement Upper Deck and Main Deck H11-1051 Sht 4 of 5

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

## **3.3 Owner Furnished Material**

3.3.1 None

## **4. Proof of Performance:**

### **4.1 Inspection**

4.1.1 Inspection Hold Points:

- a) Holdpoint 1 - CGIA and Lloyds Surveyor shall witness the initial tests of all steering gear.
- b) Hold point 2 - CGIA and Lloyds Surveyor shall witness all carrier and steady bearing readings and measurements.
- c) Hold point 3 - CGIA and Lloyds Surveyor shall inspect all steering gear, carrier bearing, steady bearing and components once disassembled, cleaned up and prepared for inspections.
- d) Hold point 4 -CGIA and Lloyds Surveyor shall witness the testing as per Section 4.2.2.

### **4.2 Testing**

- 4.2.1 Contractor shall test full operational test of the steering gear system from the Bridge console and local at the steering gear under the direction of the MMH representative prior to the disconnection of the system and before any work is carried out.
- 4.2.2 Contractor shall conduct an Emergency steering test under the direction of the MMH representative prior to the disconnection of the system and before any work is carried out.
- 4.2.3 Contractor shall conduct an Emergency steering test under the direction of the MMH representative prior to the disconnection of the system and before any work is carried out.
- 4.2.4 Contractor shall conduct a final operational test upon the completion of all work and reassembly of the system under the direction of the MMH representative.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 Signed approvals as per section 4.3
- 5.1.2 The Contractor shall provide a full report of all inspections, repairs, testing, and recommendations in PDF format to the CGTA.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

## E-13 Sailor MF/HF Antenna Mount Renewal

### 1. Scope:

The intent of this specification is to have the old Sailor MF/HF Antenna mount removed and fabricate and install a new mount as per the original.

### 2. Technical Description:

#### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall note that this specification should be completed directly in conjunction with spec item H-12 Wheelhouse Top Deck Steel repairs.
- 2.1.3 On-site CCG ITS tech rep will electrically isolate the Sailor MF/HF radio and disconnect the RF coaxial feed to Antenna Tuning Unit and RF feed wire to antenna.



Sailor MF/HF Antenna Mount Figure "1"

- 2.1.4 The Shakespeare 222 MF/HF antenna shall remove and stored in a protected area for re-installation on completion of other work.

- 2.1.5 The Contractor shall unmount the Antenna Tuning Unit from its location and stow it in a safe location close to the wheelhouse.
- 2.1.6 All new steel used in the fabrication process described in para 2.1.7 to para 2.1.15 of this specification shall be mild steel plate ASTM A283 unless otherwise noted or approved in writing by the CGTA.
- 2.1.7 The contractor shall remove flat plate that supports the antenna and support legs. 36" of each support leg is to be removed leaving enough material to weld to.
- 2.1.8 The contractor shall weld 36" lengths of  $\frac{1}{4}$ " thick 2" by 2" right angle to each existing support leg end.
- 2.1.9 The contractor shall construct and install a flat plate to support the antenna. Flat plate must be  $\frac{3}{8}$ " thick 20" by 20"; a half circle is to be cut in the plate to match original. The contractor must drill holes for Shakespeare Style 222 antenna bolt pattern where antenna is center of the plate. CCG ITS Tech rep will provide bolt pattern drawings.
- 2.1.10 The contractor must weld 20" by 20" flat plate to the new support legs. The contractor shall weld a  $\frac{1}{4}$ " 2" flat bar between the support legs and flat plate in same fashion as original.
- 2.1.11 The contractor shall provide two flat bars of  $\frac{1}{4}$ " thick 2" by 20" to support the Antenna Tuning Unit. The contractor must drill and mount flat bar in same orientation as original on support legs using stainless steel hardware.



Sailor MF/HF Antenna Tuning Unit Figure "2"

- 2.1.12 The contractor shall drill holes for the mounting of the Antenna Tuning Unit on the two flat bars. CCG ITS Tech rep will provide Antenna Tuning Unit drill template.
- 2.1.13 The Contractor shall install the Shakespeare Style 222 antenna onto the antenna mount; with the RF feed connection point facing inboard. The Contractor must use stainless steel hardware that matches original hardware.
- 2.1.14 The Contractor shall mount the Antenna Tuning Unit to its support bracket. The Contractor must use stainless steel hardware that matches original hardware.
- 2.1.15 All cables are to be properly secured in existing cable trays. In locations where trays do not exist, appropriate hangers are to be installed.
- 2.1.16 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below:
- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
  - iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

- 2.2.1 The Antenna Mount is located on the Wheelhouse deck Stbd side approximately between frames #150 to #152.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be done in conjunction with the following Specification Items:

- i GENERAL NOTES
- ii HD-15 "INSTALLATION OF THE DOPPLER SPEED LOG"
- iii H-12 "WHEELHOUSE TOP DECK STEEL REPAIRS"
- iv L-05 "BRIDGE WATCH NAVIGATION ALARM SYSTEM INSTALLATION"



- v L-06 "TV DISTRIBUTION SYSTEM BACKBONE"
- vi L-07 "RADAR ECDIS INSTALLATION"
- vii L-08 "FIBER OPTIC GYROCOMPASS INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 Dwg. MM685-193-WD (GMDSS)

3.1.2 Dwg. Shakespeare Style 222 Antenna

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

3.2.5 TP127E – Ship's Electrical Standards

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the CCG Technical Representative.

4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.3 Inspection Hold Points

- a) Hold point 1- CGIA and the onsite CCG Technical Representative will confirm with the Contractor the exact location for the storage of the Shakespeare Antenna and the Antenna Tuning unit.
- b) Hold point 2- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.

- c) Hold Point 3- CGIA will inspect the new mount when fully welded as a unit and prior to welding it to the deck.
- d) Hold point 4- CGIA and the onsite CCG Technical Representative will confirm the exact location for the base prior to it being welded to the deck.
- e) Hold Point 5- All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- f) Hold point 6- CGIA and the onsite CCG Technical Representative will confirm the positioning of the Shakespeare Antenna prior to securing it to the new base.
- g) Hold Point 7- The CGIA and the attending NACE Inspector will witness all testing as per Section 4.2 Testing.

## **4.2 Testing**

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 All deck welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements. Welding not connected to the deck will be 100% visual.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer and NACE inspector.
- 5.1.2 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

## **E-14 Life Raft Servicing**

### **1. Scope:**

The intention of this specification is to service and certify the Ships thirteen (13) Life rafts.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 Contractor shall provide all materials, crange, labour, equipment, and transportation to accomplish this work, except where otherwise stated.
- 2.1.2 The following thirteen (13) inflatable life rafts shall be removed from vessel within the first seven days of refit and stored in the CG storage space provided in General notes section 1.6. The rafts will remain in storage until six weeks before the end of refit. At this time they shall be delivered to a service depot certified by the applicable raft manufacturer. There they shall be inspected, repaired of defects and re-certified. The contractor shall include in their bid all cost except repairs of unknown defects in their bid price. On completion of work, Life rafts shall be returned to the vessel, stowed in place, in racks and secured on board the vessel prior to the scheduled end of the dry-dock. All certifications shall be dated no earlier than one week prior to undocking.
- 2.1.3 Contractor shall be responsible for removal, transportation, and crane services to and from ship to an OEM certified service facilities.
- 2.1.4 A \$15,000 allowance will be provided for Repairs of unknown defects identified after initial inspection. The actual cost is to be adjusted by PSPC 1379 action and will require a service facility invoice before the final price is agreed upon.

## 2.2 Location:

Location		Make	Type	Capacity	Raft Serial	Man. Date	Next Service (Annual)	Hydro Exp
Port rack	2	Zodiac	SOLAS A	25	XDC8FV23F516	06/15	04/17	01/17
	1	Zodiac	SOLAS A	25	XDC9FV15F516	07/15	04/17	01/17
	4	Zodiac	SOLAS A	25	XDC9FV17F516	07/15	04/17	01/17
	3	Zodiac	SOLAS A	25	XDC9FV75F516	06/15	04/17	01/17
Port on deck		Zodiac	SOLAS A	25	XDC1FR03H415	08/14	02/17	01/17
		Viking	SOLAS A	10	10DK+S30-10526863	02/06	03/17	01/17
Starboard rack	4	Zodiac	SOLAS A	25	XDC8FV22F516	06/15	04/17	05/17
	3	Zodiac	SOLAS A	25	XDC9FV16F516	07/15	04/17	01/17
	2	Zodiac	SOLAS A	25	XDC8FV21F516	06/15	04/17	01/17
	1	Zodiac	SOLAS A	25	XDC2FV10F516	05/15	04/17	01/17
Starboard on deck		Viking	SOLAS A	12	12DK+S30-10526864	02/06	03/17	01/17
		Viking	SOLAS A	12	12DK+S30-10526865	02/06	03/17	01/17
		RFD	SOLAS A	25	P-7634	11/04	02/17	01/17

Life raft Locations, make, Serial numbers and due date table.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items

2.3.2 This work shall be done in conjunction with the following Specification Items.

- i. HD-01 "DOCKING & UNDOCKING"
- ii. HD-02 "UNDERWATER AND ABOVE WATER HULL"
- iii. H-09 "UPPER DECK STEEL REPAIRS"
- iv. H-12 "WHEELHOUSE TOP DECK STEEL REPAIRS"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vi. E-11 "LIFEBOAT AND DAVIT INSTALLATION"

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

3.1.1 See Life Raft Table under 2.2 Location.

### 3.2 Standards and Regulations

3.2.1 N/A

### 3.3 Owner Furnished Equipment

3.3.1 N/A

## 4. 4: Proof of performance:

### 4.1 Inspection

4.1.1 All Inspections shall be completed as per OEM requirements for Certification

### 4.2 Testing

4.2.1 All Testing shall be completed as per OEM requirements for Certification.

### 4.3 Certification

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## **5. Deliverables:**

### **5.1 Guidance Drawings/Nameplate data**

5.1.1 All Certificates for each raft shall be given to the CGTA on the completion of Inspections and Testing.

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

**E-15 – THIS ITEM HAS BEEN REMOVED**

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## **E-16 Bilge Cleaning**

### **1. Scope:**

The intention of this specification is to clean the bilge, bilge wells, under deck piping, and under deck structure in the Engine Room, Motor Room and shaft tunnel area. Cleaning is to be completed so these areas are free of all dirt, water, oil, fuel, sludge, and debris.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 This work shall commence when all other spec items and scheduled work has been completed in the engine Room and Motor Room and shaft tunnel area.
- 2.1.2 The contractor shall be responsible for all materials, labour, and equipment required to carry out the work. All certificates required to work in the bilges will be at the contractor's expense. Re-certification of the spaces will also be at the contractors expense.
- 2.1.3 Contractor shall protect mechanical and electrical equipment from damage or ingress as required to complete this work package. Any equipment damaged because of inadequate protection shall be repaired or replaced at the contractors expense.
- 2.1.4 All solid debris and fluids in the bilges shall be removed and disposed at the contractors expense. All fluids or sludge created during the cleaning process shall be removed at the contractors expense. No additional allowances will be issued for waste/oily water removal.
- 2.1.5 The bilges, bilge wells, piping, and structure shall be pressure washed using hot water and degreaser. All fluids generated in the process along with dirt, debris, sludge, oil etc. that are loosened shall be removed and disposed of at the contractors expense.
- 2.1.6 Any damage to piping, equipment, cabling etc. will be corrected at the contractors expense.
- 2.1.7 All work to be to the satisfaction of the CGIA.

## 2.2 Location

2.2.1 The Engine Room bilges are located between Frames #70 to #100.

2.2.2 The Motor Room bilges are located between Frames #51 to #70.

2.2.3 The Shaft tunnel Bilges are located between Frames #25 to #51.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be carried out in conjunction with the following Specification Items.

- i. HD-01 "DOCKING AND UNDOCKING"
- ii. HD-04 "SEA BAYS AND SEA CHESTS"
- iii. HD-05 "MAIN SEA STRAINERS "
- iv. HD-07 "CATHODIC & SEA BAY ANODES"
- v. HD-13 "TRANSDUCER SHAFT SUPPORT RE-FABRICATION"
- vi. H-02 "SEWAGE VACUUM TANK REPLACEMENT"
- vii. H-03 "FUEL OIL TANKS SURVEY"
- viii. H-07 "#4 D/BFUEL TANK REPAIRS"
- ix. H-25 "ENGINE ROOM FRAME REPAIRS"
- x. H-26 "INSTALLATION OF BLACK AND GREY WATER O/B VALVES"
- xi. E-07 "FUEL OIL TRANSFER PUMP INSTALLATION"
- xii. E-01 "POST AND STBD THRUST BLOCKS SURVEY"
- xiii. E-02 "INTERMEDIATE SHAFTS AND BEARINGS SURVEY"
- xiv. E-08 "MAIN AIR RECEIVER INSTALLATION"
- xv. L-02 "PROPULSION GENERATOR CLEANING"
- xvi. L-03 "PROPULSION GENERATOR BEARING REPLACEMENT"

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

3.1.1 CCGS Hudson Drawing #H11-1051 Rev.8 General Arrangement Lower Deck, Below Lower Deck and Tank Top Sht 5/5.

## **3.2 Standards and Regulations**

3.2.1 All work to be completed to the satisfaction of the CGIA.

## **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA at least a 12-hour notice prior to all inspections and testing.

4.1.2 Inspection Hold Points

- a) Hold point 1- On completion of all work the Contractor shall notify the CGIA to conduct a visual inspection of all cleaned areas indicated in this specification. All areas not cleaned as per spec will be redone by the Contractor at their expense.

### **4.2 Testing**

4.2.1 N/A

### **4.3 Certification**

4.3.2 N/A

## **5. Deliverables:**

### **5.1 Guidance Drawings/Nameplate data**

5.1.1 The Contractor shall provide copies of all disposal certificates for fluids removed from the Bilge during the cleaning process to the CGTA.

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

# E-17 Deck Compressors Installation

## 1. Scope:

The intention of this specification is the removal of the forward and aft deck compressors and the installation of two (2) new compressors in the same locations.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached FLEETWAY Inc. "Air Compressor Installation Specification"
- 2.1.3 Any discrepancies between this spec and the attached Fleetway spec the Contractor shall note this spec will take precedence.
- 2.1.4 CCG Electrical Officers will assist the Contractor with identifying circuits and breakers requiring lockouts for this specification.
- 2.1.5 All new and disturbed bulkhead steel shall be prepared to an SSPC-SP6 standard and coated as per section 2.1.7.
- 2.1.6 The entire deck area in the Fwd stack and aft stack where the new compressors are located shall be prepared to an SSPC-SP6 standard and coated as per section 2.1.7. Deck color to be grey.
- 2.1.7 The Coating System is described below:
  - i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
  - ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
  - iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
  - iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

2.2.1 The Fwd Stack compressor is located in the Fwd Stack on the Wheelhouse Top Stbd Side. Approx. Frames #92 - 96.

2.2.2 The Aft Stack Compressor is located in the Aft Stack Bridge Deck Port side. Approx. between frames #67 – 71.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-12 "WHEELHOUSE TOP DECK STEEL REPAIRS"
- iv. H-14 "HANGER TOP DECK STEEL REPLACEMENT"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

3.1.1 Guidance drawings are included in the FLEETWAY Air Compressor spec included in the Technical Data Package.

3.1.2 Hudson Drawing "Air Compressor Mounting Drawing"

3.1.3 Hudson Drawing "Manchester Vertical Air Receiver"

3.1.4 Hudson Drawing "Manchester Horizontal Air Receiver"

3.1.5 Wasser MC-Miozinc 100 Product Description Sheet

3.1.6 Coatings- Wasser Paint Procedures

3.1.7 Wasser MC-Luster Product Description Sheet

3.1.8 Wasser MC-CR white Product Description Sheet

3.1.9 SSPC PA 2 Appendix 1. Procedure for Determining Conformance to Dry Coatings Thickness Requirements

## **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 TP127E – Ship’s Electrical Standards.

3.2.5 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E

## **3.3 Owner Furnished Equipment**

3.3.1 The forward and Aft compressors are Sullair Model: ST1509 and will be GSM.

3.3.2 New Air receivers for the Fwd and Aft compressors will be GSM.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor.

4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

#### 4.1.3 Inspection Hold Points

- a) Hold point 1- CGIA will witness and confirm the layout of all temporary bulkhead removals in the Fwd Stack prior to any cutting of steel.
- b) Hold point 2- CGIA will witness and confirm the layout of all temporary bulkhead removals in the Aft Stack prior to any cutting of steel.
- c) Hold point 3- CGIA will inspect the Fwd and Aft compressor spaces after all equipment is removed and the steel decks are prepared for primer.
- d) Hold point 4- CGIA will inspect the newly fabricated foundation for the Fwd compressor after it is fabricated and tacked in place. The foundation shall not be welded permanently to the deck until the CGIA carried out this inspection.
- e) Hold point 5- CGIA will inspect the newly fabricated adapter plate for the Aft stack compressor after it is fabricated, fitted and tacked in place. The adapter place shall not be welded permanently until the CGIA carried out this inspection.
- f) Hold point 6- CGIA and the attending Lloyds Surveyor will conduct a visual inspection on both the fwd and aft bulkheads that were temporarily removed to allow the installation of each compressor. This inspection will take place once the panels are prepped and tacked in place and prior to final welding.
- g) Hold point 7- CGIA and the attending Lloyds Surveyor will conduct a visual inspection on both the fwd and aft bulkheads upon completion of all finish welding of both bulkheads.
- h) Hold Point 8- CGIA will inspect both compressors upon completion of all installations and prior to initial starting.
- i) Hold Point 9 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- j) Hold Point 10 – Then CGIA must be present to witness the initial run up of each compressor as per Section 4.2.3.

## 4.2 Testing

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.3 Upon completion of installation of the Fwd and Aft compressors the Contractor shall initially start up and run each compressor as per manufacture recommendations. The CGIA must be there to witness the initial run up on each compressor.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.
- 5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.
- 5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".
- 5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A



## **E-18 Ventilation Modification and Upgrades**

### **1. Scope:**

The intention of this specification is for the Contractor to replace the existing air ventilation ducting in the Main Engine Room and casing, replace the existing exhaust air ventilation ducting on the boat deck and install new ducting for the lower laundry room dryers.

### **2. Technical Description:**

#### **2.1 General**

- 2.1.1 All staging, crantage, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 All materials to be contractor supply unless otherwise stated.
- 2.1.3 The Contractor shall follow the attached Lengkeek Specification "Ventilation Modifications and Upgrades".
- 2.1.4 Any discrepancies between this spec and the attached Lengkeek specification the Contractor shall note this spec will take precedence.
- 2.1.5 Unless otherwise stated all new and disturbed steel shall receive two (2) coats of Miozinc Primer.

#### **2.2 Location**

- 2.2.1 Lengkeek Drawing J18066-M01 Rev.0 Engine Room Supply Air Ducting Removal & Replacement.
- 2.2.2 Lengkeek Drawing J18066-M02 Rev.0 Laundry Room Dryer Exhaust Ducting Removals New Arrangement & Details.
- 2.2.3 Lengkeek Drawing J18066-M03 Rev.0 Boat Deck Accom. Exhaust Ducting Removal & Replacement

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. H-04 "POTABLE WATER TANKS SURVEY"
- iii. H-09 "UPPER DECK STEEL REPAIRS"
- iv. H-12 "WHEELHOUSE TOP DECK REPAIRS"
- v. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vi. H-22 "PORT AND STBD FAN ROOM DECK REPAIRS"
- vii. H-27 "MAIN DECK FLOORING REPLACEMENT"
- viii. E-03 "VENTILATION DUCTWORK AND FAN CLEANING"
- ix. E-09 "HVAC FAN UNIT REPLACEMENTS"

## 3. References:

### 3.1 Guidance Drawings/Nameplate data

- 3.1.1 See attached Lengkeek Specification "CCGS Hudson "Ventilation Modifications and Upgrades.
- 3.1.2 Lengkeek Drawing J18066-M01 Rev.0 Engine Room Supply Air Ducting Removal & Replacement.
- 3.1.3 Lengkeek Drawing J18066-M02 Rev.0 Laundry Room Dryer Exhaust Ducting Removals New Arrangement & Details.
- 3.1.4 Lengkeek Drawing J18066-M03 Rev.0 Boat Deck Accom. Exhaust Ducting Removal & Replacement.

### 3.2 Standards and Regulations

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E.

### **3.3 Owner Furnished Equipment**

3.3.1 N/A

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall note that the inspections and inspection hold points below will be the same for each of the three (3) ventilations jobs contained in the specification unless the inspection or hold point specifically states one job.

4.1.2 All work must be completed to the satisfaction of the CGIA and the attending Lloyds Surveyor Representative.

4.1.3 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

4.1.4 In addition to any tests and inspections specified in the attached Lengkeek specification the following inspections shall be carried out.

#### **4.1.5 Inspection Hold Points**

- a) Hold point 1- Prior to starting this specification the CGIA and the Contractor shall review the equipment to be removed and identify all components.
- b) Hold point 2- The CGIA will inspect all marked trunking to ensure each section is clearly marked prior to removal.
- c) Hold point 3- The CGIA will inspect all areas where trunking was removed prior to the Contractor installing new trunking.
- d) Hold point 4- The CGIA will review with the Contractor the structural removals required in Section 4.4 for the Laundry Room Exhaust Ventilation Upgrades prior to any steel removals.
- e) Hold point 5- The CGIA will inspect all areas upon completion of prep work and installation of all new brackets, supports and other attachments.
- f) Hold point 6- CGIA and the attending Lloyds Surveyor will inspect all inserts when prepped and tacked in place prior to final welding.

- g) Hold point 7- CGIA and the attending Lloyds Surveyor will inspect all welds as per Section 4.2.2.
- h) Hold point 8- CGIA will inspect all prepped steel prior to the application of any coatings.
- i) Hold Point 9- CGIA and the and the NACE inspector will witness all testing as per section 4.2.3 Testing.
- j) Hold Point 10 - All surface preparations, primer coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- k) Hold Point 11 – The CGIA will inspect each completed ventilation system upon completion of all sections of trunking and prior to the installation of any interference items.
- l) Hold Point 12 – The CGIA will witness all testing as per Section 4.2.1.
- m) Hold Point 13 – The CGIA will inspect each completed ventilation system upon completion of all interference items.

## **4.2 Testing**

- 4.2.1 The Contractor shall test the ductwork in each system by completing a function test of each fan unit to ensure there are no air leaks, vibration or blockages in each section of ducting. This must be completed prior to the reinstallation of all interference items.
- 4.2.2 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.3 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.3.2 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

4.3.3 All NDT shall be carried out by a Level 11 or higher NDT certified technician

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

5.1.2 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer.

5.1.3 Contractor to provide Mill Certs. for all steel and test results and documentation for all steel provided that is not Lloyds Grade "A".

5.1.4 Signed approvals as per section 4.3

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

# L-01 Bow Thruster Motor

## 1. Scope:

The intention of this specification is to remove the Bow Thruster Motor from the ship and transport it to a CG approved motor overhaul facility for overhaul and inspection. There are no known defects with the Motor at this time.

## 2. Technical Description:

### 2.1 General

- 2.1.1 All staging, crange, and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall take readings and measurements while the ship is still in the water. See Testing Section 4.2. **Contractor shall note all readings in 4.2.1 must be taken prior to Docking the vessel.**
- 2.1.3 Upon completion of all testing the Contractor shall electrically isolate the motor by locking out the breaker. All disconnections of wiring and terminations shall be labelled. CCG Electrical Officers will assist the Contractor in identifying wiring and breakers. Motor shall be electrically disconnected. After the cables and respective terminals are positively identified, the motor and its coupling are to be mechanically let go and removed ashore.
- 2.1.4 The motor shall then be properly supported, wrapped with plastic, crated in a plywood create and secured for shipping. An adequate amount of desiccant moisture absorbing packets shall be add inside the plastic to prevent moisture build up in the motor. Once motor has been wrapped and crated, CGIA shall inspect the shipping crate prior to the lid being secured.
- 2.1.5 On CGIA approval of the shipping arrangement, the contractor shall ship the motor to a CG approved motor overhaul facility. The CGTA will provide the name and address of the motor overhaul facility upon award of the contract. All billing will be as per provided invoice. The motor shall be dismantled, cleaned, inspected for defects, overhauled, and reassembled as per para 2.1.7 to 2.1.18 of this specification. All known work and defects requiring rectification will be actioned on approval and written consent form the CGTA by 1379. There will be allowance in this specification of \$25,000.00 for motor work and defect repair.

2.1.6 The following is the suggested removal route for the motor from its location.

- i. A bolted soft patch is located above the motor on the Lower Deck between frames 180-186. The ship's crew will remove and re-install the wood planner currently bolted to the top side of the soft patch. The soft patch is secured to the deck flange with 124 cap screws which are fastened to welded nuts below. The contractor shall remove the cap screws and secure them for reinstallation. The soft patch shall be moved out of the way and secured. The gasket shall be removed and inspected for damage. The gasket shall be marked as to orientation and reused during the soft patch installation. It shall be protected from damage while not installed. The opening created by the soft patch removal shall be secured to prevent personnel from falling into the created opening and required notices supplied and posted to inform personnel of the hazard during the periods of time that the soft patch is not in place. Once the motor is rigged out of the way the soft patch is to be re-installed without the gasket until the reinstallation process for the motor requires its removal. The patch will be secured with four (4) cap screws at the corners during this period of time. Upon acceptance of the Bow Motor overhaul the soft patch will be re-installed and secured by the contractor.
- ii. Certified lifting lugs (certified for 10,300 lb. motor to 12,875 lbs @ 1.25 safety factor) are fitted below the deck-head of the Main Deck above at frames 177 & 183.
- iii. The Cargo Hatch is accessible from the Lower Deck at the centerline between Frames 169-177.
- iv. The ship's crew will assist the Contractor to open and close the cargo hatch as required. A minimum of 2 hours' notice during the hours of 07:00 to 15:00 will be required to have the cargo hatch opened or closed.

2.1.7 Contractor shall take "as received megger" readings and do a complete "as received" inspection. This inspection shall be detailed and include pictures of any defects or items of interest that are found. Once completed CGIA/CGTA shall be provided with a type written PDF copy of all results.

2.1.8 New Crown Supplied brushes are to be installed and seated in. This is to be done prior to removal of the armature from the stator housing so all carbon dust created during the seating process is removed during the subsequent cleaning of the armature and the stator.

2.1.9 All brush spring tensions are to be tested and a report generated. On CGTA and the contracting authority approval all springs that do not meet the acceptable criteria shall be replaced with new.

2.1.10 Contractor shall open up the motor and remove the armature from the stator housing. Care is to be taken so as the bearings and windings are not damaged during the removal and reinstallation process. At this time the contractor shall note the details of all gaskets and seals for re-order. The contractor shall ensure that all new gaskets and seals are ordered at this time to complete re-assembly as per para 2.1.14 of this specification.

- 2.1.11 The armature and the internals of the stator are to be chemically cleaned using “MOTOR-KLEEN-R #1018/20L” or equivalent. All components are to be inspected for cracking, softening, oil saturation, carbon dust, damaged insulation, and signs of overheating. The brush holders are to be inspected.
- 2.1.12 The run out and overall roundness reading of the commutator are to be checked and the results recorded. The surface condition and coloring of the commutator bars is to be inspected and the condition recorded.
- 2.1.13 Contractor shall polish commutator to mirror finish and inspect the bars for proper bevel and undercut. The insulating material (Mica) between the commutator bars is to be inspected. All findings that do not meet or exceed the minimum industry standards for an electrical motor of this type and horsepower are to be conveyed to the CGIA immediately so corrective action can be determined. With written approval from the CGTA and contracting authority corrective action will be taken to correct all defects.
- 2.1.14 The Contractor shall prepare the external casing of the motor to a SSPC-SP 10 Near White Metal Blast followed by 1 coat of Corotech® V150 Epoxy Primer or V160 Epoxy Mastic and 2 coats of Corotech® V500 Aliphatic Acrylic Urethane.
- 2.1.15 Bearing housings are to be cleaned and inspected for defects. Bearings are to be replaced with new. Bearing part numbers are FAG 6326AB and FAG 29426EW10. The contractor shall verify and order these replacement as early as possible to avoid delays. The removed bearing and bearing housing dimensions are to be taken and recorded.
- 2.1.16 Once all inspections and required repairs are complete the machine is to be reassembled in good order using new gaskets and seals. The details of these seals and gaskets are not known. The contractor will identify these as early as possible to avoid delays. Once identified the contractor will provide this information to the CGIA.
- 2.1.17 Once reassembled, contractor shall do a full megger test and inspection and compare results to those taken in Para 2.1.7 of this specification. All results are to be recorded and presented to CGIA/CGTA in typewritten PDF file within 24 hours of inspection.
- 2.1.18 The contractor shall have the motor run up and bed tested at the overhaul facility. CGIA/CGTA and Lloyd’s surveyor will be onsite to witness these tests and approve the repair.
- 2.1.19 Once all repairs are approved by the CGIA/CGTA the contractor shall ship the motor back to their dry-docking facility and make ready for reinstall. The motor shall be returned to the bow thruster compartment using the same reversed routing as para 2.1.6 lines 1-4.
- 2.1.20 The Contractor shall re-install the unit and re-establish all required connection, couplings and alignments as required. This work shall be done with over site from the CG Chief Electrical officer.



- 2.1.21 Upon completion of the re-install and assembly, the contractor shall conduct initial runs to make a comparison against the pre-removal readings. The unit will be run for one (1) hour at various loads. The unit will be controlled by the ship's crew. The contractor will notify the CGIA the day before this test is to occur. The time of the scheduled test will be provided at that time.
- 2.1.22 Defects in the operation of the motor during this trial will be corrected by the contractor to their account.
- 2.1.23 All surfaces and equipment affected by the work are to be suitably protected from damage during the work.
- 2.1.24 All dirt, debris and other contractor generated waste materials are to be removed and disposed of by the contractor in an approved manner.

## **2.2 Location**

- 2.2.1 The motor is located in the Bow Thruster Equipment Compartment, Below Lower Deck level, centerline, at frame 183.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be carried out in conjunction with the following Specification Items.
- i. HD-01 "DOCKING AND UNDOCKING"
  - ii. HD-04 "SEA BAYS AND SEA CHESTS"
  - iii. HD-09 "ANCHOR AND CHAINS"
  - iv. HD-10 "CHAIN LOCKER"
  - v. H-09 "UPPER DECK STEEL REPAIRS"
  - vi. E-04 "BOW THRUSTER PUMP AND MACHINERY"

### 3. References:

#### 3.1 Guidance Drawings/Nameplate data

##### 3.1.1 Bow Thruster Motor Data:

Manufacturer: WESTINGHOUSE

Model: 100880

Type: CDV 1658.

HP: 346

Max. RPM: 605

VDC: 186

AMP: 1500

WIDTH: F-A 54", P-S 60"

HEIGHT: Approx. 65" including Motor Coupling Half

WEIGHT: 10,300 lbs



Figure 1 Bow Thruster Motor

3.1.2 Figure 1. above shows a picture of Bow Thruster Motor being removed.

3.1.3 Corotech V500 Product Information sheet

#### 3.2 Standards and Regulations

3.2.1 All work to be completed to the satisfaction of the CGIA.

3.2.2 See General Notes section 1.3.1 Supplementary Documentation.

### **3.3 Owner Furnished Equipment**

3.3.1 GSM supplied brushes.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 Contractor shall provide the CGIA at least a 12-hour notice prior to all inspections and testing.

4.1.2 All work to be completed to the satisfaction of the CGIA.

4.1.3 Inspection Hold Points

- a) Hold point 1- The Contractor shall notify the CGIA to witness the initial measurements taken as described in Section 4.2. Testing.
- b) Hold point 2- The CGIA will confirm all wiring is labelled and identified prior to any connections being disconnected.
- c) Hold Point 3 – The CGIA will inspect crate and mounting supports prior to shipping.
- d) Hold point 4- The Contractor shall inform the CGIA and the attending Lloyds Surveyor when the motor is unassembled and parts are laid out for inspection in the overhaul facility.
- e) Hold point 5- The CGIA will approve any parts or repairs in writing to the Contractor prior to work being carried out.
- f) Hold point 6- The CGIA and the attending Lloyds Surveyor will be present to witness any testing conducted at the overhaul facility.
- g) Hold point 7- The CGIA will inspect the outer casing after it is prepared for coatings and after each coat is applied.
- h) Hold point 8- The Contractor shall notify the CGIA to witness the final measurements taken as described in Section 4.2. Testing.

## 4.2 Testing

4.2.1 The Following measurements are to be taken and recorded while the ship is still in the water, and taken again after the Motor is overhauled, when the ship is refloated.

- a) Coupling shaft alignment.
- b) Vibration analysis at idle 50% and full speeds (both directions). Ship's crew will operate the machinery.
- c) Starting and running speed amperage readings at idle speed and 25%, 50%, 75%, & 100% in both directions. The contractor will notify the CGIA the day before this test is to occur. The time of the scheduled test will be provided at that time.
- d) Megger readings to be taken prior to disconnection of wiring and after reconnection after reinstallation before run up (also to be taken at contractor's facility both prior to dismantling and upon reassembly). The minimum resistance to ground megger readings after re-installation of the motor and reconnection of electrical connections will be 80 M ohms.

4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPW contract authority upon completion of work.

## 4.3 Certification

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

## 5. Deliverables:

### 5.1 Reports, Drawings and Manuals

5.1.1 The Contractor shall provide a full report of all measurements, testing, defects, observations and parts used during the overhaul of the Motor. This report shall be in an electronic pdf format.

### 5.2 Spares

5.2.1 N/A

### 5.3 Training

5.3.1 N/A

# L-02 Propulsion Generator Cleaning & Assessment

## 1. Scope:

The CCGS Hudson requires a total of 4 Canadian General Electric propulsion generators type –MCF 8 1500KW 1000 RPM 600V Model-101002 to be inspected, cleaned and receive maintenance service to all internal areas.

## 2. Technical Description:

### 2.1 General

- 2.1.1 The Contractor shall note that CCG estimates several weeks to do this work and that it will directly impede with the scope of work in specification H-07 #4 D/B Tank Top Repairs and can not be carried out simultaneously. It is the contractors responsibility to arrange for sub-contractor attendance so that it will not affect or interfere with the work in H-07. If contractor is on site and a conflict arises, this specification will take precedence and work on H-07 will continue once all work in this specification is complete.
- 2.1.2 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, crantage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.3 All materials to be contractor supply unless otherwise stated.
- 2.1.4 CCG Electrical Officers will assist the Contractor to ensure all Generators are locked out prior to starting this scope of work.
- 2.1.5 The contractor shall erect a shelter to completely enclose work area and prevent ingress of dirt and debris as well as prevent egress of blasting media once blasting commences. No disassembly shall take place until approved shelter is erected.
- 2.1.6 The Contractor shall subcontract all work as described in para 2.1.8 to 2.1.23 of this specification to NorthPoint Technical Services or a CCG approved company specializing in DC generators and cleaning and repair. Contact info for NorthPoint below:

Ed Newhook  
NorthPoint Technical Services  
80 Enterprise Street  
Moncton, NB  
E1E 3P7  
Ph: 506-857-8458  
Fax: 506-858-9483  
Cell: 506-866-3628  
Email: [enewhook@northpointts.com](mailto:enewhook@northpointts.com)

- 2.1.7 There is an allowance in this specification of \$100,000.00 for the services of the subcontractor. This number shall not be exceeded without written approval from the CGTA through a PSPC 1379 action. Proof of invoice must be provided for all costs associated with this 1379.

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2019 VLE DRY-DOCKING

- 2.1.8 Prior to any cleaning effort Contractor shall determine and record each generator armature and field insulation values. These tests shall to be witnessed by CGIA. The test shall be carried out using a 1000 Volt megger test for 60 seconds.
- 2.1.9 Once all megger readings are taken and approved by CGIA, the contractor shall remove all brushes through access windows and protect the generator commutator by wrapping it in a CG approved 1/16" or 1/8" rubber sheathing to ensure no damage occurs during the cleaning process.
- 2.1.10 The contractor shall be responsible for the removal and reinstallation of trunking, covers and interference items to access the internals of the Propulsion generators.
- 2.1.11 The Contractor and CGIA shall jointly carry out inspection of the generator internals and commutator prior to the cleaning work commencing. At this time any defects, abnormalities or concerns shall be noted and recorded by contractor and planning put in place through negotiation of PSPC 1379 action to correct these items, which will be classed as work arising.
- 2.1.12 The contractor shall clean generator internals first by hand wiping with lint free rags and a CGTA approved spray solvent. The wiping rags shall be "all white" and are to be free of buttons, zippers or any other loose or attached articles.
- 2.1.13 All accessible internal areas of generators shall be wiped to remove all traces of accumulated copper and carbon dust. This will include but not be limited to internal casing surfaces, buss work, brush arms, winding surfaces and air passages. Generator commutator shall not to be wiped and necessary precautions shall are to be taken to protect each commutator from any contamination from cleaning process.
- 2.1.14 After the initial cleaning above, the motor internals shall be dry-cleaned with low pressure air c/w ground corncob as an abrasive. The contractor shall exercise extreme care when using air lances and other such equipment to maintain proper pressure and protect all internal components from damage. Below is the disassembly required for each Generator:
- i. Check crankshaft deflection and NDE bearing alignment prior to dismantling machine.
  - ii. Remove top dressing of generator: DE cowling, cooler, generator connections, filter cowling.
  - iii. Remove aft commutator casing, brush-gear, and open commutating and compensating winding sandwich joints, lift top half of yoke, rig outboard and secure by blocking.
  - iv. Construct a tent around the cleaning area with tarpaulins and set-up cleaning equipment.
  - v. Dismantle tarps and vacuum clean corn-cob debris from within machine and surrounding site.
- 2.1.15 The contractor shall arrange ventilation fans, exhaust fans, filters and ducting to collect and contain any and all carbon and copper dust along with any other contaminants for disposal ashore.
- 2.1.16 Following the cleaning, all internal surfaces of the propulsion motor shall be wiped clean with lint free rags and an approved solvent as per 2.1.4 and 2.1.5 above.
- 2.1.17 The contractor shall ensure that all remnants of the cleaning products are removed from the generator after cleaning has been completed.
- 2.1.18 Contractor shall note that the physical space available to access generator internals is restricted and suitably sized and capable individuals are to be assigned to this job requirement.

- 2.1.19 The contractor shall remove all air filter assemblies from each generator. The filters shall be replaced and the assemblies reinstalled. New filters will be GSM.
- 2.1.20 Contractor shall make sure that the copper cooling fins of the tubes of the air cooler arrangement of each generator receives appropriate cleaning by use of non-residue solvent and dry compressed air to remove all accumulated carbon dust while remaining in-situ.
- 2.1.21 The contractor shall ensure that care and attention is taken to avoid using brush holders and other various stand offs and internal device mounting arrangements to support the weight of workers while inside the generator casings. Any damage caused by the contractor as a result shall be corrected at the expense of the Contractor.
- 2.1.22 At the end of each work day, the propulsion generators shall be closed up and all debris and waste shall be removed from the ship and disposed of by the Contractor.
- 2.1.23 Upon completion of cleaning the Contractor shall determine and record generator armature and field insulation values. These tests shall to be witnessed by Owner's Representative. The test shall be carried out using a 1000 Volt megger test for 60 seconds. These values shall be compared to the pre cleaning values.
- 2.1.24 After completion of all work and a final inspection by CGIA the contractor shall reinstall all access covers and interference items in their original locations, including the disassembly and removal of the temporary tent or shelter. All access covers shall have new Contractor supplied gaskets as per original.

## **2.2 Location**

- 2.2.1 All generators are located in the Main engine room of the vessel at Tank top level.

## **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.
- 2.3.2 This work shall be completed in conjunction with the following specification items:
- i. GENERAL NOTES
  - ii. HD- HD-01 "DOCKING AND UNDOCKING"
  - iii. HD-04 "SEA BAYS AND SEA CHESTS"
  - iv. HD-05 "MAIN SEA STRAINERS"
  - v. H-06 "#2 D/BFUEL TANK REPAIRS"
  - vi. H-29 "ENGINE ROOM FRAME REPAIRS"
  - vii. E-07 "FUEL OIL TRANSFER PUMP INSTALLATION"
  - viii. E-08 "MAIN AIR RECEIVER INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

- 3.1.1 See Canadian General Electric Instruction Manual Vol 1 and Vol 2 PGE1-2196. These are in the care and custody of CGIA and cannot be released to contractor but they can be viewed onboard –not to leave the vessel.

#### **3.2 Standards and Regulations**

- 3.2.1 See General Notes Section 1.3.1 Supplementary Documentation.
- 3.2.2 IACS –No.47 – Part “B” Ship Building and Repair Quality Standard.

### **4. Proof of performance:**

#### **4.1 Inspection**

- 4.1.1 Inspection Hold Points: Contractor shall note that all hold points and inspections are for each of the four (4) Generators.
- a) Hold point 1 - CGIA shall review the procedure with the Contractor and Sub-Contractor to ensure all is clear on the scope of work in this specification prior to starting the job.
  - b) Hold Point 2 - CGIA shall witness the initial megger readings before any cleaning commences.
  - c) Hold Point 3 - CGIA shall inspect the initial cleaning of the Generator prior to any additional work.
  - d) Hold Point 4 - CGIA shall inspect the shelter to ensure it is build to completely enclose work area and prevent ingress of dirt and debris as well as prevent egress of blasting media once blasting commences. No disassembly shall take place until approved shelter is erected.
  - e) Hold point 5 - CGIA and Lloyds Surveyor shall inspect each disassembled generator prior to dry-blasting and will witness and review the pre blasting megger readings.
  - f) Hold point 4 - CGIA and Lloyds Surveyor shall inspect each disassembled generator after dry-blasting and will review the post blasting megger readings.
  - g) Hold point 5 – Upon completion of blasting and after the witnessing and review of the final readings the CGIA will notify the Contractor in writing to proceed to install the covers.
  - h) Hold point 6 – CGIA shall inspect all reinstalled covers and interference items upon completion of work
  - i) Hold point 7- CGIA shall inspect all areas to ensure all debris has been removed.



4.1.2 All work shall be carried out to the satisfaction of CGIA and the attending Lloyds Surveyor

## **4.2 Testing**

4.2.1 All megger tests shall be recorded for pre-cleaning and post cleaning comparison.

## **4.3 Certification**

4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.

# **5. Deliverables:**

## **5.1 Reports, Drawings and Manuals**

5.1.1 A PDF copy of the results of all Megger testing shall be submitted in report form to the CGTA.

5.1.2 All defects that are corrected by 1379 action as work arising shall be fully documented and work report submitted in PDF format to CGIA upon completion of this specification.

5.1.3 Signed approvals as per section 4.3

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

**L-03 - THIS ITEM HAS BEEN REMOVED**

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# **L-04 Fire Detection System Annual Inspection**

## **1. Scope:**

The intention of this specification is to have an Authorized Representative perform the Annual inspection and testing of the Ships Fire Detection system.

## **2. Technical Description:**

### **2.1 General**

- 2.1.1 Contractor is responsible for all ancillary services necessary to complete the specification item. This includes, but is not limited to, strip out, cramage, transportation, staging, cleaning, debris removal and disposal, etc.
- 2.1.2 The Contractor shall schedule this inspection during the last month of the Refit Period. During the Refit period there will be many spaces where the Fire Detection system will be fully or partial disconnected.
- 2.1.3 The Ships Fire Detection System is a Notifier AM 2020 Detection and Alarm System.
- 2.1.4 The Contractor shall provide the services of an Authorized Representative to inspect and recertify the Ships Notifier Fire Alarm and detection system.
- 2.1.5 Work to include testing, inspection, Certification and a detailed service Report.
- 2.1.6 On approval of CGTA any defects shall be completed under a PSPC 1379 action. Contractor is provided an allowance not to exceed \$5000.00 to replace or repair any defects found. All repairs/replacements must be completed by a company certified to work on Fire detection systems. All costs will be adjusted with proof of invoice.

### **2.2 Location**

- 2.2.1 The Fire Detection Panel is located in the Comm. Office aft of the Bridge Port side Frame #138.

### **2.3 Interferences**

- 2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 During this Refit there will be several smoke and fire detectors isolated. The Contractor shall schedule this work in conjunction with the following Specifications.

- i. H-02 "SEWAGE VACUUM TANK REPLACEMENT"
- ii. H-09 "UPPER DECK STEEL REPAIRS"
- iii. H-10 "GALLEY DECK STEEL REPAIRS"
- iv. H-12 "WHEEL HOUSE TOP DECK STEEL REPAIRS"
- v. H-13 "FLIGHT DECK STEEL REPLACEMENT"
- vi. H-16 "BRIDGE DECK STEEL REPAIRS AND COATINGS"
- vii. H-17 "GALLEY REFURBISHMENT"
- viii. H-19 "CABIN DECKING REPLACEMENT"
- ix. H-20 "CHIEF COOKS CABIN REBUILD"
- x. H-22 "PORT & STBD FAN ROOM STEEL REPAIRS"
- xi. H-27 "MAIN DECK FLOORING REPLACEMENTS"
- xii. H-28 "ELECTRICAL STOREROOM STEEL REPAIRS"
- xiii. E-03 "VENTILATION DUCTWORK & FAN CLEANING"
- xiv. E-04 "BOW THRUSTER PUMP AND MACHINERY"
- xv. E-05 "FIXED FIRE FIGHTING SYSTEMS INSPECTIONS AND HYDRO TESTS"
- xvi. E-09 "HVAC FAN UNIT REPLACEMENT"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 CCGS Hudson Fire Alarm System SHIP004 Drawing

3.1.2 CCGS Hudson Fire Detection Panel Codes and Locations Drawing

#### **3.2 Standards and Regulations**

3.2.1 N/A

#### **3.3 Owner Furnished Equipment**

3.3.1 N/A

### **4. Proof of performance:**

#### **4.1 Inspection**

4.1.1 All Inspections shall be carried out as per Notifier Authorized Representatives requirements.

#### **4.2 Testing**

4.2.1 All Testing shall be carried out as per Notifier Authorized Representatives requirements.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.2 The Contractor must provide proof of Certification for the sub-Contractor that will be carrying out this Inspection.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor shall provide a detailed Report of all systems checks, inspections, testing and repairs in two (2) paper copies and one (1) PDF copy.
- 5.1.2 Contractor shall supply a Certificate indicating the Notifier Fire Detection and Alarm System has been inspected, checked and tested by an Authorized representative.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A

# **L-05 Installation of the Bridge Navigation Watch Alarm System (BNWAS)**

## **1. Scope:**

The intent of this specification is to install a new Bridge Navigation Watch Alarm System on the CCGS Hudson for increased operational awareness safety.

This project consists of the installation and connection of BNWAS equipment on the Navigational Bridge and Boat decks complete with connections to the Danelec DM-100 S Voyage Data Recorder (VDR), General Alarm System (GA), and Radar/EDCIS.

## **2. Technical Description:**

### **2.1 General**

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached T2 Spec "Installation of the BNWAS" included in the Technical Data Package (TDP).
- 2.1.3 Any discrepancies between this spec and the attached T2 spec the Contractor shall note this spec will take precedence.
- 2.1.4 The Contractor shall note that the T2 spec has reference to the Chief Engineer. The word "Chief Engineer" shall be substituted in all cases to the CGIA.
- 2.1.5 All equipment removed by the Contractor as directed in this specification shall be handed over to the CGIA. The Contractor shall prepare a sign off sheet for this equipment and it shall be signed by both the Contractor and the CGIA upon hand over to CCG.
- 2.1.6 There will be a CCG Technical Representative available for assisting the Contractor in confirming equipment locations and identifying cabling and cable runs. The Contractor shall still go through the CGIA for any changes to the spec and through the CGTA for 1379's.

2.1.7 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below: External coatings shall be completed as per spec HD-02 Underwater and above Water Hull.

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

2.2.1 See T2 spec attached.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-01 - DOCKING/UNDOCKING
- iii. HD-02 - UNDERWATER AND ABOVE WATER HULL
- iv. H-10 - WHEELHOUSE TOP DECK REPAIRS

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

#### **3.1.1 New BNWAS System:**

- a. Dwg. MM685-204-WD (BNWAS Wiring Diagram)
- b. Dwg. MM685-206-WD (BNWAS Block Diagram)

#### **3.1.2 Existing Systems to be Interfaced with BNWAS:**

- a. Dwg. MM685-205-WD (General Alarm Wiring Diagram)

### 3.1.3 New Systems to be Interfaced with BNWAS:

- a. Dwg. MM685-198-WD (S-VDR Wiring Diagram)
- b. Dwg. MM685-199-WD (Furuno Radar Wiring Diagram)

### 3.1.4 AMI KW810 Install Report

## 3.2 Standards and Regulations

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

3.2.5 TP127E – Ship’s Electrical Standards

## 3.3 Owner Furnished Equipment

3.3.1 The AMI BNWAS System with peripherals:

- Main Electronic Unit (MEU)
- Monitor and Alert Panel (MAP)
- Passive Infrared Sensor (PIR) (x3)
- Remote Alert Panel (RAP) (x3)
- Watch Alert Panel (WAP)
- Sonar Alert Beacon (SAB)
- Potter Brumfield Relay
- PIR Junction Box
- BNWAS 120VAC Junction Box
- Bracket for Steering Console RAP



### 3.3.2 All cables will be GSM:

- Belden 9260
- Belden 8302
- Belden 9316
- Marine 14/3 AC Cable
- Green Jacket Gnd Wire #12 AWG

## 4. Proof of performance:

### 4.1 Inspection

4.1.1 All work must be completed to the satisfaction of the CGIA the CCG Technical Representative and the attending Lloyds Surveyor.

4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.

#### 4.1.3 Inspection Hold Points

- a) Hold point 1- CGIA and the onsite CCG Technical Representative will confirm with the Contractor, the General Alarms functionality prior to starting this specification.
- b) Hold point 2- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.
- c) Hold point 3- CGIA and the onsite CCG Technical Representative will confirm positioning of all new components prior to any of them being securely mounted.
- d) Hold Point 4- CGIA and the attending Lloyds Surveyor will inspect all weld through penetrations upon completion of welding and prior to any cables being run.
- e) Hold Point 5- All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.
- f) Hold Point 6- The onsite CCG Technical Representative will carry out the test and inspection checklist as described in Section 4.2 Testing. This specification will not be considered completed until all testing and inspections are signed off by the CCG Technical Representative and the attending Lloyds Surveyor.

- g) Hold Point 7- The onsite CCG Technical Representative will carry out the test and inspection checklist as described in Section 4.2 Testing. This specification will not be considered completed until all testing and inspections are signed off by the CCG Technical Representative.
- h) Hold Point 8- The attending Lloyds Surveyor shall witness the running of the system upon completion of Hold Point #7.

## **4.2 Testing**

- 4.2.1 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.2 Upon completion of the BNWAS installation the CCG Technical Representative will carry out the Test and Inspection checklist as per attached AMI KW810 Install Report.
- 4.2.3 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **4.3 Certification**

- 4.3.1 Lloyd's approval and sign off document shall be completed and presented to CGTA as per paragraph 5.3 of section 5 Quality Assurance and Inspection and Testing of services. Copies of the sign off document shall be included with the post re-fit deliverables.
- 4.3.2 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer and NACE inspector.
- 5.1.2 Signed approvals as per section 4.3.
- 5.1.3 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# **L-06 TV Distribution Backbone Replacement**

## **1. Scope:**

The intention of this specification is to replace the existing TV Distribution Backbone system with new updated RG6 cable and equipment to have a balanced passive system within +/- 3dB at each drop.

## **2. Technical Description:**

### **2.1 General**

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached T3 Spec (TV Distribution System Backbone) included in the Technical Data Package (TDP).
- 2.1.3 Any discrepancies between this spec and the attached T3 spec the Contractor shall note this spec will take precedence.
- 2.1.4 The Contractor shall note that the T3 spec has reference to the Chief Engineer. The word "Chief Engineer" shall be substituted in all cases to the CGIA.
- 2.1.5 All equipment removed by the Contractor as directed in this specification shall be handed over to the CGIA. The Contractor shall prepare a sign off sheet for this equipment and it shall be signed by both the Contractor and the CGIA upon hand over to CCG.
- 2.1.6 There will be a CCG Technical Representative available for assisting the Contractor in confirming equipment locations and identifying cabling and cable runs. The Contractor shall still go through the CGIA for any changes to the spec and through the CGTA for 1379 approval process.
- 2.1.7 As per section T3-7 of the T3 spec-"The Contractor shall run new Belden 1694A (RG-6) cable between devices all the way to the bulkhead boxes as per Allswater Dwg # 18111-540-E-001, Dwg. MM685-120-BD (REV C), and the Cable List in this document. This is estimated to be a total of 850m of RG-6 cable. For the purpose of adjustments, the Contractor shall cost the 850m on a separate line item that will be added to the global cost. This cost will be prorated to 10m for adjustment up or down by 1379 as required.

2.1.8 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below:

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

2.2.1 See T3 spec attached.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-15 "INSTALLATION OF THE DOPPLER SPEED LOG"
- iii. E-13 "SAILOR ANTENNA MOUNT REPLACEMENT"
- iv. L-05 "BRIDGE WATCH NAVIGATION ALARM SYSTEM INSTALLATION"
- v. L-07 "RADAR ECDIS INSTALLATION"
- vi. L-08 "FIBER OPTIC GYROCOMPASS INSTALLATION"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

3.1.1 Existing TV Distribution System drawing (Reference for Removal):

- i. Dwg. MM685-120-BD (REV B) Sheet 1/2 (TV/AM/FM Distribution System)
- ii. Dwg. MM685-120-BD (REV B) Sheet 2/2 (TV/AM/FM Distribution System)
- iii. Dwg. MM685-182-BD (EMAIL AT SEA BLOCK DIAGRAM)

### 3.1.2 New TV Distribution System drawing (Reference for Installation):

- i. Dwg. MM685-120-BD (REV C) ((TV/AM/FM Distribution System)
- ii. Allswater Dwg # 18111-540-E-001

## 3.2 Standards and Regulations

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

## 3.3 Owner Furnished Equipment

3.3.1 Belden 1694A RG6 Cable (850m)

8-Way Splitters - Blonder Tongue CAT No LPD-8 (x2)

4-Way Splitters - Blonder Tongue CAT No LPD-4 (x10)

3-Way Balanced Splitters - Blonder Tongue CAT No LPD-3P (x8)

L-Band Diplexer (Blonder Tongue CAT No LUV-2150 (x66)

FS6U Connectors

FS6US Connectors

Wall Plates and Boxes (x65)

Inserts and Modules

Crimping tool CPLCCT-SLM (x1)

Crimping tips LMTIP-S for FS6U (x2)

Crimping tips LMTIP-WP for FS6US (x2)

Prep Tool PSA59/6 (x1)

BTF-TP 75ohm Terminators

3.3.2 The Aluminum plate described in section T3-7 of the T3 spec shall be GSM.

3.3.3 Contractor shall NOTE: extra materials supplied, including crimping and prep tools, are to be returned to CCG upon completion of all work.

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the CCG Technical Representative.

#### **4.1.2 Inspection Hold Points**

- a) Hold point 1- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.
- b) Hold Point 2- CGIA and the onsite CCG Technical Representative will confirm that all wires and equipment is labelled as described the T3 spec.
- c) Hold point 3- CGIA and the onsite CCG Technical Representative will confirm the locations of all new and existing bulkhead boxes that will not be re-mounted in their original locations.

### **4.2 Testing**

4.2.1 The TV Distribution system shall be tested by a CCG Technical representative to ensure all drops are balanced to within +/- 3dB from each other. A signal shall be injected at the head end diplexer in the Electronic Equipment Room in the port labelled 10 – 806 MHz, the frequency shall be set at 211.25 MHz and the level shall be set at 0dB, measure signal dB level at each outlet labelled TV only. The outlets should all be within +/- 3dB of each other.

4.2.2 The Contractor may have his representative present during the testing in line 4.2.1. Any defects in the Contractors scope of work in this specification shall be his responsibility to correct.

### **4.3 Certification**

4.3.1 N/A

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

5.1.1 N/A

### **5.2 Spares**

5.2.1 N/A

### **5.3 Training**

5.3.1 N/A

# **L-07 Radar ECDIS Installation**

## **1. Scope:**

The intention of this specification is the removal of the Bridgemaster E Radar system and replacement with Furuno FMD3200 X & S Radar/ECDIS hardware.

## **2. Technical Description:**

### **2.1 General**

- 2.1.1 All staging, crange, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached T4 Spec (Radar ECDIS Installation) included in the Technical Data Package (TDP).
- 2.1.3 Any discrepancies between this spec and the attached T4 spec the Contractor shall note this spec will take precedence.
- 2.1.4 The Contractor shall note that the T4 spec has reference to the Chief Engineer. The word "Chief Engineer" shall be substituted in all cases to the CGIA.
- 2.1.5 The following is a list of known material to be required and Contractor supplied.
- Steel pedestal bases x4
  - Breaker 15A x2
  - AC and DC J/B as required
  - AC Outlet - Duplex
  - AC Outlet – Quad
  - AC Plugs as required
  - Roxtec Transits x2
  - Flooring material as required
  - Miscellaneous Rectangular Waveguide and Hardware to connect existing waveguide to Furuno Turning Unit and Transceiver– WR112
- 2.1.6 All equipment removed by the Contractor as directed in this specification shall be handed over to the CGIA. The Contractor shall prepare a sign off sheet for this equipment and it shall be signed by both the Contractor and the CGIA upon hand over to CCG.
- 2.1.7 There will be a CCG Technical Representative available for assisting the Contractor in confirming equipment locations and identifying cabling and cable runs. The Contractor shall still go through the CGIA for any changes to the spec and through the CGTA for any 1379 actions.



2.1.8 Upon completion of all inspections and testing all new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below:

- i One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.
- ii Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.
- iii An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- iv A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## 2.2 Location

2.2.1 See T4 spec attached.

## 2.3 Interferences

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-15 "INSTALLATION OF THE DOPPLER SPEED LOG"
- iii. H-12 "WHEELHOUSE TOP DECK REPAIRS"
- iv. E-13 "SAILOR ANTENNA MOUNT REPLACEMENT"
- v. L-05 "BRIDGE WATCH NAVIGATION ALARM SYSTEM INSTALLATION"
- vi. L-08 "FIBER OPTIC GYROCOMPASS INSTALLATION"

### **3. References:**

#### **3.1 Guidance Drawings/Nameplate data**

3.1.1 See section T4-2 of the attached T4 spec.

#### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part “B” Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

3.2.5 TP127E – Ship’s Electrical Standards.

3.2.6 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E

#### **3.3 Owner Furnished Equipment**

3.3.1 The Furuno System with peripherals:

- Pedestals x4
- Radar Processors x2
- Chart Processors x2
- 26” Hatteland Monitors x4
- Radar keypads x2
- Chart keypads x2
- Rack mount UPS x4
- Isolation transformers x4
- UPS battery banks x4
- Radar power supplies x2
- X band transceiver (main)
- S band transceiver
- X band turning unit (main)
- S band Turning unit
- X band Sail 6’5”(main)
- S band Sail
- HUB 3000
- HUB 100 x2
- MC3000 Sensor Adaptors x2
- Isolation switch x2
- Heliax Commscope EIA 7/8” Connector x4

- Middle Atlantic Telescopic Shelves x8
- Newmar Power Supply

### 3.3.2 All cables will be GSM:

- Tricab RBA-DETD/10.75BK
- DVI to VGA adaptor cable
- AVA5-50 Waveguide
- Belden 1300SB
- TTYCSCLA-1Q (18 AWG 4C)
- Belden 9314
- Belden 9553
- Belden 9512
- Belden 9322
- Marine 14/3
- Green Jacket Gnd Wire #6 AWG
- Green Jacket Gnd Wire #14 AWG
- Green Jacket Gnd Wire #16 AWG

## 4. Proof of performance:

### 4.1 Inspection

- 4.1.1 All work must be completed to the satisfaction of the CGIA and the CCG Technical Representative.
- 4.1.2 All surface preparations, primer coatings and final coatings must be approved by the NACE inspector before proceeding to the next step of the coating.
- 4.1.3 Inspection Hold Points
- Hold point 1- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.
  - Hold point 2- CGIA and the onsite CCG Technical Representative will confirm positioning of all new components prior to any of them being securely mounted.
  - Hold point 3- CGIA and the onsite CCG Technical Representative will confirm all cables are installed, labelled and terminated as described in section T4-9 of the T4 spec.
  - Hold point 4- CGIA and the onsite CCG Technical Representative will confirm that the 8" mounting bases has been fitted to the Consoles as described in section T4-8 of the T4 spec.
  - Hold point 5- CGIA and the onsite CCG Technical Representative will confirm the exact location for the Radar Pedestals prior to it being welded securely to the deck.

- f) Hold Point 6- CGIA will inspect all welding to the Radar pedestals prior to the NDT technician conducting his inspection.
- g) Hold Point 7- CGIA and the and the NACE inspector will witness all testing as per section 4.2 Testing.
- h) Hold Point 8 - All surface preparations, primer coatings and final coatings must be approved by the CGIA and the NACE inspector before proceeding to the next step of the coating.

## **4.2 Testing**

- 4.2.1 All welds must be subjected to 100% Visual and Magnetic Particle Examination as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.
- 4.2.2 Testing of paint and application thickness shall be carried out at regular intervals as per Manufacturers recommendations or at the request of the NACE inspector. All testing of thickness readings shall be recorded and a report shall be generated and presented to CGTA and PSPC contract authority upon completion of work.
- 4.2.3 Testing of the Radar system will be by the CCG Technical Representative.
- 4.2.4 The Contractor may have his representative present during the testing in line 4.2.1. Any defects in the Contractors scope of work in this specification shall be his responsibility to correct.

## **4.3 Certification**

- 4.3.1 All welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 The Contractor must provide a coating application and thickness report, in PDF format, to the Inspection Authority and the CGTA that details all of the particulars of the coating application process as completed by the Contractor. The report must include environmental conditions such as temperatures and relative humidity at the time of coating. The report must also include all thickness readings conducted during the coating process, as directed by the manufacturer and NACE inspector.
- 5.1.2 A PDF copy of the results of all NDE and NDT weld inspection and testing shall be submitted in report form to the CGTA.

## **5.2 Spares**

5.2.1 N/A

## **5.3 Training**

5.3.1 N/A

# **L-08 Fiber Optic Gyrocompass (FOG) Installation**

## **1. Scope:**

The intention of this specification is the removal of the Anschutz Standard 20 gyroscopes and replace it with the Sperry Dual FOG Navigat 3000s.

## **2. Technical Description:**

### **2.1 General**

- 2.1.1 All staging, crantage, screens, heaters and other environmental control equipment, coating repairs, lighting and any other support services, equipment and material necessary to perform the tasks set out in this specification shall be supplied by Contractor unless otherwise specified.
- 2.1.2 The Contractor shall follow the attached T5 Spec (Dual (FOG) Fiber Optic Gyroscope) 3000 Installation) included in the Technical Data Package (TDP).
- 2.1.3 Any discrepancies between this spec and the attached T5 spec the Contractor shall note this spec will take precedence.
- 2.1.4 The Contractor shall note that the T5 spec has reference to the Chief Engineer. The word "Chief Engineer" shall be substituted in all cases to the CGIA.
- 2.1.5 All equipment removed by the Contractor as directed in this specification shall be handed over to the CGIA. The Contractor shall prepare a sign off sheet for this equipment and it shall be signed by both the Contractor and the CGIA upon hand over to CCG.
- 2.1.6 There will be a CCG Technical Representative available for assisting the Contractor in confirming equipment locations and identifying cabling and cable runs. The Contractor shall still go through the CGIA for any changes to the spec and through the CGTA for any 1379 actions.
- 2.1.7 Contractor shall note that one piece of equipment identified in the T5 spec may not get removed. This is the ITT Mackay Marine Radio. An internal Configuration Change request (CCR) in process for the removal process of the radios. If this CCR is not approved the radio will remain in situ. The CGTA will inform the Contractor in writing if this radio is to be removed. The Contractor shall not remove this radio unless written approval is provided. The Contractor shall provide a separate cost in their quote the Radios removal and include this cost in their bid. This separate quote will be used as a credit if it is not removed via a PSPC 1379 action.
- 2.1.8 Upon completion of all inspections and testing any new and disturbed steel shall be prepared and Coatings to be applied as per Product Surface Preparation and Application Sheets (attached) for Wasser Coatings. The Coating System is described below:

2.1.9 One (1) Stripe coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all edges, crevices, nuts, bolts, back to back angle and weld seams.

2.1.10 Spot/Full Prime coat of Wasser primer – MC- MIOZINC (DFT 3mil) to all bare metal areas and previously Stripe coated areas.

- i An intermediate coat of MC-CR White (DFT 3-5mil) on all surfaces.
- ii A topcoat of Wasser MC Luster 100 White or matching color (DFT 3-5mil) on all surfaces.

## **2.2 Location**

2.2.1 See T5 spec attached.

## **2.3 Interferences**

2.3.1 Any guidance provided by CCG should not in any way be considered inclusive. All interference items shall be determined by contractor at vessel viewing prior to bidding. Any and all interference items shall be removed and reinstalled in as found condition at contractor's expense and no extra allowances will be granted for removal and reinstallation of interference items.

2.3.2 This work shall be done in conjunction with the following Specification Items:

- i. GENERAL NOTES
- ii. HD-15 "INSTALLATION OF THE DOPPLER SPEED LOG"
- iii. H-12 "WHEELHOUSE TOP DECK REPAIRS"
- iv. E-13 "SAILOR ANTENNA MOUNT REPLACEMENT"
- v. L-05 "BRIDGE WATCH NAVIGATION ALARM SYSTEM INSTALLATION"
- vi. L-07 "RADAR ECDIS INSTALLATION"

## **3. References:**

### **3.1 Guidance Drawings/Nameplate data**

3.1.1 See section T5-2 of the attached T5 spec.

### **3.2 Standards and Regulations**

3.2.1 See General Notes Section 1.3.1 Supplementary Documentation

3.2.2 IACS - No.47 – Part "B" Shipbuilding and Repair Quality Standard.

3.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installation on Ships

3.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)

3.2.5 TP127E – Ship’s Electrical Standards.

3.2.6 CCG Welding Specification, CCG Welding Specification n-eng CT-043-eq-eg-001-E

3.2.7 Canada Shipping Act, 2001

### **3.3 Owner Furnished Equipment**

3.3.1 The Dual FOG 3000 systems:

- FOG Navigat 3000 Sensors x2
- FOG Navigat 3000 Interface & Power Supply Unit x2
- FOG Navigat 3000 Controller Display Unit x2
- FOG Navitwin J/B
- FOG Navitwin 3000 Controller Display Unit
- Actisense PRO-BUF-1

3.3.2 All cables will be GSM:

- Belden 9322
- Belden 9312
- Marine 14/3
- Green Jacket Gnd Wire #6 AWG
- Green Jacket Gnd Wire #8 AWG
- Green Jacket Gnd Wire #10 AWG

## **4. Proof of performance:**

### **4.1 Inspection**

4.1.1 All work must be completed to the satisfaction of the CGIA and the CCG Technical Representative.

4.1.2 Inspection Hold Points

- a) Hold point 1- CGIA and the onsite CCG Technical Representative will confirm all the cables and equipment to be removed prior to any disconnections.
- b) Hold point 2- CGIA and the onsite CCG Technical Representative will confirm positioning of all new components prior to any of them being securely mounted.
- c) Hold point 3- CGIA and the onsite CCG Technical Representative will confirm all cables are installed, labelled and terminated as described in section T5-5 of the T5 spec.
- d) Hold point 5- CGIA and the onsite CCG Technical Representative will confirm the location for all removed equipment. All equipment shall be turned over to the CGIA.



- e) Hold point 5- CGIA and the onsite CCG Technical Representative will confirm an alternative location for the Natitwin CDU if the ITT MacKay Marine radio is not removed.

## **4.2 Testing**

- 4.2.1 The Contractor shall test all cables replaced or worked on during this specification for continuity and insulation resistance by Megger testing. All cabling shall be tested after installation but before termination to ensure no equipment is damaged in testing. Contractor is responsible to disconnect any cables that are terminated prior to megger testing.
- 4.2.2 Testing of the new FOG system will be by the CCG Technical Representative.
- 4.2.3 The Contractor may have his representative present during the testing in line 4.2.1. Any defects in the Contractors scope of work in this specification shall be his responsibility to correct.

## **4.3 Certification**

- 4.3.1 If applicable to this specification, all welders must be certified as per CCG Welding Specification n-eng CT-043-eq-eg-001-E and Lloyd's regulatory requirements.

## **5. Deliverables:**

### **5.1 Reports, Drawings and Manuals**

- 5.1.1 As per attached T5 spec.

### **5.2 Spares**

- 5.2.1 N/A

### **5.3 Training**

- 5.3.1 N/A