

# **INTEGRATED TECHNICAL SERVICES MARINE ENGINEERING**



## **CCGS Terry Fox Drydocking**

Bottom Shell Plating & Internal Structure Damage Repairs

F6855-180586

2018



## **CONTENTS:**

PREAMBLE-----	3
HD-01 Services-----	10
HD-02 Drydocking-----	14
HD-03 Tank Cleaning & Testing-----	17
HD-04 Bottom Shell Plating & Internal Structure Renewal-----	20

## **PREAMBLE**

### **1. INTENT**

The intent of this specification shall describe the necessary work involved in carrying out the ship's Drydocking and to complete the Bottom Hull Damage Repairs. All work specified herein and all repairs, inspections and renewals shall be carried out to the satisfaction of the Technical Authority/Owner's Representative and where applicable the attending TC Marine Safety Inspector. Unless otherwise specifically stated, the Technical Authority/ Owner's Representative is the Chief Engineer.

### **2. MANUFACTURER'S RECOMMENDATIONS**

The overhaul and installation of all machinery and equipment specified herein shall be as per the manufacturer's applicable instructions, drawings and specifications. The surface preparation, ambient limitations and coating applications shall be as per the manufacturer's instructions and specifications.

### **3. TESTING AND RECORDS**

All test results, calibrations, measurements and readings are to be recorded. Three typewritten copies, in English, are to be presented to the Technical Authority and one copy to the Project Authority within three days following the completion of the applicable work item. All tests are to be witnessed by the Technical Authority and where required, Transport Canada Marine Safety. The Contractor is responsible for contacting TC-MS when their presence is required for inspections or testing. The Contractor shall advise the Technical Authority in every case when Marine Safety arrives onsite for inspection of vessel's equipment or structure.

### **4. WORKMANSHIP**

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

### **5. FACILITIES**

Quotation shall include all of the necessary labor and equipment required for the erection of access staging, rigging, lighting, tugs, pilotage, necessary crange and line handling.

### **6. MATERIALS AND SUBSTITUTIONS**

All material shall be supplied by the contractor and all materials shall be new and unused unless otherwise specified. All replacement material in the form of jointing, packing, insulation, small hardware, oils, lubricants, cleaning solvents, preservatives, paints, coatings, etc., shall be in accordance with the equipment manufacturer's drawings, manuals or instructions. Where no particular item is specified, or where substitution must be made, the Owner's representative must approve all material offered. Material data shall be provided in English to Chief Engineer.

## **7. REMOVALS**

Any items of equipment to be removed and subsequently reinstalled in order to carry out work specified or for access to carry out the work specified, shall be jointly inspected for damages prior to removal by both the contractor and Owner's representative.

## **8. EXPOSURE AND PROTECTION OF EQUIPMENT**

The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit which might become damaged by exposure, movement of materials, sand grit or shot blasting, welding, grinding, burning, gouging, painting or airborne particles of paint. Any damage shall be the responsibility of the contractor. Government furnished equipment and materials shall be received by the contractor and stored in a secure warehouse or storeroom having a controlled environment appropriate to the equipment as per the manufacturer's instructions.

## **9. LIGHTING AND VENTILATION**

Temporary lighting and/or temporary ventilation required by the contractor to carry out any item of this specification shall be supplied, installed and maintained in a safe working condition by the contractor and removed upon the completion of work.

## **10. CLEANLINESS**

The contractor shall at all times, maintain the work areas in which his personnel have access in a clean condition and free from debris. Dirt & debris generated by the spec items shall be cleaned up and removed from the vessel daily. Upon completion of this refit, the contractor shall ensure that the vessel is in a clean condition, free from all foreign material in any system or location placed there as a result of this refit. The contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. The contractor shall dispose of any and all oil and water residue, which accumulates in the machinery space bilges as a result of any refit work detailed in this specification.

## **11. ASBESTOS**

Any and all insulation materials shall be asbestos free and approved for the required application.

## **12. ENTRY INTO ENCLOSED SPACES**

The contractor shall abide by the Coast Guard Enclosed Space Entry Policy. The policy is listed in the attached Safety Annex as section 7.0.9 and section 7.0.9 (N). Entry certificates shall clearly state the type of work permitted and shall be renewed as required by the regulations. Additional copies of these certificates shall be posted in conspicuous locations for the information of ship and contractor personnel.

A fire zone shall be established and naked lights shall not be used within this zone until "gas-free" certification has been issued.

The Contractor is to ensure that any work carried out in confined spaces as defined by the Canada Labor Code complies fully with all provisions of the code.

A number of spaces onboard the vessel are designated as Enclosed Spaces; these spaces are to be entered only under safe and controlled circumstances. The Contractor shall have in place an Enclosed Space Entry Permit system, equal to or better than the procedure contained in the Coast Guard's Safety Management System, section 7.D.9. Ship's breathing apparatus and EEBD's are not to be used except in an emergency.

The Contractor will maintain a log denoting the date, persons in the tank and times in and out. All forms and permits shall be completed in English.

### **13. Suspension Of Work**

The Technical Authority reserves the right to suspend work immediately when that work is being performed in contravention of the Coast Guard's Safety Management System. Work shall be allowed to resume when the Technical Authority, in consultation with the Contractor and PWGSC, is satisfied that the agreed-upon procedures are in place and being adhered to.

### **14. HOTWORK**

Any item of work involving the use of heat in its execution requires that the contractor advise the owner's representative prior to starting such heating and upon its completion. The contractor shall be responsible for maintaining a competent and properly equipped fire watch during and for one full hour after all hotwork. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. The contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers shall not be used except in an emergency. The Contractor shall abide by the Coast Guard Hotwork Policy. The policy is listed in the attached Safety Annex as section 7.D.11 and section 7.D.11 (N). The contractor shall be responsible to ensure the contractor's personnel including any subcontractors shall follow the policy. All forms / permits shall be completed in English.

### **15. LOCKOUT AND TAGOUT PROCEDURES**

1. The Contractor shall be responsible to protect persons working on board the vessel while working on or near shipboard systems and equipment from accidental exposure to:

- electrical currents
- hydraulic
- pneumatic
- gas or steam pressure and vacuum
- high temperatures
- cryogenic temperatures
- radio frequency emissions
- potentially reactive chemicals
- stored mechanical energy
- equipment actuation

2. The contractor, under the supervision of the Chief Engineer and or the Electrical Officer, shall be responsible for the Lockout and Tagout of equipment and systems listed in the specification.
3. The Contractor shall supply and install all locks and tags and shall complete the Lockout Tagout Log sheet provided by the Vessel.
4. The Contractor shall remove all locks and tags and complete the Lockout Tagout Log sheet provided by the Vessel.

## **16. PAINTING**

All new and disturbed steelwork that will not be on the underwater wetted surface of the ship's hull is to be protected with two coats of Contractor supplied primer. Unless otherwise stated in the individual specification item, the primer is to be International Paints Interplate Zinc Silicate *NQA262INQA026* red. The paint is to be applied as per the manufacturer's instructions on their respective product data sheets. Finish coats are described in individual specification items. Finish coats are to be applied as per the manufacturer's instructions on their respective product data sheets.

## **17. WELDING**

Welding shall be in accordance with the Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E)

The Contractor shall be currently certified by the Canadian Welding Bureau (CWB) in accordance with CWB 47.1 latest revision Division I, II or III at the time of bid closing. The Contractor shall provide a current letter of validation from the CWB indicating compliance with standard CSA W47.1, Division I, II or III. (latest revision)

The Contractor may be required to provide approved procedure data sheets for each type of joint and welding position that will be involved in this refit.

The Contractor may be required to supply a current Welders Ticket for each individual welder that will be involved in this refit.

## **18. SMOKING**

The Public Service Smoking Policy forbids smoking in all Government ships in areas inside the ship where shipyard personnel will be working. The contractor shall inform shipyard workers of this policy and ensure that it is complied with.

## **19. RESTRICTED AREAS**

The following areas are out of bounds to shipyard personnel except to perform work as required by the specifications: all cabins, offices, Wheelhouse, Control Room, Engineer's office, public washrooms, cafeteria, dining room and lounge areas.

## **20. ELECTRICAL STANDARDS**

Any electrical installations or renewals shall be in accordance with the latest editions of the following marine standards:

(a) TP 127E-TC Marine Safety Electrical Standards.

(b) IEEE Standard 45 - Recommended Practice for Electrical Installation on Shipboard.

If any cable installed within this contract is found to be damaged, shorted or opened as a result of the manner of installation, the entire length of cable shall be replaced and installed at no cost to the Department. Plastic tie-wraps may be used to secure wiring in panels or junction boxes only.

## **21. DRAWINGS**

All drawings and drawing revisions that the contractor is requested to do in the execution of this contract shall be of a quality equal to that of the drawings that are requested to be updated. For example, drawings that have been lettered and dimensioned in a professional manner shall not be updated using freehand. Prints and reproductions that a contractor is required to provide shall be made on one piece of paper.

Sign off and acceptance of jobs will not occur until any and all drawings are updated to the satisfaction of the Owner's representative. All revisions shall be noted in English.

## **22. TRANSDUCERS**

The contractor shall not paint the transducers and all transducers shall be afforded the necessary protection during hull cleaning, blasting, burning, welding and coating operations.

## **23. OWNER'S REPRESENTATIVE**

Throughout this document, there is made reference to the Owner's Representative. For the purpose of this document, the Owner's representative is defined as the Chief Engineer of the Vessel.

## **24. Regulatory Authority Inspections**

The Contractor shall confirm a schedule of inspections with the regulatory authority (TCMS) for all work described in this specification and shall be responsible for calling them when inspections are required and for ensuring the work is credited by the regulatory authority in the Chief Engineer's 'Hull and Machinery Survey Book'.

The contractor shall ensure the Chief Engineer is informed when the regulating authority is onsite such that the Chief Engineer can witness the inspections by the regulating authority.

Notwithstanding any errors, omissions, discrepancies, duplication or lack of clarity in these project requirements, it shall be the responsibility of the Contractor to ensure that

~~the execution of the work specified herein is to the satisfaction of the Technical Authority.~~

Inspection of any item by the Technical Authority does not substitute for any required inspection by Transport Canada Marine Safety (TC-MS).

## **25. Waste Oil Products**

Disposal of waste oil products shall be carried out by the Contractor, or subcontractor, who has been licensed by provincial authorities for the disposal of petroleum products. Copies of certificates must be produced upon request. This must be in accordance with the Coast Guard Policy for Handling Fuel, Oil, and Waste Oil Products, which is part of the Fleet Safety Manual, section 7.C.3. a copy of which is in the attached safety annex.

## **26. WHMIS**

The contractor shall provide current MSDS sheets for any WHMIS-controlled products used onboard or around the vessel at the start of the work period before the products are used. This includes at the minimum MSDS sheets for any solvents, cleaners, chemicals, coatings and blasting grits to be used. Any neutralizing chemicals or specialized protective equipment required shall be provided by the Contractor at all times these WHMIS-controlled products are onboard the vessel.

## **27. SAFETY ANNEX**

The Contractor shall follow the Coast Guard Policies as outlined in the attached Safety Annex. This Annex contains excerpts from the Fisheries and Oceans Canada, Canadian Coast Guard Fleet Safety Manual (DFO 5737) and deals with contractor responsibilities for items such as Hot Work, Confined Space Entry, Diving, Diving Operations, Contractor Safety & Security (10.A.7 FSM) and Drydocking.

An electronic copy of the Fleet Safety Manual (Adobe Acrobat .PDF version) can be found at

<http://142.130.14.20/fleet-flotte/Safety/maine.htm>

### Safety Familiarization

The Contractors Basic Safety Familiarization shall be completed for all contractors working on CCG vessels. It will verify that a basic safety briefing has been given, understood and acknowledged by the contractor. All contractors shall follow applicable OHS regulations in accordance with CCG safety/security/environmental requirements, fire alarm protocol and conduct to follow in case of fire or other emergency situations, familiarization of restricted areas and spaces, known risks and hazards encountered at the worksite ( ie asbestos, fire fighting systems, hazardous materials, flammables etc).

## **28. Data Book**

The Contractor is to produce two Data Books in English which shall list products, supplies and other purchases by the yard for this refit listing supplier and contact information. This book shall also include the copies of the readings required for the completion of each specification item. The data book shall be 8 X 12" format and binded. The data book shall be indexed and tabbed in the same order as the refit specifications index. Contractor shall also provide 3 CD-ROM's of the data book. The CD ROM's and data books shall be provided to the Chief Engineer prior to the end of refit.

**SHIP'S PARTICULARS**

Length O.A. ----- 88.0 Metres  
Breadth Mid. ----- 17.1 Metres  
Draft ----- 6.06 Metres  
Displacement ----- 4234 MT  
Power-----17,300 KW  
Engines-----Stork -Werkspoor 8TM 410 (x 4)  
Propulsion-----Diesel- Reducer Gearbox - CPP  
Year built ----- 1983

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Services		

### **Part 1: SCOPE:**

- 1.1 The following services shall be supplied, fitted and / or connected upon arrival in the dry-dock, maintained throughout the dry-docking period and removed from the vessel on completion of the work period. The Contractor will be responsible for any additional connections required when the ship is moved between the dry-dock and alongside berth at the Contractor's facilities.
- 1.2 The services are required for the full Dry-dock period. Each item is to be priced separately.

### **Part 2: REFERENCES:**

#### **2.1 Guidance Drawings/Nameplate Data**

#### **2.2 Standards**

- 2.2.1. The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- 2.2.2. Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.3. Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.4. Coast Guard ISM Hotwork procedures
- 2.2.5. Coast Guard ISM Fall Protection procedures
- 2.2.6. Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E)
- 2.2.7. CWB CSA 47.1 latest revision Division I, II or III
- 2.2.8. SSPC-SPT

#### **2.3 Regulations**

- 2.3.1. Canada Shipping Act

#### **2.4 Owner Furnished Equipment**

- 2.4.1. The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

- 3.1.1. The Contractor is to quote a global price and daily rates for all services supplied to the vessel during the dry-docking period.

#### **READINGS AND REPORTS**

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Services</b>		

**3.1.2.** Contractor shall collect and bind all readings and reports in a booklet form. Three (3) bound copies shall be delivered to the Chief Engineer at the end of the contracted refit period along with a CD-ROM or memory stick.

**3.1.3.** The Contractor shall also send an electronic copy (CD-ROM or memory stick) to the Technical Authority prior to the end of the refit period.

#### **ELECTRICAL POWER**

**3.1.4.** Shore power facilities are to be supplied to the ship using a single 400-amp source using the Contractor's cables and fittings. The ship requires 1 x 400 amp x 600 VAC x 60 Hz x 3-phase power source for connection to the ship's shore power transformer. The Contractor will quote on supplying 6000 kW-hours per day. The Contractor will quote per kW hour for adjustment purposes on actual amount consumed.

**3.1.5.** The meter readings are to be taken from the ship's shore power meter located on the main switchboard. The meter readings will be recorded by the Contractor and the Chief Engineer's designate at the time of connection and disconnection.

#### **FIRE MAIN**

**3.1.6.** Water shall be maintained to the vessel's fire main at a pressure of 550 kPa (80 psi) and be continuous 24 hours per day. The supply line shall be fitted with an isolating valve and a pressure-regulating valve (with pressure gauge) which will be located on the ship connected to the ship's international shore connection. Drains shall be fitted in the event of cold weather.

#### **GANGWAYS**

**3.1.7.** The Contractor will supply and erect 2 gangways, complete with safety nets, guardrails and adequate lighting to the satisfaction of the Commanding Officer. The main gangway will land on the aft deck, secondary gangway on the fore deck. The gangways are to be safe, well lit and structurally suitable for the passage of shipyard workers and ship's crew. The Contractor is to maintain the gangways in a safe condition throughout the duration of the dry-docking.

**3.1.8.** The ship's gangway will not be used during the refit / dry-dock period except with the approval of the Commanding Officer and at no liability to CCG.

**3.1.9.** Any movement of the gangways required by the Contractor will be at the expense of the Contractor.

#### **INTERNET/PHONE**

**3.1.10.** The Contractor shall provide unlimited high speed internet and phone service to the vessel for the duration of the refit period.

**3.1.11.** The service will be active 24 hours per day for the duration of the contract.

**3.1.12.** The Contractor will be responsible for giving notice for connection / disconnection of the telephones as required for any ship movements.

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Services</b>		

**3.1.13.** The Contractor will supply a listing of shipyard telephone numbers, fire, police and emergency telephone numbers to the Chief Engineer when the ship arrives in the Contractor's yard.

**3.1.14.** Long distance Canadian calling included.

#### **POTABLE FRESH WATER**

**3.1.15.** The Contractor has completed the applicable paragraphs of the Safety Requirements before a connection to the vessel is made.

**3.1.16.** Potable water shall be supplied through a fresh water filling line (c/w reducing valve and pressure gauge) at the ship's fresh water connection located on the Main Deck (Frame 02) port or starboard side. Contractor to supply approximately 5 m<sup>3</sup> per day.

**3.1.17.** Contractor will also supply any fresh water and / or hot water required for the cleaning, testing or flushing of tanks as required by the Specification from a source separate from the ship's potable fresh water connection.

#### **SEWAGE CONNECTION**

**3.1.18.** Contractor to connect a 2.5" diameter connection pipe and hose to the sewage system overboard discharge, located between frames 112 & 113 starboard side. The discharge to be lead away from the ship's side to the Contractor's sewage outlet facilities. The connection to be removed on completion of docking.

**3.1.19.** Note: this connection to be made within 4 hours of ship dry-docking.

#### **GARBAGE REMOVAL**

**3.1.20.** A suitable garbage container *with cover* is to be provided for the duration of the refit. The garbage container shall be a minimum of 6 m<sup>3</sup> and is to be placed on the Main Deck aft in a location agreed upon by the Contractor and the Chief Officer.

**3.1.21.** The ship's garbage container shall be emptied at a minimum of every 3 to 4 days, more often if required by smell or capacity.

**3.1.22.** Garbage containers for use of the Contractor for disposal of debris etc. may be located on the Main Deck aft in locations agreed to by the Chief Officer. These containers shall be emptied on a regular basis.

#### **BERTHING**

**3.1.23.** The berthing and mooring facilities are to be suitable for a vessel of this size and are to be to the satisfaction of the Commanding Officer.

**3.1.24.** During the contract period, if the ship is not in the dry-dock, the ship is to be berthed at the Contractor's wharf at a safe and secure berth with adequate water at extreme low tide to ensure the vessel will not touch bottom.

**3.1.25.** The Contractor is responsible for all movements of the vessel during the contract period, including arrangements and costs for line handlers, tugs, pilot's etc.

Spec item #: HD-01	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Services</b>		

### **CLEANING**

**3.1.26.** The Contractor is to ensure all spaces, compartments and areas of the ship, external and internal, are left in an “as clean condition as found”.

**3.1.27.** The cost of removing dirt, debris and cleaning up work areas to the “as clean a condition as found” shall be included in each specification item.

### **OILY BILGE WATER**

**3.1.28.** The Contractor shall quote on removing 50 m<sup>3</sup> of oily-water from the ship’s tanks, voids, bilges and compartments. The quotation is to include the cost of craning, pumping, trucking and disposal of oily mixture. The Contractor is to provide the name of the firm contracted for the pumping and disposal of the waste oil.

**3.1.29.** Contractor will quote the cost of disposal of 1 m<sup>3</sup> to be adjusted up or down by PWGSC 1379 action. The Contractor will advise the Chief Engineer when oily bilge water is to be pumped out and a copy of the shipping manifest, indicating the volume of oily-water removed, is to be given to the Chief Engineer.

### **CRANAGE**

**3.1.30.** Contractor to bid on supplying general services of a dockside crane, driver and rigger for 20 hours during the dry-dock period as and when requested by the Chief Engineer. Contractor to quote an hourly rate for PWGSC 1379 adjustment purposes.

## **3.2 Location**

## **3.3 Interferences**

**3.3.1** Contractor is responsible for the identification of interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

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

### **4.2 Testing**

N/A

### **4.3 Certification**

N/A

## **Part 5: DELIVERABLES:**

### **5.1 Drawings/Reports**

#### **5.1.1**

### **5.2 Spares N/A**

### **5.3 Training N/A**

### **5.4 Manuals N/A**

Spec item #: HD-02	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Drydocking		

### **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to drydock the vessel for the complete permanent repair of Damage to the vessels Hull Plating and Associated Internal Structure as indicated in this specification. The chief engineer shall perform inspections on CCG's behalf along with inspections by Transport Canada.

### **Part 2: REFERENCES:**

**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Docking Plan Drawing # 00-00-08

**2.2 Standards**

- 2.2.1.** The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- 2.2.2.** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.3.** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.4.** Coast Guard ISM Hotwork procedures
- 2.2.5.** Coast Guard ISM Fall Protection procedures
- 2.2.6.** Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E)
- 2.2.7.** CWB CSA 47.1 latest revision Division I, II or III
- 2.2.8.** SSPC-SPT

**2.3 Regulations**

- 2.3.1.** Hull Construction Regulations

**2.4 Owner Furnished Equipment**

- 2.4.1.** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

### **Part 3: TECHNICAL DESCRIPTION:**

**3.1 General**

The vessel shall be docked and undocked and a suitable number of Lay Days shall be included to perform the work described herein as well as a margin of time to cover work arising as specified by the contract. Contractor to quote unit cost per Lay Day for adjustment purposes. All manpower, materials, tugs, pilots etc. required to carry out the work shall be supplied by the Contractor and shall be to approval of the Chief Engineer.

Spec item #: HD-02	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Drydocking		

- 3.1.1.** A docking plan is available on board the vessel and will be provided to the Contractor. Contractor will be responsible to ensure drawing is returned to vessel upon completion of work.
- 3.1.2.** The vessel shall be drydocked in such a way as to prevent deformation of the hull plating between the frames.
- 3.1.3.** The bow overhang shall be supported by at least 1 bow shore. The bow shore is not to be removed until just before ship is undocked. Contractor to prepare keel and margin blocks and fit the necessary breast and bow shores to maintain the true alignment of the ship's hull and equipment for the dry-docking period.
- 3.1.4.** The vessel shall be dry-docked such that dry-docking plugs, sea bays, inlet grids, anode plates and transducer orifices are clear of the blocks. Any movement of the blocks necessary for sandblasting and/or painting or removal of docking plugs shall be the responsibility of the Contractor. Contractor shall quote on moving 10 blocks. Contractor to provide a unit cost for moving 1 block for adjustment purposes.
- 3.1.5.** The Contractor shall prepare the dock in advance of the ship's arrival and the official start of the dry-docking. The dry docking shall be under the direct supervision of a Certified Docking Master. If premium time is required for evening shifts or weekend work to meet this objective, the Contractor is to identify this and include all costs in his quotation.
- 3.1.6.** A minimum clearance of 5' shall be available below the keel.
- 3.1.7.** Contractor shall bid a price of \$7000 for tugs and/or pilot services as required. This shall be adjusted up or down as necessary as per required PWGSC 1379 action.
- 3.1.8.** Contractor shall be responsible for the safe transfer of the ship from the pre-docking berth or location onto its docking blocks. During docking, radio contact shall be maintained between the vessel's Commanding Officer and the Contractor's docking master.
- 3.1.9.** Cleaning shall commence on the underwater hull by high-pressure fresh water washing (6000 psi minimum) to remove all marine growth and allow preliminary inspection immediately after drydocking.
- 3.1.10.** Prior to commencing water blasting, all hull mounted equipment and openings shall be fully protected.
- 3.1.11.** Adequate and safe access to the vessel shall be provided through a minimum of 2 gangways, complete with safety nets, lights, and rails, throughout the drydocking period.

Spec item #: HD-02	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Drydocking		

**3.1.12.** Any contamination of the vessel's hull by materials (i.e. oil) present in the dock shall be cleaned, after the vessel is re-floated and clear of the dock, at the Contractor's expense and to the satisfaction of the Chief Engineer.

**3.2 Location**  
**3.2.1.**

**3.3 Interferences**

**3.3.1** Contractor is responsible for the identification of interference items, their temporary removal, storage and refitting to vessel.

**Part 4: PROOF OF PERFORMANCE:**

**4.1 Inspection**

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

**4.2 Testing**  
N/A

**4.3 Certification**  
N/A

**Part 5: DELIVERABLES:**

**5.1 Drawings/Reports**

**5.1.1**

**5.2 Spares**  
N/A

**5.3 Training**  
N/A

**5.4 Manuals**  
N/A

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Tank Cleaning & Testing		

### **Part 1: SCOPE:**

- 1.1** The intent of this specification shall be to open, to gas free and clean the identified tanks suitable for hot work and Transport Canada Marine Safety Branch inspection (as noted):

No. 1 D.B. FO Tank Stbd.	Frs. 105-124
Fwd / Aft Sea Bays Stbd.	Frs. 99-105
Sea Box Stbd.	Frs. 99-105
No. 2 WB Tank Stbd.	Frs. 105-123
No. 2 D.B. FO Tank Stbd.	Frs. 60-94
FO Drain Tank	Frs. 94-99
FO Overflow	Frs. 94-99

### **Part 2: REFERENCES:**

#### **2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Tank Capacity Plan # T13-1027

#### **2.2 Standards**

- 2.2.1.** The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- 2.2.2.** Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.3.** Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.4.** Coast Guard ISM Hotwork procedures
- 2.2.5.** Coast Guard ISM Lock Out / Tag Out Procedures
- 2.2.6.** Coast Guard ISM Fall Protection procedures
- 2.2.7.** Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E)
- 2.2.8.** CWB CSA 47.1 latest revision Division I, II or III
- 2.2.9.** SSPC-SPT

#### **2.3 Regulations**

- 2.3.1.** Transport Canada Hull Construction Regulations.

#### **2.4 Owner Furnished Equipment**

- 2.4.1.** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Tank Cleaning &amp; Testing</b>		

**3.1.1.** The following tank are to be addressed as per this specification;

No. 1 D.B. FO Tank Stbd.	Frs. 105-124
Fwd / Aft Sea Bays Stbd.	Frs. 99-105
Sea Box Stbd.	Frs. 99-105
No. 2 WB Tank Stbd.	Frs. 105-123
No. 2 D.B. FO Tank Stbd.	Frs. 60-94
FO Drain Tank	Frs. 94-99
FO Overflow	Frs. 94-99

**3.1.2.** The tank shall be pumped as low as possible.

**3.1.3.** Prior to entry into tank, the tank shall be certified safe for entry and hotwork.

**3.1.4.** Contractor shall quote for the removal and disposal of an estimated 5 m<sup>3</sup> of residue for the tanks specified. The disposal of all residues from the tank must be by a licensed waste oil disposal company and as per Provincial Regulations. The total amount of residue, excluding residue from water washing of tank, shall be totaled and amount given to Chief Engineer. Contractor shall supply the name of the collection and disposal company along with the disposal receipts, to the TA. Contractor shall quote unit cost for removal and disposal of 1 m<sup>3</sup> of oil/sludge for PWGSC 1379 adjustment. Contractor shall provide an accurate means of measuring the removed residue through the use of flow meters or tank sounding devices.

**3.1.5.** Contractor shall supply all ventilation and lighting equipment required for the Hot-Work certificates and to maintain the equipment for the duration of the work. Gas-free/Hot-Work certificates shall be maintained and renewed as required. For the purposes of work arising, the Contractor shall quote a unit cost to gas-free a fuel oil tank for PWGSC 1379 adjustment.

**3.1.6.** Contractor shall remove manhole covers for access to tank and install covers in good order after the final inspection by the TA. All dirt and debris found in tanks shall be removed ashore and disposed of by Contractor to an approved location.

**3.1.7.** The tank internals are to be 100 percent high pressure washed at 3000 psi minimum. All water and residue from tank washing shall be pumped ashore and disposed of by Contractor. Tanks shall be thoroughly wiped down with lint-free clean rags and all sludge deposits scraped off and disposed. During the water washing process, contractor will take care not to direct a stream of water at a tank's level transducer. Each level transducer is located at a low point in the tank, usually adjacent to a manhole location. Exact location can be made by following the cable inside the tank. The level transducers must be covered up prior to any water washing of the tank.

**3.1.8.** The Contractor shall arrange with TCMSB for inspection and inform the TA prior to their arrival.

Spec item #: HD-03	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Tank Cleaning &amp; Testing</b>		

- 3.1.9.** Contractor shall remove protective covers from the level transducers after all work is completed.
- 3.1.10.** After tank inspection and any work is completed on repair, while gas-free certificate is still valid, CCG personnel will be inspecting tank gauging level sensors in the tank. After sensors are inspected and tested, the TA will advise Contractor when tank can be closed up.
- 3.1.11.** All tanks requiring testing by TCMSB shall be tested with air pressure at 1.5 PSI by Contractor to the satisfaction of the attending Marine Safety Inspector. All tests shall be witnessed by the TA as well as the Marine Safety Inspector. The quote shall include the installation and removal of blanks/balloons for suctions, sounding pipes, overflow pipes, vent head removal / dismantle / clean / re-assemble / re-installation and additional tank entries for subsequent balloon/blank adjustments. Contractor shall note that the vent heads shall be removed before work commences and not re-installed until after all work related to the cleaning, cropping / welding of steel on tanks is completed. Contractor shall advise TA prior to reinstalling manhole cover after successful pressure test so that the TA may view the tank. For bidding purposes, the contractor shall bid for testing of 5 only tanks and contractor shall quote unit cost per additional tank to be adjusted up or down by PWGSC 1379 action.
- 3.1.12.** All tanks affected by this work are to be prepared for TCMSB survey and inspection.
- 3.1.13.** Before any tank is closed up, the manhole covers shall be inspected by the TA. All tank fasteners shall be wire brushed clean and coated with an approved anti-seize compound. Contractors shall include in quotation to supply and install new ¼ inch thick gaskets that must be suitable for F/O, for replacement on the subject tanks.

#### **Part 4: PROOF OF PERFORMANCE:**

##### **4.1 Inspection**

All work shall be completed to the satisfaction of the TA.

##### **4.2 Testing**

All testing shall be witnessed by TCMSB and TA.

##### **4.3 Certification**

N/A

#### **Part 5: DELIVERABLES:**

- 5.1 Drawings/Reports** - The Contractor shall provide the Chief Engineer a report of all work completed in relation to this repair in electronic format including tank Testing.
- 5.2 Spares** N/A
- 5.3 Training** N/A
- 5.4 Manuals** N/A

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

**Part 1: SCOPE:**

- 1.1 The intent of this specification shall be to complete the permanent repairs to the vessels hull plating and structure as and where indicated in the quickest time frame possible to enable the vessel to return to program (Arctic Operations).
- 1.2 **NOTE: The extent of renewals as reflected in this specification is subject to approval by TCMS. Also, the contractor shall take adequate care as to not remove too much steel all at once that could potentially cause further deformation of hull and internal structure. The contractor shall refer to points in the engine room (via Lazer) to provide reference checks of any movement caused by the removal/re-installation of steel for Alignment purposes.**

**Part 2: REFERENCES:**

**2.1 Guidance Drawings/Nameplate Data**

See Appendix A - Shell Expansion identifying areas to be renewed.

See Appendix B – Tank Plan

See Appendix C - Photographs

**Standards**

- 2.2.1. The following Coast Guard Standards and or Technical Bulletins must be adhered to in the course of executing this specification. Copies of these standards and bulletins can be obtained from the CCG Technical Authority.
- 2.2.2. Canadian Coast Guard Fleet Safety Manual (DFO 5737)
- 2.2.3. Coast Guard ISM Confined Space Entry 7.D.9
- 2.2.4. Coast Guard ISM Hotwork procedures
- 2.2.5. Coast Guard ISM Fall Protection procedures
- 2.2.6. Canadian Coast Guard Welding Specifications for Ferrous Materials, Revision 4. (TP6151 E) and MECTS # 3049715-V3A Welding Specification.
- 2.2.7. CWB CSA 47.1 latest revision Division I, II or III
- 2.2.8. SSPC-SPT

**2.2 Regulations**

- 2.3.1. Transport Canada Hull Construction Regulations.

**2.3 Owner Furnished Equipment**

- 2.4.1. The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

**DEFINITIONS AND ABBREVIATIONS**

Contractor	Dockyard	Refit/Repairer
CCG	DFO - Canadian Coast Guard	Vessel Owner
PMC	Poseidon Marine Consultants Ltd.	Owner's Representative
TCMS	Transport Canada Marine Safety	Flag Admin / Inspection Authority

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

### **Part 3: TECHNICAL DESCRIPTION:**

#### **3.1 General**

1. All work shall be completed to the satisfaction of CCG and TCMS.
2. The CCG shall supply steel plate and appropriate steel certificates as required.
3. The Contractor to provide welding procedures to TCMS as required to complete repair. TCMS is to verify this procedure before welding begins.
4. All welding to have a tensile strength as required for specific weld procedures.
5. The Contractor shall establish critical milestones at which the work may be inspected.
6. Unless otherwise specified, bottom plating shall be mill certified Lloyd's Grade E with thickness as otherwise indicated on the Shell Expansion.
7. All new internal structure shall be mill certified Lloyd's Grade "A" with thickness as otherwise indicated on Profile & decks and sections drawings (as existing).
8. All welders shall be CWB certified.
9. The Contractor shall note that the measurements given of shell plating, transverse floors, w.t.center & longitudinal girders and o.t. bhds is approximate. Therefore for bidding purposes, the Contractor shall quote a price per additional m2 of steel for these repairs to be adjusted up or down by PWGSC 1379 action.
10. While every effort has been made to capture the extent of impact on the vessel, the Contractor shall carry out their own familiarization prior to commencing the work.

**NOTE:** In the course of planning or execution of the work, the Contractor is welcome to make suggestions for means of accelerating the completion of the work, provided that such means are acceptable to CCG and TCMS. The Contractor shall advise CCG on any anticipated deviations from the specified scope of modification prior to the commencement of work in the affected area of the vessel, as far as practicable. Also, the contractor shall be aware of the access constraints as drawings show.

#### **3.1.1 Execution of the Work.**

**3.1.1.1** In general, the Contractor shall progress repairs in a manner that:

- regards prevailing and forecasted weather conditions, such that CCG property and equipment is suitably sheltered where applicable.
- All hot work shall be carried out under vessel work permit system. Welding shall be executed in accordance with CSA W59 and CSA W47.1. Welding procedures shall be developed by the contractor and supplied to TCMS upon request.
- does not compromise the structural integrity of the vessel. Dock blocks shall be rearranged as necessary to facilitate access to the various damaged areas and maintain support for the vessel.
- enables periodic and systematic inspections of ongoing and completed work by CCG and TCMS to be arranged by the contractor.

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

- **NOTE:** It is anticipated that it will take a minimum, 20 only CWB certified welders that shall be assigned to the vessel from the start of this scope of work until it is completed. It is suggested to have 2 x 10 hours daily, 7 days / week.
- To validate this work, time sheets and hot work permits must be provided daily. This does not include other workers such as fire watch or labourers, etc. The goal is to have as many welders/workers, working concurrently to expedite and complete this repair and undock for Aug 13<sup>th</sup>, 2018 or earlier.

### 3.2.1 In preparation for steel renewals, the Contractor shall:

#### 3.2.1.1

- provide all ancillary services necessary to complete the subject repair. These may include, but are not limited to strip out, craneage, staging, cleaning, debris removal, water, shore power, etc.
- remove furnishings, fittings, fixtures, linings, deck coverings, machinery, etc. as required to complete cropping and renewal of steelwork.
- provide all appropriate permits for entrance into and completion of hot work in confined spaces. Provide appropriate Fire watch personnel. Complete tank cleaning as required for hot work.
- Where appropriate, ensure new steel is shot blasted and coated with weldable primer prior to placement onboard.

### 3.3.1 During the completion of hot work, the Contractor shall:

#### 3.3.1.1

- supply fire watch while hot work is ongoing, with appropriate class portable fire extinguisher and charged fire hose ready for use.
- utilize existing seams/butts as practical when cropping / completing plate renewals. Where no butts/seams are present in the vicinity of new steel, corners to have a minimum radius of 100mm.
- subject work to inspection as coordinated with CCG and TCMS ( prior to hotwork, after removal, after fit-up & final inspection after welding completed) .
- bring to the Owner's attention any issues impacting the safe and timely completion of the work as defined.

### 3.4.1 Following the completion of hot work in specific areas of the vessel, the Contractor shall:

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

#### 3.4.1.1

- subject all welding to 100% visual inspection. Full penetration welds on primary structure members (side / bottom shell & floors) shall be subject to 50% UT or MPI examination or as otherwise required by TCMS. The NDT personnel shall be CGSB Level II or greater for the technique being used. NDT shall be completed using Lloyd's Register evaluation standards.
- Subject all tanks in way of new and disturbed steel work to hydrostatic or air testing as required and under witness of TCMS inspector. Contractor to provide unit cost for each test to be adjusted by PWGSC 1379 action.
- clean affected spaces, remove debris from vessel and reinstate outfit and equipment.
- clean and apply primer to welded seams and other disturbed areas. Apply internal and external coatings as existing or directed by CCG personnel.
- replace furnishings, fittings, fixtures, linings, deck coverings, machinery, etc. that were removed to complete the steel renewals.

#### 3.5.1 SCOPE OF RENEWALS

AREA #1 – (NO. 1 DB FO TANK / NO. 2 WB TANK)  
 AREA #2 – (NO. 1 DB FO TANK / ECHO SOUNDER COMPARTMENT)  
 AREA #3 – (NO. 1 DB FO TANK / NO. 2 WB TANK / SEA BAY / SEA BOX)  
 AREA #4 – (NO. 2 DB FO / FO DRAIN TANK / FO OVERFLOW / AFT SEA BAY)  
 AREA #5 – (NO. 2 DB FO)  
 AREA #6 – (NO. 2 DB FO)  
 AREA #7 – (NO. 2 DB FO)

Steel renewals associated with this scope of work are intended to repair damages to the vessels bottom plating and internal structure generally along the starboard side, in way of the following tanks:

<b>Tank</b>	<b>Longitudinal Extent</b>
No. 1 D.B. FO Tank Stbd.	Frs. 105-124
Fwd / Aft Sea Bays Stbd.	Frs. 99-105
Sea Box Stbd.	Frs. 99-105
No. 2 WB Tank Stbd.	Frs. 105-123
No. 2 D.B. FO Tank Stbd.	Frs. 60-94
FO Drain Tank	Frs. 94-99
FO Overflow	Frs. 94-99

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

**3.5.1.1** Areas indicated for renewal are approximate and based solely on visual survey of damages to shell and a sample of internal structure. Additional cropping of adjacent shell plating may be required in way of set up plating between transverse floors, to suit proper fitment of new plating to existing. Final determination of internal structure to be cropped and renewed is to be completed at each area when bottom shell plating has been removed. Total area to be addressed shall be confirmed onsite by the CCG designate and TCMS.

**3.5.1.2 AREA #1 – (NO. 1 DB FO Tank / NO. 2 WB Tank)**

**Bottom Shell**

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 112 to 75mm fwd of frame 118	3.00m – 3.75m off center	2.33	25mm	LR Grade E

**Transverse Floors**

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 112 to 118 / 0.75m	0.30m from bottom	1.6	12mm	LR Grade A

Note: Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped d as found necessary. 125x10 FB

**Longitudinal Girder**

	Longitudinal Location	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 112 to 118	0.30m from bottom	1.0	10mm	LR Grade A

**3.5.1.3 AREA #2 – (NO. 1 DB FO TANK / ECHO SOUNDER COMPARTMENT)**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

### **Bottom Shell**

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 109 ½ to 116 ½	1.20m – 2.40m off center	4.00	25mm	LR Grade E

### **Transverse Floors & O.T. Bhds**

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 110 to 116 / 1.2m	0.30m from bottom	2.52	12mm	LR Grade A

Note:

1. Transducer and speed log to be temporarily removed and reinstated upon completion of repairs as per original.
2. Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped and renewed as found necessary. 125x10 FB

#### **3.5.1.4 AREA #3 – (NO. 1 DB FO TANK / NO. 2 WB TANK / SEA BAY / SEA BOX)**

### **Bottom Shell**

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 99 ½ to 109 ½	5.60m – 6.80m off center	1.12 3.82	25mm 20mm	LR Grade E

### **Transverse Floors & O.T. Bhds**

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 100 to 109 / 1.0m	0.30m from bottom	3.0	12mm	LR Grade A

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

Note: Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped and renewed as found necessary. 125x10 FB

**3.5.1.5 AREA #4 – (NO. 2 DB FO / FO Drain Tank / FO Overflow / Aft Sea Bay)**

**Bottom Shell**

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 85 ½ to 99 ½	3.00m – 3.9m off center	7.44	20mm	LR Grade E

**Transverse Floors & O.T. Bhds**

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 86 to 99 / 0.9m	0.30m from bottom	3.8	12mm	LR Grade A

Note: Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped and renewed as found necessary. 125x10 FB

**3.5.1.6 AREA #5 – (NO. 2 DB FO)**

**Bottom Shell**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

### **Bottom Shell**

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 71 ½ to 79 ½	From center line extending outboard 0.625m port and starboard	4.86	20mm	LR Grade E
2	Frs. 79 ½ to 82 ½	From center line extending to port 1.500m and 0.625m to stbd.	3.11	20mm	LR Grade E

### **Transverse Floors**

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 72 to 79/ 1.2m	0.30m from bottom	2.9	12mm	LR Grade A
2	Frs. 80-82/ 2.0m	0.30m from bottom	1.8	12mm	LR Grade A

Note: Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped and renewed as found necessary. 125x10 FB

### **W.T. Centre GDR**

	Longitudinal Location	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 71 ½ to 82 ½	0.30m from bottom	1.65	12mm	LR Grade A

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
<b>Bottom Shell Plating &amp; Internal Structure Renewal</b>		

### 3.5.1.7 AREA #6 – (NO. 2 DB FO)

#### Bottom Shell

	Longitudinal Location	Transverse Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 72 1/2 to 80 1/2	5.80m – 6.65m off center	3.58	20mm	LR Grade E

#### Transverse Floors & O.T. Bhds

	Longitudinal Location / Transverse Extent	Vertical Extent	Approx. Area m <sup>2</sup>	New Plate Thickness	Material Grade
1	Frs. 73 to 80 / 0.85m	0.30m from bottom	2.04	12mm	LR Grade A

Note: Flat bar vertical stiffener on transverse floor plates to be rewelded or lower 18" cropped and renewed as found necessary. 125x10 FB

### 3.5.1.8 AREA #7 – (NO. 2 DB FO)

Renewal of bottom shell and internals completed.

### 3.5.1.9 SOUNDER & HOUSING

**3.5.1.9.1** As a result of the grounding and temporary repair to the hull damage previously, there was an insert plate welded over where the Sounder Glass was located. This was to provide a leak free compartment as the hull plating was deformed in this area.

3.5.1.9.2 This insert shall be cropped out by the contractor. The existing Sounder Housing is damaged, therefore this shall be cropped out / removed along with the weld in flange. The CCG shall provide a new Sounder Housing that shall be installed by the contractor.

3.5.1.9.3 The contractor shall fabricate/supply/install a new weld-in flange c/w all studs and mounting instructions as per drawing # 54 409 9246.

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

3.5.1.9.4 The contractor shall disconnect all associated wiring for this sounder. CCG personnel (SEW) shall complete the terminations of all wiring for the newly replaced sounder.

3.5.1.9.5 The contractor shall supply/ install a new gasket for the weld-in flange.

3.5.1.9.6 As per the drawings supplied - the contractor shall pay attention to attached outline drawing and installation instructions No. 54 414 9220, para 4, ref. to transducers on iron ships and drawing #'s 54 409 9206 and 54 409 9246.

3.5.1.9.7 the inboard transducer with its gasket has to be installed into the specified flange in a way that the directional marker points to the ships roll axis. Hexagonal nuts secured by tab washer with long tap shall be supplied / installed by the contractor.

3.5.1.9.8 The rise on the point of insertion of transducer may amount to less than or equal to 5 degrees. The radiating surface shall not be painted or damaged.

3.5.1.9.9 As this is a water tight compartment, the contractor shall prove it watertight after repair is completed and shall be witnessed by the chief engineer and TCMS.

3.6 **Location** – Double Bottom floors and outer shell plating of vessel as indicated.

3.7 **Interferences** – The Contractor shall be responsible for the identification of all interference items, their temporary removal, storage and refitting to vessel.

## **Part 4: PROOF OF PERFORMANCE:**

### **4.1 Inspection**

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

### **4.2 Testing**

All testing including UT, MPI & Tank Air / Hydrostatic tests shall be witnessed by TCMSB and Chief Engineer.

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

#### **4.3 Certification**

All welders shall be CWB Certified.

All material shall have mill certificates provided.

All new materials, equipment and systems not specifically identified in this document shall be approved by CCG and/or TCMS prior to procurement.

### **Part 5: DELIVERABLES:**

**5.5 Drawings/Reports** – The Contractor shall provide the Chief Engineer a report of all work completed in relation to this repair in electronic format, including tank and NDT Testing.

**5.6 Spares**

N/A

**5.7 Training**

N/A

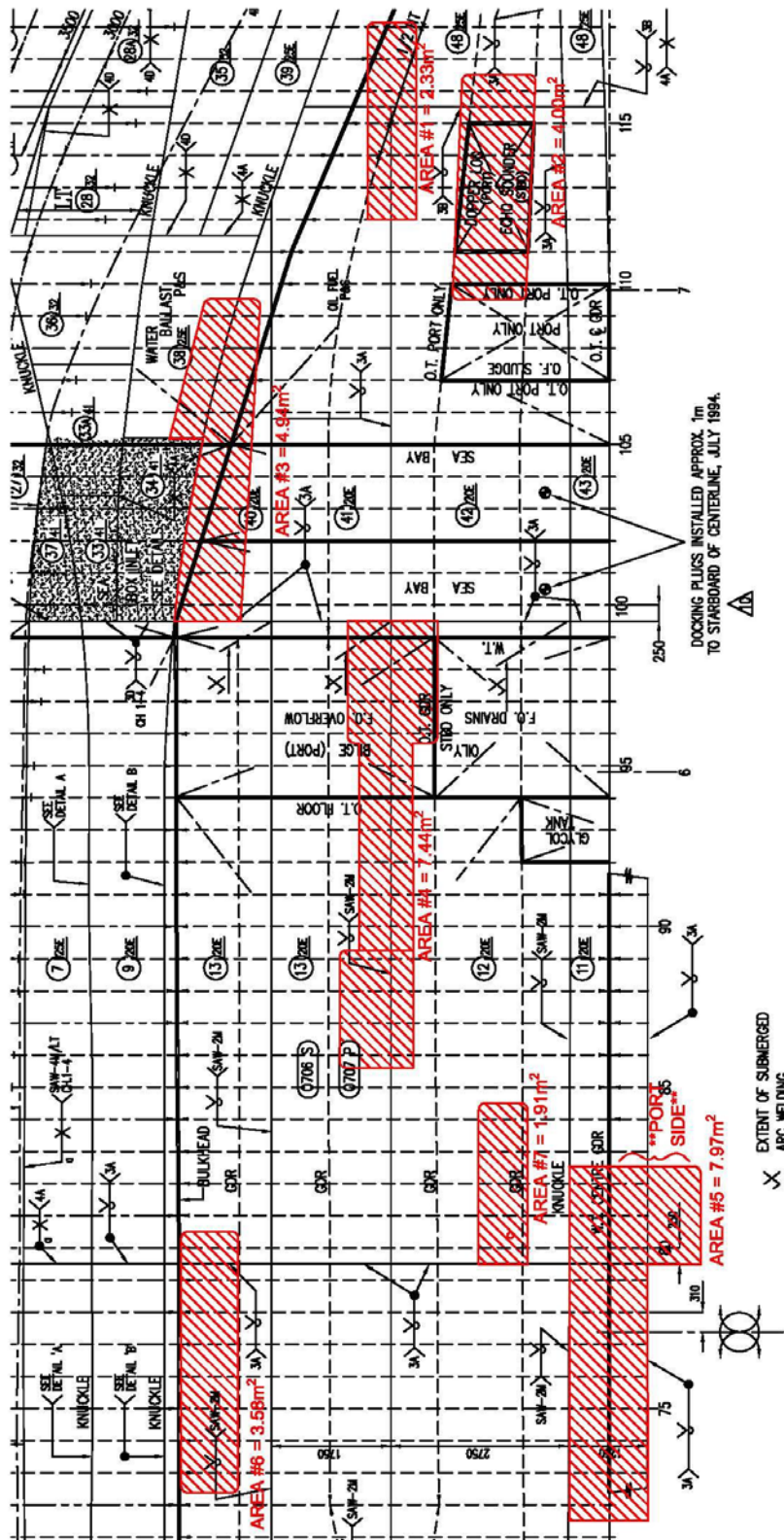
**5.8 Manuals**

N/A

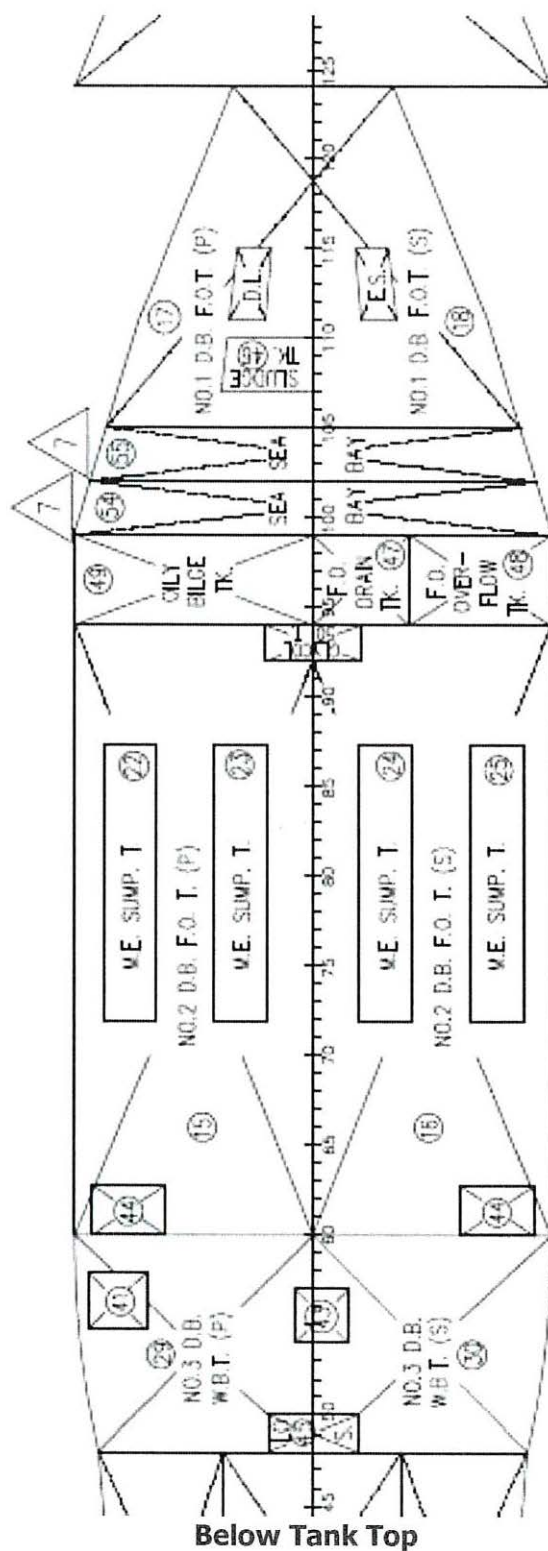
Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

## APPENDIX A

### Shell Expansion Identifying Areas to be Cropped and Renewed

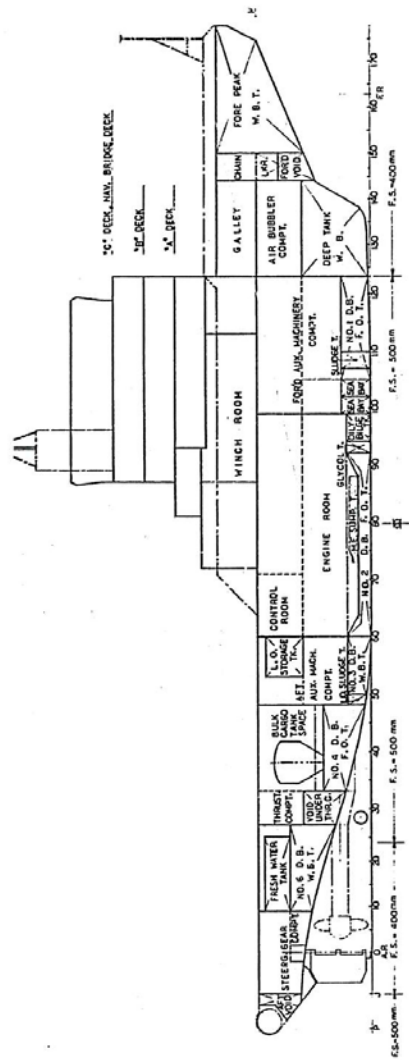


**\*\*AREAS SHOWN ARE STARBOARD SIDE ONLY EXCEPT AS OTHERWISE NOTED\*\***

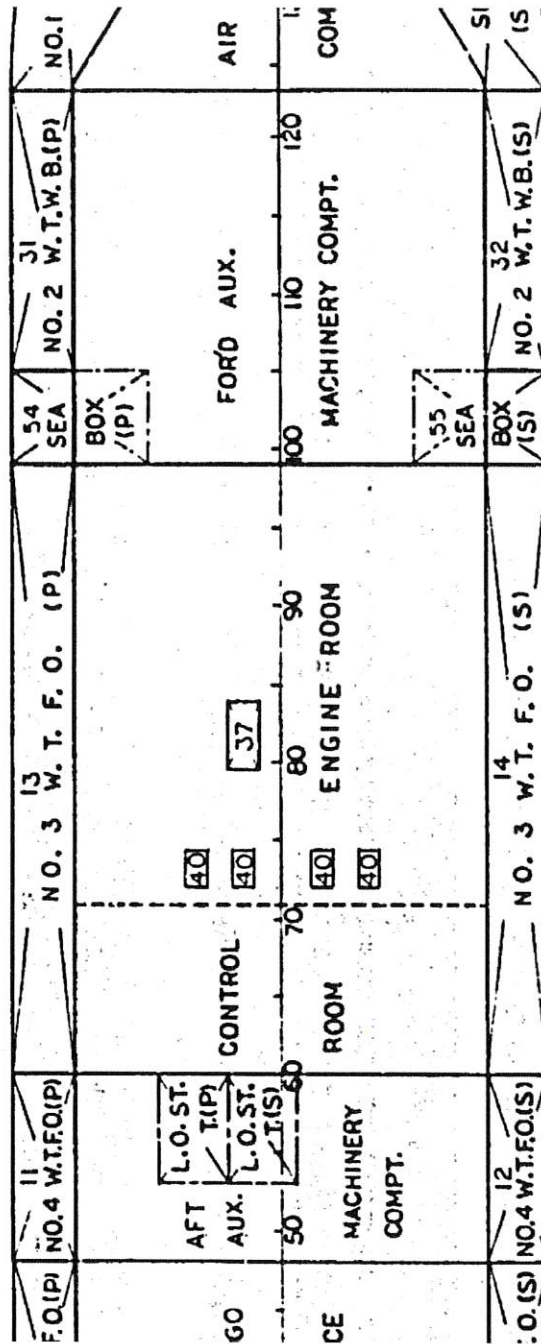


## **APPENDIX B**

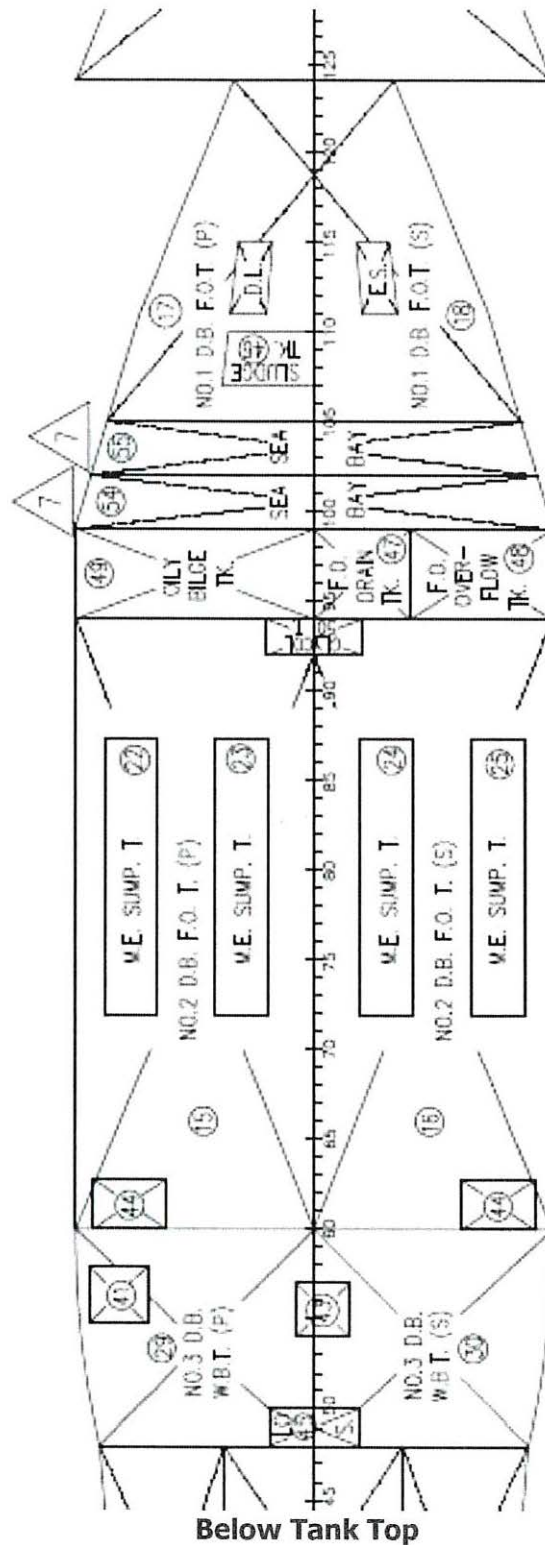
### **Tank Plan**



**Profile**



Below Main Deck

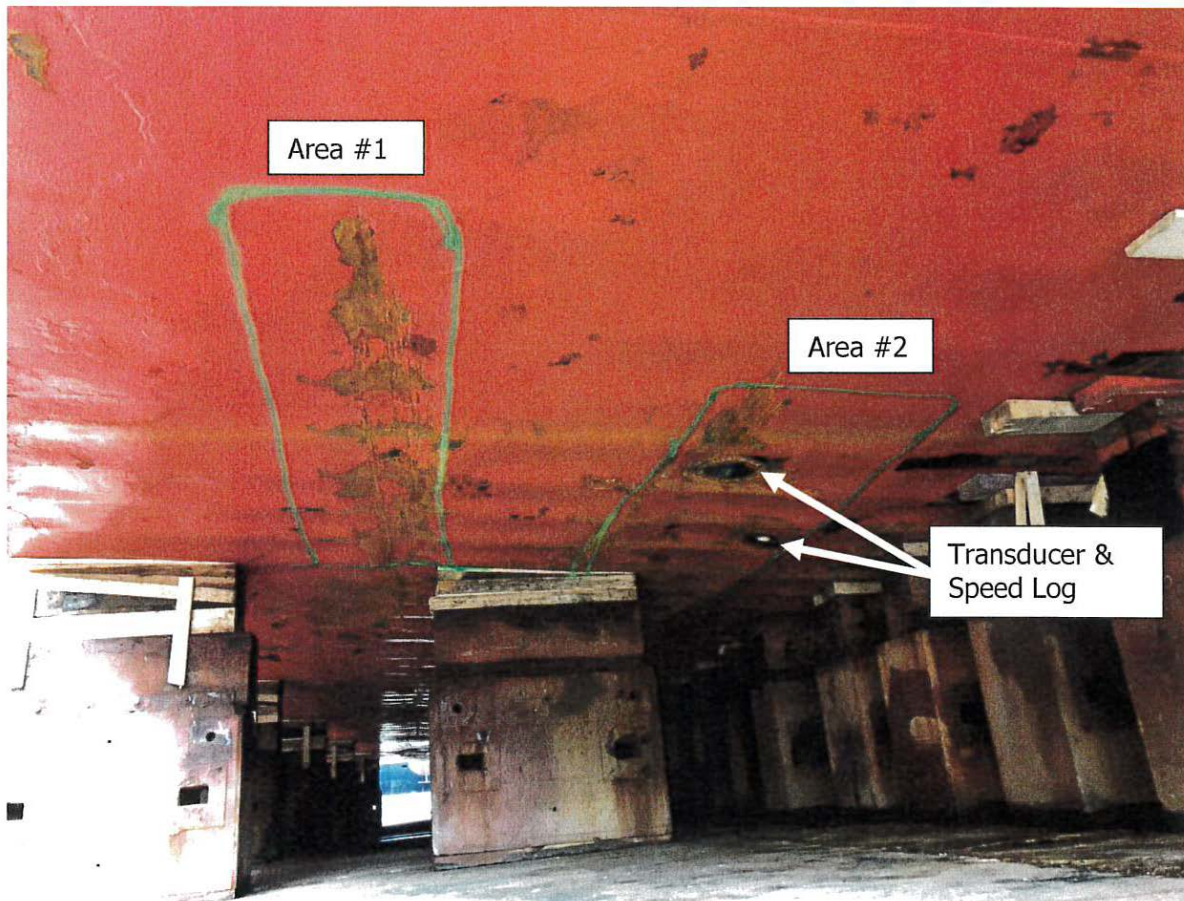


Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

## **APPENDIX C**

### **Photographs**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		



**Photograph 1 – Looking Aft**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		



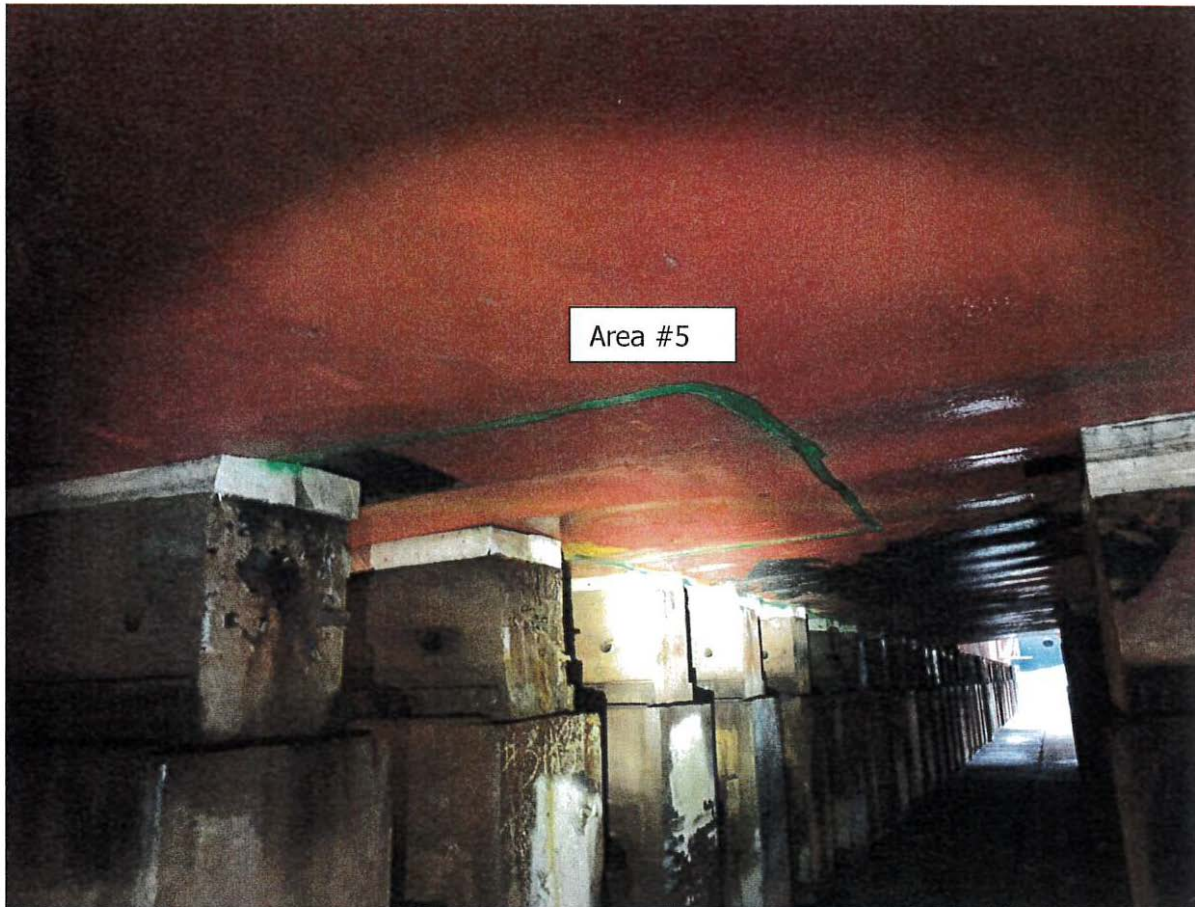
**Photograph 2 – Looking Aft**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		

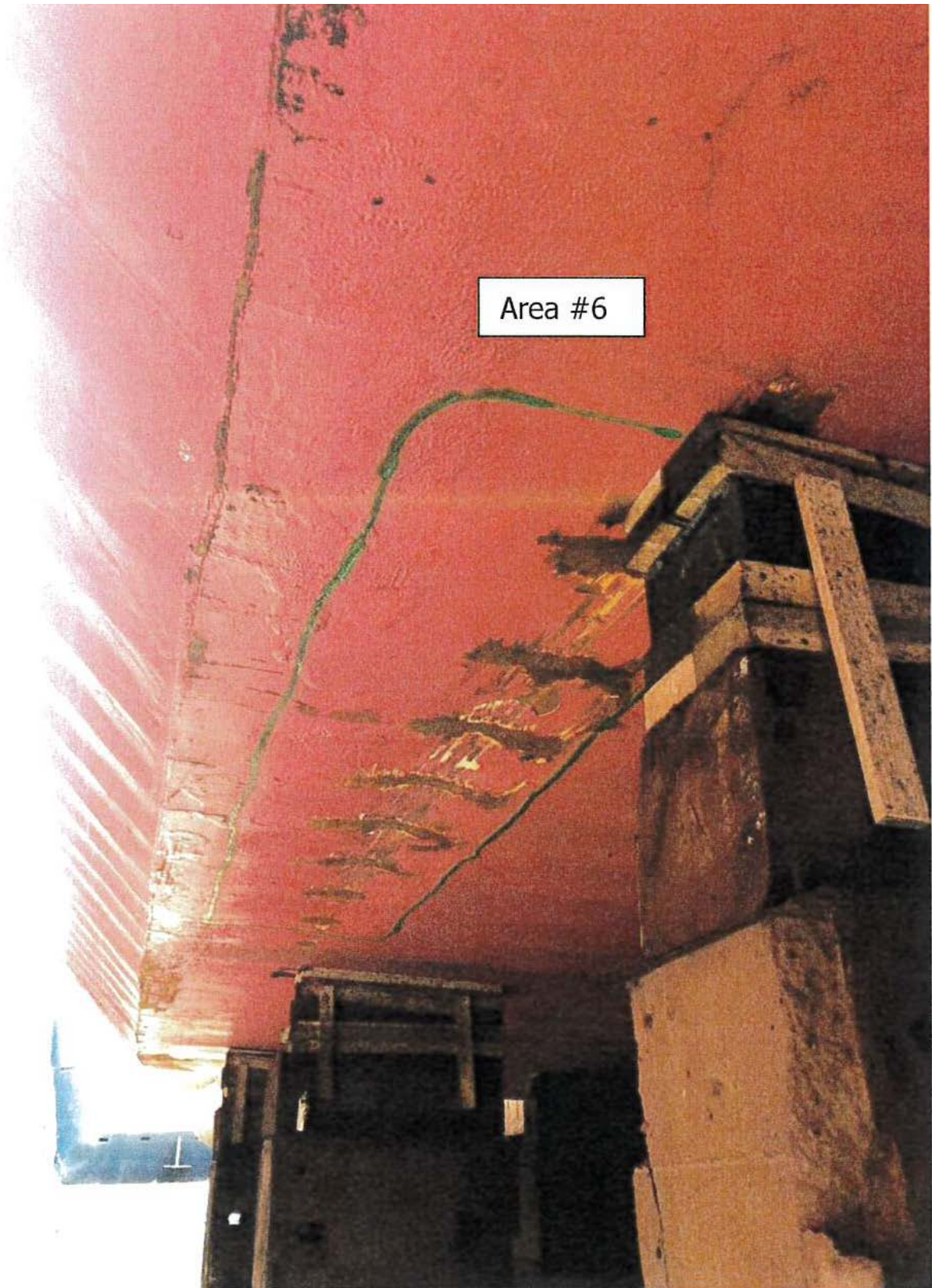


**Photograph 3 – Looking Aft**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		



**Photograph 4 – Port Side Looking Aft**

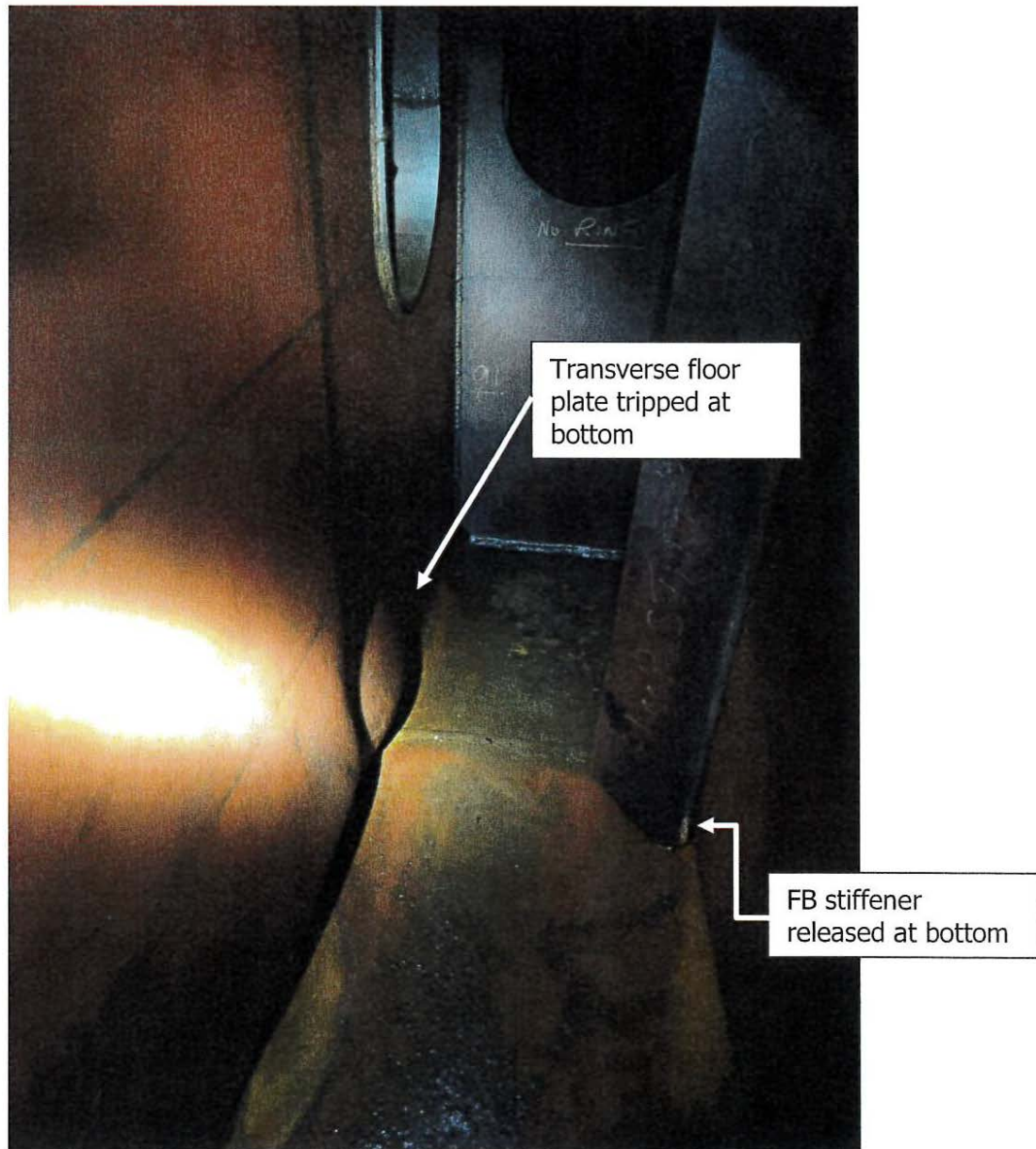


**Photograph 5 – Looking Aft**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		



**Photograph 6 – Looking Fwd**

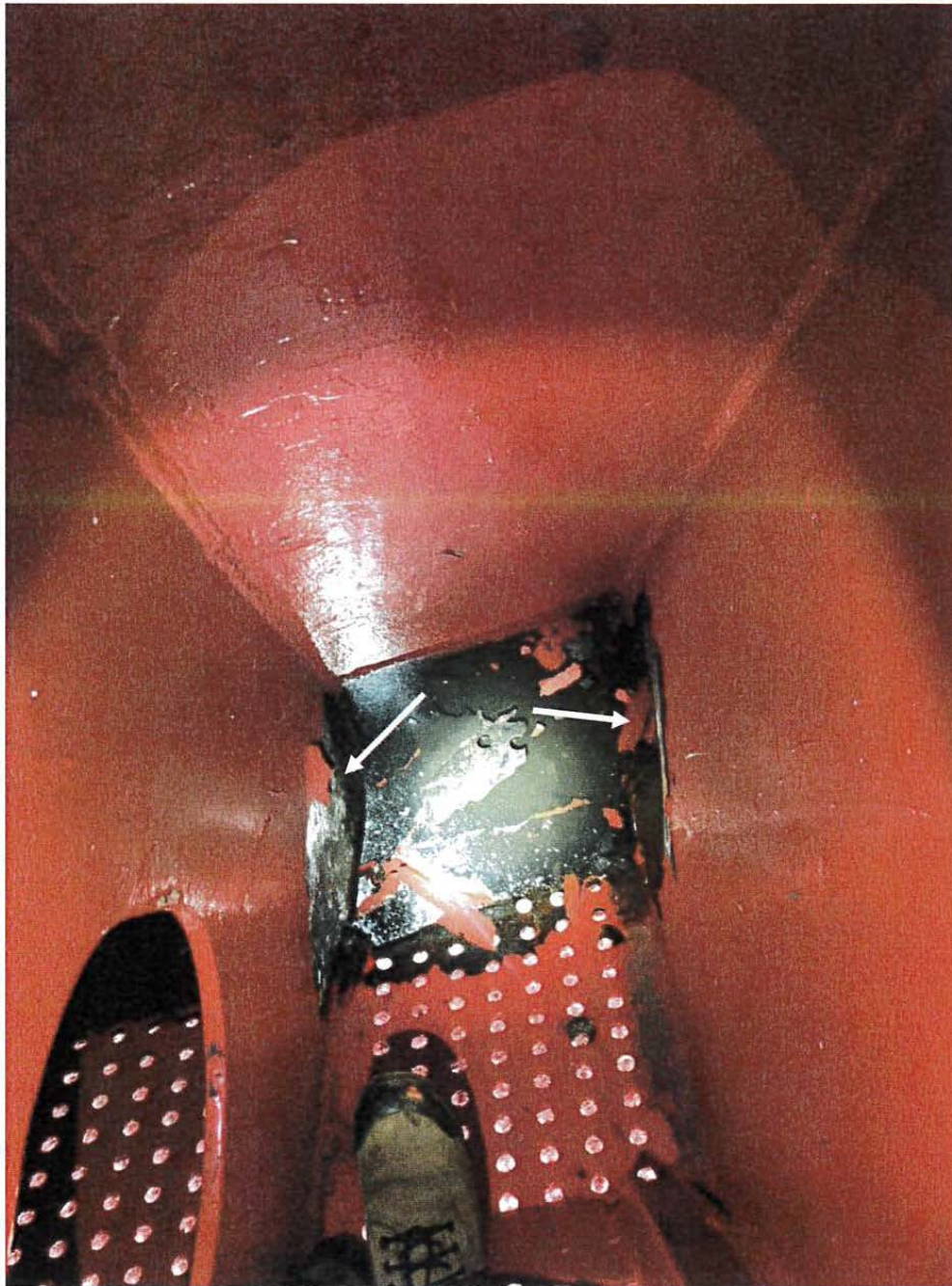


**Photograph 7 – View of transverse floor plate in #2 FO Tank.  
Buckling of lower edge of floor plate consistent at each frame in way of damage.**

Spec item #: HD-04	<b>SPECIFICATION</b>	TCMSB Field #: N/A
Bottom Shell Plating & Internal Structure Renewal		



**Photograph 8 – View of transverse floor plate in transducer compartment. Buckling of lower edge of floor plate consistent at each frame in way of damage.**



**Photograph 9 – View of transverse floor plate in Sea Box.  
Buckling of lower edge of floor plate/bhd. consistent at each frame in way of  
damage.**

