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Gatineau, Québec K1A 0S5

Bid Fax: (819) 997-9776

SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION

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

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

Comments - Commentaires

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11 Laurier St. / 11, rue Laurier

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Gatineau, Québec K1A 0S5

Title - Sujet CCGS Terry Fox VLE	
Solicitation No. - N° de l'invitation F7049-200041/B	Amendment No. - N° modif. 005
Client Reference No. - N° de référence du client F7049-200041	Date 2021-11-28
GETS Reference No. - N° de référence de SEAG PW-\$\$MD-043-28394	
File No. - N° de dossier 043md.F7049-200041	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM Eastern Daylight Saving Time EDT on - le 2022-04-14 Heure Avancée de l'Est HAE	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Pandini, Madeleine	Buyer Id - Id de l'acheteur 043md
Telephone No. - N° de téléphone (873) 353-9119 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

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Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

Solicitation Amendment # 5

This amendment is hereby raised :

- 1. To include Questions and the Responses for the solicitation.**
- 2. To provided updates to Annex A - Statement of Work (SOW)**

1. To include Questions and the Responses for the solicitation.

Q1. Can you kindly advise how this project has achieved an exemption from having ITB requirements?

A1. There are a number of factors to consider in determining the applicability of the ITB Policy including, but not limited to, the project pre-tax dollar value, scope and duration as well as the portion of labour that will be carried out in Canada. An assessment was conducted and it was determined that the ITB Policy would not apply for the Terry Fox requirement.

Q2. Is this solicitation considered part of the NSS?

A2. Yes, the Terry Fox VLE requirement falls under the National Shipbuilding Strategy.

Q3. Under the NSS Canada has employed a successful contracting strategy of awarding a funded ancillary contract to the shipyard to perform detailed design work, followed by a funded definition contract to complete the detailed engineering work and produce an indicative price from which Canada can obtain funding or budget certainty.

However, in this solicitation PSPC is expecting the bidder to be able to complete the VLE detailed design work during the bid phase, to a sufficient level of confidence, to offer a firm price. This is not possible to any acceptable level of accuracy. It is also unfair to ask bidders to take on this level of work at the bid phase. Bidders are aware that their efforts will lead to wildly inaccurate pricing and an unsuccessful VLE, even if determined the lowest responsive bidder.

This procurement strategy is extremely high risk to both parties and will work contrary to the very successful contracting strategies currently employed under NSS.

Will Canada re-consider this procurement strategy to allow for a balanced risk approach that will lead to a successful outcome for both the Bidder and Canada?

A3. Canada acknowledges that ancillary contracts have been used in certain circumstances, however, they are not considered for competitive procurement processes under the NSS.

Industry responses to the RFI posted in October 2020 confirmed the procurement approach, that being, to bundle the procurement of long lead items with the VLE work carried out at the shipyard. Canada is moving forward with this procurement strategy.

Canada appreciates the level of effort required to prepare bid packages. The Terry Fox VLE is a unique work package that requires a different level of effort compared to previous refit/VLE requirements. Bidders are encouraged, as needed, to work with key suppliers, engineering and/or project management firms to

develop their bid. Canada has included an initial 8 month work period after contract award to carry out detailed design work and procure the long lead items.

2. To provided updates to Annex A - Statement of Work (SOW), located in Annex A - Statement of Work folder (included in the attachment '*annex_annexe_a.zip*')

I) In the subfolder 1. SOW Index and in file '*CCGS Terry Fox Vessel Life Extension Index*':

- Delete (in its entirety):
GR 11
Insert:
GR 11 Field Service Representative (FSR) Requirements Page 129
- Delete (in its entirety):
11.6
Insert:
11.6 Sea Bay & Sea Chest Anode System Page 42
- Delete (in its entirety):
11.7
Insert:
11.7 Reverse Osmosis Sea Suction Sea Chest Modifications Page 4
- Delete (in its entirety):
15.2
Insert:
15.2 Bilge & Ballast Systems Piping Replacement Page 5
- Delete (in its entirety):
16.1
Insert:
16.1 Domestic Water Piping System Page 1
- Delete (in its entirety):
18.1
Insert:
18.1 Integrated Communications System Replacement Page 1

II) In the subfolder 2. SOW PART A and in file 'Part A GR Section – General Requirements':

a) Under section **GR 01 GENERAL REFERENCE AND REQUIREMENTS:**

- Delete (in its entirety):

1.1.1.7.

Insert (***Altered sentences are indicated in bold italics***):

1.1.1.7. Three dimensional scans including images of the hull, internal machinery compartments and tanks can be used as reference information, for the purposes of determining approximate distances and coordinates. ***Actual measurements, if required must be verified by the Contractor.***

TruView Enterprise Website hyperlink (Username: DFOTFScans, Password: DFOTF01) ;
<http://TruView.epco.ca>.

b) Under section **GR 03 MECHANICAL REQUIREMENTS:**

- Add:

2.1.1.32 Arrangement of all new piping structural penetrations must be in accordance with drawings 71-01-07 and 71-01-08 and subject to Class approval.

- Add section 8 and subsections 8.1.1.1 to 8.1.1.19:

8. Propulsion Machinery Alignment

8.1.1.1 The Contractor must be responsible for ensuring correct alignment of all new and existing propulsion machinery from the propellers through to the main engines on completion of the VLE refit.

8.1.1.2 The requirement for establishing correct and acceptable alignment of new propulsion machinery (engines, clutches, gearboxes) is defined in SOW item 12.1. In coordination with the above requirement for new propulsion machinery, the Contractor must also establish and provide correct and acceptable propulsion shaft line alignment throughout the VLE refit.

8.1.1.3 The Contractor must engage the services of an Alignment Specialist for this work. The Specialist must have experience in conducting theoretical alignment analysis, developing alignment procedures, measurement of alignment and be able to provide a list of ships for which successful propulsion shafting alignment work has been conducted. The specialist must have proven experience in strain gauge alignment measurements and assessment on Ice Class Vessels with over 6,000 kW/shaft.

8.1.1.4 The Contractor must provide documentation detailing the Alignment Specialist's qualifications, experience and abilities, and must provide a list of ships for which successful propulsion shafting alignment work has been conducted, as well as contact information from ship owners for follow up.

- 8.1.1.5 Details of the new propulsion machinery to be installed and propulsion machinery alignment plan are defined in SOW item 12.1 and must be made available to the Alignment Specialist for consideration in development of a propulsion shaft line alignment plan.
- 8.1.1.6 Coordination of the new propulsion machinery alignment and propulsion shaft line alignment must be the responsibility of the Contractor. All available technical information and historical data applicable to the shaft lines will be made available to the Contractor and the Alignment Specialist by the TA.
- 8.1.1.7 The Alignment Specialist must prepare a finite element alignment model applicable to the vessel's shaft lines. A theoretical analysis of the static alignment condition and whirling vibration criteria for the vessel's shaft lines must be conducted using these models. This must include natural whirling frequency, bearing loads, bearing reaction influence numbers, shaft deflection curves, shaft bending stresses, etc. Bearing wear-down influence on alignment condition must also to be conducted. The effect on alignment of hull deflection/loading conditions and propeller hydrodynamic forces are not required to be assessed.
- 8.1.1.8 A detailed step-by-step alignment procedure must be developed and presented to the TA for review and comment. The procedure is to include the strain gauge alignment technique and bearing jack-load technique.
- 8.1.1.9 Upon completion of initial information review, finite element model creation and initial assessment, analysis and preparation of alignment procedure, the Alignment Specialist must be responsible for the following:
- a) Obtaining proper alignment measurements and data recording;
 - b) Assessing the quality of data, calculating the alignment condition from the measurements, and determining if the alignment condition of the entire shafting system is acceptable;
 - c) If required, provide recommendations to achieve an acceptable alignment; and
 - d) Providing a complete alignment report.
- 8.1.1.10 The alignment verification process must be applied to both shaft lines and must be based on strain gauge and bearing jack load alignment techniques to measure the alignment condition.
- 8.1.1.11 Alignment measurements must be taken under the following five (5) conditions:
- a) Prior to drydocking the vessel;
 - b) On dock prior to shaft removal;
 - c) On dock after dock work completed and shafting installed and connected;
 - d) Afloat after dock work – final alignment conducted at this stage; and
 - e) Afloat after bearings and gearbox are chocked and bolted in place.
- 8.1.1.12 In addition, the Alignment Specialist must be engaged to assess the condition of the port stern tube and the stern tube bushing replacement process defined in SOW item 12.10.
- 8.1.1.13 All measurement data collected in SOW item 12.10 must be made available to the alignment specialist as must all shaft bearing measurement data collected in SOW item 12.13.
- 8.1.1.14 With the tail shaft removed, the relative position of the center bore of the stern tube bushings must be measured using optical methods (Laser / wire / scope). Collection of these

measurements must be the responsibility of the Contractor. The Alignment Specialist must provide guidance on the measurements and must assess the measurements. At a minimum, four targets over the length of the aft stern tube bushing position, two along the forward stern tube bushing position, and one in way of the stern tube seal ring must be used. Vertical and horizontal offsets from a reference line of the centre of the bearing bores and seal must be measured. The equipment and procedures to be applied must be presented to the TA for approval.

- 8.1.1.15 With the existing stern tube bushings removed, the relative position of the center bore of the stern tube must be measured applying the same procedure and requirements as applied to assessment of the center bore of the stern tube bushings, above.
- 8.1.1.16 Data collected must be made available to the Alignment Specialist for assessment. The Alignment Specialist must advise on any requirement for boring of the stern tube. If required, boring of the stern tube will be addressed through the PWGSC 1379 process.
- 8.1.1.17 With new stern tube bushings installed, the relative position of the center bore of the stern tube bushings must be measured applying the same procedure and requirements as applied to assessment of the center bore of the original stern tube bushings above.
- 8.1.1.18 Data collected must be made available to the Alignment Specialist for assessment. Any requirement to adjust position of intermediate shaft bearings to achieve acceptable alignment is addressed in SOW item 12.13.
- 8.1.1.19 All collected data pertaining to all shaft line alignment requirements defined above, must be made available to the TA as it becomes available through the complete process.

c) Under section **GR 04 ELECTRICAL AND ELECTRONICS**:

- Delete (in its entirety):

1.7.1.10

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.7.1.10. All new cable installations must be in accordance with approved plans which must include cable and conductor termination numbering schedules for each new installation.

Cable and conductor termination numbering must align with the original vessel cable and termination numbering system as reflected in the original vessel electrical wiring drawings to the greatest extent practicable. Any deviation from this approach must be acceptable to the TA.

d) Under section **GR 06 DOCUMENTATION**:

- Delete (in its entirety):

2.4.1.8

Insert (***Altered sentences and added sentences are indicated in bold italics***):

2.4.1.8 ***Plotted drawings must be on standard ANSI paper sizes, must be produced on 28lb paper weight and folded to a size suitable for storage in a legal-size file folder and hanger. Drawing title block must be visible on the top fold of the drawing. In addition, two complete sets of reduced sized, critical drawings must be produced,***

folded, and bound in 8.5 X 11 three ring binders. Title blocks must be visible on top fold of these drawings when inserted into binders.

e) Under section **GR 07 QUALITY CONTROL, INSPECTIONS, TESTS AND TRIALS:**

- Delete (in its entirety):

2.1.1.5

Insert (***Altered sentences and added sentences are indicated in bold italics***):

2.1.1.5 In addition, the Pre-arrival Sea Trials must determine, and document specific operational parameters associated with:

- a) Propeller Pitch Control System Performance;
- b) Propulsion Shaft Lines Performance;
- c) Bubbler System Performance;
- d) Stern Thruster Performance;
- e) Steering and Steering Control Systems Performance; ***and***
- f) ***Vessel and main propulsion machinery vibration characteristics. Vibration analysis of the existing hull, superstructure and propulsion machinery, from engines through to propeller shafting, must be completed and analyzed to determine the existing axial, torsional and lateral vibration in accordance with ANSI S.2.27.2002, Class Requirements, and SNAME T&R 2-29A. This service must be provided by a qualified service provider with experience in marine vibration assessment and analysis.***

- Add section 6.6.3 and subsection 6.6.3.1:

6.6.3 Vibration Analysis

6.6.3.1 The Contractor must engage the services of a qualified service provider with experience in marine, shipboard vibration assessment and analysis, to complete a vibration assessment of the vessel's hull, superstructure and propulsion machinery.

This vibration assessment and analysis must be completed in accordance with ANSI S.2.27.2002, Class Requirements, and SNAME T&R 2-29A.

f) Under section **GR 11 FIELD SERVICE REPRESENTATIVE (FSR) REQUIREMENTS:**

- Delete (in its entirety):

1.1.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.1.1.1. The Contractor is responsible for obtaining the services of an accredited FSR team for each equipment and/or system manufacturer or supplier, if required per the SOW.

- Delete (in its entirety):

1.1.1.2 Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.1.1.2 The total cost of those services must include any travel related costs.

- Delete (in its entirety):
 - 1.1.1.4
- Insert:
 - 1.1.1.4 The CCG has provided primary contact information for the Bidders to use when contacting FSRs. CCG recognizes that some of the firms listed in section 10 of the SOW have offices throughout Canada, and the Bidder may use a local office to arrange the FSR. Regardless of the source of the FSR, it is incumbent on the Contractor to provide the TA with documentation that proves the FSR attending the VLE is accredited by the parent company to perform the tasks listed in Annex A.
- g) Under section **GR 12 INTEGRATION AND POWER MANAGEMENT**:
 - Delete (in its entirety):
 - Section 2.3.2 and subsections 2.3.2.1 to 2.3.2.5
 - Insert section 2.3.2 and subsections 2.3.2.1 to 2.3.2.5:
 - 2.3.2 Ice Breaking Mode**
 - 2.3.2.1. Full load ice breaking with the four main engines driving the propellers as well as the shaft alternators, shaft alternators supplying main bus electrical load, auxiliary generators available as required.
 - 2.3.2.2. Bubbler compressor electrical load must be considered in the overall main bus electrical load.
 - 2.3.2.3. The stern thruster electrical load need not be considered in the main bus overall electrical load (stern thruster is not used when ice breaking).
 - 2.3.2.4. Auxiliary generators brought into service, if and as required, to maintain full power availability to propellers.
 - 2.3.2.5. Combinator mode not available.
 - Delete (in its entirety):
 - Section 2.3.3 and subsections 2.3.3.1 to 2.3.3.3
 - Insert section 2.3.3 and subsections 2.3.3.1 to 2.3.3.3:
 - 2.3.3. Split Bus Mode**
 - 2.3.3.1. If operational requirements demand, an alternate operational mode will be applied wherein shaft alternators are separated from the main bus.
 - 2.3.3.2. Four main engines will power the propellers at full rated power and shaft alternators must supply the bubbler compressors and stern thruster as required. Main bus will be supplied by auxiliary generators.
 - 2.3.3.3. Combinator mode not available.
 - Delete (in its entirety):
 - Section 2.3.4 and subsection 2.3.4.1
 - Insert section 2.3.4 and subsection 2.3.4.1:
 - 2.3.4. Open Water Operation**
 - 2.3.4.1. Open water operation will be accommodated by one of three modes:

- a) Four Main Engines online, two shaft alternators supplying main electrical bus, bubbler compressors, stern thruster not in service, combinator mode available.
 - b) Two main engines online, two shaft alternators supplying main electrical bus, bubbler compressors, stern thruster not in service, combinator mode available. Propeller pitch limited to insure adequate electrical supply available from shaft alternators.
 - c) Two main engines online, shaft alternators not in service, auxiliary generator (s) supplying main bus, bubbler compressors and stern thruster not in service, combinator mode available.
- Delete (in its entirety):
Section 2.3.6 and subsections 2.3.6.1 to 2.3.6.2
Insert section 2.3.6 and subsections 2.3.6.1 to 2.3.6.2:
2.3.6 Vessel Stopped (Drifting, at Anchor, Alongside)
2.3.6.1 Main engines shut down, auxiliary generator (s) supplying main bus
2.3.6.2 Stern thruster must be available.

III) In the subfolder 3. SOW PART B and in file '*Part B Section 10 – Safety and Security*':

- a) Under section **10.3 FIRE DETECTION SYSTEM**:
 - Delete (in its entirety):
3.8.1.9
Insert (*Altered sentences and added sentences are indicated in bold italics*):
3.8.1.9 Metal Cable Identification Tags must be embossed ID tags and permanently affixed to each end of the cable and on either side of every penetration and cable gland. ***Metal tags must match the supplied drawing/cable schedule. All cables must be secured using metal clamps and metal cable ties. See section 3.8.1.10 for cable and equipment tag ID formats.***
 - Delete (in its entirety):
3.8.1.10
Insert:
3.8.1.10 Electrical cable and conductor terminations must be numbered in accordance with GR 4.0, section 1.7.1.10. The Fire Detection System key designator must be "FD".
- b) Under section **10.6 FIRE MAIN AND MONITOR PIPING SYSTEMS**:
 - Delete (in its entirety):
3.5.1.5
Insert:
3.5.1.5 The Contractor must install a new tee in the fire main system sized to suit the sea water supply requirement of the new Local Area Fire Fighting System to be installed under SOW item #10.7. Location of this tee, to be determined by the Contractor. Connection of the new tee to the LAFFS is dealt with under scope of work defined in SOW item 10.7.

c) Under section **10.7 HIGH PRESSURE LOCAL APPLICATION FIRE FIGHTING SYSTEM:**

- Delete (in its entirety):
3.3.2.1
Insert:
3.3.2.1 The Contractor must install a fresh water supply to the LAFFS main pump unit utilizing the freshwater feed pump supplied as part of the LAFFS package.
- Delete (in its entirety):
3.3.2.4
Insert:
3.3.2.4. The Contractor, under this SOW item, must install the fresh water supply pump and all required pipe and valves to connect the pump to both tank #28 and the LAFFS main pump unit. This installation must be in accordance with the LAFFS provider instructions and requirements for this installation.
- Delete (in its entirety):
Section 3.6.3 and subsections 3.6.3.1 to 3.6.3.3
Insert section 3.6.3 and subsections 3.6.3.1 to 3.6.3.3:
3.6.3. Feed water Pump (Refer to section 3.3.2)
3.6.3.1. The Contractor must install the feed water pump in a suitable location in the aft cargo space, or the stern thruster compartment, in accordance with OEM instructions. The final location must be acceptable to the TA through the design phase.
3.6.3.2. The Contractor must install all required piping, valves, and associated fittings to connect the new feed pump from Tank #28 to the LAFFS main pump unit in accordance with the LAFFS provider instructions and requirements for this installation and must include tank internal suction piping installation of an arrangement like that indicated on drawing #70-08-02, "Detail of FW Tank Connection".
3.6.3.3. The Contractor must install a new low water level detection device in domestic water tank #28. The new low water level detection device must be of a type acceptable to both the LAFFS FSR and the TA.
- Delete (in its entirety):
3.6.6.8
Insert:
3.6.6.8 Electrical cable and conductor terminations must be numbered in accordance with GR 4.0, section 1.7.1.10. The Local Application Fire Fighting System key designator must be "LAF".
- Delete (in its entirety):
3.6.6.9
Insert:

3.6.6.9. Core Markers must be affixed to each cable core using printed heat shrink label and must match the supplier drawing/cable schedule & termination. Refer to section 3.6.6.8 for cable and equipment tag ID formats.

- Delete (in its entirety):

3.6.6.10

Insert:

3.6.6.10 Lamacoid equipment tags Printed with Equipment ID and Number must be affixed next to and/or on each piece of LAFFS equipment. See section 3.6.6.8 for cable and equipment tag ID formats.

IV) In the subfolder 3. SOW PART B and in file '**Part B Section 11 – Hull and Related Structure**':

- a) Under section **11.4 HULL PROTECTION SYSTEMS SERVICES**:

- Delete (in its entirety):

3.5.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.5.1.1 The Contractor must install the new thyristor cabinet in a suitable location in the forward auxiliary machinery space. ***Suggested location is on exterior of electrical shop bulkhead, port side, upper forward auxiliary machinery space, aft of the fire monitor pump starter panels. Final location must be acceptable to the TA.*** The Contractor must install all the required support structure to carry the new cabinet.

- Delete (in its entirety):

3.5.1.6

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.5.1.6. The Contractor must install all new electrical cabling from the new, and the original hull protection system control panels to their respective reference cells and anodes in accordance with Jastram instructions. ***The four forward anodes and two forward reference cells must be connected to the new forward thyristor control cabinet.***

- b) Under section **11.10 SEA CONNECTIONS**:

- Delete (in its entirety):

2.3.1.1

Insert (***added column indicated in bold italics***):

2.3.1.1 Table 2-1 Valve List

MAIN SEA VALVES (Direct sea connections)

Sea Inlet w/ air actuator	Port	Fr 101-102	Butterfly, 18"	<i>Threaded Lug</i>
Discharge to Inner Seabox w/ air actuator	Port	Fr 103-104	Butterfly, 12"	<i>Threaded Lug</i>

Discharge to Outer Seabox w/ air actuator	Port	Fr 103-104	Butterfly, 12"	Threaded Lug
Sea Inlet w/ air actuator	Starboard	Fr 101-102	Butterfly, 18"	Threaded Lug
Discharge to Inner Seabox w/ air actuator	Starboard	Fr 103-104	Butterfly, 12"	Threaded Lug
Discharge to Outer Seabox w/ air actuator	Starboard	Fr 103-104	Butterfly, 12"	Threaded Lug

MISC SUCTION VALVES (Direct sea connections)

Fire Monitor Pump Suction w/ air actuator	Port	Fr 105-106	Butterfly, 10"	Threaded Lug
Fire Monitor Pump Suction w/ air actuator	Starboard	Fr 105-106	Butterfly, 10"	Threaded Lug
Reverse Osmosis Suction from Sea	Center	Fr 100-101	Globe, 3"	Flanged / Angle
Reverse Osmosis Suction Vent	Center	Fr 100-101	Gate, 2"	Flanged / Straight
Fire & Bilge Pump Suction from Sea	Port	Fr 58-59	Globe, 5"	Flanged / Angle
Fire & Bilge Pump Suction from Sea Vent	Port	Fr 58-59	Globe, 2"	Flanged / Straight -

OVERBOARD DISCHARGE VALVES (Direct sea connections)

Chain Locker Bilge Pump O/B	Port	Fr 142-143	Globe, 1"	Flanged / Straight
Sewage & Grey Water O/B	Starboard	Fr 112-113	Globe, 2.5"	Flanged / Straight
Oily Water Separator O/B	Starboard	Fr 118-119	Globe, 2.5"	Flanged / Angle
Unknown/Unused (Blanked) O/B	Starboard	Fr 97-98	Globe, 2.5"	Flanged / Straight
Fire & GS Pump O/B	Port	Fr 113-114	Globe, 5"	Flanged / Straight
Bilge & Ballast Pump O/B	Port	Fr 90-91	Globe, 5"	Flanged / Straight
Fire & Bilge Pump O/B	Port	Fr 59-60	Globe, 5"	Flanged / Straight
Reverse Osmosis O/B	Port	Fr 100-101	Globe, 3"	Flanged / Straight
Reverse Osmosis O/B	Starboard	Fr 100-101	Globe, 3"	Flanged / Straight
Stern Tube Cooling	Port	Fr 33-34	Globe, 2"	Flanged / Straight
Sterntube Emgy Cooling	Port	Fr 33-34	Globe, 2"	Flanged / Straight
Sterntube Cooling	Starboard	Fr 33-34	Globe, 2"	Flanged / Straight
Sterntube Emgy Cooling	Starboard	Fr 33-34	Globe, 2"	Flanged / Straight

Sea Inlet Air	Port	Fr 101-102	Globe, 3/4"	Flanged / Straight / SDNR
Discharge to Inner Seabox Air	Port	Fr 103-104	Globe, 3/4"	Flanged / Straight / SDNR
Discharge to Outer Seabox Air	Port	Fr 103-104	Globe, 3/4"	Flanged / Straight / SDNR
Fire Monitor Suction Air	Port	Fr 105-106	Globe, 3/4"	Flanged / Straight / SDNR

Sea Inlet Air	Starboard	Fr 101-102	Globe, 3/4"	Flanged / Straight / SDNR
Discharge to Inner Seabox Air	Starboard	Fr 103-104	Globe, 3/4"	Flanged / Straight / SDNR
Discharge to Outer Seabox Air	Starboard	Fr 103-104	Globe, 3/4"	Flanged / Straight / SDNR
Fire Monitor Suction Air	Starboard	Fr 105-106	Globe, 3/4"	Flanged / Straight / SDNR
Chain Locker Bilge Pump O/B Air	Port	Fr 142-143	Globe, 1/2"	Flanged / Straight / SDNR
Sewage & Grey Water O/B Air	Starboard	Fr 112-113	Globe, 1/2"	Flanged / Straight / SDNR
Oily Water Separator O/B Air	Starboard	Fr 118-119	Globe, 1/2"	Flanged / Straight / SDNR
Unknown/Unused (Blanked) Air	Starboard	Fr 97-98	Globe, 1/2"	Flanged / Straight / SDNR
Evaporator Suction from Sea Air	Center	Fr 100-101	Globe, 1/2"	Flanged / Straight / SDNR
Fire & Bilge Pump Suction From Sea Air	Port	Fr 58-59	Globe, 1/2"	Flanged / Straight / SDNR
Fire & GS Pump O/B Air	Port	Fr 113-114	Globe, 1/2"	Flanged / Straight / SDNR
Bilge & Ballast Pump O/B Air	Port	Fr 90-91	Globe, 1/2"	Flanged / Straight / SDNR
Fire & Bilge Pump O/B Air	Port	Fr 59-60	Globe, 1/2"	Flanged / Straight / SDNR
Reverse Osmosis O/B Air	Port	Fr 100-101	Globe, 1/2"	Flanged / Straight / SDNR
Reverse Osmosis O/B Air	Starboard	Fr 100-101	Globe, 1/2"	Flanged / Straight / SDNR

SEABAY VALVES (NOT direct sea connections)

Forward Seabay Vent	Port	Fr 102-103	Butterfly, 6"	Threaded Lug
Forward Seabay Vent	Starboard	Fr 102-103	Butterfly, 6"	Threaded Lug
Aft Seabay Vent	Port	Fr 99-100	Butterfly, 6"	Threaded Lug
Aft Seabay Vent	Starboard	Fr 99-100	Butterfly, 6"	Threaded Lug
Port Sea water Pump Suction	Port	Fr 100-101	Butterfly, 10"	Threaded Lug
Center Sea Water Pump Suction	Port	Fr 100-101	Butterfly, 10"	Threaded Lug
Starboard Sea Water Pump Suction	Starboard	Fr 100-101	Butterfly, 10"	Threaded Lug
Forward Seabay Pump Down Suction	Center	Fr 102-103	Butterfly, 3"	Threaded Lug
Aft Seabay Pump Down Suction	Center	Fr 101-102	Butterfly, 3"	Threaded Lug
Fire & GS Pump Suction	Port	Fr 101-102	Butterfly, 5"	Threaded Lug
Emgy Fire Pump Suction	Port	Fr 99	Butterfly, 5"	Threaded Lug
Bilge & Ballast Pump Suction	Port	Fr 99	Butterfly, 5"	Threaded Lug
Fire & Bilge Pump Suction from Seabay	Port	Fr 99	Butterfly, 5"	Threaded Lug
Cooler Discharge to Seabay	Port	Fr 104-105	Butterfly, 8"	Threaded Lug
Cooler Discharge to Seabay	Starboard	Fr 104-105	Butterfly, 8"	Threaded Lug

Reverse Osmosis Unit Suction	Port	Fr 101-102	Globe, 2"	<i>Threaded Lug</i>
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OTHER VALVES (NOT direct sea connections)

Main Recirc Valve w/ air actuator	Port	Fr 102-103	Butterfly, 12"	<i>Threaded Lug</i>
Main Recirc Valve w/ air actuator	Starboard	Fr 102-103	Butterfly, 12"	<i>Threaded Lug</i>
Main Strainer Outlet	Port	Fr 101-102	Butterfly, 18"	<i>Threaded Lug</i>
Main Strainer Outlet	Starboard	Fr 101-102	Butterfly, 18"	<i>Threaded Lug</i>

- Delete (in its entirety):

3.3.4.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.3.4.1 New butterfly valve pneumatic actuators must be:

- Direct, double acting***
- Supplied with electric air control solenoids by the valve OEM
- Equipped with manual air over ride capability
- Include position feedback limit switches
- Suitable for operation of the valves, and application to which they are to be fitted, with a compressed air supply of 100 PSI.
- Actuator control solenoid valve operating voltage must be compatible with output voltage available from Central Control, Alarm and Monitoring System, refer to SOW item #19.2.***

- Delete (in its entirety):

5.3.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

5.3.1.1 The Contractor must supply one spare valve for each size, arrangement, and style of valve in service. ***Where there are more than four valves of the same size, arrangement and style in service, the Contractor must supply additional spare valves in the ratio of one spare valve for every group of four fitted or portion of.***

- Add:

5.3.1.4. The Contractor must provide four spare actuator air control solenoid valves, c/w solenoids.

- Under section **11.14 INTERNAL STEEL REPAIRS:**

- Delete (in its entirety):

1.2.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.2.1.1 This Work must be carried out in conjunction with the following SOW items:

- 10.7 High Pressure Local Application Fire Fighting System**

- b) 11.3 Hull and Structural Steel Repairs
 - c) 11.11 Main Deck Plating Renewal
- Delete (in its entirety):
 - 2.2.1.2
- Insert (***Altered sentences and added sentences are indicated in bold italics***):
- 2.2.1.2 Table: List of applicable drawings and documents.

Drawing/Document No.	Description
T13-1059-004-R6	General Arrangement Machinery Flat & Tank Top
62-00-01	Diagram of Machinery Space Ventilation
62-00-02 Sht 1	Machinery Space Ventilation Engine Room
62-00-02 Sht 2	Machinery Space Ventilation Forward. Machinery Space
62-00-02 Sht 3	Machinery Space Ventilation Aft Aux. Machinery Space
62-00-02 Sht 4	Machinery Space Ventilation Air Bubbler Compartment
62-00-02 Sht 5	Machinery Space Ventilation Stern Thruster Compartment
2365-01-00 (MSI)	CCGS TERRY FOX Cargo Hold Tween Deck Structural Arrangement
ETS UT Survey Report *	Engine Room Supply Trunking

* ETS = Eastern Technical Services Ltd.

- Add section 3.2 and subsections 3.2.1.1 to 3.2.1.6:
 - 3.2 Installation of Tween Deck Section in Aft Cargo Hold**
 - 3.2.1.1 The Contractor is to fabricate and install a new section of Tween-deck decking to accommodate the installation of the new High Pressure Local Application Water Mist Firefighting System (LAFFS) (reference Specification 10.7).
 - 3.2.1.2 The new deck section is to be fabricated and installed as per ABS Rules, MSI drawing 2365-01-00 entitled CCGS Terry Fox Cargo Hold Tween Deck Structure Arrangement supply for reference. See Figure 1 Proposed Tween Deck Location for more information.
 - 3.2.1.3 The new deck section is to be designed to take a deck load minimum of High-pressure-Local Application Water Mist Firefighting System and is fabricated from the ABS equivalent of Lloyd's Grade A steel.
 - 3.2.1.4 Once the new deck section has been installed it is to be surrounded on three (3) sides with a half wall sections as per Figure 1 below. Half wall sections are to be fabricated from six (6mm) minimum and secured in place.
 - 3.2.1.5 The Figure 1 below shows the location and proposed layout of the of new tween deck extension with the following legend:
 - A1 New deck Section (approx. 2000 mm x 1400 mm)
 - A2 Added half wall in transverse direction (approx. 1800 mm tall x 1400 mm)

- A3: Added half wall in longitudinal direction (approx. 1800 mm tall x 2000 mm)

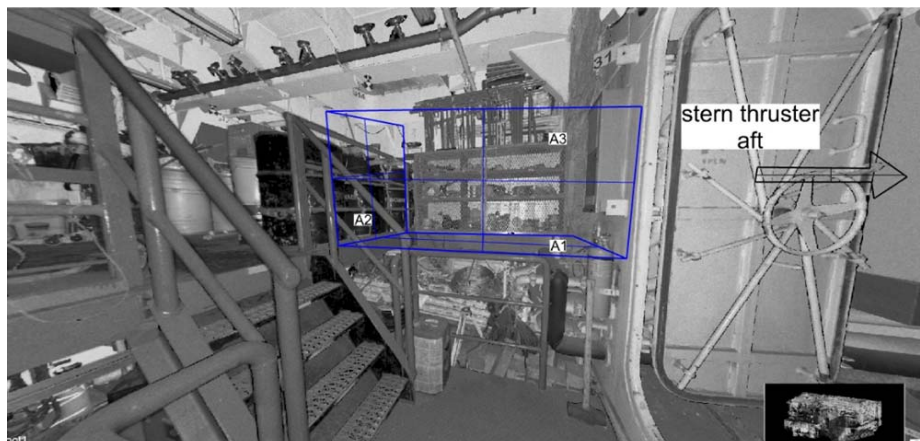


Figure 1 Proposed Tween Deck Location

3.2.1.6 All new steel work is to receive the same paint schedule as detailed in section 3.1.1.7 of this Statement of Work.

d) Under section **11.16 TANK VENT AND SOUNDING PIPES:**

- Delete (in its entirety):

1.1.1.2

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.1.1.2. General scope must include:

- All existing fuel oil and lube oil tank vent pipes must be renewed in way of penetrations through exposed weather decks.
- All existing ballast tank, void tank, sea bay and sea chest vent and sounding pipes must be replaced in their entirety.
- New sounding pipes must be installed in four ballast tanks where not previously fitted.
- Fuel Oil and Lube Oil Sludge Tank vent pipes must be replaced with larger sized piping from the tank connections to vent heads.
- All tank vent check valves (vent heads) must be inspected and serviced.
- Installation of new identification name plates on all tank vent and sounding pipes.***

- Delete (in its entirety):

2.2.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

2.2.1.1. Table: List of applicable drawings and documents.

Drawing/Document Number	Description
T131027001R8	Capacity Plan
<i>T1313001R14</i>	<i>Vents and Soundings Diagram</i>
70-07-02, Shts 1-3	Arrangement of Air Vents and Sounding

Drawing/Document Number	Description
27-00-01	WT Manholes and Hatches Standards and Locations
11.16-1	Winteb vent head brochure

- Add section 3.8 and subsections 3.8.1.1 to 3.8.1.5:

3.8 Identification Name Plates

- 3.8.1.1 The Contractor must remove all existing vent and sounding pipe identification name plates and all remnants of existing mounting hardware or other products for the existing name plates.
- 3.8.1.2 The Contractor must install new identification name plates on all existing and new tank vent and sounding pipes.
- 3.8.1.3 New name plates must be of solid bronze material and must be engraved or etched with the applicable tank name in 3/8" high, minimum, upper-case letters. Etched lettering must be permanently colored in black.
- 3.8.1.4 New name plates must be sized with a suitable blank border around lettering and must be riveted to stainless steel mounting plates fully welded to the respective tank vent or sounding pipe.
- 3.8.1.5 Tank identification must include the tank number, name, application, and position (Port, Center, Starboard). Eg: #7 Wing FO Port. Final tank identifications to be applied must be acceptable to the TA.

e) Under section **11.20 WINDOWS AND SKYLIGHTS:**

- Delete (in its entirety):

3.3.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.3.1.1 The Contractor must supply all new windows in accordance with detail defined on drawings #28-00-01 and #07-80-39 with the following exceptions:

- a) Windows numbered #B20 and #B27 on wheelhouse must be of a larger size than the original windows. ***Refer to section 3.1.1.4. The new, larger windows must be heated.***
- b) Wheelhouse skylights must not be heated.

- Delete (in its entirety):

3.3.1.2

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.3.1.2 The Contractor must assess and confirm all fitted window dimensions and form, including corner radii prior to ordering windows. ***All new windows must be accurately sized and shaped to fit the existing structural cut outs except as noted in section 3.1.1.4.***

- Delete (in its entirety):

3.4.1.6

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.4.1.6 ***The Contractor must modify and/or supply new bulkhead linings and trim outfitting at windows B20 and B27 on the wheelhouse to suit the larger window dimensions.*** The finished trim must be of similar style and arrangement as the original.

f) Under section **11.23 WEATHER DOORS:**

- Delete (in its entirety):

1.2.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.2.1.1 This Work must be carried out in conjunction with the following SOW items:

a) 11.13 Superstructure and Deck coatings

b) 11.31 Focsle Deck Storage Locker Installation

- Add:

5.1.1.4 The Contractor must create and provide an up to date version of drawing #42-00-01 reflecting final status and detail of new weather doors installed. This drawing update must also reflect all previous changes to all doors on the vessel and include installation of new door associated with SOW item 11.31.

g) Under section **11.29 GALLEY RENOVATION:**

- Delete (in its entirety):

3.5.1.5

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.5.1.5. The existing deck covering finished product is 4" X 4" ceramic tile. The deck covering subfloor material is by Dexotex, approximately 2" thick. The Contractor must remove all the deck flooring and subflooring systems and expose the full area of the Galley steel deck structure beneath the flooring systems. ***The Contractor must provide a unit cost per square foot for removal and disposal of subfloor material for adjustment purposes should it be found that not all of the subfloor needs to be removed.***

- Delete (in its entirety):

3.6.1.2

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.6.1.2 The Contractor must assess the full area of exposed steel deck by the ultrasonic method. Thickness of deck plating must be determined in 100 locations distributed evenly over the full area of the exposed steel deck. ***The Contractor must bid on replacing 3 square meters of steel and give a unit price per square meter for adjustment as per PWGSC 1379.***

h) Under section **11.31 FOC'SLE STORE ROOM:**

- Delete (in its entirety):

3.2.1.5

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.2.1.5. The new storage compartment is to be fitted externally with the following:

- a) ***A suitably sized, Class approved, steel, weather tight door in accordance with all requirements for weather doors defined in section 3.3 of SOW item #11.23 and acceptable to the TA.***
- b) A ladder fitted to allow for access the deck top of the new storage compartment.
- c) Handrails fitted (Fig. 7) in way of the landing and the top of storage compartment

V) In the subfolder 3. SOW PART B and in file 'Part B Section 12 - Propulsion & Maneuvering':

a) Under section **12.1 PROPULSION MACHINERY REPLACEMENT:**

- Add:
3.7.1.6 The PM Mounting and Alignment Plan must be coordinated with the overall alignment plan defined in SOW Part A, GR 3, section 8.

b) Under section **12.10 TAILSHAFTS AND STERN TUBES:**

- Delete (in its entirety):

2.4.1.2

Insert:

2.4.1.2 Stern Tube Bushings:

Thordon Bearings Inc.
3225 Mainway,
Burlington, ON L7M 1A6
1.905.335.1440
Thordonbearings.com

- Delete (in its entirety):

3.1.1.5

Insert:

3.1.1.5 The Contractor must engage the services of Thordon Bearings Inc., or an authorized agent of Thordon Bearings Inc., to oversee all Work specified associated with the supply and installation of the new stern tube bushings and must provide FSR services for this requirement. The Contractor must coordinate the total labor and material requirements for this requirement (stern tube bushing supply and installation) with the FSR and must include all FSR costs as well as all Contractor costs for all labour and material requirements.

- Add:

3.3.3.9 The Contractor must assess and determine the alignment of the stern tube bushing carriers per GR 03, section 8.

c) Under section **12.13 INTERMEDIATE SHAFTS AND BEARINGS:**

- Delete (in its entirety):

2.4.1

Insert:

2.4.1. Intermediate Shaft Bearings

Flender Canada
300 Applewood Crescent, Unit 1
Concord, ON
L4K5C7
Sam Jatou
416-200-1215
Sam.jatou@flender.com

- Delete (in its entirety):

2.4.2.3

Insert:

2.4.2.3 The Contractor must engage the services of Flender Canada to oversee all work herein specified. Flender Canada must provide FSR services for this work scope.

- Delete (in its entirety):

2.4.2.5 (not used)

- Add Section 3.4 and subsections 3.4.1.1 and 3.4.1.2:

3.4 Shaft Bearing Repositioning

3.4.1.1 The Contractor must provide a unit cost per intermediate shaft bearing to release a bearing from its seating, remove all existing Chockfast® Orange chocking material, reposition the bearing as required to facilitate correct shaft line alignment (refer to GR 3, section 8), re-chock the bearing on Chockfast® Orange and reinstall intermediate shaft bearing hold down bolts to specification of Flender Canada.

3.4.1.2 ITW Polymers, makers of Chockfast® Orange, or an authorized agent of ITW Polymers, must be engaged to oversee all chocking requirements and must provide FSR services for any such requirement. All costs to engage the services of ITW Polymers and their provision of an FSR, must be included in the unit cost.

- Delete (in its entirety):

5.3.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

5.3.1.1 The Contractor must provide the following spares:

- a) Two intermediate shaft bearing shell sets.
- b) One hydraulic lift pump unit.
- c) Two bearing sets for the hydraulic lift pump motors.
- d) Two rebuild kits for the hydraulic lift pumps.
- e) Two drive coupling inserts for the hydraulic lift pump units.
- f) Six "Inner Pipes", Item #57 on parts drawing***
- g) Six each of Inner Pipe Fittings, Item #'s 58, 59, 60 and 61 on parts drawing***
- h) Six each Temperature Sensors with Wells, Item # 55 on parts drawing***

VI) In the subfolder 3. SOW PART B and in file '*Part B Section 13 – Electrical Power Generation*':

- a) Under section **13.1 SHAFT ALTERNATOR REPLACEMENT AND FREQUENCY STABILIZATION:**
- Delete (in its entirety):
3.3.7 and subsection (not used)

VII) In the subfolder 3. SOW PART B and in file '*Part B Section 15 – Auxiliary Systems*':

- a) Under section **15.2 BILGE AND BALLAST SYSTEMS PIPING REPLACEMENT:**
- Delete (in its entirety):
2.2.1.1
Insert (***Altered sentences and added sentences are indicated in bold italics***):
2.2.1.1 Table: List of applicable drawings and documents.

Drawing/Document Number	Description
60-00-01	Machinery Arrangement
70-04-01	Bilge & Ballast Diagram
70-04-02, Shts. 1-4	Bilge & Ballast Arrangement
70-04-03	<i>Oily Bilge Diagram</i>
70-04-02, Shts 1 & 3 marked	<i>Bilge & Ballast Arrangement, marked</i>
PL 70-04-02	<i>Bilge and Ballast arrangement BOM</i>
71-06-03	Diagram – Control Air Piping for Bilge & Ballast Valves
07-82-15	Bilge & Ballast Control System
71-06-01	Compressed Air Diagram
V5325/1/A2	5" Screw Lift Globe Valve & Actuator
V5326/1/A2	5" Screw Lift Screw Down Non-Return Angle Valve & Actuator
V5328/1/A2	4" Screw Down Non-Return Angle Valve & Actuator
V5442/2/A0	Detail of Mimic Diagram
V5499/2/A1	Terminal Connection Diagram
V5493/1/A0	Valve Tank Numbers & Location
V5517/1/A1, Shts 1-2	Schematic Wiring Diagram
15.2-1	Young & Cunningham Manual
15.2-2	Pneumatic Valve List

Note: Drawing PL 70-04-02, BOM, does not fully represent the existing, as fitted arrangement of the Bilge and Ballast System. It is offered for guidance only. The Contractor must be responsible for determining the full material requirement for replacement of the existing system.

- Delete (in its entirety):
3.1.1.2
Insert (***Altered sentences and added sentences are indicated in bold italics***):
3.1.1.2 All bilge and ballast piping systems associated with the following pumps must be dealt with:
a) Bilge & Fire Pump

- b) Bilge & Ballast Pump
- c) Fire & General Service Pump
- d) **Oily Bilge Pump**
- e) Chain Locker Pump

- Delete (in its entirety):

3.2.1.2

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.2.1.2 Scope of removal must include:

- a) All sea suction piping couplings and hardware between the pump suction manifolds and sea bay suction valves. Sea bay suction valves are dealt with in SOW item #11.10 Sea Connections.
- b) All direct bilge suction piping, strainers, and hardware from pump suction manifolds through to bilge wells.
- c) All bilge main piping and hardware from pump suction manifolds through to all bilge wells.
- d) ***All ballast main piping and hardware between pump suction and discharge manifolds through to all tank connections, including tank valves.***
- e) All pump discharge manifolds.
- f) ***All overboard discharge piping from pump discharge manifolds through to overboard discharge valve connections. Overboard discharge valves and piping through wing tanks are dealt with in SOW item #11.10 Sea Connections.***
- g) All pump suction manifolds and suction strainers.
- h) All associated valves, including all pump manifold valves, must be included as removals.
- i) All deck and bulkhead penetrations must be included as removals.
- j) ***Oily bilge pump suction manifold and piping removal and replacement must include all suctions reflected on drawing #70-04-02, Sheets 1 & 3 marked.***

- b) Under section **15.8 BILGE AND BALLAST SYSTEMS PIPING REPLACEMENT:**

- Delete (in its entirety):

2.2.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

2.2.1.1 Table: List of applicable drawings and documents.

Drawing/Document Number	Description
71-04-01	Fuel Oil Transfer System Diagram
71-04-03 Shts 1-3	Fuel Oil Transfer System Arrangement
71-04-04 Shts 1-2	Arrangement of Fuel Oil Service
71-06-03	Control air For Fuel Valves Diagram
15.8-1	Allweiller Pump Info
15.8-2	Eaton Strainer Info
15.8-3	Liquid Meters info
15.8-4	Dewers Valve Info
15.8-5	New Quick Close Valve and System Info
15.8-6	<i>List of Quick Closing Valves</i>

- Delete (in its entirety):

3.3.5

Insert:

3.3.5. Quick Closing Valves & Operating System

Note: Reference drawings do not clearly represent the existing quick close valve system. The Contractor must note that there are twenty-four (24) quick close valves fitted, operated by twenty-three (23) activation control valves. The two purifier supply valves from the port and starboard day tanks, valves #17 and #22, are actuated by one control air valve. Two control activation stations are fitted. The port station has seventeen (17) activation control air valves, the starboard station has six (6) activation control air valves.

- Delete (in its entirety):

3.3.5.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.3.5.1 New quick closing valves must be direct bolt in replacements for the original valves. Piping modifications must not be required to accommodate the new valves. ***Refer to reference document 15.8-6 for list of quick closing valves to be dealt with.***

- Delete (in its entirety):

3.4.1.6

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.4.1.6 The Contractor must pressure test all valves to 150 psi for 30 minutes. ***The pressure test must be arranged to prove both the integrity of the complete valve assembly as well as the integrity of the disc/seat seal.***

VIII) In the subfolder 3. SOW PART B and in file 'Part B Section 16 – Domestic Systems':

- a) Under section **16.1 DOMESTIC WATER PIPING SYSTEM:**

- Delete (in its entirety):

3.1.2.3

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.1.2.3 The Contractor must develop and provide a drawing detailing modification to the pressure pump suction and discharge piping as well as reworking of the aft circulating pump piping to achieve the following requirements:

- a) Connect tank #3 pump suction connections installed under SOW item 16.3 to the pressure pump suction connections.
- b) ***Provide arrangement to allow tank #3 to be drained to the grey water collection tank via a flexible connection at the collection tank. This arrangement must not be hard piped but arranged for manual use when required.***
- c) Maintain the ability of the circulating pump to discharge water from tank #28 overboard via the aft filling connections.
- d) Provide ability for the aft circulating pump to transfer water from tank #28 to tank #3.
- e) Reference document 16.1-2 is offered for guidance only, the Contractor must develop a final

proposal in accordance with relevant rules and standards.

- Add:
3.2.1.5 The existing pressure pump suction piping from tank #28 must not be removed but must be modified as defined elsewhere in this SOW item.
- Delete (in its entirety):
3.3.1.1
Insert:
3.3.1.1 With one exception, all new materials must be as defined by original system drawing # 70-08-01, Hot & Cold Domestic and Sanitary Fresh Water Service except as noted otherwise at sections 3.5.2 through 3.5.6.
- Delete (in its entirety):
3.3.1.3
Insert:
3.3.1.3 Piping at the aft circulating pump is not indicated on drawing #70-08-01, refer to reference document #16.1-1. All indicated piping at the aft circulating pump is of 316 stainless steel. All modifications to this piping installation must be completed with stainless steel piping and fittings.

b) Under section **16.2 DOMESTIC WATER SYSTEM EQUIPMENT:**

- Delete (in its entirety):
2.2.1.1
Insert (***Altered sentences and added sentences are indicated in bold italics***):
2.2.1.1 Table: List of applicable drawings and documents.

Drawing/Document Number	Description
70-08-01	Diagram of Hot and Cold Domestic and Sanitary Fresh Water Service
70-08-02 Shts. 1-2	Arrangement of Hot and Cold Domestic and Sanitary Fresh Water System
15-00-22	Seat No 54 FW Pressure Tank, Seat #55 FW Pressure Pumps
<i>Eb 7908-271-3</i>	<i>Fresh Water Heater for Ships & Offshore</i>
16.2-1	Existing Pressure Pump Reference
<i>16.2-2a</i>	<i>Existing Pressure Tank Reference</i>
<i>16.2-2b</i>	<i>New Pressure Tank Reference</i>
<i>16.2-3a</i>	<i>New Hot Water Heater Specification</i>
<i>16.2-3b</i>	<i>New Hot Water Heater Guidance Sketch</i>
<i>16.2-3c</i>	<i>Hot Water Heater Electrical Schematic</i>
<i>16.2-3d</i>	<i>Hot Water Heater Securing Arrangement (photo)</i>

Drawing/Document Number	Description
16.2-4	New Hot Water Heater Location Sketch
16.2-5	New Chlorination System Schematic Sketch
16.2-6	Hach CL 17 Chlorine Analyzer
16.2-7	LMI Milton Roy Dosing Pumps
16.2-8	Myers Circulating Pumps

- Delete (in its entirety):
3.3.3.1
Insert:
3.3.3.1 The Contractor must provide a new hot water heater to the same specifications as the existing heater. Specification for the manufacture of the existing heater is included as reference document #16.2-3a. The existing heater is not original but was manufactured under specification offered (16.2-3a) which must be applied to production of a new heater. Drawing Eb 7908-271-3 is of the original heater and is offered for additional reference.
- Delete (in its entirety):
3.4.3.2
Insert (***Altered sentences and added sentences are indicated in bold italics***):
3.4.3.2 The Contractor must install a new mounting seat and securing brackets for the new tank in accordance with drawing #15-00-122. ***The contractor must assess the load carrying capacity of the deck structure in way of the new hot water heater. The Contractor must install any required deck stiffening to accommodate the additional water heater.***
- Delete (in its entirety):
3.4.3.3
Insert (***Altered sentences and added sentences are indicated in bold italics***):
3.4.3.3 The Contractor must install a new electrical feed for the new hot water heater. The electrical feed must be taken from a convenient source in the vessel's non-essential electrical distribution system and must include a suitably sized breaker, cable, and a local isolation switch at the new heater. ***The Contractor must install the new electrical panel, heating elements, temperature controllers and all required interconnecting cabling between all electrical components of the new water heater.***
- Add:
3.4.3.6 The Contractor must install suitably rated thermal insulation over the full area of the water heater and stainless-steel sheet cladding over the insulation. Type of insulation and insulation and cladding securing arrangement must be acceptable to the TA.

c) Under section **16.3 DOMESTIC WATER TANKS:**

- Delete (in its entirety):

3.4.1.5

Insert:

3.4.1.5 Local Area Fire Fighting System Penetrations

- a) The Contractor must install two new tank penetrations to accommodate the requirements of the new Local Area Fire Fighting System (LAFFS) installation defined in SOW item #10.7.
- b) Tank penetrations must be provided for:
Fresh water supply to LAFFS fresh water supply pump
Low water level detection device
- c) Size and location of the new tank penetrations must be coordinated with the needs of the LAFFS supplied and must be acceptable to the TA.
- d) Arrangement of new penetrations must be like existing penetrations as indicated on drawing # 70-08-02.
- e) Installation of LAFFS freshwater pump suction piping and low water level detection device are dealt with under SOW item #10.7.

d) Under section **16.16 MACHINERY FAN SPACES:**

- Delete (in its entirety):

1.1.1.1

Insert:

1.1.1.1 The intent of this SOW item must be to overhaul the fan/motor assemblies for the following fans:

- a) Forward Auxiliary Machinery Space (2 Off)
- b) Aft Auxiliary Machinery Space (2 Off)
- c) Air Bubbler Compartment Space (2 Off)
- d) Stern Thruster Compartment Space (1 Off)

- Delete (in its entirety):

2.3.1 (NOT USED)

- Delete (in its entirety):

2.3.2.(NOT USED)

IX) In the subfolder 3. SOW PART B and in file '*Part B Section 17 – Deck Equipment Ship Support Systems*':

a) Under section **17.10 CHAIN LOCKERS:**

- Delete (in its entirety):

1.2.1.1

Insert (***Altered sentences and added sentences are indicated in bold italics***):

1.2.1.1 This Work must be carried out in conjunction with the following SOW items:

- a) 17.8 Anchors & Chains
- b) 17.9 Windlass
- c) **15.2 Bilge and ballast System Piping Replacement**

- Delete (in its entirety):

4.3

Insert (***Altered sentences and added sentences are indicated in bold italics***):

4.3 Trials

Note: The chain locker bilge suction piping is to be replaced with new material under SOW item # 15.2 Bilge and Ballast System Piping Replacement. The new chain locker bilge suction piping is to be tested under this SOW, 17.10.

X) In the subfolder 3. SOW PART B and in file 'Part B Section 18 – Vessel Communications and Navigation':

- a) Under section **18.3 AUTOPILOT UPGRADE:**

- Delete (in its entirety):

3.3.1.3

Insert (***Altered sentences and added sentences are indicated in bold italics***):

3.3.1.3 The overall estimated cable lengths of the specified cables to be installed are listed below in the Table.

Table 3.3 Equipment Supply

Description	Part Number
Navipilot 4000 Control and Display Unit	074927-0000-000
Product Key	022922-0000-000
Steering Control Unit	074851-0000-000
Isolated Proportional Board	020044-0000-000
24 VDC Power Supply	60477

Table 3.4 Cabling Supply

Cable Type	Total Amount (Meters)
1 x 2 x 1.5 mm ² Shielded	50
2 x 2 x 0.75 mm ² Shielded	200

- Delete (in its entirety):

5.3.1.1

Insert:

5.3.1.1 The Contractor must supply one spare unit for all items listed in table 3.3.

XI) In the subfolder 3. SOW PART B and in file '*Part B Section 19 – Integrated Control Systems*':

a) Under section **19.7 WHEELHOUSE CONSOLES:**

- Delete (in its entirety):

1.2.1.1

Insert:

1.2.1.1 This Work must be carried out in conjunction with the following SOW items:

- a) 10.3 Fire Detection System Replacement
- b) 10.5 Watertight Door Replacement
- c) 10.9 Electric Foghorn
- d) 12.6 Steering Gear and Control Upgrade
- e) 18.1 *Integrated Communication System Replacement***
- f) 18.2 AIS Replacement
- g) 18.3 Auto Pilot Replacement
- h) 18.4 Distance Measuring System Replacement
- i) 18.6 VHF-DF
- j) 18.7 CCTV (Camera System)
- k) *EMPTY***
- l) 18.9 Gyro Compass
- m) 19.1 Propulsion Control System Upgrade
- n) 19.2 Alarm and Monitoring System Replacement
- o) *EMPTY***

- Add:

5.1.1.3 The Contractor must provide a complete set of final "as fitted" drawings for the refurbished wheelhouse consoles. The drawings must include as a minimum but not limited to the following:

- a) Full plan and elevation drawings indicating all surface mounted hardware on the complete console.
- b) Full drawing set indicating all hardware mounted within the Console interior.
- c) Full electrical drawing set identifying all terminal strip and component connection terminal strips and all interconnections between console terminal strips and all console fitted hardware.
- d) Full external connection drawings consolidating and indicating source of all console electrical connections with external systems and hardware.