

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Bid Receiving - PWGSC / Réception des soumissions
- TPSGC
11 Laurier St. / 11, rue Laurier
Place du Portage, Phase III
Core 0B2 / Noyau 0B2
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

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Ship Refits and Conversions / Radoubss et
modifications de navires and / et
11 Laurier St. / 11, rue Laurier
6C2, Place du Portage
Gatineau, Québec K1A 0S5

Title - Sujet LEONARD J COWLEY VLE REFIT- 2015	
Solicitation No. - N° de l'invitation F7049-140286/A	Amendment No. - N° modif. 002
Client Reference No. - N° de référence du client F7049-140286	Date 2015-01-07
GETS Reference No. - N° de référence de SEAG PW-\$\$MD-021-24828	
File No. - N° de dossier 021md.F7049-140286	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-02-03	
Time Zone Fuseau horaire Eastern Standard Time EST	
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: Byron, Dan	Buyer Id - Id de l'acheteur 021md
Telephone No. - N° de téléphone (819) 956-0691 ()	FAX No. - N° de FAX (819) 956-7725
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
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 #2 is issued to:

- 1) Change the bid closing date of the solicitation to February 3, 2015**
- 2) Revise the time for the bidders conference indicated in the Invitation to Tender**
- 3) Introduce the questions and answers received to date**
- 4) Include drawings for L-06**
- 5) Replace specification L-06 in the technical specification package**
- 6) Introduce additional specifications into the technical specification package**
- 7) Replace the Pricing Data Sheet**
- 8) Replace the Cumulative Pricing Data Sheet**
- 9) Replace the Vessel Transfer Cost table in Part 6, Clause 6.3 of the solicitation document,**
- 10) Replace the Vessel Transfer Cost tables in Annex H, part H6 of the solicitation document**
- 11) Replace Annex G, section G6 Inspection and Trials Process, para 2e**

- 1) Change the bid closing date of the solicitation to February 3, 2015**

DELETE: page 1, Solicitation Closes - in its entirety

INSERT: page 1, Solicitation Closes

At 2:00 PM Eastern Standard Time

On 2015-02-03

- 2) Revise the time for the bidders conference indicated in the Invitation to Tender**

DELETE: PART 2 - BIDDERS INSTRUCTIONS, section 2.5 Bidders Conference, para 1 in its entirety

INSERT: PART 2 - BIDDERS INSTRUCTIONS, section 2.5 Bidders Conference, para 1

A bidders' conference chaired by the Contracting Authority will be held at (To Be Determined), St. John's NL on **January 15, 2015 @ 13:00**. The scope of the requirement outlined in the bid solicitation will be reviewed during the conference and questions will be answered. It is recommended that bidders who intend to submit a bid attend or send representative.

3) Introduce the questions and answers received to date

ADD:

QUESTION NUMBER	QUESTION	ANSWER
1	<p>SPEC # HD-17 Port Miranda Davit Installation Section 3 Technical Description Para 9 and Section 6 Hydraulic Installation Para 6.1</p> <p>Who is responsible to supply all the hydraulic piping, hydraulic hoses, hydraulic fittings required for the above complete installation?</p>	<p>The hoses and tubing are supplied with the davit for installation by yard. Due to possible variations in installations some of the hose ends are crimped at one end only, the other end to be to be crimped by yard on assembly of the system.</p>
2	<p>SPEC # HD-18 STBD Miranda Davit Installation Section 3 Technical Description Para 9 and Section 6 Hydraulic Installation Para 6.1</p> <p>Who is responsible to supply all the hydraulic piping, hydraulic hoses, hydraulic fittings required for the above complete installation?</p>	<p>The hoses and tubing are supplied with the davit for installation by yard. Due to possible variations in installations some of the hose ends are crimped at one end only, the other end to be to be crimped by yard on assembly of the system.</p>
3	<p>Will Halifax shipyard and Shelburne Marine be removed from the bidders list due to the contracts in place for the ship building.</p>	<p>Both HSI and Shelburne are eligible to bid on refit and R & O work, even with the Contracts presently in place for ship building.</p>
4	<p>Can the vessel viewing date and bidders conference date be moved to the end of January.</p>	<p>The dates chosen for Vessel Viewing and Bidders Conference in the Invitation to Tender are taking into account the CCGS Leonard Cowley operational availability between missions. The vessel is currently in service and the dates cannot be changed.</p>
5	<p>Can the bid closing date be extended</p>	<p>Bid closing date will be moved to February 3, 2015.</p>
6	<p>Do we need to attend the vessel viewing on both days ?</p>	<p>No, it is entirely up to the bidder. Vessel is being made available for two days.</p>
7	<p>How late will the ship be made available in the evening ?</p>	<p>The ship will be made available until 1900. If additional time is required in the evening, please notify and Canada will try to accomodate.</p>

4) include drawings for L-06 ICS and Related Systems Supply and Installation

ADD: to Annex A - Statement of Work

8010-100-COWLEY_X01_R4
8010-100-COWLEY_X02_R4
8010-100-COWLEY_X03_R4
8010-100-COWLEY_X04_R4
8010-100-COWLEY_X05_R4
8010-100-COWLEY_X06_R4
8010-100-COWLEY_X07_R4

5) replace specification L-06 ICS and Related Systems Supply and Installation in the technical specification package included in the Invitation to Tender.

A summary of the changes made to L-06 include:

- 1) changes to the specification on fibre cable made in section 3.1.26**
- 2) addition of new para 3.1.33**
- 3) addition of new para 3.1.34**

DELETE: L-06 from CCGS Leonard J. Cowley VLE Refit 2015 (Rev 7) in its entirety.

INSERT: L-06 (rev 1) into the technical specifications, Annex A - Statement of Work

6) introduce additional specifications into the technical specification package:

ADD: to Annex A - Statement of Work

E-06 Reverse Osmosis Unit #1 Aft
E-07 Reverse Osmosis Unit #2 Forward
E-08 Panama Fairleads
ED-10 Deck Hydraulics Forward
ED-11 Deck Hydraulics AFT
H-30 Flooring Hallways
H-31 Flooring Washrooms
H-32 Flooring Laundry Room
HD-16 Freshwater Tank
HD-19 Water Ballast Tanks #1 Port and Stbd
HD-20 Water Ballast Tanks #4 Port and Stbd

Solicitation No. - N° de l'invitation

F7049-140286/A

Client Ref. No. - N° de réf. du client

F7049-140286

Amd. No. - N° de la modif.

002

File No. - N° du dossier

021mdF7049-140286

Buyer ID - Id de l'acheteur

021md

CCC No./N° CCC - FMS No/ N° VME

7) replace the Pricing Data Sheet

DELETE: Appendix H - Appendix 1 Pricing Data Sheet (in its entirety)

INSERT: Appendix H - Appendix 1 Pricing Data Sheet

ANNEX H - APPENDIX 1

PRICING DATA SHEETS

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
1	Preamble	Preamble		\$	\$	\$	\$	
2	H-01	Production Chart		\$	\$	\$	\$	
3	H-02	Services		\$	\$	\$	\$	
		3.2.4 Potable Water						\$ /m ³
		3.2.6 Electrical Shore Power						\$ /kwh
		3.2.8 Crainage						Unit cost per lift \$ /Lift
		3.2.17 Shelter						Hourly rate for use of crane \$ /Hr. \$ /100 m ²
31	H-03	Sea Trials		\$	\$	\$	\$	
4	H-04	Fixed Foam and Wet Chemical		\$	\$	\$	\$	
5	H-05	Fixed Smothering System		\$	\$	\$	\$	
6	H-06	Portable Fire Extinguishers		\$	\$	\$	\$	
7	H-07	Fire Fighting Suits, SCBA's and Cylinder		\$	\$	\$	\$	
9	H-08	Liferafts and HRU's		\$	\$	\$	\$	
57	H-09	Fuel Oil Piping/ Valve Replacement					\$	
		3.1.14 recondition pressure test Quick closing valve						\$ /valve
		3.1.16 remove/install 50 DNmm bulkhead fitting						\$ /bulkhead fitting
		3.1.16 remove/install 200 DNmm spool piece						\$ /spool
		3.1.18 remove/dispose of fuel oil						\$ /m ³
44	H-10	Sewage Treatment Tank Replacement		\$	\$	\$	\$	
		3.4.4 cabling supply /install						\$ /m

Solicitation No. - N° de l'invitation

F7049-140286/A

Client Ref. No. - N° de réf. du client

F7049-140286

Amd. No. - N° de la modif.

002

File No. - N° du dossier

021mdF7049-140286

Buyer ID - Id de l'acheteur

021md

CCC No./N° CCC - FMS No/ N° VME

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		Avgas Dispenser Unit Replacement		\$	\$	\$	\$	
		3.1.4						\$ /m ³

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
70	H-12	Flooring and Sub-flooring		\$	\$	\$	\$	
		3.1.10.4 Unit price for SP-6						\$ /m2
		3.1.10.5 Unit price for Amerlock 2 primer						\$ /m2
		3.1.10.6 Unit price for Dex-O-Tex Quick Set Undelayment (6.35 mm thick)						\$ /m ²
		3.1.10.7 Uniot price for Dex-O-Tex Terazzo M Fine Finish						\$ /m2
		3.1.10.7 Uniot price for Cove Base Installation						\$ /m
		3.1.11.4 Unit price for SP-6						\$ /m2
		3.1.11.5 Unit price for Amerlock 2 primer						\$ /m2
		3.1.11.6 Unit price for Dex-O-Tex Quick Set Undelayment (6.35 mm thick)						\$ /m ²
		3.1.11.7 Uniot price for Dex-O-Tex Terazzo M Fine Finish						\$ /m2
		3.1.11.7 Uniot price for Cove Base installation						\$ /m
		3.1.12. (a) and (b) Unit price for Surface preparation and cleaning						\$ /m2
		3.1.12 (c) Unit price for TM Bondcoat						\$ /m2
		3.1.12 (d) Uniot price for Dex-O-Tex Terazzo M Fine Finish						\$ /m ²
		3.1.12 (d) Uniot price for Cove Base Installation						\$ /m
		3.1.13.6 Unit price for SP-6						\$ /m ²
		3.1.13.7 Unit price for Amerlock 2 primer						\$ /m ²
		3.1.13.8 Unit price for Dex-O-Tex Decklite A-60 Fire rated (35 mm thick)						\$ /m ²
		3.1.13.9 Uniot price for Dex-O-Tex Terazzo M Fine Finish						\$ /m ²
		3.1.13.9 Uniot price for Cove Base Installation						\$ /m

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		3.1.14.4 Unit price for SP-6						\$ /m ²
		3.1.14.5 Unit price for Amerlock 2 primer						\$ /m ²
		3.1.14.6 Unit price for Dex-O-Tex Decklite A-70 VLW (77 mm thick)						\$ /m ²
		3.1.14.7 Unit price for T/M Bondcoat						\$ /m ²
		3.1.14.8 Unit price for Carpet Tile						\$ /m ²
		3.1.14.9 Unit price for Black Vinyl Base Installation						\$ /m
32	H-13	Bilge Cleaning		\$	\$	\$	\$	
		3.1.3 Unit price to clean						\$ /m ²
		3.1.3 Unit price to Remove and dispose of liquids						\$ /m ³
71	H-14	Panneling		\$	\$	\$	\$	
		3.1.8 Unit price to remove existing pannel						\$ /pannel
		Unit price to remove existing joiner strip						\$ /m
		3.1.8 Unit price to supply/install B Class M 51 Decorative Foil Pannel						\$ /pannel
		3.1.8 Unit price to supply/install Joiner strip for B Class M 51 Decorative Foil Pannel						\$ /pannel
		3.1.8 Unit price to supply/install outside corner for B Class M 51 Decorative Foil Pannel						\$ /pannel
		3.1.8 Unit price to supply/install inside corner for B Class M 51 Decorative Foil Pannel						\$ /pannel
69	H-15	Furniture and Cabinets		\$	\$	\$	\$	
		3.3.1 Desks (quantity 14)		\$	\$	\$	\$	
		3.3.2 Vanities (custom fabrication) (quantity 5)		\$	\$	\$	\$	
		3.3.3 Bunks (quantity 7)		\$	\$	\$	\$	
		3.3.4 Laundry Room Cabinet (quantity 1)		\$	\$	\$	\$	
		3.5.2.6 Book/Binder Shelves (quantity 2)		\$	\$	\$	\$	

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
47	H-16	Galley Equipment Replacement		\$	\$	\$	\$	
46	H-17	Galley Flooring		\$	\$	\$	\$	
		3.6 Unit cost to supply and install non-skid quarry tile (and grout)						\$ /m ²
		3.7 Unit cost to supply and install base plate tile (and grout)						\$ /m
60	H-18	Engin Room Supply Fans		\$	\$	\$	\$	
54	H-19	HVAC Units, Fans and Motors		\$	\$	\$	\$	
61	H-20	Trunking and Damping		\$	\$	\$	\$	
66	H-21	Fan Room Deck Repair		\$	\$	\$	\$	
		3.1.5 Unit price to remove/dispose of old flooring						\$ /m ²
		3.1.5 Unit price to prepare and clean deck to SP-6						\$ /m ²
		3.1.5 Unit price to coat deck with Amerlock 2 primer						\$ /m ²
		3.1.5 Unit price for Dex o Tex Decklite Underlayment A60 (Fire Rated)						\$ /m ²
		3.1.5 Unit price Dex o Tec Terrazzo M Fine Finish						\$ /m ²
45	H-22	Fire Line Replacement		\$	\$	\$	\$	
63	H-23	Balast Pipe Replacement		\$	\$	\$	\$	
50	H-24	Domestic Fresh Water Piping		\$	\$	\$	\$	
42	H-25	Galley Cold Room Insulation		\$	\$	\$	\$	
62	H-26	Galley Cold Rooms Refrigeration		\$	\$	\$	\$	
59	H-27	Aviation Gas Damper Renewal		\$	\$	\$	\$	
8	H-28	Forward Machinery Space Deck Coating		\$	\$	\$	\$	
49	H-29	Lightship Surveyy, Inclining and Stability Book		\$	\$	\$	\$	
76	H-30	Flooring Hallways		\$	\$	\$	\$	
78	H-31	Flooring Washrooms		\$	\$	\$	\$	
77	H-32	Flooring Laundry Room		\$	\$	\$	\$	

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		Dry-docking		\$	\$	\$	\$	
								\$ /lay day
11	HD-02	Underwater Hull Inspection		\$	\$	\$	\$	
35	HD-03	Cathodic Protection		\$	\$	\$	\$	
		3.1.5 anode cable						\$ /5m
		3.1.6 bulkhead fitting						\$ /bulkhead fitting
36	HD-04	SW Cooling Anti-Fouling System		\$	\$	\$	\$	
12	HD-05	Sacrificial Hull Anodes		\$	\$	\$	\$	
13	HD-06	Underwater Hull Painting		\$	\$	\$	\$	
		3.1.2 Grit Blasting Unit Cost						\$ /m ²
		3.2.4 Coating Unit cost						\$ /m ²
51	HD-07	Scuppers and Drain Lines		\$	\$	\$	\$	
14	HD-08	Hull Painting Above Ice Belt		\$	\$	\$	\$	
15	HD-09	Hull Butts and Seams		\$	\$	\$	\$	

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
33	HD-10	Hull Repairs		\$	\$	\$	\$	
		1.10 Unit price per strake						\$ /strake
		1.10.3 Unit Price for Supply and Installation of Insulation (aluminum on one side)						\$ /m ²
		1.11 Unit price per strake						\$ /strake
		1.11.3 Unit Price for Supply and Installation of Insulation (aluminum on one side)						\$ /m ²
		1.12 Unit price per strake						\$ /strake
		1.12.3 Unit Price for Supply and Installation of Insulation (aluminum on one side)						\$ /m ²
		1.13 Unit price per strake						\$ /strake
		1.14 Unit price per strake						\$ /strake
		1.14.3 a) Unit Price for removal of panel						\$ /panel
		1.14.3 a) Unit Price for removal of Insulation						\$ /m ²
		1.14.3 b)Unit Price for Supply and Installation of Insulation with aluminum on one side						\$ /m ²
		1.14.4 b)Unit Price for Supply and Installation of Insulation with aluminum on one side						\$ /m ²
		1.15 Unit price per strake						\$ /strake
		1.15.3 a) Unit Price for removal/ire-install panel						\$ /panel
		1.15.3 a) Unit Price for removal of insulation						\$ m ²
		1.15.3 b)Unit Price for Supply and Installation of Insulation (aluminum on one side)						\$ /m ²

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		1.15.4 a) Unit Price for removal of panel						\$ /panel
		1.15.4 a) Unit Price for removal of Insulation						\$ /m ²
		1.15.4 b)Unit Price for Supply and Installation of Insulation with aluminum on one side						\$ /m ²
		1.16 Unit price per strake						\$ /strake
		1.16.4 b)Unit Price for Supply and Installation of Insulation with aluminum on one side						\$ /m ²
		1.17 Unit price per strake						\$ /strake
16	HD-11	Valve Suction and Discharge		\$	\$	\$	\$	
17	HD-12	Stern tube Oil Change		\$	\$	\$	\$	
68	HD-13	Water Balast Tank #2 Port and Stbd		\$	\$	\$	\$	
		3.1.7 unit price for grit blast to SP-10						\$ /m ²
34	HD-14	#3 Water Balast Tank Change to F.O. Tank		\$	\$	\$	\$	
		3.1 unit rate pumping/dispose						\$ /m ³
		3.8 unit rate per access hole						\$ /hole
		3.1 unit rate coating						\$ /m ²
18	HD-15	Bilge Keels		\$	\$	\$	\$	
		1.3 Unit Cost per meter of gouging and welding						\$ /m ²
		3.1.3 Unit Cost for gas freing additional tank						\$ /tank
19	HD-16	Grey Water Tank		\$	\$	\$	\$	
38	HD-17	Port Miranda Davit Installation		\$	\$	\$	\$	
39	HD-18	Stbd Miranda Davit Installation		\$	\$	\$	\$	
75	HD-19	Fresh Water Tank		\$	\$	\$	\$	
82	HD-20	Water Balast Tank #1 Port and Starboard		\$	\$	\$	\$	
83	HD-21	Water Balast Tank #4 Port and Starboard		\$	\$	\$	\$	
20	E-01	Generator Engine Overhaul		\$	\$	\$	\$	
21	E-02	Bilge and Emergency Fire Pump		\$	\$	\$	\$	

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
22	E-03	Relief Valve Certification		\$	\$	\$	\$	
23	E-04	Lifeboat and Davits Quinnadrinnal		\$	\$	\$	\$	
		3.1.13 Unit cost to remove/inspect/re-inst all sheave						\$ /sheave
		3.1.13 Unit cost to remove/inspect/re-insa ll pin						\$ /pin
		3.1.13 Unit cost to remove/inspect/reinsta ll bushing						\$ /bushing
58	E-05	R.O Unit Suplpy Pipe Replacement		\$	\$	\$	\$	
73	E-06	Reverse Osmosis Unit #1 Aft.		\$	\$	\$	\$	
74	E-07	Reverse Osmosis Unit #2 fwd		\$	\$	\$	\$	
81	E-08	Panama Fairleads		\$	\$	\$	\$	
55	ED-01	Steering Gear Controls Upgrade		\$	\$	\$	\$	
24	ED-02	Stbd Main Engine Overhaul		\$	\$	\$	\$	
		3.1.7.6 unit price on to remove corroded cylinder hold down stud						\$ / stud
		3.1.13.6 unit price on machining cylinder block						\$ /block
		3.1.14.3 unit price on machining pump landing						\$ / pump landing
37	ED-03	Port and Stbd Main Engine Controls		\$	\$	\$	\$	
		3.1.5 Unit rate for electrician per hour						\$ /hr
		3.1.6 Unit rate for welder/fire watch per hour						\$ /hr
65	ED-04	Stbd ME Silencer		\$	\$	\$	\$	
56	ED-05	Exhaust Piping Supports		\$	\$	\$	\$	
25	ED-06	Upper/Lower CPP Pump Overhaul		\$	\$	\$	\$	
67	ED-07	CPP OD Bopx Overhaul		\$	\$	\$	\$	

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
64	ED-08	Bow Thruster Contol Upgrade		\$	\$	\$	\$	
53	ED-09	Salt Water Cooling Water System Replacement		\$	\$	\$	\$	
79	ED-10	Deck Hydraulics Forward		\$	\$	\$	\$	
80	ED-11	Deck Hydraulics Aft		\$	\$	\$	\$	
26	L-01	Auxiliary Generators #1, #2, #3 Overhaul		\$	\$	\$	\$	
48	L-02	Auxiliary Generators Electric governor upgrade		\$	\$	\$	\$	
27	L-03	Fire Detection System		\$	\$	\$	\$	
28	L-04	Megger Testing		\$	\$	\$	\$	
20	L-05	Thermoscan		\$	\$	\$	\$	
43	L-06	ICS and related systems supply and install		\$	\$	\$	\$	
		3.1.33 unit cost for the supply and install of 20 wire hangers stainless						\$ /20 hangars
30	L-07	Master Clock Replacement		\$	\$	\$	\$	
		3.1.6 Unit rate for roxtec or equal LRS gland						\$ /gland
		3.1.8 Unit rate for cable removal/disposal						\$ /m
		3.1.8 Unit rate for cable rerote						\$ /m
		3.1.8 Unit rate for cable supply and install						\$ /m

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
40	L-08	Miranda Davit Electrical		\$	\$	\$	\$	
		3.5 Stbd Davit - Starters to MCR switchboard - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Stbd Davit - Starters to MCR switchboard - Unit Price to supply and install per transit						\$ /transit
		3.5 Stbd Davit - Starters to MCR switchboard - Unit Price to supply and install per hangar						\$ /hangar
		3.5 Stbd Davit- Starters to Davit moror - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Stbd Davit- Starters to Davit moror - Unit price to supply and install per transit						\$ /transit
		3.5 Stbd Davit- Starters to Davit moror - Unit price to supply and install per hangar						\$ /hangar
		3.5 Stbd Davit- Starters to Davit limits and start stop - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Stbd Davit- Starters to Davit limits and start stop - Unit price to supply and install per transit						\$ /transit
		3.5 Stbd Davit- Starters to Davit limits and start stop - Unit price to supply and install per hangar						\$ /hangar
		3.5 Stbd Davit- Starters to Port Davitt starters interlock cables- Unit price to supply and install per cables						\$ /m

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		3.5 Stbd Davit- Starters to Port Davitt starters interlock cables- Unit price to supply and install per transit						\$ /transit
		3.5 Stbd Davit- Starters to Port Davitt starters interlock cables- Unit price to supply and install per hangar						\$ /hangar
		3.5 Stbd Davit- 120 Volt power feed - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Stbd Davit- 120 Volt power feed - unit price to supply and install per transit						\$ /transit
		3.5 Stbd Davit- 120 Volt power feed - unit price to supply and install per hangar						\$ /hangar
		3.5 Port Davit - Starters to MCR switchboard - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Port Davit - Starters to MCR switchboard - Unit Price to supply and install per transit						\$ /transit
		3.5 Port Davit - Starters to MCR switchboard - Unit Price to supply and install per hangar						\$ /hangar
		3.5 Port Davit - Starters to Davitt motor - Unit Price per to supply and install metre of cable						\$ /m
		3.5 Port Davit - Starters to Davitt motor - Unit price to supply and install per transit						\$ /transit
		3.5 Port Davit - Starters to Davitt motor - Unit price to supply and install per hangar						\$ /hangar
		3.5 Port Davit - Starters to Davitt limits and start stop - Unit Price to supply and install per metre of cable						\$ /m

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item # reference in ANNEX H Appendix 2	Spec. #	Description	Total Hours	Total Labour Cost	Total Material Cost	Total FSR& Sub- Contractors Cost	Total Firm Price	Unit Cost
		3.5 Port DPort Daviit limits- - Starters to Davit limits and start stop - Unit price to supply and install per transit						\$ /transit
		P3.5 ort DPort Daviit limits- - Starters to Davit limits and start stop - Unit price to supply and install per hangar						\$ /hangar
		3.5 Port Davit - 120 Volt power feed - Unit Price to supply and install per metre of cable						\$ /m
		3.5 Port Davit - 120 Volt power feed - unit price to supply and install per transit						\$ /transit
		3.5 Port Davit - 120 Volt power feed - unit price to supply and install per hangar						\$ /hangar
72	L-09	Navigation Light Installation		\$	\$	\$	\$	
		3.1.10 Unit Price to supply and install per metre of cable						\$ /m
		3.1.10 Unit price to supply and install per transit bulkhead penetration						\$ /penetration
52	L-10	FM200 Remote Alarm Added		\$	\$	\$	\$	

Solicitation No. - N° de l'invitation

F7049-140286/A

Amd. No. - N° de la modif.

002

Buyer ID - Id de l'acheteur

021md

Client Ref. No. - N° de réf. du client

F7049-140286

File No. - N° du dossier

021mdF7049-140286

CCC No./N° CCC - FMS No/ N° VME

8) replace the Cumulative Pricing Data Sheet

DELETE: Appendix H - Appendix 2 Cumulative Pricing Data Sheet (in its entirety)

INSERT: Appendix H - Appendix 2 Cumulative Pricing Data Sheet

ANNEX H - APPENDIX 2**CUMULATIVE PRICING DATA SHEET****NOTES TO BIDDERS:**

(1) Bidders are to sequentially enter their bids in the **CUMULATIVE PRICING DATA SHEET, respecting the order of entries**, and continue entering their pricing and cumulative pricing for each spec item. Bidders continue entering their pricing/cumulative pricing on the spec items with the intention of getting their bid as close to \$9,000,000 (without exceeding), and no less than \$8,500,000.

(2) Skipping an entry of pricing/ cumulative pricing in the sequence will result in the bid being non responsive.

(3) Bidders are reminded that at no time can their cumulative pricing exceed the exposed budget amount of \$9,000,000.00. Bidders are to stop entering pricing/cumulative pricing information in appendix 2 at the point where their bid gets as close to the exposed budget (without exceeding). If the cumulative price exceeds \$9,000,000.00 the bid will be considered non responsive.

(4) The bidder can not stop bidding on spec items until a minimum cumulative price of \$8,500,000 is reached. If the minimum cumulative price does not exceeds \$8,500,000.00 the bid will be considered non responsive.

(5) 10 points will be assigned to each spec item that the bidder has bid on. Bidders are reminded not to enter uncharacteristically low bid amounts on spec items that they do not intend on completing during the refit to acquire more cumulative points. The 1205 Acceptance process will remove two times the value to complete the spec items from the Contract Value (not two times the bid value).

(6) At the point where the bidder stops bidding, the cumulative bid price (not exceeding \$9,000,000.00) is to be entered into Annex H1 - Price for Evaluation, Item A Known Work.

(7) At the point where the bidder stops bidding, the cumulative points associated with the spec item where the bidding stops is to be entered into Annex H1 - Price for Evaluation, **Item F CUMULATIVE POINTS**.

(8) Spec Items that have not been bid on by the Contractor, will not be introduced as new work or work arising during the Contract.

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item	Spec. #	Description	Total Firm Price	Cumulative Price	Points per spec	Cumulative points
1	Preamble	Preamble	\$	\$	10	10
2	H-01	Production Chart	\$	\$	10	20
3	H-02	Services	\$	\$	10	30
4	H-04	Fixed Foam and Wet Chemical	\$	\$	10	40
5	H-05	Fixed Smothering System	\$	\$	10	50
6	H-06	Portable Fire Extinguishers	\$	\$	10	60
7	H-07	Fire Fighting Suits, SCBA's and Cylinder	\$	\$	10	70
8	H-28	Forward Machinery Space Deck Coating	\$	\$	10	80
9	H-08	Liferafts and HRU's	\$	\$	10	90
10	HD-01	Dry-docking	\$	\$	10	100
11	HD-02	Underwater Hull Inspection	\$	\$	10	110
12	HD-05	Sacrificial Hull Anodes	\$	\$	10	120
13	HD-06	Underwater Hull Painting	\$	\$	10	130
14	HD-08	Hull Painting Above Ice Belt	\$	\$	10	140
15	HD-09	Hull Butts and Seams	\$	\$	10	150
16	HD-11	Valve Suction and Discharge	\$	\$	10	160
17	HD-12	Stern tube Oil Change	\$	\$	10	170
18	HD-15	Bilge Keels	\$	\$	10	180
19	HD-16	Grey Water Tank	\$	\$	10	190
20	E-01	Generator Engine Overhaul	\$	\$	10	200
21	E-02	Bilge and Emergency Fire Pump	\$	\$	10	210
22	E-03	Relief Valve Certification	\$	\$	10	220
23	E-04	Lifeboat and Davits Quinndrinnal	\$	\$	10	230
24	ED-02	Stbd Main Engine Overhaul	\$	\$	10	240
25	ED-06	Upper/Lower CPP Pump Overhaul	\$	\$	10	250
26	L-01	Auxiliary Generators #1, #2, #3 Overhaul	\$	\$	10	260
27	L-03	Fire Detection System	\$	\$	10	270
28	L-04	Megger Testing	\$	\$	10	280
29	L-05	Thermoscan	\$	\$	10	290
30	L-07	Master Clock Replacement	\$	\$	10	300
31	H-03	Sea Trials	\$	\$	10	310
32	H-13	Bilge Cleaning	\$	\$	10	320
33	HD-10	Hull Repairs	\$	\$	10	330
34	HD-14	#3 Water Balast Tank Change to F.O. Tank	\$	\$	10	340
35	HD-03	Cathodic Protection	\$	\$	10	350
36	HD-04	SW Cooling Anti-Fouling System	\$	\$	10	360
37	ED-03	Port and Stbd Main Engine Controls	\$	\$	10	370
38	HD-17	Port Miranda Davit Installation	\$	\$	10	380
39	HD-18	Stbd Miranda Davit Installation	\$	\$	10	390
40	L-08	Miranda Davit Electrical	\$	\$	10	400
41	H-11	Avgas Dispenser Unit Replacement	\$	\$	10	410
42	H-25	Galley Cold Room Insulation	\$	\$	10	420
43	L-06	ICS and related systems supply and install	\$	\$	10	430
44	H-10	Sewage Treatment Tank Replacement	\$	\$	10	440
45	H-22	Fire Line Replacement	\$	\$	10	450
46	H-17	Galley Flooring	\$	\$	10	460

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

F7049-140286/A

002

021md

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

F7049-140286

021mdF7049-140286

Item	Spec. #	Description	Total Firm Price	Cumulative Price	Points per spec	Cumulative points
47	H-16	Galley Equipment Replacement	\$	\$	10	470
48	L-02	Auxiliary Generators Electric governor upgrade	\$	\$	10	480
49	H-29	Lightship Surveyy, Inclining and Stability Book	\$	\$	10	490
50	H-24	Domestic Fresh Water Piping	\$	\$	10	500
51	HD-07	Scuppers and Drain Lines	\$	\$	10	510
52	L-10	FM200 Remote Alarm Added	\$	\$	10	520
53	ED-09	Salt Water Cooling Water System Replacement	\$	\$	10	530
54	H-19	HVAC Units, Fans and Motors	\$	\$	10	540
55	ED-01	Steering Gear Controls Upgrade	\$	\$	10	550
56	ED-05	Exhaust Piping Supports	\$	\$	10	560
57	H-09	Fuel Oil Piping/ Valve Replacement	\$	\$	10	570
58	E-05	R.O Unit Supply Pipe Replacement	\$	\$	10	580
59	H-27	Aviation Gas Damper Renewal	\$	\$	10	590
60	H-18	Engin Room Supply Fans	\$	\$	10	600
61	H-20	Trunking and Damping	\$	\$	10	610
62	H-26	Galley Cold Rooms Refrigeration	\$	\$	10	620
63	H-23	Balast Pipe Replacement	\$	\$	10	630
64	ED-08	Bow Thruster Control Upgrade	\$	\$	10	640
65	ED-04	Stbd ME Silencer	\$	\$	10	650
66	H-21	Fan Room Deck Repair	\$	\$	10	660
67	ED-07	CPP OD Bopx Overhaul	\$	\$	10	670
68	HD-13	Water Balast Tank #2 Port and Stbd	\$	\$	10	680
69	H-15	Furniture and Cabinets	\$	\$	10	690
		3.3.1 Desks (quantity 14)	\$	\$		
		3.3.2 Vanities (custom fabrication) (quantity 5)	\$	\$		
		3.3.3 Bunks (quantity 7)	\$	\$		
		3.3.4 Laundry Room Cabinet (quantity 1)	\$	\$		
		3.5.2.6 Book/Binder Shelves (quantity 2)	\$	\$		
70	H-12	Flooring and Sub-flooring	\$	\$	10	700
71	H-14	Panneling	\$	\$	10	710
72	L-09	Navigation Light Installation	\$	\$	10	720
73	E-06	Reverse Osmosis Unit #1 Aft	\$	\$	10	730
74	E-07	Reverse Osmosis Unit #2 fwd	\$	\$	10	740
75	HD-19	Fresh Water Tank	\$	\$	10	750
76	H-30	Flooring Hallways	\$	\$	10	760
77	H-32	Flooring Laundry Room	\$	\$	10	770
78	H-31	Flooring Washrooms	\$	\$	10	780
79	ED-10	Deck Hydraulics Fwd	\$	\$	10	790
80	ED-11	Deck Hydraulics Aft	\$	\$	10	800
81	E-08	Panama Fairleads	\$	\$	10	810
82	HD-20	Water Balast Tank #1 Port and Starboard	\$	\$	10	820
83	HD-21	Water Balast Tank #4 Port and Starboard	\$	\$	10	830
		TOTAL BID PRICE	\$	\$		

9) Replace the Vessel Transfer Cost table in Part 6, Clause 6.3 of the solicitation document,

DELETE: Part 6, Clause 6.3 (in it entirety)

INSERT:

6.3 Vessel Transfer Costs

Vessel Transfer Costs will apply to the evaluation price of this solicitation.

1. The evaluation price must include the cost for transferring the vessel from its home port to the shipyard/ship repair facility where the Work will be performed and the cost of transferring the vessel to its home port following completion of the Work, in accordance with the following:

(a) The Bidder must provide the location of the shipyard/ship repair facility where it proposes to perform the Work together with the applicable vessel transfer cost from the list provided under paragraph 2 of this clause shall be entered into Table H1 (D):

(b) If the list in paragraph 2 of this clause does not provide the shipyard/ship repair location where the Bidder intends to perform the Work, then the Bidder must advise the Contracting Authority, in writing, at least **10 calendar days** before the bid closing date, of its proposed location for performing the Work. The Contracting Authority will confirm to the Bidder, in writing, at least **5 calendar days** before the bid closing date, the location of the shipyard/ship repair and the applicable vessel transfer cost.

A bid that specifies a location for executing the Work which is not on the list of paragraph 2 of this clause, and for which a notification in writing has not been received by the Contracting Authority as required above, will be considered non-responsive.

2. List of shipyard/ship repair facilities and applicable vessel transfer costs

Vessel: CCGS Leonard J Cowley
Home port: St. John's, NL

Transfer costs in the case of vessels transferred using a government delivery crew include the fuel cost at the vessel's most economical speed of transit and for unmanned refits only, crew transportation costs for the delivery crew based on the location of the vessel's home port and the shipyard/ship repair facility. Crew transportation costs do not include any members of the delivery crew who remain at the shipyard/ship repair facility in order to discharge project responsibilities related to the vessel being transferred.

Transfer costs in the case of vessels transferred unmanned by either commercial towing, railway, highway or other suitable means of transportation must be:

(i) included as part of the Bidder's financial bid in the case where the Bidder is responsible for the transfer; or

(ii) identified as the applicable vessel transfer cost, as given in the list below, in the case when Canada is responsible for the transfer.

Solicitation No. - N° de l'invitation

F7049-140286/A

Client Ref. No. - N° de réf. du client

F7049-140286

Amd. No. - N° de la modif.

002

File No. - N° du dossier

021mdF7049-140286

Buyer ID - Id de l'acheteur

021md

CCC No./N° CCC - FMS No/ N° VME

Shipyard/ship repair facility

Applicable vessel transfer cost

Company	City	Transfer Cost Un-Manned
CME	North Sydney NS	C\$28,208.00
New Dock, St. John's Dockyard Ltd.	St. John's	C\$0.00
Halifax Shipyards Ltd.	Halifax	C\$37,752.00
Shelburne Marine.	Shelburne	C\$42,479.00
Group Verreault Navigation Inc.	Les Mechins	C\$62,280.00
Davie Canada Yard Inc.	Levis	C\$61,296.00
Heddle Marine Service Inc.	Hamilton	C\$87,740.00
Pictou Shipyard	Pictou	C\$35,324.00
Ocean Industries Inc.	Saint-Bernard-Sur-Mer	C\$58,385.00

Proposed Drydocking Location : _____

Refer to Annex "J1" for Deliverables/Certifications.

10) Replace the Vessel Transfer Cost tables in Annex H, part H6 of the solicitation document

DELETE: Annex H, part H6 (in its entirety)

INSERT: Annex H, part H6

H6 Vessel Transfer Costs

1. The evaluation price must include the cost for transferring the vessel from its home port to the shipyard/ship repair facility where the Work will be performed and the cost of transferring the vessel to its home port following completion of the Work, in accordance with the following:

(a) The Bidder must provide the location of the shipyard/ship repair facility where it proposes to perform the Work together with the applicable vessel transfer cost from the list provided under paragraph 2 of this clause shall be entered into Table H1:

(b) If the list in paragraph 2 of this clause does not provide the shipyard/ship repair location where the Bidder intends to perform the Work, then the Bidder must advise the Contracting Authority, in writing, at least 5 calendar days before the bid closing date, of its proposed location for performing the Work. The Contracting Authority will confirm to the Bidder, in writing, at least 3 calendar days before the bid closing date, the location of the shipyard/ship repair and the applicable vessel transfer cost.

A bid that specifies a location for executing the Work which is not on the list of paragraph 2 of this clause, and for which a notification in writing has not been received by the Contracting Authority as required above, will be considered non-responsive.

2. List of shipyard/ship repair facilities and applicable vessel transfer costs

Vessel: CCGS Leonard J Cowley
Home port: St. John's, NL

Transfer costs in the case of vessels transferred using a government delivery crew include the fuel cost at the vessel's most economical speed of transit and for unmanned refits only, crew transportation costs for the delivery crew based on the location of the vessel's home port and the shipyard/ship repair facility. Crew transportation costs do not include any members of the delivery crew who remain at the shipyard/ship repair facility in order to discharge project responsibilities related to the vessel being transferred.

Transfer costs in the case of vessels transferred unmanned by either commercial towing, railway, highway or other suitable means of transportation must be:

(i) included as part of the Bidder's financial bid in the case where the Bidder is responsible for the transfer; or

(iii) identified as the applicable vessel transfer cost, as given in the list below, in the case when Canada is responsible for the transfer.

Solicitation No. - N° de l'invitation

F7049-140286/A

Client Ref. No. - N° de réf. du client

F7049-140286

Amd. No. - N° de la modif.

002

File No. - N° du dossier

021mdF7049-140286

Buyer ID - Id de l'acheteur

021md

CCC No./N° CCC - FMS No/ N° VME

**Shipyard/ship repair facility
cost****Applicable vessel transfer
cost**

Company	City	Transfer Cost un-Manned
CME	North Sydney NS	C\$28,208.00
New Dock, St. John's Dockyard Ltd.	St. John's	C\$0.00
Halifax Shipyards Ltd.	Halifax	C\$37,752.00
Shelburne Marine.	Shelburne	C\$42,479.00
Group Verreault Navigation Inc.	Les Mechins	C\$62,280.00
Davie Canada Yard Inc.	Levis	C\$61,296.00
Heddle Marine Service Inc.	Hamilton	C\$87,740.00
Pictou Shipyard	Pictou	C\$35,324.00
Ocean Industries Inc.	Saint-Bernard-Sur-Mer	C\$58,385.00

11) Replace Annex G, section G6 Inspection and Trials Process, para 2e**DELETE: Annex G, section G6, Inspection and Trials Process, Para 2e (in its entirety)****INSERT: Annex G, section G6, Inspection and Trials Process, Para 2e**

e. Before carrying out any inspection, the **PWGSC** Inspection Authority must review the requirements for the Work and the acceptance and/or rejection standards to be applied. Where more than one standard or requirement is called up and they are potentially conflicting, the Inspection Authority must refer to the order of precedence in the Contract to determine the standard or requirement to be applied.

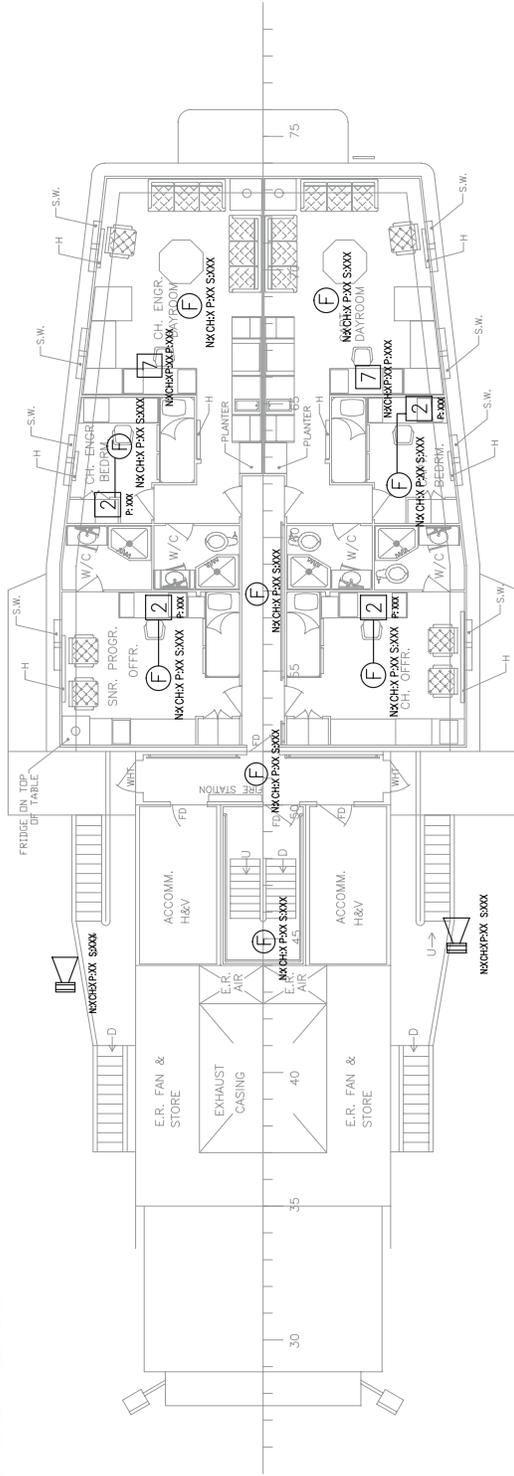
End of Solicitation Amendment #2

CABLING REQUIREMENTS

CAT 5E CABLE ENDS: RJ45 MALE/110 PUNCHDOWN AT NODE
 EQUIPMENT: RJ45 FEMALE
 TERMINATE TO TIA-EIA-568B
 100 METERS MAX FROM NODE TO ENDPOINT

SPEAKER—PHONE CHAINING

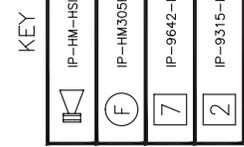
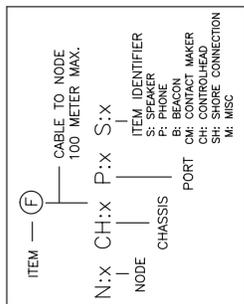
THE CAT5 CABLE FROM THE NEAREST ICP NODE PLUGS INTO THE BACK/BOTTOM OF THE SPEAKER IN THE RJ45 JACK LABELED "N". A CAT5 PATCH CABLE (NOT PROVIDED) IS CONNECTED TO THE "P" RJ45 JACK ON THE SPEAKER AND THE ADJACENT TELEPHONE.



ENDPOINTS (THIS SHT)

Quantity	ENDPOINT
4	CHAINED DEVICE
13	PORT (DEVICE HOMERUN)
17	TOTAL ENDPOINTS

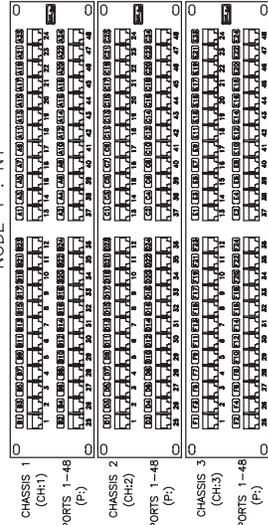
BRIDGE DECK (B)



EQUIPMENT LIST (THIS SHT)

Count	Name	DESCRIPTION
2	IP-9642-MOH	12 LINE PHONE BULKHEAD MOUNT
4	IP-HM-HSIS	INTERIOR/EXTERIOR HORN
4	IP-9315-MOH-CHAINED	IP DESK PHONE, 6 BUTTON
9	IP-HM305F	FLUSH SPEAKER

NODE 1 : N1



IMPORTANT: THIS MATERIAL IS THE PROPERTY OF ROSS-MCCANN COMMUNICATIONS AND IS LOANED FOR REVIEW AND EVALUATION PURPOSES ONLY. IT IS PROPRIETARY AND CONFIDENTIAL, AS SUCH, IT IS SUBJECT TO RECALL AT ANY TIME AND IS NOT TO BE DISCLOSED OR TRANSMITTED TO OTHER PARTIES NOR COPIED IN ANY FORM WITHOUT THE PRIOR WRITTEN CONSENT OF ROSS-MCCANN COMMUNICATIONS.

ROSS-MCCANN COMMUNICATIONS
 DERIDDER BEACH, FL
 WE COMMUNICATE ANYTIME, THAT'S THE BEST™

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMALS = 0.05
 FRACTIONS = 1/16"
 DIMS. ARE TO FACE UNLESS NOTED OTHERWISE
 DO NOT SCALE DRAWING

DATE SD
ENG AJ

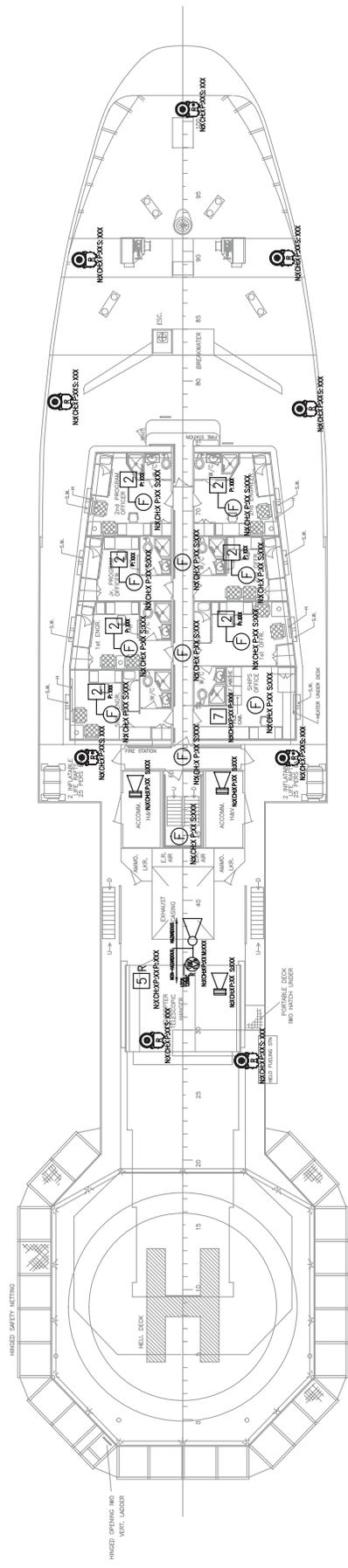
SHEET 3 OF 7
SCALE: N.T.S.
PROJECT #73274

CCG COWLEY SHIP LAYOUT
DWG. NO. 8010-100-COWLEY
REV. 4

CABLING REQUIREMENTS
 CAT 5E CABLE ENDS: RJ45 MALE/110 PUNCHDOWN AT NODE
 EQUIPMENT: RJ45 FEMALE
 TERMINATE TO TIA-EIA-568B
 100 METERS MAX FROM NODE TO ENDPOINT

SPEAKER-PHONE CHAINING

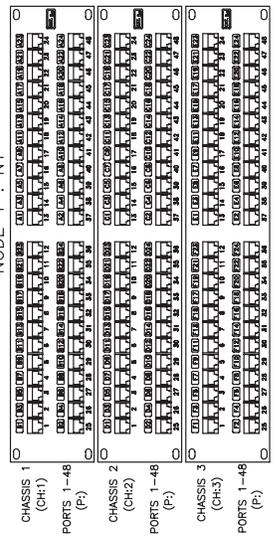
THE CAT5 CABLE FROM THE NEAREST ICP NODE PLUGS INTO THE BACK/BOTTOM OF THE SPEAKER IN THE RJ45 JACK LABELED "N". A CAT5 PATCH CABLE (NOT PROVIDED) IS CONNECTED TO THE "P" RJ45 JACK ON THE SPEAKER AND THE ADJACENT TELEPHONE.



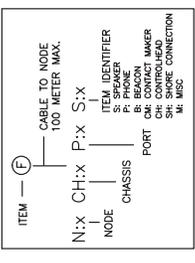
FORECASTLE DECK (F)

ENDPOINTS (TOTAL)	
Quantity	ENDPOINT
7	CHAINED DEVICE
27	PORT (DEVICE HOMERUN)
34	TOTAL ENDPOINTS

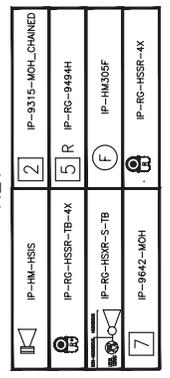
NODE 1 : N1



SCHEMATIC



KEY



Count	Name	DESCRIPTION
1	IP-RC-HSSR-5-TB	HAZARDOUS AREA TALKBACK STATION
1	IP-RC-9494H	PUSHBUTTON PHONE, WATERTIGHT
1	IP-9642-MOH	12 LINE PHONE BULKHEAD MOUNT
3	IP-HM-HSIS	INTERIOR/EXTERIOR HORN
3	IP-RC-HSSR-TB-4X	SUBMERGENCE PROOF TALKBACK SPEAKER
6	IP-RC-HSSR-4X	SUBMERGENCE PROOF SPEAKER
7	IP-9315-MOH-CHAINED	IP DESK PHONE, 6 BUTTON
12	IP-HM305F	FLUSH SPEAKER

IMPORTANT: THIS MATERIAL IS THE PROPERTY OF BOSS-MCCANN COMMUNICATIONS AND IS LOANED FOR REVIEW AND EVALUATION PURPOSES ONLY. IT IS PROPRIETARY AND CONFIDENTIAL, AS SUCH, IT IS SUBJECT TO RECALL AT ANY TIME AND IS NOT TO BE DISCLOSED OR REPRODUCED TO OTHER PARTIES NOR COPIED IN ANY FORM WITHOUT THE WRITTEN CONSENT OF BOSS-MCCANN COMMUNICATIONS.

BOSS-MCCANN COMMUNICATIONS
 DERRIFIELD BEACH, FL
 WE COMMUNICATE ANYTIME, ANYWHERE, ANYTIME.

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMALS = 1/32"
 METRIC = 1/16"
 ENG. AJ
 DO NOT SCALE DRAWING

QUANT SD 5-5-14 SHEET 4 OF 7
 SCALE N.T.S.
 ENG #73274

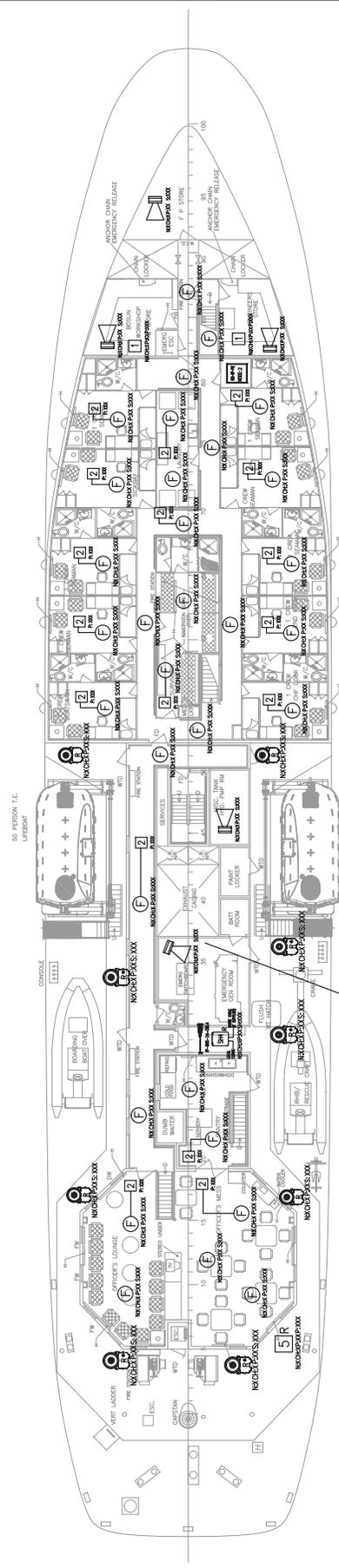
CCG COWLEY SHIP LAYOUT
 DWG NO. 8010-100-COWLEY REV. 4

CABLING REQUIREMENTS

CAT 5E CABLE ENDS: RJ45 MALE/110 PUNCHDOWN AT NODE
 EQUIPMENT: RJ45 FEMALE
 TERMINATE TO TIA-EIA-568B
 100 METERS MAX FROM NODE TO ENDPOINT

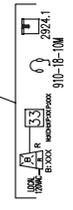
SPEAKER—PHONE CHAINING

THE CAT5 CABLE FROM THE NEAREST ICP NODE PLUGS INTO THE BACK/BOTTOM OF THE SPEAKER IN THE RJ45 JACK LABELED "N". A CAT5 PATCH CABLE (NOT PROVIDED) IS CONNECTED TO THE "P" RJ45 JACK ON THE SPEAKER AND THE ADJACENT TELEPHONE.



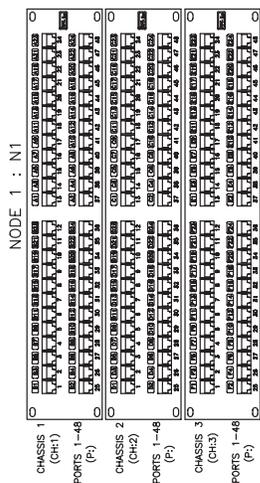
UPPER DECK (U)

UPPER DECK (U)



SCHEMATIC

ITEM — E
 CABLE TO NODE
 100 METER MAX.
 N:X CH:X P:X S:X
 NODE
 ITEM IDENTIFIER
 P: SPEAKER
 S: BEACON
 CH: CONTROL WAGER
 SH: SHORE CONNECTION
 M: MSC



NODE 1 : N1

KEY

(F)	IP-HM305F	IP-665-24-CBL4
(S)	IP-RG-HSSR-TB-4X	IP-626H70
(K)	IP-HM-HSIS	910-18-10M
(5R)	IP-RG-9494H	IP-RG-HMCE70R-1206B
(2)	IP-9315-MOH-CHAINED	2924.1
(1)	IP-9315-MOH	IP-RG-HSSR-4X
(SM)	IP-RG-865-4	HMC-ICP-PVE

ENDPOINTS (THIS SHIP)

Quantity	ENDPOINT
18	CHAINED DEVICE
51	PORT DEVICE (HOMERUN)
69	TOTAL ENDPOINTS

EQUIPMENT LIST (THIS SHIP)

Count	Name	DESCRIPTION
1	IP-RG-9494H	PUSHBUTTON PHONE, WATERTIGHT
1	IP-RG-865-4	4 LINE SHORE BOX
1	HMC-ICP-PVE	HMC-ICP-PVE NODE
1	IP-626H70	RUGGEDIZED PHONE WITH BEACON CONN.
1	IP-RG-HMCE70R-1206B	ROTATING BEACON, AMBER DOME
1	910-18-10M	HEADSET, DUAL EAR W/ MIC, 10 METER CORD
1	IP-865-24-CBL4	SHORE BOX CABLE 4 LINE
1	2924.1	BEASET STORAGE BOX
2	IP-9315-MOH	IP DESK PHONE, 6 BUTTON
4	IP-RG-HSSR-4X	SUBMERGENCE PROOF SPEAKER
5	IP-HM-HSIS	INTERCOM/EXTERIOR HORN
5	IP-RG-HSSR-TB-4X	SUBMERGENCE PROOF TALKBACK SPEAKER
17	IP-9315-MOH-CHAINED	IP DESK PHONE, 6 BUTTON
32	IP-HM305F	FLUSH SPEAKER

IMPORTANT: THIS MATERIAL IS THE PROPERTY OF BOSS-MCCANN COMMUNICATIONS AND IS LOANED FOR REVIEW AND EVALUATION PURPOSES ONLY. IT IS PROPRIETARY AND CONFIDENTIAL, AS SUCH, IT IS SUBJECT TO RECALL AT ANY TIME AND IS NOT TO BE DISCLOSED OR REPRODUCED TO OTHER PARTIES NOR COPIED IN ANY FORM WITHOUT THE WRITTEN CONSENT OF BOSS-MCCANN COMMUNICATIONS.

BOSS-MCCANN COMMUNICATIONS
 DERIVED BEACH, FL.
 WE COMMUNICATE ANYTIME, ANYWHERE, ANYTIME.

DATE	SD	5-5-14	SHEET 5 OF 7
ENG	AJ	5-8-14	SCALE: N.T.S.
			PROJ: #73274

CCG COWLEY SHIP LAYOUT
DWG NO. 8010-100-COWLEY
REV. 4

Spec item #: E-06	SPECIFICATION	TCMSB Field #: N/A
E-06 Reverse Osmosis Unit #1 Aft.		

Part: 1 SCOPE:

- 1.1** The intent of this specification shall be contractor to remove number 1 aft existing Reverse Osmosis (R.O.) water maker and replace with a new contractor supplied direct replacement R.O water maker.
- 1.2** This work shall be carried out in conjunction with
- a) H-28 Forward Machinery Space Deck Coating.
 - b) E-05 RO Units Supply Piping
 - c) E-07 Reverse Osmosis Unit #2 Forward
 - d) H-22 Fire Lines Replacement
 - e) HD-03 Cathodic protection

Part: 2 REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Forward Machinery Room. Drawing # 590-79.
Profile and Decks Drawings # 590-04
- 2.1.2** Contractor supplied one R.O. unit it shall be Matrix Silver S3600 Reverse Osmosis Sea Water System. (Cabinet Design 440 Volt / 3 Phase / 60 Cycle)
- 2.1.3** The reverse osmosis unit will be capable of producing at least 3,600 US gallons (13,645 liters) per 24 hours of fresh potable water from seawater feed containing 36,000 mg/l total dissolved solids and 25 degrees C seawater temperature.
- 2.1.4** The unit will meet or exceed WHO and USPH health guidelines.
- 2.1.5** The units will come with the following standard features,
- a) Nickel aluminum bronze high pressure pump, TEFC motor.
 - b) Nickel Aluminum Bronze supply pump with TEFC motor.
 - c) Corrosive resistant fiberglass pressure vessels. (3).
 - d) Three (3) 102 x 1016 inch spiral wound, thin film composite membranes.
 - e) Dual 5 micron cartridge filtration.
 - f) Aluminum welded structural assembly with powder coating. Matterhorn White.
 - g) NEMA 4X FRP control enclosure. Waterproof wiring and conduit.

Spec item #: E-06	SPECIFICATION	TCMSB Field #: N/A
E-06 Reverse Osmosis Unit #1 Aft.		

- h) High and Low pressure switches for system protection.
- i) SS316 and monel pressure gauges. Glycerin Filled.
- j) Product and concentrate flow indicators.
- k) Elapsed time meter.
- l) Vibration absorption mounts.
- m) 316 stainless steel high-pressure fittings.
- n) Digital conductivity meter with LCD display.
- o) Solenoid actuated divert valve for product quality assurance.
- p) The Supply pump and high pressure pump motor starters with overload Protection.

2.2 Standards

- 2.2.1** The unit will meet or exceed World Health Organization (WHO) and USPH health guidelines.

2.3 Regulations

- 2.3.1** The contractor shall comply with the latest edition of all Provincial 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

- 3.1.1** Contractor shall inform the Chief Engineer prior to starting work.
- 3.1.2** Contractor shall confirm with the Chief Engineer that the existing R.O. unit is isolated, locked out and tagged as per Provincial Regulations.
- 3.1.3** Contractor shall disconnect all wiring and piping from the existing R.O. unit and remove existing unit from the base.

Spec item #: E-06	SPECIFICATION	TCMSB Field #: N/A
E-06 Reverse Osmosis Unit #1 Aft.		

- 3.1.4** Contractor to confirm with the Chief Engineer what parts are to dispose of the old R.O. unit that is been removed. Contractor to dispose of these parts as per Provincial Regulations
- 3.1.5** Contractor shall grit blast R.O. unit base to near white metal (SSPC-SP10).
- 3.1.6** Prior to starting grit blasting the R.O. unit base, contractor shall use protective material to cover all the equipment in the machinery room space from damage when grit blasting the base.
- 3.1.7** Contractor shall apply 1st coat Amercoat 5105/ 4298 (3 mil dft) and a finish of Amercoat 5450-AX9736 (3 mil dft) to be applied as per manufactures application procedures.
- 3.1.8** Contractor shall supply and install new Matrix Silver S3600 Reverse Osmosis Sea Water System unit.
- 3.1.9** Contractor shall provide all materials needed for the installation of the new R.O. water maker unit as per manufactures instructions and have it included in the cost.
- 3.1.10** Contractor shall arrange and have an OEM Certified Technician from where the R.O. unit were purchased to install and commission the new R.O. unit water maker to maintain warranty. Contractor shall have the cost of the OEM Technician for installation and Commissioning and all other related expenses to be included in the price.
- 3.1.11** The Chief Engineer and the Lloyds Inspector shall witness the commissioning of the R.O. water maker by the OEM Technician.

3.2 Location

- 3.2.1** Forward Machinery Room Space. (Frames 66-71).

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

Spec item #: E-06	SPECIFICATION	TCMSB Field #: N/A
E-06 Reverse Osmosis Unit #1 Aft.		

4.1.1 Chief Engineer and Lloyd's inspector shall witness the commissioning of the R.O. unit.

4.2 Testing

4.2.1 Chief Engineer and Lloyd's inspector shall witness the R.O. unit run up and proven operational for a minimum of 30 minutes. R.O. Unit shall produce the maximum rated water output as per manufactures specifications.

4.3 Certification

4.3.1 R.O. unit water maker certification.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall provide to Chief Engineer three type written copies and one electronic copy of a report of all work carried out.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

5.4.1 Contractor shall provide to Chief Engineer three operation manuals for the R.O. unit.

Spec item #: E-07	SPECIFICATION	TCMSB Field #: N/A
E-07 Reverse Osmosis Unit #2 Forward		

Part: 1 `SCOPE:

- 1.1** The intent of this specification shall be contractor to remove number 2 Forward existing Reverse Osmosis (R.O.) water maker and replace with a new contractor supplied direct replacement R.O. water maker.
- 1.2** This work shall be carried out in conjunction with
- a) H-28 Forward Machinery Space Deck Coating.
 - b) E-05 R.O. Units Supply Piping
 - c) E-06 Reverse Osmosis Unit #1 Aft
 - d) H-22 Fire Lines Replacement
 - e) HD-03 Cathodic protection

Part: 2 REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Forward Machinery Room. Drawing # 590-79.
Profile and Decks Drawings # 590-04
- 2.1.2** Contractor supplied one R.O. unit it shall be Matrix Silver S3600 Reverse Osmosis Sea Water System. (Cabinet Design 440 Volt / 3 Phase / 60 Cycle)
- 2.1.3** The reverse osmosis unit will be capable of producing at least 3,600 US gallons (13,645 liters) per 24 hours of fresh potable water from seawater feed containing 36,000 mg/l total dissolved solids and 25 degrees C seawater temperature.
- 2.1.4** The unit will meet or exceed WHO and USPH health guidelines.
- 2.1.5** The units will come with the following standard features,
- a) Nickel aluminum bronze high pressure pump, TEFC motor.
 - b) Nickel Aluminum Bronze supply pump with TEFC motor.
 - c) Corrosive resistant fiberglass pressure vessels. (3).
 - d) Three (3) 102 x 1016 inch spiral wound, thin film composite membranes.
 - e) Dual 5 micron cartridge filtration.
 - f) Aluminum welded structural assembly with powder coating. Matterhorn White.
 - g) NEMA 4X FRP control enclosure. Waterproof wiring and conduit.

Spec item #: E-07	SPECIFICATION	TCMSB Field #: N/A
E-07 Reverse Osmosis Unit #2 Forward		

- h) High and Low pressure switches for system protection.
- i) SS316 and monel pressure gauges. Glycerin Filled.
- j) Product and concentrate flow indicators.
- k) Elapsed time meter.
- l) Vibration absorption mounts.
- m) 316 stainless steel high-pressure fittings.
- n) Digital conductivity meter with LCD display.
- o) Solenoid actuated divert valve for product quality assurance.
- p) The supply pump and high pressure pump motor starters with overload Protection.

2.2 Standards

- 2.2.1** The unit will meet or exceed World Health Organization (WHO) and USPH health guidelines.

2.3 Regulations

- 2.3.1** The contractor shall comply with the latest edition of all Provincial 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

- 3.1.1** Contractor shall inform the Chief Engineer prior to starting work.
- 3.1.2** Contractor shall confirm with the Chief Engineer that the existing R.O. unit is isolated, locked out and tagged as per Provincial Regulations.
- 3.1.3** Contractor shall disconnect all wiring and piping from the existing R.O. unit and remove existing unit from the base.

Spec item #: E-07	SPECIFICATION	TCMSB Field #: N/A
E-07 Reverse Osmosis Unit #2 Forward		

- 3.1.4** Contractor to confirm with the Chief Engineer what parts are to dispose of the old R.O. unit that is been removed. Contractor to dispose of these parts as per Provincial Regulations
- 3.1.5** Contractor shall grit blast R.O. unit base to near white metal (SSPC-SP10).
- 3.1.6** Prior to starting grit blasting the R.O. unit base, contractor shall use protective material to cover all the equipment in the machinery room space from damage when grit blasting the base.
- 3.1.7** Contractor shall apply 1st coat Amercoat 5105/ 4298 (3 mil dft) and a finish of Amercoat 5450-AX9736 (3 mil dft) to be applied as per manufactures application procedures.
- 3.1.8** Contractor shall supply and install new Matrix Silver S3600 Reverse Osmosis Sea Water System unit.
- 3.1.9** Contractor shall provide all materials needed for the installation of the new R.O. water maker unit as per manufactures instructions and have it included in the cost.
- 3.1.10** Contractor shall arrange and have an OEM Certified Technician from where the R.O. unit were purchased to install and commission the new R.O. unit water maker to maintain Warranty. Contractor shall have the cost of the OEM Technician for installation and commissioning and all other related expenses to be included in the price.
- 3.1.11** The Chief Engineer and the Lloyds Inspector shall witness the commissioning of the R.O. water maker by the OEM Technician.

3.2 Location

- 3.2.1** Forward Machinery Room Space. (Frames 66-71).

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

Spec item #: E-07	SPECIFICATION	TCMSB Field #: N/A
E-07 Reverse Osmosis Unit #2 Forward		

4.1.1 Chief Engineer and Lloyd's inspector shall witness the commissioning of the R.O. unit.

4.2 Testing

4.2.1 Chief Engineer and Lloyd's inspector shall witness the R.O. unit run up and proven operational for a minimum of 30 minutes. R.O. unit shall produce the maximum rated water output as per manufactures specifications.

4.3 Certification

4.3.1 R.O. unit water maker certification.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall provide to Chief Engineer three type written copies and one electronic copy of a report of all work carried out.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

5.4.1 Contractor shall provide to Chief Engineer three operation manuals for the R.O. unit.

Spec item #: E-08	SPECIFICATION	TCMSB Field #: N/A
E- 08 Panama Roller Fairleads		

Part: 1 SCOPE:

1.1 The intent of this specification shall be contractor is to remove two existing Roller Fairleads welded to the aft deck. Contractor shall supply and install two new Roller Fair leads on the after deck where the existing ones were removed.

Part: 2 REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Capacity Plan Drawing 590-79
Profile and Decks Drawing 590-04
- 2.1.2** Contractor shall supply and install two (2) Lloyds approved Smith Berger Marine Inc. Model FR4-6 Four Roller Fairleads or equivalent.
- 2.1.3** The existing four Roller Fairleads approximate measurements are,
Width: 635mm
Height: 559mm
Horizontal Rollers are 572mm long.
Vertical Rollers are 483mm long.
The Rollers are approximately 165mm diameter.

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** The Roller Fairleads must be Lloyds approved.
- 2.3.2** Contractor shall follow Lloyds approved welding procedure.
- 2.3.3** Contractor must follow the latest edition of all Provincial Regulations pertaining to hot work confined space entry and lockout tag out procedures.
- 2.3.4** Contractor welder performing the welding shall be certified by the Canadian Welding Bureau (CWB) at the time the work is performed.

2.4 Owner Furnished Equipment

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

Spec item #: E-08	SPECIFICATION	TCMSB Field #: N/A
E- 08 Panama Roller Fairleads		

Part: 3 TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** Contractor shall supply and install two (2) Lloyds approved Smith Berger Marine Inc. Model FR4-6 Four Roller Fairleads or equivalent. The fairlead must be designed with a safe working load of 40MT (88,184lbs or 392.7KN) per O.C.I.M.F. REV.3 guidelines and be Lloyd's approved.
- 3.1.2** Prior to commencement of the work contractor shall inform the Chief Engineer.
- 3.1.3** The #5 water ballast tank is located under one of the existing Roller Fairlead and half of another that are to be cut off the deck and the new ones installed.
- 3.1.4** Contractor shall confirm with the Chief Engineer that the water ballast system is locked out, isolated and tagged. The suction and discharge valves for # 5 Water Ballast tanks locked in closed position and the Water Ballast Pumps locked out.
- 3.1.5** Contractor shall confirm with Chief Engineer that # 5 water ballast tank is empty. Contractor shall remove the manhole cover from # 5 water ballast tank located in the steering gear compartment.
- 3.1.6** Prior to entry, the area and the tank where hot work is to be carried out is to be certified "Safe for Workers and Safe for Hot Work. The certification to be done by certified chemist or other certified personnel as per Provincial Regulations.
- 3.1.7** A copy of the gas free certificate, Safe for Workers and Safe for Hot Work to be posted at entry into the tank, the area being worked in and a copy posted at the gangway.
- 3.1.8** Contractor shall supply adequate ventilation and extraction to the area while work is being carried out. The contractor shall supply all ventilation fans, hoses and extractors and any other equipment required. The air supply to the area where work is being carried out is to be from outside the ship. Air extraction from the area where work is being carried is to be vented to the outside the ship.
- 3.1.9** Contractor shall supply Fire Sentries in each space on (aft Upper deck, outside manhole of #5 Water ballast tank in steering gear compartment and the adjacent to steering gear compartment aft. When welding, grinding and burning is being carried out. Fire Sentries shall be provided with an

Spec item #: E-08	SPECIFICATION	TCMSB Field #: N/A
E- 08 Panama Roller Fairleads		

- appropriate fire extinguisher and shall be trained in its use. The fire Sentry shall maintain a watch in his designated area for at least (30) minutes after any hot work has been complete.
- 3.1.10** Fire sentry in steering gear compartment has to have radio contact with the upper deck personal when work is been carried out at all times.
- 3.1.11** Contractor shall take the following precautions where hot work is to be conducted. Contractor shall keep copies of all active and expired hot work certificates in a central location on the vessel for viewing. Certificates shall specify “safe for persons” and or “safe for hot work” as appropriate. Contractor shall post a copy of all certificates at the entrance to the affected spaces and at the gangway. Protective material shall be used to prevent the spread of sparks, protecting electrical cables and other services and equipment.
- 3.1.12** Contractor shall supply to Lloyds Register a welding procedure for the welding the Roller Fairleads to the deck. The welding procedure must be approved by Lloyds prior to any work starting on the Roller Fairleads and followed for welding the Roller Fairleads to the deck.
- 3.1.13** Contractor shall cut off the two existing Roller Fairleads on the aft deck.
- 3.1.14** Contractor shall prepare the deck to install the new Roller Fairleads.
- 3.1.15** Contractor shall weld the new Roller Fairleads to the aft deck where the existing ones were removed from.
- 3.1.16** The new Roller Fairleads are to have grease passageways to the bearings and grease nipples installed so the roller bearings can be greased.
- 3.1.17** Contractor welders are to be certified as per provincial regulations and certified by the Canadian Welding Bureau. (CWB).
- 3.1.18** Contractor shall have a certified technician to do MPI testing on 100 % of the welding the Fairleads to the deck.
- 3.1.19** When the Roller Fairleads to the deck is complete and the welding MPI is certified the Chief Engineer and Lloyds Surveyor to carry out a 100% visual inspection of the work.
- 3.1.20** Contractor shall apply one coat of Amercoat 5101 Red Oxide primer to all new and disturbed metal, and two finish coats of paint each coat (3 mil dft). Roller Fairleads paint is Amercoat 5450 Black AX8930 and on the aft deck paint is Amercoat 5450-AX-8947 Gloss Alkyd Enamel-Green #60.

Spec item #: E-08	SPECIFICATION	TCMSB Field #: N/A
E- 08 Panama Roller Fairleads		

- 3.1.21** The existing coating on the # 5 water ballast tank will be damaged because welding and cutting on the Fairleads on the deck above the water ballast tank and the steering gear compartment deck aft storage section above on Stbd side. The coating on the water ballast tank and steering gear compartment to be repaired after all hot work on the deck above is complete: The first coat shall be Inter-shield ENA 300 Bronze 5-6 mils dft. The top coat shall be inter-shield ENA 300 Aluminum 5-6 mils dft.
- 3.1.22** Chief Engineer to inspect inside # 5 Water Ballast tank when the Roller Fairleads specification work is complete.
- 3.1.23** Contractor shall install the man hole cover on # 5 water ballast tank using a new contractor supplied approved gasket material for sea water on man hole cover.
- 3.1.24** Contractor shall include in cost to remove one broken stud, supply and install a new man hole cover stud and quote on cost per additional stud to remove broken stud, supply and install new stud which can be adjusted up or down by 1379 action.

3.2 Location

- 3.2.1** Steering Gear Compartment (Frames 0 – G)
- 3.2.2** After Main Deck Frames (Frames 0 – G)

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

- 4.1.1** Chief Engineer and Lloyds Inspector to carry out 100 % visually inspection of the Roller Fairleads when installed.

4.2 Testing.

- a) Contractor to have welding 100 % MPI testing done on all welds by approved testing personnel.

4.3 Certification

Spec item #: E-08	SPECIFICATION	TCMSB Field #: N/A
E- 08	Panama Roller Fairleads	

- a) Contractor performing the welding shall be currently certified at the Canadian Welding Bureau (CWB) at the time this work is performed.
- b) Roller Fairleads and Welding Procedure to be Lloyds approved.
- c) Roller Fairleads are to be Lloyds Approved.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1 Contractor shall provide the Chief Engineer with three type written copies and 1 electronic copy of a report of all work carried out.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

Part: 1 SCOPE:

1.1 The intent of this specification shall be to refurbish the Forward Hydraulic Systems as listed in this specification.

1.2**Part: 2 REFERENCES:****2.1 Guidance Drawings/Nameplate Data**

2.1.1 Reference drawings General arrangement Focsle, Upper, Main deck and Hold 590-70 sheet 1 of 2 and 2 of 2.

2.1.2 Manuals located in Chief Engineers Cabin.

2.2 Standards

2.2.1 All standard fluid power practices to be used as a standard in this refit. All hydraulic work shall be done by a certified hydraulic shop. All customer supplied oil to be filtered into our systems through a filter cart with 3 micron filters.

2.3 Regulations

2.3.1 Contractor responsible for all standard lockout procedures as per Provincial regulations.

2.3.2 Contractor responsible for all standard lockout procedures as per Provincial 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 Hydraulic Systems located in Forepeak Stores****3.1.1 Port hydraulic power unit**

3.1.1.1 Prior to disconnecting the electrical motor (30HP 460voltage 70amp 1770 rpm).

3.1.1.1.1 Motor to have a vibration analysis carried out.

3.1.1.1.2 Motor current readings to be taken.

3.1.1.1.3 Motor meggar reading taken.

3.1.1.1.4 Motor winding resistance taken.

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

- 3.1.1.2** Electrical motor to be disconnected by contractor and shipped to a certified electrical rebuilding shop for refurbishing. Contractor to supply and replace new bearings for the motor. Motor to be disassembled for inspection 100% visual by CCG Chief Engineer.
- 3.1.1.3** Contractor to supply electric motor (30HP 460voltage 70amp 1770 rpm) test reports of refurbished electric motor to Chief Engineer.
- 3.1.1.4** Contractor to remove hydraulic pump (Denison model TBC 022JR00A1) from forward port side Hydraulic Power Unit (HPU).
- 3.1.1.5** Pump to be transported to contractor shop.
- 3.1.1.6** Pump to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.1.1.7** Pump to be assembled with contractor supplied seal kit. Pump to be tested to manufactures specifications on contractor test bench and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.1.1.8** Electric motor and pump to be install back on ship using standard alignment procedures, an inspection of alignment to be done by Chief Engineer prior to start up and testing.
- 3.1.1.9** Contractor shall carry out vibration test on the electrical motor when running it up for testing after installation. Noted pump not to be started until after the hydraulic tank has been cleaned and new oil added to the tank. Vibration analysis to be compared to the previous test with and to the satisfaction of the Chief Engineer.
- 3.1.1.10** Hydraulic tank to be pump out and contractor responsible for removal and disposal of oil.
- 3.1.1.11** Tank to be opened up and inside cleaned with lint free rags.
- 3.1.1.12** Tank to be inspected by Chief Engineer prior to closing it up.
- 3.1.1.13** All filters to be changed with customer supplied filters.
- 3.1.1.14** Contractor to supply 200 liters of Petro Canada Hydrex MV -36 oil to be filtered into the hydraulic tank through a filter cart with contractor supplied 3 micron filters.

3.1.2 Starboard side Hydraulic Power Unit

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

- 3.1.2.1** Prior to disconnecting the electrical motor (30HP 460voltage 70amp 1770 rpm).
- 3.1.2.1.1** Motor to have a vibration analysis carried out.
- 3.1.2.1.2** Motor current readings to be taken.
- 3.1.2.1.3** Motor meggar reading taken.
- 3.1.2.1.4** Motor winding resistance taken.
- 3.1.2.2** Electrical motor to be disconnected by contractor and shipped to a certified electrical rebuilding shop for refurbishing, Contractor to supply and replace new bearings for the motor. Motor to be disassembled for inspection 100% visual by CCG Chief Engineer.
- 3.1.2.3** Contractor to supply electric motor (30HP 460voltage 70amp 1770 rpm) test reports of refurbished electric motor to Chief Engineer.
- 3.1.2.4** Contractor to remove hydraulic pump (Denison model TBC 022JR00A1) from forward port side Hydraulic Power Unit (HPU).
- 3.1.2.5** Pump to be transported to contractor shop.
- 3.1.2.6** Pump to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.1.2.7** Pump to be assembled with contractor supplied seal kit. Pump to be tested to manufactures specifications on contractor test bench and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.1.2.8** Electric motor and pump to be install back on ship using standard alignment procedures, an inspection of alignment to be done by Chief Engineer prior to start up and testing.
- 3.1.2.9** Contractor shall carry out vibration test on the electrical motor when running it up for testing after installation. Noted pump not to be started until after the hydraulic tank has been cleaned and new oil added to the tank. Vibration analysis to be compared to the previous test with and to the satisfaction of the Chief Engineer.
- 3.1.2.10** Hydraulic tank to be pump out and contractor responsible for removal and disposal of oil.
- 3.1.2.11** Tank to be opened up and inside cleaned with lint free rags.
- 3.1.2.12** Tank to be inspected by Chief Engineer prior to closing it up.

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

3.1.2.13 All filters to be changed with customer supplied filters.

3.1.2.14 Contractor to supply 200 liters of Petro Canada Hydrex MV -36 oil to be filtered into the hydraulic tank through a filter cart with contractor supplied 3 micron filters.

3.1.3 Racine selector valves complete Valve Code (FD4 B: 4S 106SH 60) (2) from forward hydraulic systems.

3.1.3.1 Contractor to remove under deck valves and transported to contractor shop.

3.1.3.2 Valves to be disassembled for inspections by CCG Chief Engineer.

3.1.3.3 Valves to be assembled with contractor supplied seal kit. Valves to be tested on contractor test bench as per manufactures specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.

3.1.3.4 Contractor to re-install back on vessel and test its operation to be witness by Chief Engineer.

3.1.4 Net Hauler Sector Valve

3.1.4.1 Replace sector valve type Walvoil DH 25 with new and test its operation to be witness by Chief Engineer.

3.1.5 Forward Capstan

3.1.5.1 Drain gear oil from forward capstan head gearbox, oil sample of this gear oil to be sent for sampling and results presented to CCG Chief Engineer.

3.1.5.2 Remove Capstan head hydraulic motor (Calzoni MR 1800 N5) from gear box. Motor to be transported to contractor shop.

3.1.5.3 Motor to be disassembled for inspections 100% visual by CCG Chief Engineer.

3.1.5.4 Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufactures specifications and test report provided. Contractor must also provide oil sample certificated of test bench oil with a minimum of NAS Class 6.

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

3.1.5.5 Motor to be reinstalled back on gear box, gear box to be filled with contractor supplied oil.

3.1.5.6 Contractor to run up and test Capstan operation to be witness by Chief Engineer.

3.2 Starboard Anchor Windlass (Burrard Iron Works Limited H6 Windlass).

3.2.1 Contractor to replace hydraulic hoses (2) 1219mm x 25.4mm, (2) 914.4mm x 25.4mm and (1) 1828.8mm x 19.1mm with new steel adapters with steel crimps.

3.2.1.1 All hoses to flame resistant with a maximum working pressure of 163 bar.

3.2.1.2 All hoses to be certified and supplied with a test certificate and a tag on each hose.

3.2.1.3 All hoses and steel ends to be denso wrapped.

3.2.2 Contractor drain gear oil from gearbox and sent oil sample for testing a copy of the results is to be supplied to Chief Engineer.

3.2.3 Contractor to remove winch hydraulic motor type (Calzoni: MR DON) and transport to contractor facility to be disassembled for 100% visual inspection by CCG Chief Engineer.

3.2.4 Contractor to blank hydraulic motor opening after the motor is removed to safe guard any contamination from weather and from other surrounding shipyard work.

3.2.5 Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.

3.2.6 Contractor to transport the hydraulic motor back to vessel to its location on the vessel. Contractor to install hydraulic motor and fill up gearbox with new contractor supplied oil. The anchor winch windlass is now tested by lifting and lower anchor and chain two times. This must be witness and approved by Chief Engineer.

3.3 Port Anchor Windlass (Burrard Iron Works Limited H6 Windlass).

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

- 3.3.1** Contractor to replace hydraulic hoses (2) 1219mm x 25.4mm, (2) 914.4mm x 25.4mm and (1) 1828.8mm x 19.1mm with new steel adapters with steel crimps.
- 3.3.1.1** All hoses to flame resistant with a maximum working pressure of 163 bar.
- 3.3.1.2** All hoses to be certified and supplied with a test certificate and a tag on each hose.
- 3.3.1.3** All hoses and steel ends to be denso wrapped.
- 3.3.2** Contractor drain gear oil from gearbox and sent oil sample for testing a copy of the results is to be supplied to Chief Engineer.
- 3.3.3** Contractor to remove winch hydraulic motor type (Calzoni: MR DON) and transport to contractor facility to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.3.4** Contractor to blank hydraulic motor opening after the motor is removed to safe guard any contamination from weather and from other surrounding shipyard work.
- 3.3.5** Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.3.6** Contractor to transport the hydraulic motor back to vessel to its location on the vessel. Contractor to install hydraulic motor and fill up gearbox with new contractor supplied oil. The anchor winch windlass is now tested by lifting and lower anchor and chain two times. This must be witness and approved by Chief Engineer.

3.4 Forward Console control valve

- 3.4.1** Remove control valves from deck console for forward hydraulic systems.
- 3.4.1.1** Valves to be transported to contractor shop.
- 3.4.1.2** Valves to be disassembled for 100% visual inspections by CCG Chief Engineer.
- 3.4.1.3** Control valve to be assembled with contractor supplied seal kit. Valve to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

3.4.1.4 Control valves to be re-installed and their operation tested and witness by Chief Engineer.

3.4.2 Contractor bid on replacing (7) 1524mm x 25.4mm and bid per one 1524mm x 25.4mm hose for adjustment purposes by PWGSC 1379 hoses are approximate actual sizes to be confirmed by contractor and fittings will be replaced in console, Steel adapters and steel crimps.

3.4.2.1 All hoses to flame resistant with a maximum working pressure of 163 bar.

3.4.2.2 All hoses to be certified and supplied with a test certificate and a tag on each hose.

3.4.2.3 All hoses and steel ends to be denso wrapped.

3.5 Location

3.5.1 Forepeak Store Room

3.6 Interferences

3.6.1 N/A

Part: 4 PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 Chief Engineer to witness an inspection of opened machinery (hydraulic motors pumps and electrical motors).

4.2 Testing of Forward Hydraulic Equipment

4.2.1 All test to be witness by CCG Chief Engineer.

4.2.2 Winches to be ran up for 5 minutes in each direction to ensure oil to each component.

4.2.3 Oil level to be topped up in hydraulic tank.

4.2.4 Bollard pull is required for capstan winch to simulate the capstan working under loaded conditions.

4.2.5 Anchor Windlass port and stbd winches required to lift and lower the anchor chain one complete time. Contractor to install chain back on ship.

4.3 Certification

Spec item #: ED-10	SPECIFICATION	TCMSB Field #: N/A
ED-10 Deck Hydraulics Forward		

4.3.1 All standard fluid power practices to be used as a standard in this refit. All hydraulic work shall be done by a certified hydraulic shop.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 The successful contractor shall supply three hard copies and one electronic copy of refit report including test reports, oil sample reports, to Chief Engineer.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: ED-11	SPECIFICATION	TCMSB Field #: N/A
ED-11 Deck Hydraulics Aft		

Part: 1 SCOPE:

1.1 The intent of this specification shall be to refurbish the Aft Hydraulic Systems as listed in this specification.

Part: 2 REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1** Reference drawings General arrangement Focsle, Upper Deck, Main Deck and Hold 590-70 sheet 1 of 2 and 2 of 2.
- 2.1.2** Manuals located in Chief Engineers Cabin.

2.2 Standards

- 2.2.1** All standard fluid power practices to be used as a standard in this refit. All hydraulic work shall be done by a certified hydraulic shop. All customer supplied oil to be filtered into our systems through a filter cart with 3 micron filters.

2.3 Regulations

- 2.3.1** Contractor responsible for all standard lockout procedures as per Provincial regulations.
- 2.3.2** Contractor responsible for all standard lockout procedures as per Provincial 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 Hydraulic Systems located in Steering Gear Compartment****3.1.1 Hydraulic power unit**

- 3.1.1.1** Prior to disconnecting the two electrical motors: (30HP 460voltage 70amp 1770 rpm) and (5hp 460voltage 6.5amp 1740rpm)
 - 3.1.1.1.1** Motor to have a vibration analysis carried out.
 - 3.1.1.1.2** Motor current readings to be taken.
 - 3.1.1.1.3** Motor meggar reading taken.
 - 3.1.1.1.4** Motor winding resistance taken.

Spec item #: ED-11	SPECIFICATION	TCMSB Field #: N/A
ED-11 Deck Hydraulics Aft		

- 3.1.1.2** Electrical motors to be disconnected by contractor and shipped to a certified electrical rebuilding shop for refurbishing, Contractor to supply and replace new bearings for the motor. Motors to be disassembled for inspection 100% visual by CCG Chief Engineer.
- 3.1.1.3** Contractor to supply test reports of refurbished electric motors (30HP 460voltage 70amp 1770 rpm) and (5hp 460voltage 6.5amp 1740rpm) to Chief Engineer.
- 3.1.1.4** Contractor to remove two hydraulic pumps one (Denison model TBC 022JR00A1) the other is a smaller one for the aft storage reel.
- 3.1.1.5** Pumps to be transported hydraulic pumps to contractor shop.
- 3.1.1.6** Pumps to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.1.1.7** Pumps to be assembled with contractor supplied seal kit. Pumps to be tested to manufactures specifications on contractor test bench and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.1.1.8** Electric motors and pumps to be install back on ship using standard alignment procedures, an inspection of alignment to be done by Chief Engineer prior to start up and testing.
- 3.1.1.9** Contractor shall carry out vibration test on the electrical motors when running it up for testing after installation. Noted pump not to be started until after the hydraulic tank has been cleaned and new oil added to the tank. Vibration analysis to be compared to the previous test with and to the satisfaction of the Chief Engineer.
- 3.1.1.10** Hydraulic tank to be pump out and contractor responsible for removal and disposal of oil.
- 3.1.1.11** Tank to be opened up and inside cleaned with lint free rags.
- 3.1.1.12** Tank to be inspected by Chief Engineer prior to closing it up.
- 3.1.1.13** All filters to be changed with customer supplied filters.
- 3.1.1.14** Contractor to supply 200 liters of new Petro Canada Hydrex MV -36 oil to be filtered into the hydraulic tank through a filter cart with contractor supplied 3 micron filters.

Spec item #: ED-11	SPECIFICATION	TCMSB Field #: N/A
ED-11 Deck Hydraulics Aft		

3.1.2 AFT Capstan

- 3.1.2.1** Drain gear oil from forward capstan head gearbox, oil sample of this gear oil to be sent for sampling and results presented to CCG Chief Engineer.
- 3.1.2.2** Remove Capstan head hydraulic motor (Calzoni MR 1800 N5) from gear box. Motor to be transported to contractor shop.
- 3.1.2.3** Motor to be disassembled for inspections 100% visual by CCG Chief Engineer.
- 3.1.2.4** Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufactures specifications and test report provided. Contractor must also provide oil sample certificated of test bench oil with a minimum of NAS Class 6.
- 3.1.2.5** Motor to be reinstalled back on gear box, gear box to be filled with customer supplied oil.

3.2 Hawbolt Industries Tow Winch Model HSF 2234

- 3.2.1** Contractor to replace hydraulic hoses (2) 3657.6mm x 25.4mm, (2) 1219.2mm x 25.4mm and (1) 914.4mm x 13mm with new steel adapters with steel crimps.
 - 3.2.1.1** All hoses to flame resistant with a maximum working pressure of 163 bar.
 - 3.2.1.2** All hoses to be certified and supplied with a test certificate and a tag on each hose.
 - 3.2.1.3** All hoses and steel ends to be denso wrapped.
- 3.2.2** Contractor drain gear oil from gearbox and sent oil sample for testing a copy of the results is to be supplied to Chief Engineer.
- 3.2.3** Contractor to remove winch hydraulic motor and transport to contractor facility to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.2.4** Contractor to blank hydraulic motor opening after the motor is removed to safe guard any contamination from weather and from other surrounding shipyard work.
- 3.2.5** Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.2.6** Contractor to transport the hydraulic motor back to vessel to its location on the vessel. Contractor to install hydraulic motor and fill up gearbox with new oil. The Tow winch is now tested by doing a bollard pull. This must be witness and approved by Chief Engineer.

3.3 Storage Reel

Spec item #: ED-11	SPECIFICATION	TCMSB Field #: N/A
ED-11 Deck Hydraulics Aft		

- 3.3.1** Contractor to replace hydraulic hoses (2) 3657.6mm x 19.1mm, (2) 914.4mm x 19.1mm and (3) 1219.2mm x 25.4mm with new steel adapters with steel crimps.
- 3.3.1.1** All hoses to flame resistant with a maximum working pressure of 163 bar.
- 3.3.1.2** All hoses to be certified and supplied with a test certificate and a tag on each hose.
- 3.3.1.3** All hoses and steel ends to be denso wrapped.
- 3.3.2** Contractor to remove winch hydraulic motor and transport to contractor facility to be disassembled for 100% visual inspection by CCG Chief Engineer.
- 3.3.3** Motor to be assembled with contractor supplied seal kit. Motor to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.3.4** Contractor to transport the hydraulic motor back to vessel to its location on the vessel. Contractor to install hydraulic motor. The storage reel to be tested to rotate in both rotation for a period of fifteen minutes each way. This must be witness and approved by Chief Engineer.

3.4 Control valves AFT (Capstan, Tow winch and Storage Reel)

- 3.4.1** Remove control valves from deck consoles for aft hydraulic systems.
- 3.4.2** Valves to be transported to contractor shop.
- 3.4.3** Valves to be disassembled for 100% visual inspections by CCG Chief Engineer.
- 3.4.4** Control valve to be assembled with contractor supplied seal kit. Valve to be tested on contractor test bench as per manufacture specifications and test report provided. Contractor must also provide oil sample certification of test bench oil with a minimum of NAS Class 6.
- 3.4.5** Contractor transport the valves back to vessel and re-install and tested for correct operation to be witness by Chief Engineer.

3.5 Location

- 3.5.1** Steering Gear Compartment & Aft Upper Deck.

3.6 Interferences

- 3.6.1** N/A

Spec item #: ED-11	SPECIFICATION	TCMSB Field #: N/A
ED-11 Deck Hydraulics Aft		

Part: 4 PROOF OF PERFORMANCE:**4.1 Inspection**

4.1.1 Chief Engineer to witness an inspection of opened machinery (hydraulic motors pumps and electrical motors).

4.2 Testing of After Hydraulic Equipment

4.2.1 All test to be witness by CCG Chief Engineer.

4.2.2 Winches to be ran up for 5 minutes in each direction to ensure oil to each component.

4.2.3 Oil level to be topped up in hydraulic tank.

4.2.4 Bollard pull is required for capstan winch to simulate the capstan working under loaded conditions.

4.2.5 Bollard pull is required for tow winch to simulate the tow winch working under loaded conditions.

4.2.6 Storage reel to be rotated 15 minutes each direction.

4.2.7

4.3 Certification

4.3.1 All standard fluid power practices to be used as a standard in this refit. All hydraulic work shall be done by a certified hydraulic shop.

Part: 5 DELIVERABLES:**5.1 Drawings/Reports**

5.1.1 The successful contractor shall supply three hard copies and one electronic copy of refit report including test reports, oil sample reports, to Chief Engineer.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: H-30	SPECIFICATION	TCMSB Field #: N/A
H-30 : Flooring Hallways		

Part: 1 SCOPE:

1.1 The intent of this specification shall be contractor to replace all flooring with new as described in this specification. Contractor shall remove and dispose the flooring and the cove base from hallways and laundry room as described in this specification. This work shall be carried out in Conjunction with the following work Specifications,

- a) H-12 Paneling
- b) H-22 Fire Lines Replacement
- c) H-24 Domestic Freshwater Piping Replacement

Part: 2 REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 Deck Covering. Drawing # 590-92.
- 2.1.2 Life Saving equipment Plan .Drawing # 590-83-1.
- 2.1.3 Application specification for Dex - O-Tex flooring products and Terrazzo M (Fine).

2.2 Standards

- 2.2.1 N/A

2.3 Regulations

- 2.3.1 All deck covering material must be incombustible and approved by Lloyds with Fire Protection Regulations and Standards applicable to this vessel.

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.

Spec item #: H-30	SPECIFICATION	TCMSB Field #: N/A
H-30 : Flooring Hallways		

Part: 3 TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** Contractor shall inform Chief Engineer prior to starting any work on the Decks.
- 3.1.2** Contractor shall supply all material required for the new flooring replacement and refinishing. **No substitutions.**
- 3.1.3** The flooring required is approximate only, Contractor to verify actual measurement prior to starting work. The Contractor will quote per m2 of materials, per m2 of preparation, and per 1 m for cove base (dex-o-tex) for each area described for adjustment purposes by PWGSC 1379 action.
- 3.1.4** Contractor shall enclose flooring areas being worked on so that no debris dust or flumes may pass to any other compartment of the vessel while this work is being carried out.
- 3.1.5** Contractor shall supply proper ventilation to work area being worked on from outside the vessel and Contractor shall exhaust air from the area being worked on to the outside atmosphere.
- 3.1.6** Contractor shall supply all material required for the new flooring replacement. All new Dex-O-Tex flooring Terrazzo M Fine floor finish colour to be DFS-17.
- 3.1.7** Contractor shall remove and dispose the existing flooring and cove base to the bare metal from the areas listed below. The deck area to be prepared and new flooring and cove base to be installed by contractor.
- 3.1.8** Chief Engineer to inspect the decks after they are cleaned and after application of each coat of flooring.
- 3.1.9** All decks shall be prepared according to deck coating manufactures specifications.

3.2 Bridge Deck

- 3.2.1** Contractor shall remove and replace the existing flooring on the Bridge Deck Hallways.

Spec item #: H-30	SPECIFICATION	TCMSB Field #: N/A
H-30 : Flooring Hallways		

- 3.2.2 Contractor shall remove and replace 11.148 square meters of flooring and 27.432 linear meters of 101.6mm cove base from Bridge Deck.
- 3.2.3 Contractor to remove the flooring and cove base from the Bridge Deck Hallways to the bare metal.
- 3.2.4 Contractor shall clean all decks to SSPC –SP-6.
- 3.2.5 Contractor shall apply one coat of Amerlock 2 Epoxy Primer to the complete metal deck surface.
- 3.2.6 Contractor shall apply one layer of Dex O Tex Quick Set Underlayment @ 6.35 mm thick
- 3.2.7 Contractor shall apply a coat of Dex O Tex Terazzo M Fine Finish Flooring System with integral cove base as per manufactures applications instructions.

3.3 Forecastle Deck

- 3.3.1 Contractor shall remove and replace the existing flooring and cove base on the main hallways on the Forecastle Deck not the forward one of the main hallway.
- 3.3.2 The total amount of flooring to be replaced is 18.58 square meters of flooring and 43.891 linear meters of 101.6mm cove base.
- 3.3.3 Contractor shall remove all the flooring material to the bare metal.
- 3.3.4 Contractor shall clean all decks to SSPC-SP-6 as per manufactures specifications.
- 3.3.5 Contractor shall apply one coat of Amerlock 2 Epoxy Primer to the complete metal deck.
- 3.3.6 Contractor shall apply one layer of Dex O Tex Quick Set Underlayment @6.35 mm thick over the Epoxy Primed deck.
- 3.3.7 Contractor shall apply a coat of Dex O Tex Terazzo M Fine Finish Flooring system with integral cove base as per Manufactures Application Instructions.

3.4 Main Deck

- 3.4.1 Note: This Flooring is a Fire Rated Dex O Tex.
- 3.4.2 Contractor shall remove the existing flooring and 101.6mm cove base to the bare metal, from the alleyway decks from the Engineers Washroom to the Crews Mess Entrance and replace with new Fire Rated Flooring.
- 3.4.3 The total area of decking and 101.6mm cove base to be replaced is 10 square meters of decking and 20 linear meters of 101.6mm cove base. Contractor shall remove the existing decking and 101.6mm cove base to the bare metal.
- 3.4.4 Contractor shall clean all decks to SSPC-SP-6.
- 3.4.5 Contractor shall apply one coat of Amerlock 2 Epoxy Primer to the
- 3.4.6 Complete metal deck.
- 3.4.7 Contractor shall apply one layer of DEX O Tex Decklite A-60 Fire Rated Decking @ 35 mm thick as per Manufactures Application Instructions.
- 3.4.8 Contractor shall apply Dex O Tex Terazzo M Fine Finish Flooring Systems with the integral cove base as per manufactures Applications instructions.

Spec item #: H-30	SPECIFICATION	TCMSB Field #: N/A
H-30 : Flooring Hallways		

3.5 Location

3.5.1 As per deck covering drawings listed in Reference Section 2.1.

3.6 Interferences

3.6.1 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

4.1.1 Chief Engineer to inspect the flooring.

4.2 Testing

4.3 Certification

4.3.1 All flooring to be certified Lloyd's approved.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall provide Chief Engineer with three type written hard copies and one electronic copy of a report of all work carried out, complete with certification of all the material supplied.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: H-31	SPECIFICATION	TCMSB Field #: N/A
H-31 : Flooring Washrooms		

Part: 1 SCOPE:

- 1.1** The intent of this specification shall be contractor to resurface 34 washrooms flooring with new as described in this specification. This work shall be carried out in Conjunction with the following specifications listed.
- a) H-12 Paneling
 - b) H-22 Fire Lines Replacement
 - c) H-24 Domestic Freshwater Piping Replacement

Part: 2 REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Deck Covering. Drawing # 590-92. SH2, SH3 and SH4.
- 2.1.2** Life Saving equipment Plan Drawing # 590-83-1.
- 2.1.3** Application specification for Dex - O-Tex flooring products and Terrazzo M (Fine).

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** All deck covering material must be incombustible and approved by Lloyds with Fire Protection Regulations and Standards applicable to this vessel.

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** Contractor shall inform Chief Engineer prior to starting any work on the Decks.
- 3.1.2** Contractor shall supply all material required for the new flooring refinishing. **No substitutions.**

Spec item #: H-31	SPECIFICATION	TCMSB Field #: N/A
H-31 : Flooring Washrooms		

- 3.1.3** The flooring required is approximate only, Contractor to verify actual measurement prior to starting work. The Contractor will quote per m2 of materials, per m2 of preparation, and per 1 m for cove base (dex-o-tex flooring Terrazzo M Fine) for each area described for adjustment purposes by PWGSC 1379 action.
- 3.1.4** Contractor shall enclose flooring areas being worked on so that no debris dust or flumes may pass to any other compartment of the vessel while this work is being carried out.
- 3.1.5** Contractor shall supply proper ventilation to work area being worked on from outside the vessel and Contractor shall exhaust air from the area being worked on to the outside atmosphere.
- 3.1.6** Contractor shall supply all material required for the new flooring refinishing. All new Dex-O-Tex flooring Terrazzo M Fine floor finish colour to be DFS-17.
- 3.1.7** All decks shall be prepared according to deck coating manufactures specifications.

3.2 Washrooms

- 3.2.1** The 34 washrooms listed below are to have the decks and cove base prepared and a refinish coat applied as per manufactures specifications.
- a) Contractor shall remove the toilet from the washroom deck.
 - b) Contractor shall sand deck to remove the finish and glaze from deck and cove base.
 - c) Contractor shall clean decks as per manufactures instructions.
 - d) Contractor shall apply one coat of TM Bondcoat @ 5 mils DFT and allow leave dry as per manufactures specifications.
 - e) Contractor shall apply Dex O Tex Terazzo M Fine throughout deck and cove base as per manufactures applications.
 - f) Contractor shall reinstall the toilets in the washrooms.
- 3.2.2** The washrooms locations are listed below according to the deck. For bidding purposes each washroom is to be quoted at 1.858 square meter of flooring area and 5.4864 linear meters of 101.6mm cove base. For 34 washrooms, total floor area is 63.173 square meters for bidding and 186.5376 meters linear meters of 101.6mm cove base.
- a) Navigation Bridge Deck one (1) washroom.
 - b) Bridge Deck four (4) washrooms.
 - c) Forecastle Deck seven (7) washrooms.
 - d) Upper deck eleven (12) wash rooms.

Spec item #: H-31	SPECIFICATION	TCMSB Field #: N/A
H-31 : Flooring Washrooms		

- e) Main deck ten (10) washrooms, 8 are forward frame section 52 one in the crews mess and one next to the Engineers change room.

3.3 Location

3.3.1 As per deck covering drawings listed in Reference Section 2.1.

3.4 Interferences

3.4.1 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

4.1.1 Chief Engineer to inspect the flooring.

4.2 Testing

4.3 Certification

4.3.1 All flooring to be certified Lloyd's approved.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall provide Chief Engineer with three type written hard copies and one electronic copy of a report of all work carried out, complete with certification of all the material supplied.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: H-32	SPECIFICATION	TCMSB Field #: N/A
H-32 : Flooring Laundry Room		

Part: 1 SCOPE:

1.1 The intent of this specification shall be contractor to replace all flooring with new as described in this specification. Contractor shall remove and dispose the flooring and the cove base from laundry room as described in this specification. This work shall be carried out in Conjunction with the following work Specifications,

- a) H-12 Paneling
- b) H-22 Fire Lines Replacement
- c) H-24 Domestic Freshwater Piping Replacement
- d) H-14 Furniture & Cabinets

Part: 2 REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1** Deck Covering. Drawing # 590-92.
- 2.1.2** Life Saving equipment Plan .Drawing # 590-83-1.
- 2.1.3** Application specification for Dex - O-Tex flooring products and Terrazzo M (Fine).

2.2 Standards

- 2.2.1** N/A

2.3 Regulations

- 2.3.1** All deck covering material must be incombustible and approved by Lloyds with Fire Protection Regulations and Standards applicable to this vessel.

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.

Spec item #: H-32	SPECIFICATION	TCMSB Field #: N/A
H-32 : Flooring Laundry Room		

Part: 3 TECHNICAL DESCRIPTION

3.1 General

- 3.1.1** Contractor shall inform Chief Engineer prior to starting any work on the Decks.
- 3.1.2** Contractor shall supply all material required for the new flooring replacement and refinishing. **No substitutions.**
- 3.1.3** The flooring required is approximate only, Contractor to verify actual measurement prior to starting work. The Contractor will quote per m2 of materials, per m2 of preparation, and per 1 m for cove base (dex-o-tex) for each area described for adjustment purposes by PWGSC 1379 action.
- 3.1.4** Contractor shall enclose flooring areas being worked on so that no debris dust or flumes may pass to any other compartment of the vessel while this work is being carried out.
- 3.1.5** Contractor shall supply proper ventilation to work area being worked on from outside the vessel and Contractor shall exhaust air from the area being worked on to the outside atmosphere.
- 3.1.6** Contractor shall supply all material required for the new flooring replacement. All new Dex-O-Tex flooring Terrazzo M Fine floor finish colour to be DFS-17.
- 3.1.7** Contractor shall remove and dispose the existing flooring and cove base to the bare metal from the areas listed below. The deck area to be prepared and new flooring and cove base to be installed by contractor.
- 3.1.8** Chief Engineer to inspect the decks after they are cleaned and after application of each coat of flooring.
- 3.1.9** All decks shall be prepared according to deck coating manufactures specifications.

3.2 Upper Deck Laundry Room Deck

- 3.2.1** Contractor shall disconnect and remove the following items from the laundry room. Contractor shall safely secure the items and reinstall them when the decks are complete.
 - 3.2.1.1** three (3) washing machines,

Spec item #: H-32	SPECIFICATION	TCMSB Field #: N/A
H-32 : Flooring Laundry Room		

- 3.2.1.2 two (2) clothes dryers,
- 3.2.1.3 electric base board heater,
- 3.2.1.4 plastic laundry tub, and laundry tables,

- 3.2.2 Contractor shall remove existing flooring and the 101.6mm cover base in the laundry room to the bare metal.
- 3.2.3 The total area of decking in laundry room to be replaced is 11.6125 square meters and 15.545 linear meters of 101.6mm cove base.
- 3.2.4 Contractor shall clean the decks to SSPC-SP-6.
- 3.2.5 Contractor shall apply one coat of Amerlock 2 Epoxy Primer to the complete metal deck.
- 3.2.6 Contractor shall apply one layer of Dex O Tex Quick Set Underlayment@ 6.35 mm Thick and leave dry to manufactures Instructions.
- 3.2.7 Contractor shall apply a coat of T/M Bondcoat sealer over the Underlayment to seal the surface.
- 3.2.8 Contractor shall apply Dex O Tex Terazzo M Fine Finish Flooring System with integral cove base as per Manufactures Applications Instructions.

3.3 Location

- 3.3.1 As per deck covering drawings listed in Reference Section 2.1.

3.4 Interferences

- 3.4.1 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

- 4.1.1 Chief Engineer to inspect the flooring.

4.2 Testing

4.3 Certification

- 4.3.1 All flooring to be certified Lloyd's approved.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1 Contractor shall provide Chief Engineer with three type written hard copies and one electronic copy of a report of all work carried out, complete with certification of all the material supplied.

Spec item #: H-32	SPECIFICATION	TCMSB Field #: N/A
H-32 : Flooring Laundry Room		

5.2 Spares
N/A

5.3 Training
N/A

5.4 Manuals
N/A

Spec item #: HD-19	SPECIFICATION	TCMSB Field #: N/A
HD-19 Freshwater Tank		

Part 1: SCOPE:

- 1.1 The intent of this specification shall be to inspection, complete 100% grit blast to bare metal, recoating and hydrostatic testing of the domestic fresh water tank.
- 1.2 Coast Guard will arrange for a NACE inspector to view the tank condition, grit blasting meets standard referred to in this specification and inspect the coatings to make sure they are applied as per manufacture's product data sheets.

Part 2: REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1. Capacity Plan 590-79
- 2.1.2. Capacity 32.5 Cubic Meters
- 2.1.3. Easy prime and Easy Flex product data sheets
- 2.1.4. Royal Coatings supplier: Barry Schnare, Manager, Marine and Industrial Coatings
K&D Pratt
55 Akerley Blvd, Dartmouth, NS|B3B 1M3
DL: 902-480-3011|C:902-456-9238
barry.schnare@kdpratt.com|www.kdpratt.com
- 2.1.5.

2.2 Standards

- 2.2.1 Fleet Safety Manual 7.F.12 Potable Water Quality

2.3 Regulations

- 2.3.1

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-19	SPECIFICATION	TCMSB Field #: N/A
HD-19 Freshwater Tank		

- 3.1.1. Contractor shall connect up a separate fresh water supply of 3.5 bar pressure to ship's domestic freshwater system, before the fresh water tank is taken out of service and left in place until the fresh water tank is ready to go back in service.
- 3.1.2. Contractor is to sound and record the amount of water in the tank before starting work. Contractor shall pump out contents of the tank and dispose of any residual water remaining. The contractor is to remove the remaining water from the tank and shall bid on the removal of 1m3 of water and provide unit cost per m3 for the removal of additional water.
- 3.1.3. Contractor shall remove manhole cover and gas free tank, "safe for personnel". Certificate to be given to Chief Engineer, and copies posted by manhole for the tank to be entered and a copy posted by the ships gang way.
- 3.1.4. Contractor prior to grit blasting shall plug all outlets (pump suction, level transducer) and inlet piping (filling/sounding, Ro unit inlet piping) vents and drains. Chief Engineer to inspect tank prior to grit blasting starting.
- 3.1.5. Contractor must prior to grit blasting make sure any equipment that maybe damaged by grit blast is protected from direct blast or debris.
- 3.1.6. Contractor to note this tank is fitted with a PSM tank level sensor that has to be protected when carrying out this work. Proper functioning of this sensor is to be proven before and after completion of work.
- 3.1.7. Contractor to bid on grit blasting to bare metal as per SSPC-SP5/NACE 1 White –Metal Blast Cleaning standard 130 square meters and quote per one square meter to be adjusted up or down by PWGSC 1379 action.
- 3.1.8. Contractor shall removed all debris from grit blasting to ashore and properly disposed of it in accordance with its Provincial enviromental regulations.
- 3.1.9. Contractor must contact Chief Engineer and NACE inspector prior to any coating being applied, to inspect that the grit blasting to bare metal is as per SSPC-SP5/NACE 1 White –Metal Blast Cleaning standard 2-4 mil profile. The surface preparation has to be agreed, that it is as specified by the Chief Engineer for coating to start.
- 3.1.10. Contractor shall bid on coating 260 square meters (2 coats x 130m2 area of tank) using Royal Coatings one coat of Easy Prime 3-4 mils dft one coat of Easy Flex 12-14 dft, light grey in color.

Spec item #: HD-19	SPECIFICATION	TCMSB Field #: N/A
HD-19 Freshwater Tank		

3.1.11. Contractor must follow the manufactures product data sheet for application of Easy Prime and Easy Flex 100% solids epoxy tank coatings.

1. Before application, the coatings (Easy Prime and Easy Flex) must be above 22° C prior to mixing.
2. Contractor shall note that the application conditions must provide a substrate temperature greater than 3°C and rising while air temperature must be greater than 4°C. Relative humidity shall be lower than 90% during application.
3. Contractor shall be responsible to supply and maintain heating/dehumidifying equipment required to ensure proper environment.
4. Any sharp edges, crevices, bolts, nuts, back to back angle and weld seams within the prepared areas shall be first stripe coated with Easy Flex.
5. Contractor to then apply one coat to 3-4mils dft of Royal's Easy Prime to all prepared steel.
6. Apply one top coat of Easy Flex to all primed areas to a dry film thickness of 12-14mils. Runs and sags in the applied coating should be left alone. Allow the coating to cure for 48hours @ 20°C or above. At lower temperatures let cure for 72hours.
7. Allow to dry until fingernail hard usually 18-30 hours depending on the temperature.

3.1.12. Coatings must be approved for use in potable domestic water tank.

3.1.13. Contractor must contact manufacturer's representative, to review application procedures, for Royal Coatings, prior to starting work.

3.1.14. Contractor must notify Chief Engineer and the NACE Inspector after each coating is completed, the coated areas shall be inspected by the Chief Engineer and the NACE Inspector prior to the second coat being applied and after the second coat has being applied. Contractor to quote per 1m2 coating to be adjusted up or down by PWGSC 1379 action.

3.1.15. The contractor is to provide tank with a mechanical ventilation system vented to the outside of the ship. Good ventilation must be provided and any blowers/extractors must ensure good air movement and solvent vapour removal from the lowest point in the tank.

3.1.16. Contractor must monitor the tank, temperature, humidity and VOC'S in the tank. The VOC readings after the tank it cure must be 15ppm or less if not the coating is not deemed cured.

HD-19 Freshwater Tank

- 3.1.17.** Contractor shall prove the tank sounding pipe / tank inlets, vent and outlet piping and pump suction strainer are free and clear prior to closing up the tank.
- 3.1.18.** Contractor shall supply / install a steel elbow adaptor c/w bolt type 150 # flange / gasket sized to bolt to 1.5 inch sounding pipe isolation valve located lower end of tank stbd side in the forward machinery space. Contractor shall remove the existing short section of sounding pipe already flanged to the isolation valve for removal to fit install the adaptor. This adaptor will allow the Contractor(s) supplied pump / hoses / fittings to be connected for the purpose of pumping out the fresh water tank when flushing / chlorinating the tank. Upon completion of all work in this spec and prior to commissioning the domestic fresh water system the Contractor shall remove adaptor and re-pipe sounding pipe as per original.
- 3.1.19.** Upon completion of inspection and work in this spec the contractor shall remove the vent cap from the vent pipe and replace manhole cover (s) using a new gaskets & anti seize compound on all studs. The Contractor shall include the cost to replace three manhole studs and provide a unit cost per replacement of additional manhole studs to be adjusted by PWGSC 1379 action.
- 3.1.20.** Contractor to hydrostatically test tank. The tank vents on deck are to be removed and the tanks are to be filled with water to the top of their respective sounding pipes in order to provide a hydrostatic test. Test to be carried out to the satisfaction of attending Lloyd's Surveyor and the Chief Engineer. Upon completion of the hydrostatic test the Contractor is to remove and dispose of the water used in the test. The tank vents are then to be reinstalled using new gaskets. Any and all plugs used if any for the testing and grit blasting to be removed from tank. Anti-seizing compound is to be used on the fastener threads.
- 3.1.21.** Contractor shall flush the tank once and refill with fresh water, then super chlorinate (disinfect) the tank as per procedure set out in the Fleet Safety Manual 7.F.12 Potable Water Quality, Section 3.5 Disinfection. All taps throughout the vessel shall be turned on to supply super chlorinated water to all piping. The super chlorinated water shall stand for a minimum of four hours. Super chlorination is achieved by adding unscented bleach @ 5% sodium hypochlorite at a volume of 1 litre / cubic meter of water in the tank. Contractor to dispose of the super chlorinated water in the tank in accordance with latest provincial regulations. Contractor to fill tank once to flush tank of super chlorinated water.
- 3.1.22.** Contractor shall re-fill the tank with fresh water and chlorinate to a standard level of 0.2 – 0.5 mg/litre which is achieved by dosing the tank

HD-19 Freshwater Tank

with unscented bleach at a rate of 2 litres / 100 cubic meters. Contractor shall first take sample of shore water supply and send to an independent laboratory for testing, the testing parameters (28) shall follow the testing parameters set out in the Fleet Safety Manual 7.F.12 Potable Water Quality.

3.1.23. Contractor shall bid on 4 fills and 3 flushes. The Contractor shall include the cost for the disposal of the any chlorinated and neutralized water.

3.1.24. After completion of work, three samples of fresh water shall be taken from the tank, furthest point from tank and the Galley, these three samples shall be sent to an independent laboratory for testing, the testing parameters (28) shall follow the testing parameters set out in the Fleet Safety Manual 7.F.12 Potable Quality. The contractor shall test for VOC levels in the testing procedures and shall include the cost of the VOC testing in the bid price. Contractor must test for total hydrocarbons. An inspection certificate shall be sent to the Chief Engineer.

3.1.25. All work shall be as per the coating Product Data/ Application Instructions to the latest issue and to the satisfaction of the Chief Engineer, Nace Surveyor and Technical Authority.

3.2 Location:

3.2.1. Frame, 71-75

3.3 Interferences

3.2.1. 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

4.1.1. Inspection of tank shall be carried out by Lloyd's Surveyor, Nace Inspector and Chief Engineer before any work is started.

4.1.2. Inspection by Chief Engineer and Nace inspector after grit blasting and before first coating is applied, after one coat it applied and before second coating is applied. Then after the second coating is applied.

Spec item #: HD-19	SPECIFICATION	TCMSB Field #: N/A
HD-19 Freshwater Tank		

4.1.3. Inspection of tank before closing shall be done by Lloyd's Surveyor the Chief Engineer.

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

4.2 Testing

4.2.1. After completion of work, three samples of fresh water shall be taken from the tank, furthest point from tank and the Galley, these three samples shall be sent to an independent laboratory for testing, the testing parameters (28) shall follow the testing parameters set out in the Fleet Safety Manual 7.F.12 Potable Quality.

4.2.2. Water test Total Hydrocarbon.

4.2.3. Air Test VOC'S levels should be zero when paint is fully cured.

4.2.4. Hydrostatic test for Lloyd's

4.2.5. Entry into confined space shall be carried out in accordance with the instructions given in the Preamble of this specification.

4.3 Certification

4.3.1 An inspection certificate shall be sent to the Chief Engineer.

Part 5: DELIVERABLES:

5.1 Drawings/Reports

5.1.1 Contractor shall provide to the Chief Engineer and NACE inspector, before the coating is applied, the following information sheets regarding the coating used: working procedures sheets, product data sheets, and the Material Safety Data Sheets.

5.1.2 Three copies of laboratory reports should be sent to Chief Engineer.

5.2 Spares

N/A

5.3 Training

N/A

5.4 Manuals

N/A

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

Part 1: SCOPE:

- 1.1** The intent of this specification item is to describe the work required for the contractor to open up the two listed water ballast tanks for removal of existing coatings (Intershield ENA 300 and coal tar) by Grit blasting to bare metal and re coating and for inspection and hydrostatic testing as required by Lloyd's. All inspections and testing shall be witnessed by the Chief Engineer and the attending Lloyd's Register inspector.
- 1.2** Coast Guard will arrange for a NACE inspector to view the tank condition, grit blasting meets standard referred to in this specification and inspect the coatings to make sure they are applied as per manufacture's product data sheets.

Part 2: REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Drawing Capacity Plan 590-79
2.1.2. Docking Plan # 590-96 Rev. 2
2.1.3. #590-40-01, 590-40-03, Vents and sounding pipes
2.1.4. #590-54 Manhole and level transmitter locations.

Tank No. & Name	Loaction	Capacity Cubic meters	Area (Sq. Meters)	Add 30% For Floors / Framing
No. 1 Water Ballast port	Fr. 71-81	36.7	130	169
No. 1 Water Ballast stbd	Fr. 71-81	40	130	169

2.2 Standards**2.2.1****2.3 Regulations****2.3.1****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:

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.1 General

- 3.1.1. The tanks listed above shall be opened for cleaning, grit blasting, coating, and survey by a Lloyd's Surveyor and the Chief Engineer. The Owner will provide the services of a NACE inspector to witness all aspects of painting.
- 3.1.2. The tanks shall be pumped down to their lowest levels by the ships crew leaving approximately 2 cubic meters total residue to be disposed of by the Contractor in accordance with Provincial Environmental Regulations. Contractor shall quote unit cost per 1m³ for adjustment up or down by 1379 action. Contractor shall remove all manhole covers, as detailed on Drawing #590-54 for Manhole and level transmitter locations.
- 3.1.3. Prior to entry, tank is to be certified "Safe for Workers" or "Safe for Hot Work" as required by Transport Canada Marine Safety TP3177E. The certificates shall be given to the Chief Engineer and copies posted by the tank manhole and gangway.
- 3.1.4. All of the above listed tanks shall be inspected by a Lloyd's Surveyor, Chief Engineer and NACE inspector prior to grit blasting.
- 3.1.5. Contractor prior to grit blasting shall plug all outlets (pump suction/discharge, level transducer) sounding, vents.
- 3.1.6. Contractor must prior to grit blasting make sure any equipment that maybe damaged by grit blast is protected from direct blast or debris.
- 3.1.7. Contractor to bid on grit blasting to bare metal as per SSPC SP-10/NACE 2_Near White_Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils) 338 square meters (total area of the above tanks) and quote per one square meter to be adjusted up or down by PWGSC 1379 action.
- 3.1.8. Contractor to clean all debris from grit blasting in preparing for coatings.
- 3.1.9. Contractor shall removed all debris from grit blasting put ashore and properly disposed of it in accordance with its provincial enviromental regulations.
- 3.1.10. All ventilation requirements to assist in drying out of tanks prior to painting and to assist paint curing shall be Contractor supply.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.1.11. Coating Specification for Application :

- i. **Surface Preparation:** Steel surface shall be prepared to meet a minimum of SSPC SP-10/NACE 2 Near White Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils).
- ii. **Coating System:** 2 (two) coats: One primer coat Intershield ENA 300 – Bronze and one Top coat Intershield ENA 300 – Aluminium or approved equal product. Apply each coat (5-6 mils) dry film thickness (dft) directly on to the prepared steel surface. Note two stripe coats have to be put on as specified in this specification prior to each full coat being applied.
 1. 1st coat: Colour Bronze, followed by a stripe coat.
 2. 2nd coat: Colour Aluminum, followed by a stripe coat.

3.1.12. General Information, Product Information, and Description of Work to be carried out in Ballast Tanks follows:

1.0 Description

1.1 Work Included

1.1.1 The work under this Section shall include the supply of all labour, supervision, materials, equipment, and transportation necessary for the supply, fabrication, surface preparation, and delivery to site required for the Work, as specified herein, and as directed by the Chief Engineer, complete in every respect.

1.1.2 The Work shall include, but not be limited to, the following:

- (1) High pressure water cleaning at 242bar the Tank Surfaces.
Collect the high pressure wash residue and remove from Site.
- (2) Dehumidification of the interior of the Ballast Tanks to control the environment and ensure a non-stop work schedule.
- (3) Surface preparation of areas to be painted. Collect all blasting residue and remove from Site.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

- (4) Painting of the Ballast Tank Surfaces with the specified coating system.
- (5) Testing and Inspection of the applied coating.

1.2 Codes, Standards, and, Related Documents.

- (1) SSPC PA 1 Specification for Shop, Field, and Maintenance Painting.
- (2) SSPC PA 2 Specification for Measurement of Dry Coating Thickness.
- (3) SSPC SP-1 Specification for Solvent Cleaning.
- (4) SSPC SP-2 Hand Tool Cleaning.
- (5) SSPC SP-6 Commercial Abrasive Blast Cleaning.
- (6) SSPC VIS-1 Visual Standard for Abrasive Blast Cleaned Steel.
- (7) Steel Structures Painting Manual Volume 1, Good Painting Practice.
- (8) Steel Structures Painting Manual Volume 2, Systems and Specifications, 2005 Edition.
- (9) Pictorial Surface Preparation Standards for Painted Steel Surfaces.
- (10) SSPC SP-12/NACE No. 5. Surface Preparation and Cleaning of metal by Water Jetting prior to Abrasive Blast Cleaning of Metal surfaces to meet SSPC SP-6, Commercial Blast Cleaning (Pipe Tunnel) and SSPC SP-10, Near White Metal Blast Cleaning (Ballast Tanks).
- (11) ASTM D 4285, Indicating Oil and Water in Compressed Air.
- (12) International Standards ISO 8502-3, Part 3, Assessment of Dust on Steel Surfaces prepared for Painting (Pressure Sensitive Tape Method).
- (13) ASTM D 5162-01 Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates, Method B.
- (14) ASTM D 4417, Determining Surface Profile of Blast Cleaned Steel using Replica Tape, Method C.
- (15) NACE RPO 287-95, NACE Standard Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces.

1.2.1 Paint Manufacturer's Technical Bulletins:

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

- (a) Product Data and Safety Data Sheets.
- (b) Repair procedures for correcting damage to coated surfaces.

1.2.2 Guidelines for Application and Removal of Protective Coatings-
Canadian Coast Guard Environment Operations Branch.

1.3 **Quality Assurance**

1.3.1 Only skilled painters shall be used in performing work to produce the highest quality product. In the acceptance or rejection of applied finishes, no allowances will be made for lack of skill on the part of the painters. Contractor shall submit names and work experience of skilled painters to the Chief Engineer for review prior to commencement of coating system application.

1.3.2 The Contractor shall require strict quality control over surface preparation and application of coatings to ensure compliance with the specifications and applicable requirements of the paint manufacturer.

1.3.3 The following tests and checks shall be carried out before, during, and after the painting process. A Coating Application Log of these tests shall be maintained and submitted to the Chief Engineer upon completion of the Project.

- (a) Surface preparation including anchor profile and abrasive used.
- (b) Wet and Dry film thicknesses.
- (c) Surface temperature, ambient temperature, room temperature, relative humidity, dew point and coating temperature.
- (d) Continuity of Paint to be checked using low voltage detector (Sponge Test) as specified by the Chief Engineer.
- (e) Adhesion tests as specified by the Chief Engineer.
- (f) Coating Batch Numbers.

1.4 **Product Delivery, Storage, and Handling**

1.4.1 **Delivery**

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

1.4.1.1 Materials shall be delivered to the Contractor's shop or construction site in their original containers unopened and bearing original labels. Labels shall contain at least the following information: name of material, CGSB number if applicable, manufacturer's name and stock number, content constituents, preparation instructions, thinning instructions and application instructions.

1.4.2 Storage

1.4.2.1 Only approved materials shall be stored at the job site, and these shall be stored only in suitable and designated areas restricted to the storage of paint materials and related equipment. Provide and maintain dry temperature control and weather proof storage. Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C. Store temperature sensitive products above minimum temperature as recommended by manufacturer. Remove only, quantities required for same day use. **Provide a minimum of one 9 kg type ABC dry chemical fire extinguisher adjacent to storage area.**

1.4.2.2 The Contractor shall use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.

1.4.2.3 Materials unsuitable for use or rejected by the Chief Engineer shall be immediately removed from the site.

1.4.3 Handling

1.4.3.1 All necessary precautionary measures shall be taken to prevent fire hazards and spontaneous combustion for materials stored on the Construction Site.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

1.4.4 Protection

1.4.4.1 The Contractor shall use all means necessary to protect paint materials before, during and after application and shall protect surfaces not to be painted from paint and damage. In the event of damage, the Contractor shall immediately notify the Chief Engineer and then make all repairs and replacements necessary to the Chief Engineer's approval and at no cost to the Owner.

1.4.4.2 The Contractor shall provide sufficient drop cloths, shields and protective equipment or materials to prevent spray or droppings from fouling surfaces not intended to be refinished.

2.0 PRODUCTS

2.1 Materials

2.1.1 General

2.1.1.1 All paint materials shall be the product of a single manufacturer.

2.1.1.2 Alteration of paint formulation will not be permitted without approval of the Chief Engineer.

2.1.1.3 The use of accelerators will not be permitted.

2.1.2 Compatibility

2.1.2.1 All paint materials and equipment shall be compatible in use. All tools and equipment shall be compatible with the paint to be applied.

2.1.2.2 Thinners, when used, shall be only those thinners recommended for that purpose by the paint manufacturer.

2.2 Application Equipment

2.2.1 The Contractor shall use application equipment as recommended by the painting material manufacturer and compatible with the material being applied.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

2.2.2 The Contractor shall ensure equipment used is capable of producing the required finish and appearance.

2.3 Protective Coating systems

2.3.1 The paint shall be a Primer coat Intershield ENA 300 – Bronze and Top coat Intershield ENA 300 – Aluminium as manufactured by International Paints Canada, or approved equal, applied to a dry film thickness of:

- (1) Total dry film thickness applied in two (2) full coats and (2) striped coats. (12mils) on flat and combined with striped coats (16 mils) on curved surfaces.
- (2) Two Stripe coats it shall be applied to all corners, crevices, rivets, bolts, welds, and other edges using the specified coating prior to application of each full coat on the interior structure. First coating is to be Colour bronze and second stripe coat to be Aluminium Such striping shall extend a minimum of 2.2 cm from the edge. The stripe coat shall set to touch before the full coat is applied. **Note: stripe coating is most effective on edges that are rounded by grinding.**

2.4 Shop and Field Touch-Up Painting

2.4.1 At the completion of the painting and as part of acceptance of the Work by the Chief Engineer, the Contractor shall, in the presence of the Chief Engineer, inspect the painting system for damage.

2.4.2 Damaged areas shall be clearly noted by the Chief Engineer and when requested by the Chief Engineer the Contractor shall repair the previously agreed upon damaged areas at no cost to the owner.

2.4.3 Procedure to determine applied coating discontinuity using ASTM D 5162-01, ASTM D4787, Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates. This procedure is carried out at the request of the Chief Engineer.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

2.5 Mixing

- 2.5.1 Painting materials shall be mixed and prepared in strict accordance with the manufacturer's recommendation.
- 2.5.2 Materials shall be stirred prior to and during application to produce a uniform mixture.
- 2.5.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.

3.0 EXECUTION

3.1 Surface Preparation

3.1.1 Ballast Tanks

- 3.1.1.1 All surfaces to be coated shall be abrasive blast cleaned to a commercial blast finish according to Steel Structures Painting Council (1) specification SSPC-SP 10/NACE 2, near white metal abrasive blast. Steel shall be cleaned with a minimum surface profile of 50-75 microns (2-3 mils) to obtain the required adhesion of the Intershield ENA 300 paint to the steel. The SSPC surface preparation, as specified, must be in evidence immediately before application of coating.
- 3.1.2 Determine level of cleanliness using International Standard ISO 8502-3, Part 3. **Note: acceptable level for dust quantity and dust particle size shall not exceed rating 2.**

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

- 3.1.3** Determine surface profile of blast cleaned steel using Replica Tape (ASTM D 4417) Method C. **Note: This Replica Tape provides an anchor profile and shall be affixed to final report. A NACE Certified Coating Inspector shall witness and record the Test Results.**
- 3.1.4** All sharp edges shall be ground prior to sand blasting to form a rounded contour of minimum edge radius of 2 mm. This 2 mm rounding may be achieved by minimum 2 or 3 strokes of a grinding disc as recommended by coating manufacturer.
- 3.1.5** The acceptable chloride ion level shall be less than 2ppm. Coating shall not be applied until this level is achieved.
- 3.1.6** Weld joints which do not have a smooth ripple finish, shall be ground to a rounded contour.

3.2 Other Surface Preparations

- 3.2.1** Any major surface defects, particularly surface laminations or scales, and welding defects, as holes and very sharp transitions between layers detrimental to the protective coating shall be removed by suitable dressing and/or with repair welding as required. Where such defects have been revealed during blast cleaning and the dressing has been performed, the dressed area shall be reblasted to the specified standard. All welds shall be inspected and if necessary, repaired prior to final blast cleaning.
- 3.2.2** Steel surfaces shall not be blasted nor coated when:
- (a) surface temperature is less than 3°C above the dew point,
 - (b) when relative humidity is greater than 80% or,
 - (c) when there is a possibility that the blasted surface will be subjected to wetting or flash rusting before the primer can be applied.
- 3.2.2.1** Surfaces shall be blown, wiped or vacuumed free of blasting abrasive and residue before the surface is coated. Particular care and effort shall be employed to remove residue from pockets, corners, bolt heads and other such irregular surfaces.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

- 3.2.2.2** It is mandatory that no more surface be blasted than can be coated by the end of the same work shift.
- 3.2.3** A 200mm (8 inch) wide strip of uncoated, blasted surface shall be left between the coated and unblasted surfaces. When blasting is continued, the 200mm (8 inch) strip of previously blasted surface shall be reblast cleaned in a direction away from the coated surface.
- 3.2.4** Compressed air used for blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators and traps shall be provided.
Blast cleaning shall be done in such a manner that no damage is done to partially or entirely completed portions. In any case, execution shall commence at the top of the structures and progress towards the bottom.
- 3.2.5** If any rusting, including flash rusting or rust bloom occurs, the Contractor shall reblast the affected surfaces prior to coating.
- 3.2.6** All sharp edges, welds, high spots and edges shall be strip coated prior to application of any paint.
- 3.2.7** Any areas contaminated by oil or grease shall be washed with coating manufacturer's recommended solvent to SSPC-SP 1, Solvent Cleaning to remove all residues. The Contractor shall ensure that the solvent has evaporated or is removed prior to application of the touch-up primer.
- 3.2.8** All dirt, soil and extraneous matter shall be removed by water washing using stiff bristle brushes if necessary and allowed to dry. All surfaces damaged after painting or designated to be "touched-up" shall be prepared by spot abrasive blast.
- 3.2.9** All edges of areas to receive touch-up shall be feathered so as to produce a sound edge and to provide a roughened surface to act as a mechanical key. Contact Coating Manufacturer for additional instructions for this procedure.
- 3.2.10** Any contamination which has taken place since the surface was prepared shall be removed and any dust settlement removed by blowing down with oil-free, dry air.
Coatings shall not be applied to damp surfaces or to surfaces below -7°C or above 43°C. Consult coating manufacturer.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.2.11 Inhibitive washing to prevent rusting is prohibited unless approved by coating manufacturer.

3.2.12 All surfaces damaged after painting or designated to be 'touched up' shall be prepared by spot abrasive cleaning prior to coating application.

3.2.13 All edges of areas to receive a 'touch-up' shall be feathered so as to produce a sound edge and to provide a sound edge and to provide a roughened surface to act as a mechanical key.

3.3 Chloride ion Testing

3.3.1 Carry out chloride ion testing of prepared surfaces as listed.

3.3.2 **On completion** of pre-surface preparation by SSPC-SP 1 to ensure the chloride ion are not imbedded into the substrate when cleaning Ballast Tanks to near white metal (SSPC-SP10) as specified. If chloride ion level, as specified is not attained, a rewash of the affected area shall be carried out using a soluble salt remover, such as Chlor-Rid Liquid Salt Remover at a dilution ratio of 1:100, sprayed on the affected area at a minimum of 20 mps (3000 psi).

3.3.3 **On completion** of substrate preparation by SSPC-SP 10 (Ballast Tank) prior to coating application:

3.3.4 NACE Inspector shall witness and record these tests.

3.3.5 The acceptable chloride ion level shall be less than $2\mu\text{g}/\text{cm}^2$. Coating shall not be applied until this level is achieved.

3.4 WORKMANSHIP

3.4.1 General

3.4.1.1 All coatings shall be applied in accordance with the paint manufacturer's published application instructions. Such instructions are deemed a part of this technical specification.

3.4.2 Inspection

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.4.2.1 All cleaned and prepared surfaces shall be inspected by NACE Certified Coating Inspector prior to the application of coating.

3.4.3 Application

3.4.3.1 All equipment shall be maintained in good working condition and shall be comparable to that described in the printed instructions of the coating manufacturer. All equipment shall be thoroughly cleaned before use.

3.4.3.2 All air lines shall be equipped with water traps to positively remove condensed moisture.

3.4.3.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.

3.4.3.4 Paint film is to be of specified thickness, free of voids, pinholes, runs, sags or other signs of improper application techniques or undesirable shop conditions. Wet film thickness shall be applied so as to produce the required dry film thickness in one coat.

3.4.3.5 Minimum drying time as stated in the printed instructions of the coating manufacturer shall be carefully observed.

3.4.3.6 The coating shall not be force dried under conditions which will cause checking, wrinkling, blistering, formation of pores, mudcracking or detrimentally affect its condition or appearance. Newly coated surfaces shall be protected to the fullest practical extent from detrimental forces until the coating has cured.

3.4.3.7 Errors or deficiencies resulting from poor workmanship will not be tolerated and, subject to the Chief Engineer's decision, shall be removed and redone.

3.4.3.8 Above all, application of coatings shall be as required to produce a high quality system with respect to appearance and integrity.

3.4.3.9 The coating manufacturer and the Chief Engineer shall be consulted concerning items not covered herein.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.4.3.10 Newly coated surfaces will be inspected when the coating has thoroughly dried. The coated surfaces will be examined with respect to uniformity, continuity and soundness and may be rejected if any of the following defects are apparent and if the Engineer, in his judgement, believes the coating performance and life may be impaired by these conditions:

- (1) Runs, sags, holidays or shadowing caused by inefficient application methods.
- (2) Evidence of poor coverage at plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

3.4.3.11 Coated surfaces rejected by the Chief Engineer shall be made good by the Contractor. Small affected areas may be touched up. Large affected areas, or where insufficient dry film thickness has been attained, shall involve the application of another complete coat at the Contractor's expense. Runs, sags or coating damaged in handling shall be removed by scraper prior to further application of coatings.

3.4.3.12 Special care shall be taken so that difficult areas to paint such as edges, crevices, structural members or other intricate areas shall receive the specified amount of coating.

3.4.3.13 Coatings shall not be applied closer than 20mm to a non-blasted area. Any subsequent blasting operation shall not result in sand particles embedded in the coating film.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

3.5 INSPECTION

- 3.5.1** The Chief Engineer may inspect all aspects of the work, or designate a NACE Certified Coating Inspector, in addition to testing required to be performed by the Contractor, it shall be clearly understood that it is the prime responsibility of the Contractor to provide all labour, materials and equipment to properly execute the Work, to confer with the manufacturer of the products used, and to keep the Chief Engineer informed of any problems or difficulties arising out of the Work.
- 3.5.2** All painting shall be inspected for such items as proper mixing, thinning, wet and dry film thickness, lifting, overspray, mud-cracking, sagging, runs, skips, sharp edge coverage, pinholing, bubbling, curing or any other common deficiency or problem area that would be detrimental to the life expectancy or quality of the system.
- 3.5.3** Procedure to determine applied coating discontinuity using ASTM D5162-01, Standard Practice For Discontinuity (Holiday) Testing of Non Conductive Protective Coating on Metallic Substrates Test Method A – Low Voltage Testers. This procedure shall be carried out on 100% of the coated surface.
- 3.5.4** Testing by the Chief Engineer and repair by the Contractor, necessitated by destructive testing, of coatings which meet the requirements of this Specification will be at the expense of the Owner. The cost of testing and repair of coatings which do not meet the Specification will be at the expense of the Contractor.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

4.0 ENVIRONMENTAL AND SAFETY REQUIREMENTS

4.1 General

4.1.1 The Contractor is completely responsible for the environmental safety of the coating work. Precautions shall be taken to protect humans, and the environment from cleaning operations, sandblasting, solvents and chemical contamination.

4.2 Final Clean-Up

4.2.1 General Requirements, during application of the coating systems the Contractor shall prevent spillage of coating materials and, in the event of such spillage, shall immediately advise the Chief Engineer, remove all spilled material and the waste or other equipment used to clean up spills, and return the surfaces to their original undamaged condition to the approval of the Chief Engineer at no additional cost to the Owner.

4.2.2 Upon completion of the application work, the Contractor shall visually inspect all surfaces and remove all coatings and traces of coatings from surfaces not scheduled to be coated.

3.1.13. All Tanks shall be inspected by Chief Engineer before closing up. Tanks shall be closed up in good order, using new jointing and anti-seize compound on manhole cover studs and nuts (Contractor supply). The contractor shall bid on replacing one manhole stud per tank and provide unit cost per stud replacement.

3.1.14. Upon completion of inspection and close up, the vent cap shall be removed from each individual tank vent and the tank is to be hydrostatically tested with the Lloyd's Hull surveyor and Chief Engineer in attendance to witness test.

3.1.15. Upon completion of testing, all vent caps shall be installed in good order, bolts used for connection shall be cleaned and coated with anti-seize

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

compound. Contractor to inspect vent head screens for damage or blockage, any defects to be reported to the Chief Engineer immediately for corrective action.

3.1.16. Contractor shall fill all the tanks with fresh water and perform a hydrostatic test on the tanks.

3.1.17. Contractor to supply all materials and equipment to carry out work on the tanks. The contractor is responsible for notifying the Lloyd's Surveyor and the Chief Engineer when tank is ready for inspection and testing.

3.1.18. Chief Engineer and Lloyd's Surveyor shall witness testing.

3.1.19. All work to be to the satisfaction of Chief Engineer and the Lloyd's Surveyor.

3.2 Location

3.2.1.

3.3 Interferences

3.3.1 N/A

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1. 100% visual By Chief Engineer, Lloyd's Surveyor.

4.1.2. Upon completion of all repairs and testing, the Contractor and the Chief Engineer shall conduct a final inspection and ensure all tanks, covers, vents and piping connections have been returned to operating conditions and the attending the Lloyd's Surveyor has completed all inspections.

4.2 Testing

4.2.1. Hydrostatic testing all tanks to satisfaction of Chief Engineer and Lloyd's.

4.2.2. The contractor shall supply all necessary materials, fittings blanks and labor for respective tests. All blanks installed in order to perform a pressure test are to be recorded on a list according to location on the tank and shall be accounted for by the contractor and the Chief Engineer or his delegate upon their removal.

Spec item #: HD-20	SPECIFICATION	TCMSB Field #: N/A
HD-20 Water Ballast Tanks # 1 Port and Stbd		

4.3 Certification

Part 5: DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1 The Contractor shall provide to the Chief Engineer and NACE inspector, before the coating is applied, the following information sheets regarding the coating used: working procedures sheets, product data sheets, and the Material Safety Data Sheets.
- 5.1.2 Contractor supply Chief Engineer three copies written and one electronic copy of a report of all work carried out.

5.2 Spares N/A

5.3 Training N/A

5.4 Manuals N/A

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

Part 1: SCOPE:

- 1.1** The intent of this specification item is to describe the work required for the contractor to open up the two listed water ballast tanks for removal of existing coatings (Intershiield ENA 300 and coal tar) by Grit blasting to bare metal and re coating and for inspection and hydrostatic testing as required by Lloyd's. All inspections and testing shall be witnessed by the Chief Engineer and the attending Lloyd's Register inspector.
- 1.2** Coast Guard will arrange for a NACE inspector to view the tank condition, grit blasting meets standard referred to in this specification and inspect the coatings to make sure they are applied as per manufacture's product data sheets.

Part 2: REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Drawing Capacity Plan 590-79
2.1.2. Docking Plan # 590-96 Rev. 2
2.1.3. #590-40-01, 590-40-03, Vents and sounding pipes
2.1.4. #590-54 Manhole and level transmitter locations.

Tank No. & Name	Loaction	Capacity Cubic meters	Area (Sq. Meters)	Add 30% For Floors / Framing
No. 4 Water Ballast port	Fr. 18-28	38	86	111.8
No. 4 Water Ballast stbd	Fr. 18-28	48.1	86	111.8

2.2 Standards**2.2.1****2.3 Regulations****2.3.1****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:

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.1 General

- 3.1.1. The tanks listed above shall be opened for cleaning, grit blasting, coating, and survey by a Lloyd's Surveyor and the Chief Engineer. The Owner will provide the services of a NACE inspector to witness all aspects of painting.
- 3.1.2. The tanks shall be pumped down to their lowest levels by the ships crew leaving approximately 2 cubic meters total residue to be disposed of by the Contractor in accordance with Provincial Environmental Regulations. Contractor shall quote unit cost per 1m³ for adjustment up or down by 1379 action. Contractor shall remove all manhole covers, as detailed on Drawing #590-54 for Manhole and level transmitter locations.
- 3.1.3. Prior to entry, tank is to be certified "Safe for Workers" or "Safe for Hot Work" as required by Transport Canada Marine Safety TP3177E. The certificates shall be given to the Chief Engineer and copies posted by the tank manhole and gangway.
- 3.1.4. All of the above listed tanks shall be inspected by a Lloyd's Surveyor, Chief Engineer and NACE inspector prior to grit blasting.
- 3.1.5. Contractor prior to grit blasting shall plug all outlets (pump suction/discharge, level transducer) sounding, vents.
- 3.1.6. Contractor must prior to grit blasting make sure any equipment that maybe damaged by grit blast is protected from direct blast or debris.
- 3.1.7. Contractor to bid on grit blasting to bare metal as per SSPC SP-10/NACE 2_Near White_Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils) 223.6 square meters (total area of the above tanks) and quote per one square meter to be adjusted up or down by PWGSC 1379 action.
- 3.1.8. Contractor to clean all debris from grit blasting in preparing for coatings.
- 3.1.9. Contractor shall removed all debris from grit blasting put ashore and properly disposed of it in accordance with its provincial enviromental regulations.
- 3.1.10. All ventilation requirements to assist in drying out of tanks prior to painting and to assist paint curing shall be Contractor supply.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.1.11. Coating Specification for Application :

- i. **Surface Preparation:** Steel surface shall be prepared to meet a minimum of SSPC SP-10/NACE 2 Near White Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils).
- ii. **Coating System:** 2 (two) coats: One primer coat Intershield ENA 300 – Bronze and one Top coat Intershield ENA 300 – Aluminium or approved equal product. Apply each coat (5-6 mils) dry film thickness (dft) directly on to the prepared steel surface. Note two stripe coats have to be put on as specified in this specification prior to each full coat being applied.
 1. 1st coat: Colour Bronze, followed by a stripe coat.
 2. 2nd coat: Colour Aluminum, followed by a stripe coat.

3.1.12. General Information, Product Information, and Description of Work to be carried out in Ballast Tanks follows:

1.0 Description

1.1 Work Included

1.1.1 The work under this Section shall include the supply of all labour, supervision, materials, equipment, and transportation necessary for the supply, fabrication, surface preparation, and delivery to site required for the Work, as specified herein, and as directed by the Chief Engineer, complete in every respect.

1.1.2 The Work shall include, but not be limited to, the following:

- (1) High pressure water cleaning at 242bar the Tank Surfaces.
Collect the high pressure wash residue and remove from Site.
- (2) Dehumidification of the interior of the Ballast Tanks to control the environment and ensure a non-stop work schedule.
- (3) Surface preparation of areas to be painted. Collect all blasting residue and remove from Site.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

- (4) Painting of the Ballast Tank Surfaces with the specified coating system.
- (5) Testing and Inspection of the applied coating.

1.2 Codes, Standards, and, Related Documents.

- (1) SSPC PA 1 Specification for Shop, Field, and Maintenance Painting.
- (2) SSPC PA 2 Specification for Measurement of Dry Coating Thickness.
- (3) SSPC SP-1 Specification for Solvent Cleaning.
- (4) SSPC SP-2 Hand Tool Cleaning.
- (5) SSPC SP-6 Commercial Abrasive Blast Cleaning.
- (6) SSPC VIS-1 Visual Standard for Abrasive Blast Cleaned Steel.
- (7) Steel Structures Painting Manual Volume 1, Good Painting Practice.
- (8) Steel Structures Painting Manual Volume 2, Systems and Specifications, 2005 Edition.
- (9) Pictorial Surface Preparation Standards for Painted Steel Surfaces.
- (10) SSPC SP-12/NACE No. 5. Surface Preparation and Cleaning of metal by Water Jetting prior to Abrasive Blast Cleaning of Metal surfaces to meet SSPC SP-6, Commercial Blast Cleaning (Pipe Tunnel) and SSPC SP-10, Near White Metal Blast Cleaning (Ballast Tanks).
- (11) ASTM D 4285, Indicating Oil and Water in Compressed Air.
- (12) International Standards ISO 8502-3, Part 3, Assessment of Dust on Steel Surfaces prepared for Painting (Pressure Sensitive Tape Method).
- (13) ASTM D 5162-01 Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates, Method B.
- (14) ASTM D 4417, Determining Surface Profile of Blast Cleaned Steel using Replica Tape, Method C.
- (15) NACE RPO 287-95, NACE Standard Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces.

1.2.1 Paint Manufacturer's Technical Bulletins:

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

- (a) Product Data and Safety Data Sheets.
- (b) Repair procedures for correcting damage to coated surfaces.

1.2.2 Guidelines for Application and Removal of Protective Coatings-
Canadian Coast Guard Environment Operations Branch.

1.3 **Quality Assurance**

1.3.1 Only skilled painters shall be used in performing work to produce the highest quality product. In the acceptance or rejection of applied finishes, no allowances will be made for lack of skill on the part of the painters. Contractor shall submit names and work experience of skilled painters to the Chief Engineer for review prior to commencement of coating system application.

1.3.2 The Contractor shall require strict quality control over surface preparation and application of coatings to ensure compliance with the specifications and applicable requirements of the paint manufacturer.

1.3.3 The following tests and checks shall be carried out before, during, and after the painting process. A Coating Application Log of these tests shall be maintained and submitted to the Chief Engineer upon completion of the Project.

- (a) Surface preparation including anchor profile and abrasive used.
- (b) Wet and Dry film thicknesses.
- (c) Surface temperature, ambient temperature, room temperature, relative humidity, dew point and coating temperature.
- (d) Continuity of Paint to be checked using low voltage detector (Sponge Test) as specified by the Chief Engineer.
- (e) Adhesion tests as specified by the Chief Engineer.
- (f) Coating Batch Numbers.

1.4 **Product Delivery, Storage, and Handling**

1.4.1 **Delivery**

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

1.4.1.1 Materials shall be delivered to the Contractor's shop or construction site in their original containers unopened and bearing original labels. Labels shall contain at least the following information: name of material, CGSB number if applicable, manufacturer's name and stock number, content constituents, preparation instructions, thinning instructions and application instructions.

1.4.2 Storage

1.4.2.1 Only approved materials shall be stored at the job site, and these shall be stored only in suitable and designated areas restricted to the storage of paint materials and related equipment. Provide and maintain dry temperature control and weather proof storage. Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C. Store temperature sensitive products above minimum temperature as recommended by manufacturer. Remove only, quantities required for same day use. **Provide a minimum of one 9 kg type ABC dry chemical fire extinguisher adjacent to storage area.**

1.4.2.2 The Contractor shall use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.

1.4.2.3 Materials unsuitable for use or rejected by the Chief Engineer shall be immediately removed from the site.

1.4.3 Handling

1.4.3.1 All necessary precautionary measures shall be taken to prevent fire hazards and spontaneous combustion for materials stored on the Construction Site.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

1.4.4 Protection

1.4.4.1 The Contractor shall use all means necessary to protect paint materials before, during and after application and shall protect surfaces not to be painted from paint and damage. In the event of damage, the Contractor shall immediately notify the Chief Engineer and then make all repairs and replacements necessary to the Chief Engineer's approval and at no cost to the Owner.

1.4.4.2 The Contractor shall provide sufficient drop cloths, shields and protective equipment or materials to prevent spray or droppings from fouling surfaces not intended to be refinished.

2.0 PRODUCTS

2.1 Materials

2.1.1 General

2.1.1.1 All paint materials shall be the product of a single manufacturer.

2.1.1.2 Alteration of paint formulation will not be permitted without approval of the Chief Engineer.

2.1.1.3 The use of accelerators will not be permitted.

2.1.2 Compatibility

2.1.2.1 All paint materials and equipment shall be compatible in use. All tools and equipment shall be compatible with the paint to be applied.

2.1.2.2 Thinners, when used, shall be only those thinners recommended for that purpose by the paint manufacturer.

2.2 Application Equipment

2.2.1 The Contractor shall use application equipment as recommended by the painting material manufacturer and compatible with the material being applied.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

2.2.2 The Contractor shall ensure equipment used is capable of producing the required finish and appearance.

2.3 Protective Coating systems

2.3.1 The paint shall be a Primer coat Intershield ENA 300 – Bronze and Top coat Intershield ENA 300 – Aluminium as manufactured by International Paints Canada, or approved equal, applied to a dry film thickness of:

- (1) Total dry film thickness applied in two (2) full coats and (2) striped coats. (12mils) on flat and combined with striped coats (16 mils) on curved surfaces.
- (2) Two Stripe coats it shall be applied to all corners, crevices, rivets, bolts, welds, and other edges using the specified coating prior to application of each full coat on the interior structure. First coating is to be Colour bronze and second stripe coat to be Aluminium Such striping shall extend a minimum of 2.2 cm from the edge. The stripe coat shall set to touch before the full coat is applied. **Note: stripe coating is most effective on edges that are rounded by grinding.**

2.4 Shop and Field Touch-Up Painting

2.4.1 At the completion of the painting and as part of acceptance of the Work by the Chief Engineer, the Contractor shall, in the presence of the Chief Engineer, inspect the painting system for damage.

2.4.2 Damaged areas shall be clearly noted by the Chief Engineer and when requested by the Chief Engineer the Contractor shall repair the previously agreed upon damaged areas at no cost to the owner.

2.4.3 Procedure to determine applied coating discontinuity using ASTM D 5162-01, ASTM D4787, Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates. This procedure is carried out at the request of the Chief Engineer.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

2.5 Mixing

- 2.5.1 Painting materials shall be mixed and prepared in strict accordance with the manufacturer's recommendation.
- 2.5.2 Materials shall be stirred prior to and during application to produce a uniform mixture.
- 2.5.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.

3.0 EXECUTION

3.1 Surface Preparation

3.1.1 Ballast Tanks

- 3.1.1.1 All surfaces to be coated shall be abrasive blast cleaned to a commercial blast finish according to Steel Structures Painting Council (1) specification SSPC-SP 10/NACE 2, near white metal abrasive blast. Steel shall be cleaned with a minimum surface profile of 50-75 microns (2-3 mils) to obtain the required adhesion of the Intershield ENA 300 paint to the steel. The SSPC surface preparation, as specified, must be in evidence immediately before application of coating.
- 3.1.2 Determine level of cleanliness using International Standard ISO 8502-3, Part 3. **Note: acceptable level for dust quantity and dust particle size shall not exceed rating 2.**

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

- 3.1.3** Determine surface profile of blast cleaned steel using Replica Tape (ASTM D 4417) Method C. **Note: This Replica Tape provides an anchor profile and shall be affixed to final report. A NACE Certified Coating Inspector shall witness and record the Test Results.**
- 3.1.4** All sharp edges shall be ground prior to sand blasting to form a rounded contour of minimum edge radius of 2 mm. This 2 mm rounding may be achieved by minimum 2 or 3 strokes of a grinding disc as recommended by coating manufacturer.
- 3.1.5** The acceptable chloride ion level shall be less than 2ppm. Coating shall not be applied until this level is achieved.
- 3.1.6** Weld joints which do not have a smooth ripple finish, shall be ground to a rounded contour.

3.2 Other Surface Preparations

- 3.2.1** Any major surface defects, particularly surface laminations or scales, and welding defects, as holes and very sharp transitions between layers detrimental to the protective coating shall be removed by suitable dressing and/or with repair welding as required. Where such defects have been revealed during blast cleaning and the dressing has been performed, the dressed area shall be reblasted to the specified standard. All welds shall be inspected and if necessary, repaired prior to final blast cleaning.
- 3.2.2** Steel surfaces shall not be blasted nor coated when:
- (a) surface temperature is less than 3°C above the dew point,
 - (b) when relative humidity is greater than 80% or,
 - (c) when there is a possibility that the blasted surface will be subjected to wetting or flash rusting before the primer can be applied.
- 3.2.2.1** Surfaces shall be blown, wiped or vacuumed free of blasting abrasive and residue before the surface is coated. Particular care and effort shall be employed to remove residue from pockets, corners, bolt heads and other such irregular surfaces.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

- 3.2.2.2** It is mandatory that no more surface be blasted than can be coated by the end of the same work shift.
- 3.2.3** A 200mm (8 inch) wide strip of uncoated, blasted surface shall be left between the coated and unblasted surfaces. When blasting is continued, the 200mm (8 inch) strip of previously blasted surface shall be reblast cleaned in a direction away from the coated surface.
- 3.2.4** Compressed air used for blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators and traps shall be provided.
Blast cleaning shall be done in such a manner that no damage is done to partially or entirely completed portions. In any case, execution shall commence at the top of the structures and progress towards the bottom.
- 3.2.5** If any rusting, including flash rusting or rust bloom occurs, the Contractor shall reblast the affected surfaces prior to coating.
- 3.2.6** All sharp edges, welds, high spots and edges shall be strip coated prior to application of any paint.
- 3.2.7** Any areas contaminated by oil or grease shall be washed with coating manufacturer's recommended solvent to SSPC-SP 1, Solvent Cleaning to remove all residues. The Contractor shall ensure that the solvent has evaporated or is removed prior to application of the touch-up primer.
- 3.2.8** All dirt, soil and extraneous matter shall be removed by water washing using stiff bristle brushes if necessary and allowed to dry. All surfaces damaged after painting or designated to be "touched-up" shall be prepared by spot abrasive blast.
- 3.2.9** All edges of areas to receive touch-up shall be feathered so as to produce a sound edge and to provide a roughened surface to act as a mechanical key. Contact Coating Manufacturer for additional instructions for this procedure.
- 3.2.10** Any contamination which has taken place since the surface was prepared shall be removed and any dust settlement removed by blowing down with oil-free, dry air.
Coatings shall not be applied to damp surfaces or to surfaces below -7°C or above 43°C. Consult coating manufacturer.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.2.11 Inhibitive washing to prevent rusting is prohibited unless approved by coating manufacturer.

3.2.12 All surfaces damaged after painting or designated to be 'touched up' shall be prepared by spot abrasive cleaning prior to coating application.

3.2.13 All edges of areas to receive a 'touch-up' shall be feathered so as to produce a sound edge and to provide a sound edge and to provide a roughened surface to act as a mechanical key.

3.3 Chloride ion Testing

3.3.1 Carry out chloride ion testing of prepared surfaces as listed.

3.3.2 **On completion** of pre-surface preparation by SSPC-SP 1 to ensure the chloride ion are not imbedded into the substrate when cleaning Ballast Tanks to near white metal (SSPC-SP10) as specified. If chloride ion level, as specified is not attained, a rewash of the affected area shall be carried out using a soluble salt remover, such as Chlor-Rid Liquid Salt Remover at a dilution ratio of 1:100, sprayed on the affected area at a minimum of 20 mps (3000 psi).

3.3.3 **On completion** of substrate preparation by SSPC-SP 10 (Ballast Tank) prior to coating application:

3.3.4 NACE Inspector shall witness and record these tests.

3.3.5 The acceptable chloride ion level shall be less than $2\mu\text{g}/\text{cm}^2$. Coating shall not be applied until this level is achieved.

3.4 WORKMANSHIP

3.4.1 General

3.4.1.1 All coatings shall be applied in accordance with the paint manufacturer's published application instructions. Such instructions are deemed a part of this technical specification.

3.4.2 Inspection

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.4.2.1 All cleaned and prepared surfaces shall be inspected by NACE Certified Coating Inspector prior to the application of coating.

3.4.3 Application

3.4.3.1 All equipment shall be maintained in good working condition and shall be comparable to that described in the printed instructions of the coating manufacturer. All equipment shall be thoroughly cleaned before use.

3.4.3.2 All air lines shall be equipped with water traps to positively remove condensed moisture.

3.4.3.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.

3.4.3.4 Paint film is to be of specified thickness, free of voids, pinholes, runs, sags or other signs of improper application techniques or undesirable shop conditions. Wet film thickness shall be applied so as to produce the required dry film thickness in one coat.

3.4.3.5 Minimum drying time as stated in the printed instructions of the coating manufacturer shall be carefully observed.

3.4.3.6 The coating shall not be force dried under conditions which will cause checking, wrinkling, blistering, formation of pores, mudcracking or detrimentally affect its condition or appearance. Newly coated surfaces shall be protected to the fullest practical extent from detrimental forces until the coating has cured.

3.4.3.7 Errors or deficiencies resulting from poor workmanship will not be tolerated and, subject to the Chief Engineer's decision, shall be removed and redone.

3.4.3.8 Above all, application of coatings shall be as required to produce a high quality system with respect to appearance and integrity.

3.4.3.9 The coating manufacturer and the Chief Engineer shall be consulted concerning items not covered herein.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.4.3.10 Newly coated surfaces will be inspected when the coating has thoroughly dried. The coated surfaces will be examined with respect to uniformity, continuity and soundness and may be rejected if any of the following defects are apparent and if the Engineer, in his judgement, believes the coating performance and life may be impaired by these conditions:

- (1) Runs, sags, holidays or shadowing caused by inefficient application methods.
- (2) Evidence of poor coverage at plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

3.4.3.11 Coated surfaces rejected by the Chief Engineer shall be made good by the Contractor. Small affected areas may be touched up. Large affected areas, or where insufficient dry film thickness has been attained, shall involve the application of another complete coat at the Contractor's expense. Runs, sags or coating damaged in handling shall be removed by scraper prior to further application of coatings.

3.4.3.12 Special care shall be taken so that difficult areas to paint such as edges, crevices, structural members or other intricate areas shall receive the specified amount of coating.

3.4.3.13 Coatings shall not be applied closer than 20mm to a non-blasted area. Any subsequent blasting operation shall not result in sand particles embedded in the coating film.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

3.5 INSPECTION

- 3.5.1** The Chief Engineer may inspect all aspects of the work, or designate a NACE Certified Coating Inspector, in addition to testing required to be performed by the Contractor, it shall be clearly understood that it is the prime responsibility of the Contractor to provide all labour, materials and equipment to properly execute the Work, to confer with the manufacturer of the products used, and to keep the Chief Engineer informed of any problems or difficulties arising out of the Work.
- 3.5.2** All painting shall be inspected for such items as proper mixing, thinning, wet and dry film thickness, lifting, overspray, mud-cracking, sagging, runs, skips, sharp edge coverage, pinholing, bubbling, curing or any other common deficiency or problem area that would be detrimental to the life expectancy or quality of the system.
- 3.5.3** Procedure to determine applied coating discontinuity using ASTM D5162-01, Standard Practice For Discontinuity (Holiday) Testing of Non Conductive Protective Coating on Metallic Substrates Test Method A – Low Voltage Testers. This procedure shall be carried out on 100% of the coated surface.
- 3.5.4** Testing by the Chief Engineer and repair by the Contractor, necessitated by destructive testing, of coatings which meet the requirements of this Specification will be at the expense of the Owner. The cost of testing and repair of coatings which do not meet the Specification will be at the expense of the Contractor.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

4.0 ENVIRONMENTAL AND SAFETY REQUIREMENTS

4.1 General

4.1.1 The Contractor is completely responsible for the environmental safety of the coating work. Precautions shall be taken to protect humans, and the environment from cleaning operations, sandblasting, solvents and chemical contamination.

4.2 Final Clean-Up

4.2.1 General Requirements, during application of the coating systems the Contractor shall prevent spillage of coating materials and, in the event of such spillage, shall immediately advise the Chief Engineer, remove all spilled material and the waste or other equipment used to clean up spills, and return the surfaces to their original undamaged condition to the approval of the Chief Engineer at no additional cost to the Owner.

4.2.2 Upon completion of the application work, the Contractor shall visually inspect all surfaces and remove all coatings and traces of coatings from surfaces not scheduled to be coated.

3.1.13. All Tanks shall be inspected by Chief Engineer before closing up. Tanks shall be closed up in good order, using new jointing and anti-seize compound on manhole cover studs and nuts (Contractor supply). The contractor shall bid on replacing one manhole stud per tank and provide unit cost per stud replacement.

3.1.14. Upon completion of inspection and close up, the vent cap shall be removed from each individual tank vent and the tank is to be hydrostatically tested with the Lloyd's Hull surveyor and Chief Engineer in attendance to witness test.

3.1.15. Upon completion of testing, all vent caps shall be installed in good order, bolts used for connection shall be cleaned and coated with anti-seize

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

compound. Contractor to inspect vent head screens for damage or blockage, any defects to be reported to the Chief Engineer immediately for corrective action.

3.1.16. Contractor shall fill all the tanks with fresh water and perform a hydrostatic test on the tanks.

3.1.17. Contractor to supply all materials and equipment to carry out work on the tanks. The contractor is responsible for notifying the Lloyd's Surveyor and the Chief Engineer when tank is ready for inspection and testing.

3.1.18. Chief Engineer and Lloyd's Surveyor shall witness testing.

3.1.19. All work to be to the satisfaction of Chief Engineer and the Lloyd's Surveyor.

3.2 Location

3.2.1.

3.3 Interferences

3.3.1 N/A

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1. 100% visual By Chief Engineer, Lloyd's Surveyor.

4.1.2. Upon completion of all repairs and testing, the Contractor and the Chief Engineer shall conduct a final inspection and ensure all tanks, covers, vents and piping connections have been returned to operating conditions and the attending the Lloyd's Surveyor has completed all inspections.

4.2 Testing

4.2.1. Hydrostatic testing all tanks to satisfaction of Chief Engineer and Lloyd's.

4.2.2. The contractor shall supply all necessary materials, fittings blanks and labor for respective tests. All blanks installed in order to perform a pressure test are to be recorded on a list according to location on the tank and shall be accounted for by the contractor and the Chief Engineer or his delegate upon their removal.

Spec item #: HD-21	SPECIFICATION	TCMSB Field #: N/A
HD-21 Water Ballast Tanks # 4 Port and Stbd		

4.3 Certification

Part 5: DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1 The Contractor shall provide to the Chief Engineer and NACE inspector, before the coating is applied, the following information sheets regarding the coating used: working procedures sheets, product data sheets, and the Material Safety Data Sheets.
- 5.1.2 Contractor supply Chief Engineer three copies written and one electronic copy of a report of all work carried out.

5.2 Spares N/A

5.3 Training N/A

5.4 Manuals N/A

Spec item #: L-06 (rev 1)	SPECIFICATION	TCMSB Field #: N/A
------------------------------	----------------------	--------------------

L – 06 (rev 1) : ICS and Related Systems Supply and Installation

Part: 1 SCOPE:

- 1.1 The intent of this specification is to remove the existing ships internal communications system and replace with a new Contractor supplied Hose McCann, or equivalent. Please refer to paragraph 3.1.2.6. Contractor to include in their bid an allowance of \$26,000.00 for Hose McCann FSR or equivalent supplier FSR to be adjusted on proof of invoice by PWGSC 1379 action.
- 1.2 This work shall be carried out in conjunction with the following:
 - 1.2.1 Deckhead Replacement Spec
 - 1.2.2 Master Clock Replacement Spec
- 1.3 Contractor shall supply all materials and parts required to perform the specified work unless otherwise stated.

Part: 2 REFERENCES:

2.1 Guidance Drawings/Nameplate Data

- 2.1.1 General Arrangement Bridge/Focsle Decks Drawing # 59017601
- 2.1.2 General Arrangement Main/Upper Decks Drawing # 59017701
- 2.1.3 General Arrangement Upper/Main/Hold Drawing # 59017602
- 2.1.4 PA and Telephone System Lower Decks Drawing # 59016002
- 2.1.5 PA and Telephone System Upper Decks Drawing # 59016001
- 2.1.6 Cowley Ship Layout Drawing # 8010-100
- 2.1.7 ICP Nav Bridge Layout Drawing # 8010-100
- 2.1.8 ICP Bridge Deck Layout Drawing # 8010-100
- 2.1.9 ICP Forecastle Deck Layout Drawing # 8010-100
- 2.1.10 ICP Upper Deck Layout Drawing # 8010-100
- 2.1.11 ICP Main Deck Layout Drawing # 8010-100
- 2.1.12 ICP Hold Layout Drawing # 8010-100
- 2.1.13 System Component Drawings

2.2 Standards

- 2.2.1 Fleet Safety and Security Manual (DFO/5737)
- 2.2.2 TP127E – Ships Electrical Standards
- 2.2.3 IEEE 45:2002 – Recommended Practice for Electrical Installations on Ships
- 2.2.4 Specification for the Installation of Shipboard Electronic Equipment (70-000-000-EU-JA-001)
- 2.2.5 TCMS recognized, Classification Society Approval

2.2.6 Standard Technical Architecture for the Shipboard Computer
Installation (46-000-000-ES-TE-001)

2.3 Regulations

2.3.1 Canada Shipping Act, 2001

Part: 3 TECHNICAL DESCRIPTION

3.1 General

3.1.1 Contractor shall remove and dispose of all cabling from the original United Marine ICS (PA/PBX) system. Contractor shall remove all components from the original United Marine ICS (PA/PBX) system and return to the crown as this will be used as spares for similar equipment in CCG fleet.

Contractor shall note that there are a total of 8 connection boxes (IC-1 to IC-8) total to also be removed as detailed in reference drawings.

3.1.2 Contractor shall supply and install a Class Approved, as recognized by Lloyds or relevant classification society, Internet Protocol (IP) based End-to-End Digital, Integrated Communications System (ICS) Public Address (PA) and PBX (VIOP) and audio Entertainment shall be provided.

3.1.2.1 Integrated Internal Communication System Requirements;

The system shall use only STP Cat5e copper and Multi-Mode fiber optic cabling. All endpoint equipment shall be connected using RJ45 jacks wired in accordance with TIA/EIA 568B specifications regardless of equipment type. Exterior connections shall have an environmental rating of IP66 or better.

All Systems shall be IP based, (End-to-End Digital) and must operate on the same cable infrastructure. The systems shall be designed so that the failure of one system does not affect operation of another system.

The main equipment rack(s) (Node) are to be shock mounted and contain thermostatically controlled cooling fans. The node shall contain the Public Address system controller, the hot standby Public Address system controller, VoIP PBX system controller and all equipment for endpoint (speaker, phone, beacon, etc.) connectivity eliminating the need for additional cross-connect or junction panel hardware.

The node(s) shall receive power from an emergency 220Vac power source as well as a normal 220Vac source via a transfer switch, and include UPS that will maintain system power for 30 minutes, this ensures a disturbance free and clean source of power.

3.1.2.2 Public Address (PA) Requirements:

A marine grade Public Address (PA) system capable of multichannel paging shall be installed. The system will be designed in accordance with ABS/Lloyds Register requirements.

All speakers shall be self-amplified and arranged such that announcements can be heard and understood over normal ambient noise. Interior speakers and horns are to be individually addressable and PoE powered. Loudhailers and beacons are to be individually addressable and supported by 120Vac external power. The failure of one IP speaker must not affect the operation of any other IP speaker in the system.

Controlhead stations shall be touch screen units capable of making announcements, controlling alarms or other signals and making/receiving phone calls via programmable menus/sub-menus. The controlhead must be backlit and powered via PoE. The controlheads must also monitor and report failure of any Public Address device (loudspeakers, beacons, IP relay boxes, IP contact maker/boxes, etc.) including PA system controller and hot standby system controller. Users must be notified at the controlhead of the exact PA device failure in the system. In the event that the Public Address system controller and hot standby are lost, emergency All Call activation must still be possible via the controlhead.

Talkback communication between the controlhead(s) and outlying stations shall be by use of the controlhead handset, integrated push to talk button and outlying station selection via controlhead touch screen. Call in from outlying stations shall be accomplished via "call in" push button at talkback speaker. The talkback speakers shall also receive audio associated with activated alarms and normal group paging per system configuration without the use of any switching at the talkback speaker.

The system must have PA and alarm override capabilities based on priority settings. PA zones shall be software configurable to accommodate future changes in configuration or operation without re-cabling.

The system shall be capable of multiple configurations so that speakers can be placed into different paging zones, volume controls can be changed to support activities as “at pier”, “underway”, etc. Multiple configurations shall be pre-programmed and selectable at the controlhead.

The system shall be capable of accepting a dry contact closure from another system to provide alarm activation (an example is an unacknowledged fire alarm). The system shall provide a contact to silence the general alarm during a page.

Speakers installed in storerooms and offices shall be provided with the capability to connect an IP phone via Cat5e cable. This feature is included to reduce cabling and to provide volume/channel control for shipboard entertainment over the local loudspeaker.

IP (Internet Protocol) Equipment for public address shall be provided with Ingress Protection (IPxx) indicated as follows:

- IP Ceiling Loudspeaker, for cabins and common areas, (IP22) – 99 pcs.
- IP Horn type loudspeaker for machinery spaces, (IP66) – 30 pcs.
- IP Horn type loudspeaker for outside spaces, (IP66) – 12 pcs.
- IP Horn type loudspeaker for outside spaces w/push button for talkback (IP66) – 12 pcs.
- IP Loudhailer for bridge top and heli hanger (IP66) 120V/60Hz supply – 3 pcs.
- IP relay box for TV mute and General Alarm Bells Mute – 2 pcs.
- IP contact box for fire system interface – 1 pc.
- IP general alarm switch (Bridge and ECR console) – 2 pcs.
- IP EPIC control head (or equal) – 4 pcs.

3.1.2.3 PBX (VoIP) System Requirements

A marine grade VoIP system shall be provided. The system shall provide operator free dialing and communication for incoming and outgoing calls between all spaces identified.

System Features

- Self-contained unit
- Programmable from Web Interface
- Call forwarding
- Call transfer
- Voicemail
- 3-way conferencing
- Exterior Communication Access – Programmable (Shoreline, Satellite, Cellular)
- Incoming call routing
- Public Address Interface
- Remote Diagnostics/Maintenance
- Night Bells

All IP telephones shall be able to dial all other telephones on board and access shore trunks and other external communication systems if so programmed. IP telephones shall be equipped with special marine handset retainers, suitable for bulkhead or desk mount and be either drip-proof or waterproof type, depending on location. In high noise areas, auxiliary visual signaling via rotating (blue) beacons shall be supplied and installed to indicate an incoming call.

The VoIP system shall be supplied with a 4 line shoreline connection box (including 150ft. custom shoreline cable) and have the ability to access satellite and cellular line as applicable. It shall be capable of interfacing with a fax machine on the vessel.

A wake-up system shall be incorporated with the PBX allowing for individual operator programming and cancelling of wake-up calls.

Equipment for PBX (VoIP) system shall be provided with Ingress Protection (IPxx) indicated as follows:

- IP telephone (wall or desk mount) – 59 pcs.

- RJ-45 outlet/wall plate for telephone – 59 pcs.
- IP telephone (rugged), with headset jack and beacon, and headset stowage box (machinery spaces) wall mounted, (IP44) – 9 pcs each.
- IP telephone (weatherproof) exterior – 2 pcs.
- Shoreline connection box (4 line with 150 ft. shoreline cable) 12Vac, 60Hz – 1 pc.
- IP interface (for Iridium and Cell) 120Vac, 60Hz – 1 pc.
- IP interface (for fax machine) 120Vac, 60Hz – 1 pc.

3.1.2.4 Ships Recreational Entertainment Systems Requirements:

The IICS shall be capable of accepting (4) line level audio inputs for Ship's Recreational Entertainment. Distribution of entertainment audio (i.e. music, recorded announcements, etc.) for cabins and offices shall be programmable via system configuration software. Additional cabling and speakers for entertainment audio shall not be required. Control of audio source and volume in spaces shall be via local phone. Entertainment audio shall be over-ridden and volume level selected for entertainment will be automatically bypassed in the event of an alarm or PA announcement.

A standard relay will be used to override entertainment in the event of General Alarm Bell activation.

Equipment for Entertainment System shall be as follows:

- IP 4 Channel Interface 120Vac, 60Hz – 1 pc.

3.1.2.5 Wireless Telephone System Requirements:

An IP based Wireless Telephone System with two portable units (minimum) shall be provided for the operation on the bridge. The system will operate in conjunction with the previously specified PBX. The base controller will connect to the node via Cat5e cable.

The system will consist of:

- IP VoIP base Unit – 1 pc.
- IP VoIP Portable Telephones (with chargers) – 2 pcs.

3.1.2.6 OEM Equivalency

One supplier which meets the above IICS system requirement is Hose McCann. Contractors that wish to supply and install an Equivalent system shall seek approval within the formal “Question and Answer” process, during the Solicitation. Additionally, Training and Spares Requirements for Equivalent systems shall be included within the known work scope, as detailed within the formal “Answer” for each proposed system.

3.1.3 The Contractor shall arrange for OEM authorized field service representatives (FSR) to conduct the set to work and commissioning of the ICS system.

3.1.4 The Contractor shall work in conjunction with a Coast Guard Electronics Technician to oversee the installation of the new ICS system to ensure compliance with the applicable Coast Guard standards and to determine the final installation location of additional components as supplied with the system. Terminations and crimping at all end points shall be completed by the CCG Technicians

3.1.5 Prior to any hot work taking place, the contractor shall ensure that the area of work and all equipment, wiring, transits, etc. have been sufficiently protected from any sparks or metal filings.

3.1.6 Contractor shall ensure that all identified electrical supplies for the system have been isolated and secured using the established lock-out / tag-out system as outlined in the preamble.

3.1.7 All electronic components removed from the vessel resulting from the performance of this specification shall be returned to the Owner for disposal/reuse.

3.1.8 All cabling which has been deemed surplus to the installation of this system shall be removed from the vessel and disposed of at the Contractor’s expense.

3.1.9 Contractor shall be responsible to ensure that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

3.1.10 Contractor shall remove a total of 115 speakers and any associated volume control knobs (75 Deck head Flush Mount complete with backing boxes and associated volume control knobs, 2 Loudhailers, 24

Submerge Proof talkback speakers and associated talkback buttons, 5 horn type speakers, 2 intrinsically safe speakers, on the wheelhouse top, navigation deck, bridge deck, forecastle deck, upper deck, main deck, and hold deck). Removals of these speakers shall be complete with connecting cable back to originating locations as detailed in reference drawings. For any bulkhead mounted speaker the backing boxes are to remain for mounting the new speaker using adaptor plate.

- 3.1.11** Contractor shall install 154 new speakers (99 deck head flush mount, 3 loudhailers, 30 horn speakers, and 22 Submerge proof speakers on the wheelhouse top, navigation deck, bridge deck, forecastle deck, upper deck, main deck, and hold deck) as detailed in reference drawings.
- 3.1.12** Contractor shall install 75 of the 99 SS flush mount speakers in the space vacated by the old speakers by flush mounting the new speakers using 12-1/2" x 12-1/2" x 1/16" thick sheet metal with rounded edges. This speaker will now occupy the larger space left behind by the speakers that were removed. The remaining 24 speakers shall be flush mounted in areas indicated in reference drawings by cutting deck head panels to accommodate the extra speakers.
- 3.1.13** Contractor shall install three (3) loudhailers in the space vacated by the old as indicated in reference drawings. The contractor shall be responsible for modifying the mounting as necessary to accommodate the new loudhailers. The contractor shall be aware that the new loudhailers are supplied with a driver box that has to be mounted **above** and **near** the speaker for connection of an acoustic tube. The contractor shall also be responsible for mounting these driver boxes.
- 3.1.14** Contractor shall install 30 horn type speakers. Some of these will be a direct replacement of the old and some will be in addition to the old. See reference drawings attached.
- 3.1.15** Contractor shall remove 36 telephones complete with cable back to originating locations as detailed in reference drawings. Contractor shall also remove all associated dial telephone jacks complete with cable as shown in reference drawings.
- 3.1.16** Contractor shall install 70 new telephones (59 bulkhead IP phones, 11 ruggedized phones, and 1 dect portable VoIP handset with charger) as detailed in reference drawings.

- 3.1.17** Contractor shall install 36 of these telephones in the space vacate by the old telephones. The remaining 34 phones shall be installed as per the reference drawings.
- 3.1.18** Contractor shall remove four (4) auxiliary visual signaling devices (Blue Rotating Beacons) in the following locations (engine Room, harbor generator, emergency generator room, and bow thruster compartment) complete with signal cable as shown in reference drawings. Electrical isolation for these beacons are via panels
- EL4-25A/27C
 - EL4-9B/11C
 - EL4-13A/15B
 - EL5-1A/3B.
- 3.1.19** Contractor shall install nine (9) new beacons (blue) four of these will replace the four that were removed and will reuse the 115Vac, the remaining 5 will be installed in the (engine room, steering gear compartment, Purifier room, transducer compartment, fwd machinery room). AC for the remaining beacons shall be junctioned from the nearest rotating beacon.
- 3.1.20** Contractor shall remove three (3) existing IDCH-7200 control heads complete with cable from the bridge port & starboard wings and forward machinery console. Contractor shall also remove one (1) control head for direct line access in the engine control room complete with cable as detailed in reference drawings.
- 3.1.21** Contractor shall install four (4) new EPIC control heads complete with handsets in the space vacated by the old control heads. The EPIC control heads for these locations shall be installed using adapter plates with the EPIC control heads and handsets fitted in the adapting plates. These plates shall be of the same paint scheme as the location they are being installed.
- 3.1.22** Contractor shall remove the Main Equipment PA/GA control cabinets complete with Telephone Exchange (PBX) on the bridge in the electronics equipment room. Contractor shall completely remove all cabling associated with both cabinets. Contractor shall be responsible to isolate the AC mains prior to removal.
- 3.1.23** Contractor shall install an IP relay box in the emergency generator room for connection of the ICS system to this panel for muting the General alarm during a PA announcement.

3.1.24 Contractor shall install two nodes, one in the electronics equipment room on the navigating bridge, and the other in the LAN closet on the upper deck. Exact locations and mounting configuration to be determined on site. The Nodes shall be mounted to allow the split rack to open out to 180 degrees. A UPS shall be mounted beneath each Node and off the deck.

3.1.25 For the purpose of Deck and Bulkhead penetrations the contractor shall use existing where possible.

The contractor shall supply and install six (6) S 4x1 Roxtec primed frames complete with 36 RM20 modules per frame, one Wedge kit galvanized per frame, and six stay plates per frame. Contractor may substitute the 36 RM20's with RM15's or any mixture of.

For the purpose of adjustments, the contractor shall include a unit cost for the supply and install for one (1) S 4x1 Roxtec primed frame complete with 36 RM 20 Roxtec modules per frame, one wedge kit galvanized and stay plates per frame.

3.1.26 Contractor shall supply and install 100m (2 runs) of fiber optic cable for the interconnection of the two main ICP nodes. The fiber cable shall be ran from Node #1 in the electronics equipment room frame 46 port on the navigating bridge to upper deck frame 81 stbd. Fiber Cable shall be the Drake series ~~S611T (S611T50H) 50um multimode fiber.~~ **S611T (S611T62.5) 62.5um multimode fiber 6 core.**

The contractor shall supply and install two Almond 3 duplex port fiber drop boxes complete with 3 LCD (duplex) couplers to be mounted at the back of each node.

For the purpose of adjustment, the contractor shall include a unit cost for the supply and install for 10 meters of this cable type.

The contractor shall supply and install (2) 1m LC to LC fiber patch cord between the fiber drop boxes and the nodes.

3.1.27 Contractor shall supply and install **8000m of Cat5e cable** (Belden 1300SB Category 5e Shipboard ABS Type Approved) for the connection of speakers, phones, beacons, controllers, and accessories as detailed in the reference drawings.

For the purpose of adjustments, the contractor shall include a unit cost for the supply and install for 10 meters of 1300SB Cat5e cable.

3.1.28 Contractor shall run 200 Cat5e homerun cables from all peripheral devices to the Nodes. 75 homeruns will be to Node #2 in the LAN closet upper deck, and 125 homeruns will be to Node #1 in the electronics equipment room. These can be seen in reference drawings attached.

Contractor shall run an additional 60 Cat5e cables for the connection of chained devices as outlined in the reference drawings.

3.1.29 Contractor shall be aware that the majority of the bulkhead phones are connected to the nearest speaker within that space and not the nodes.

3.1.30 For the bulkhead mounted telephones, the contractor shall supply and install seventy (70) Panduit (KWP5EY) stainless steel wall phone plates with complete with one punch down Cat5e keystone jack modules, and seventy (70) back boxes. Each KWP5EY wall plate with jack and back box shall be mounted in the space vacated by the old phone. Cable runs behind bulkhead panels shall be suitably protected and secured by the back box used. Bulkhead telephones shall be mounted directly over these wall plates and be connected via a short Cat5e patch cable supplied with phone. Mounting configuration can be seen in reference drawings.

3.1.31 All Cat5e homerun cables shall be labelled with stamped metal tags affixed with the designation of (N:x CH:x P:x S:x) at both ends. The S can be substituted with a P to indicate phone, B to indicate beacon, R to indicate relay, CM to indicate contact maker, CH to indicate control head, SH to indicate shore connection. N represents Node and x represents number, CH represents Chassis and x represents number, P represents port and x represents number. As an example, the following label **N:1 CH:1 P:1 S1** is identified as **Node: 1, Chassis: 1, Port: 1, Speaker: 1**. These cable designations are found on the layout drawings.

3.1.32 Contractor shall replace/refurbish all outside speaker cable clips that are not suitable for further use. The contractor shall ensure the new Cat5e cable is properly secured from the exit of each outside gland to the termination point at each speaker. Spacing between these clips shall not exceed 300mm, if this is the case new clips are to be added.

- 3.1.33** For the purpose of adjustment contractor shall include a unit cost for the supply and install of 20 wire hangers stainless.
- 3.1.34** All exterior Cat5e cable shall be properly protected from exit of gland to entry of speaker.
- 3.1.35** All cabling, once installed, shall be labelled with a stamped metal tags securely affixed to the cable at each end with the designation for each cable provided in the installation drawings or as per the respective electrical supply.
- 3.1.36** All cabling shall follow existing cable trays and transits throughout the vessel where fitted. Once installed, all cabling shall be secured of per TP127.
- 3.1.37** Contractor shall supply and install a new 460V to 230 Vac step-down transformer capable of supplying the new system when under full load (system is supplied by two (2) 20 amp circuits one for each node) in the HVAC/Electrical Room. Supply for this transformer shall be from an existing spare circuit on the 460Vac Emergency Bus. Suggested circuit is EP10 (Spare) on emergency switchboard in the emergency generator room. The transformer shall be mounted above the existing two transformers in the HVAC/Electrical Room in a similar fashion. A second circuit shall be provided from the 230Vac Heating Panel in the HVAC/Electrical Room to the transfer switch. A new breaker shall be supplied and installed in the 230Vac heating panel rated to handle 2 – 20 amp circuits.
- 3.1.38** Contractor shall supply and install 10 meters of 10/4 awg marine shipboard cable for the purpose of connecting the switchboard to the new transformer.
- 3.1.39** Contractor shall supply and install a new 230Vac service panel Lloyds approved, complete with two (2) 20Amp supply breakers, in the HVAC/Electrical room on the focsle deck beside the existing 230Vac Heating Panel.
- 3.1.40** Contractor shall supply and install a new automatic changeover switch (ACOS) in the area of the new 230Vac panel. This automatic changeover switch will be fed one circuit from the new transformer and from a spare circuit on the heating panel in the HVAC/Electrical Room. The transfer switch shall have indication for normal and emergency power operation. Normal supply will be from the heating panel and the Emergency Supply from the new transformer. The Changeover switch shall have a contact on each input to sense a power failure on each supply circuit and shall be integrated into the alarm and monitoring system (Trihedral, VTS Scada system). Contractor shall

arrange to have an FSR for the alarm and monitoring system available to perform this integration.

A cable run from the contact on each input shall be ran to the Alarm & Monitoring System for this purpose. Cable type TBD

This shall meet regulation **18.3 Public Address System** of the (General Information for the Rules and Regulations for the Classification of Ships).

The Automatic Changeover Switch shall meet Lloyd's approval.

- 3.1.41** Contractor shall supply and install 75 meters of 10/4 awg marine shipboard cable for the connection of these components.
- 3.1.42** Contractor shall supply and install 100 meters of 12/3 awg marine shipboard cable for the connection of the UPS's for each of the nodes to the new panel. Contractor shall also feed this same cable from each UPS to each node.
- 3.1.43** For the purpose of adjustments, contractor shall include a unit cost for the supply and install for 10 meters of these cable types.
- 3.1.44** Contractor shall install two (2) Uninterruptable Power Supplies (UPS), one with each node. UPS is to be installed in the vicinity of each node. Electrical configuration of these UPS units is Wye (Y) configuration. These UPS shall be installed near each node.
- 3.1.45** Contractor shall provide an AC feed to each of the Loudhailer speakers, two (2) on wheelhouse top, one (1) in the helicopter hanger, and one for the shoreline connection box that's to be mounted on the upper deck via a spare circuit in Panel EL7 on bridge.

3.2 Location

All regularly occupied spaces will be affected by this installation.

- 3.2.1** Navigating Bridge Deck
- 3.2.2** Bridge Deck
- 3.2.3** Forecastle Deck
- 3.2.4** Upper Deck
- 3.2.5** Main Deck

3.2.6 Hold

3.3 Interferences

3.3.1 Contractor is responsible for the identification of interference items, their temporary removal, storage, and refitting to vessel. Representative interferences will be available for viewing prior to the bidders conference.

Part: 4 PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1 All work shall be subject to witness by chief engineer of delegate and the attending surveyor.

4.2 Testing

4.2.1 The commissioning of the new ICS system shall be done under the direction of an approved FSR and in accordance with the

- 4.2.2** manufacturers approved procedures.
- 4.2.3** Testing shall be completed on the system to confirm that all system aspects are in accordance with the requirements of Transport Canada and the relevant Classification Society to ensure a class approved installation. A report on all testing and findings shall be submitted to the Owner prior to the acceptance of this item.
- 4.2.4** Programming of the system shall be carried out by the FSR at time of installation

4.3 Certification

- 4.3.1** All original Class approval certificates for all system components shall be submitted to the owner prior to acceptance of this item.

Part: 5 DELIVERABLES:

5.1 Drawings/Reports

- 5.1.1** Contractor shall provide the Technical Authority with a typewritten report of the contractors work in both electronic and hardcopy formats outlining the details of the inspections and any alterations / repairs to the acceptance of this item.
- 5.1.2** As-built drawing package shall be provided. At minimum, this package shall include separate drawings for :
1. Device Locations (over-laid on the vessels General Arrangement, provided)
 2. Cable run, Deck and Bulkhead Penetration details over-laid on the vessels General Arrangement, provided)
 3. Block Diagram with Connection Details and electrical supply.

4. Regulatory & Statutory requirements. Three (3) paper copies ISO A2 size and one (1) electronic copy ACAD 2013.dwg format.

Hose McCann (or the accepted proposed equipment supplier) shall provide an itemized list with details and serial numbers for all replaceable items used in this install to CCG. This is required for CCG to be able to enter all items in AMS (Asset Management System)

As built Programming/Configuration File (Flash Drive of CD)

5.2 Spares

- 5.2.1 The list of recommended spares provided shall be returned to the owner prior to acceptance of this item.

5.3 Training

- 5.3.1 Contractor shall provide one (1) training course of eight (8) hour duration to be held onboard after the final installation and commissioning of all new system components. This training shall be provided to the ship's personnel involved in the operation of the system (both crews) and to the CCG Technicians responsible for the maintenance on the system. The training shall be provided by the manufacturer's technical representative (FSR). Training shall encompass all items outlined in the operating and maintenance instructions as supplied by the manufacturer. This may have to be provided on completion of the Vessel Life Extension based on access to the vessel during VLE.

5.4 Manuals

- 5.4.1 Contractor shall ensure that all operation, maintenance, and installation manuals supplied with the new equipment unit are submitted to the Owner prior to the acceptance of this item.

