Public Works and Government Services Canada

Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

PWGSC
11 Laurier St. / 11, rue Laurier
Place du Portage , Phase III
6C2 - 42
Gatineau, Québec K1A 0S5
kristin.cook@pwgsc.gc.ca

REQUEST FOR PRICE AND AVAILABILITY
DEMANDE DE PRIX ET DE DISPONIBILITÉ

This is not a bid solicitation but an inquiry for the purpose of obtaining price and availability information for the goods, services, and construction specified herein. The information requested herein is for budgeting and planning purposes only. Contracts will not be entered into on the basis of suppliers' responses.

Il ne s'agit pas d'une invitation à soumissionner mais d'une demande de renseignements sur les prix et la disponibilité des biens, services et construction spécifiés aux présentes. Les renseignements demandés aux présentes sont nécessaires uniquement à l'établissement du budget et à la planification. Les marchés ne seront pas attribués suite aux réponses des fournisseusr/entrepreneurs.

Comments - Commentaires

Title - Sujet
Buoy Handling Crane Control Sys Ren

Solicitation No. - N° de l'invitation F2599-145078/A	**Date** 2015-01-22
Client Reference No. - N° de référence du client F2599-145078	**GETS Ref. No. - N° de réf. de SEAG** PW-$$MD-030-24932
File No. - N° de dossier 030md.F2599-145078	**CCC No./N° CCC - FMS No./N° VME**

Solicitation Closes - L'invitation prend fin
at - à 02:00 PM
on - le 2015-02-27

Time Zone
Fuseau horaire
Eastern Standard Time
EST

F.O.B. - F.A.B.
Plant-Usine: ☐ **Destination:** ☐ **Other-Autre:** ☐

Address Enquiries to: - Adresser toutes questions à: Cook, Kristin	**Buyer Id - Id de l'acheteur** 030md
Telephone No. - N° de téléphone (819) 956-1397 ( )	**FAX No. - N° de FAX** ( ) -

Destination - of Goods, Services, and Construction:
Destination - des biens, services et construction:
Department of Fisheries and Oceans
520 Exmouth Street
Sarnia, Ontario N7T 8B1

Instructions: See Herein

Instructions: Voir aux présentes

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

Delivery Required - Livraison exigée See Herein	**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**

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

Canada

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1. Purpose

The Canadian Coast Guard (CCG) has identified a requirement to replace a shipboard buoy-handling crane control system onboard the CCGS Samuel Risley. Public Works and Government Services Canada (PWGSC) is seeking information and a rough order of magnitude costs from respondents who are interested and capable of completing the work outlined herein.

The Objective of this Price and Availability (P&A) enquiry is to:

a. Advise Canadian industry of the requirement, including general technical information on the current equipment.

b. Provide Canadian industry with a preliminary SoW which includes engineering, design, equipment integration, installation and operational trials of the new crane control system, attached as Annex A – Statement of Work.

c. Enable Canada to engage Canadian industry and obtain information on replacement of a shipboard buoy-handling crane control system including non-binding, indicative cost information based for planning purposes.

2. Information for Respondents

2.1 Incurred Cost

Canada will not reimburse respondents for costs incurred in responding to this P&A.

2.2 Responses

Responses may be incorporated by Canada to develop or modify procurement strategies and/or draft documents, as required. Responses will not be formally evaluated and no method of ranking will culminate from responses submitted.

A review team composed of representatives of CCG and PWGSC will review all submissions on behalf of Canada. No specific format will be enforced however provision of sufficient detail to enable a clear understanding of the information is requested.

Respondents are requested to provide any of the information requested in this P&A. A comprehensive response that includes all requested information will ensure the most detailed analysis.

Respondents are encouraged to provide comments, concerns and where applicable, alternative technical recommendations applicable to the Work identified herein.

2.3 Subsequent Information Session

PWGSC may at its discretion contact any Respondent to clarify and/or obtain a more comprehensive understanding of their submission. Please provide accurate contact information for this purpose.

3. Submission Requirements

Information to be incorporated in the submission may include but is not limited to the following:

a. A brief company profile including contact information.

b. An estimated timeline to procure and install the system onboard the vessel. Please include approximate schedules for design, engineering, manufacturing, delivery and installation.

c. A system design that utilizes common, readily available industry standard components. Avoid custom or proprietary components wherever possible.

   Include an itemized list of all custom and/or proprietary components incorporated in the submission.

d. Any other value-add options or expert opinion not identified that may be beneficial. Details should be provided that include explanation of the alternate item(s)/component(s)/system(s) and associated cost implications.

e. A rough order-of-magnitude to complete the work identified in Annex A – Statement of Work. This information should include a breakdown by requirement. A blank cost breakdown table has been provided as Appendix 1 to Annex A – Statement of Work as a guide for Respondents.

3.1 Confidentiality

Respondents must clearly mark any portions of their submission that they consider confidential. Canada cannot speculate on what is confidential and/or propriety and will not be responsible for information not marked as such. Canada will treat any portions clearly marked as such in accordance with the Access to Information Act.

3.2. Security

There is no security requirement associated with this P&A. Any possible future opportunities may include an obligation for security.

4. Enquiries and P&A Submission

Respondents may make enquiries regarding this P&A via email at the PWGSC Contracting Authority identified below. Submission packages may also be sent by email *as an attachment* to the same individual.

PWGSC Contracting Authority:

Kristin Cook
Supply Specialist
PWGSC
Marine Systems Directorate
6C2 Place du Portage, Phase III
11 Laurier Street, Gatineau Quebec K1A 0S5

Email: Kristin.cook@pwgsc.gc.ca

4.1 Certifications / Clauses and Conditions

For the purpose of responding to this P&A enquiry, Respondents may assume that any Certifications and/or Clauses and Conditions could apply to any resulting solicitation.

5. Additional information Requests

Upon completion of the review of all submission packages received, additional information and/or clarification may be requested by CCG through the Contracting Authority identified in article 2.4 of this P&A.

6. Information to interested Respondents

This is neither a call to tender nor a Request for Proposal (RFP) and no agreement or contract for the procurement of any portion of and/or component for the system identified in Annex A – Statement of Work will be entered into solely as a result of this P&A enquiry.

This enquiry does not constitute a commitment by Canada. Canada does not intend to award a contract or otherwise pay for the information solicited. Any and all expenses incurred by Industry in pursuing this enquiry, including the provision of information and potential visits, are at the Respondent's sole risk and expense.

Any discussion on this P&A with project staff representing CCG or PWGSC, or any other Government of Canada representative, or other personnel involved in project activities, shall not be construed as an offer to purchase or as a commitment by CCG, PWGSC or Government of Canada as a whole.

Canada reserves the right to use the information supplied by Respondents as a result of this P&A to assist them in drafting Specifications / Statements of Work / Requirements and for budgetary purposes. Requirements are subject to change, which may be a result of information provided in response to this P&A. Respondents are advised that any information submitted to Canada in response to this P&A may or may not be used by Canada in the development of a potential subsequent solicitation.

The issuance of this P&A does not create an obligation for Canada to issue a solicitation and does not bind Canada legally or otherwise to enter into any agreement or to accept or reject any suggestions.

There will be no short-listing of Respondents for the purposes of undertaking any future work as a result of this P&A. Similarly participation in this P&A is not a condition or prerequisite for the participation of any solicitation.

Respondents must provide point of contact information in their submission.

7. Closing Date

Respondents are asked to submit their submission package on or before the closing date of March 27, 2015.

ANNEX A

STATEMENT OF WORK
Buoy Handling Crane Control System Renewal

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1.0 BOUY HANDLING CRANE CONTROL SYSTEM REPLACEMENT

1.1 Intent

The Canadian Coast Guard has a requirement for the replacement of a shipboard buoy handling crane electro-hydraulic control system for the CCGS Samuel Risley. The Canadian Coast Guard is seeking contractors who may be interested in this work.

The contractor shall utilize as much mechanical equipment as possible while replacing the existing control system with a new PLC based system. The contractor shall be responsible for all engineering, design work, equipment integration, installation and operational trials of the new crane control system.

1.2 References

Drawings

Drawing Number	Drawing Name
161-300-01	General Arrangement
161-202-11	Structural Sections Frame 11
161-202-12	Structural Sections Frame 12
6787-011.00.00.000-001	Kran PBWS 15(8.5)/8(20)
6787-061.00.00.000-002	Base Column
	Liebherr Elect_Dwg
	Liebherr Hydraulic Schematics

Documents

Reference Number	Document Name
	Liebherr Instruction Manual
	Liebherr Replacement Parts List

Regulations

- Transport Canada TP127E – Ships Electrical Standard (Latest Version);
- Canada Shipping Act – Marine Machinery Regulations (Latest Version);
- Canada Shipping Act – Cargo, Fumigation and Tackle Regulations Part 3 (Latest Version);
- Lloyd's Registry of Shipping – Regulation for "Practice for Lifting Appliances in a Marine Environment";

Standards

- National Electrical Manufacturer's Association – Standard for NEMA Enclosures;
- API Spec 2C Design Standard for Offshore Cranes (Latest Version);
- IEC 61508 Functional Safety of Electrical/ Electronic/ Programmable electronic safety-related systems
- All appropriate ISO-Construction Standards;

1.3 Details of existing equipment

Currently located on the starboard aft working deck of the CCGS Samuel Risley is a buoy handling crane. This crane is a Liebherr PBW S 15(8,5)/8(20) pedestal deck crane. For guidance on existing crane specifications and dimensions please refer to Liebherr Crane Manual and drawings provided in the reference documents.

The existing crane has a safe working load capacity of 8.5 metric tonnes at 20m on the main hoist. The crane has a secondary lifting hook position at 7.5m. This secondary lifting position has a capacity of 22.5 metric tonnes. There are two whip hoists located on port and starboard sides of the main boom. These whip hoists have a capacity of 5 metric tonnes each and are located at 18m. Slewing Crane (w/o pedestal) weight is approximately 59.0 metric tonnes.

The existing crane is powered by electro-hydraulic power with hydraulics powering the hydraulic luffing cylinder, the slewing gear and both the main hoist winch and whip hoist winches. The electro-hydraulic power is supplied by two squirrel cage electrical motors of approximately 160 kW each at 575 VAC, 60 Hz, 3 phase.

1.3.1 Control System

The existing crane control system consists of adjustable speed integrators for exact and smooth crane control. All safety interlocks and limit switches for all major functions are integrated.

1.3.2 Power Supply

Power supply for existing crane via slip ring collector in the base column.

3 rings	575VAC, 3ph, 60 Hz
1 ring	neutral
1 ring	earth
1 ring	240 VAC, 1ph, 60 Hz with step-down transformer to 110 VAC, 1 ph., 60 Hz.
2 rings	for emergency stop of crane operation via ship's control board
8 ring	Spare for future developments (16 Amps)

1.3.3 Drive

The existing crane is designed with two electro hydraulic power packs. Each crane movement has its own closed hydraulic circuit with variable displacement pumps for slewing, hoisting and a fixed piston pump for luffing. Crane is equipped with powered lowering of boom and hoist.

All pumps, hydraulic motors, hoses and threaded unions are designed for nominal pressure rating of 400 bar, but operates at approximately 280 bar.

Hoist and slew drives are equipped with automatic constant power regulators. These units automatically determine the maximum speed for each load in such a way that a maximum power consumption remains constant.

Crane operator can achieve the maximum speed merely by moving the control lever to the maximum position. The system automatically selects the maximum speed.

1.3.4 Luffing Gear

Jib movements are completed using 2 hydraulic cylinders, pivot mounted at lower end of jib and on the slewing column. The cylinders are equipped with safety check-valves, which are functioning as a hose burst security.

1.3.5 Hoisting Gear

The hoisting gears consist of a grooved rope drum with integrated planetary gear, multiple disc brake, hydraulic motor, wire rope, lower block and hook. The multi disk brake is flanged in between gear and hydraulic motor. The gear is integrated in the drum and thus protected against salt water and dirt.

1.3.6 Slewing Gear

The slewing gear is equipped with an automatic power regulator which will automatically compensate for tangential swings of the load. The pinions of the slewing gears engage with the geared slewing ring.

A spring-action hydraulically released multi-disc brake is arranged in between the hydraulic motor and the gear box. Whenever the control lever is in neutral position and in the event of power failure or pressure drop in the hydraulic circuit these brakes are automatically applied.

Due to the closed hydraulic circuits the brake is normally acting only as a holding brake and not as a service brake. Accelerations and decelerations are performed hydraulically.

Brakes

All gears are equipped with spring loaded hydraulically released multi-disc brakes. These brakes close whenever the control handle is in neutral position in the event of pressure drop or power failure. Due to closed circuits, these brakes are acting only as holding brakes.

In the event of a power failure or pressure drop in the hydraulic circuit the spring-actioned hydraulically released multi-disc brake will be automatically applied.

1.3.7 Safety Devices

The existing crane is equipped with a limit switch for the lower extreme hook position. When this position is reached, the hoist gear stops automatically but can be driven in reverse direction without any additional switching operation.

Hoisting and slewing gear are equipped with spring actioned hydraulically released brakes that automatically close in case of power failure or hydraulic pressure drop in circuit.

The crane is equipped with an overturning moment restriction with the following function;

a) Release of whip hoist lines with a tension of 5 tonnes whenever 100% of the designed moment is reached without automatic recovering when hoisting lever is in neutral position. Automatically resets when overload situation has ended.
b) Setting an alarm (audible) in driver's cabin.
c) The same arrangement whenever the slewing designed moment has been reached.

Main hoist is equipped with constant tension swell compensation to operate via push button on the control lever. When actuated, it will provide a constant tension of approximately 25% of nominal load capacity.

1.4 Refit Requirements

1.4.1 Crane Technical Requirements

Operational Criteria

Unlimited 360 degrees operation	
Significant Wave height	H/3 = 1.6 M
Operational Weather Limit	Beaufort 4
Min. operating air temp.	-40°C
Max. Operating air temp.	+35°C
Humidity	100%
List	5° + rolling +/- 5°
Roll Period	T = 8 sec.
Roll Centre	5m below crane base
Offlead	5° / 3°
Side Lead	3° / 6°
Main Hoist Leads	1
Whip Hoist Leads	2
Man Lift Capability	No

Simultaneous Operation:

The new crane control system shall be designed to operate four (4) motions simultaneously.

- Main hoist and whip hoist
  Or
- Two whip hoists without main hoist may be operated simultaneously with slewing and luffing.

A selector switch shall be provided with the following function:

- Main hoist + whip hoist left
- Main hoist + whip hoist right
- Whip hoist left + whip hoist right

Lifting Capacity (Main Hoist)

4.5 m radius to 8.0 m radius 15.0 metric tonnes
4.5 m radius to 13.5 m radius 12.0 metric tonnes
4.5 m radius to 20 m radius 8.5 metric tonnes

Lifting Capacity (Whip Hoists)

3.5m radius to 17.0 radius 5.0 metric tonnes each, simultaneously.

Operating Speeds

Stepless speed control from zero to maximum speed with automatic power output regulator.

Main Hoist (2-fall operation)

0 – 30m/min. with 15.0 metric tonnes
0 – 40m/min. with 11.2 metric tonnes
0 – 50m/min. with 9.0 metric tonnes
0 – 60m/min. with 7.5 metric tonnes

Whip Hoist (single line operation)

0 – 90m/min. with 5.0 metric tonnes
0 – 100m/min. with 4.5 metric tonnes
0 – 120m/min. with 3.7 metric tonnes
0 – 150m/min. with 3.0 metric tonnes

Slewing

Stepless speed control from zero to maximum speed with automatic power output regulator.

0 – 0.8 rpm with full load against 10° list
0 – 1.5 rpm with full load on even keel

Luffing

Stepless speed control from zero to maximum speed to minimum radius with full load in 60 sec.

Lifting heights

Main Hoist:
Hook Travel 30m

Whip Hoist:
Hook Travel 30m

Power Transmission

Hydrostatic power transmission with a minimum of two separate central power stations, each consisting of a prime mover, distribution gear box, variable displacement pumps for hoisting, and fixed piston pumps for luffing and slewing.

Each movement shall have its own closed hydraulic circuit, providing powered lowering. Hoisting and slewing gear shall be equipped with constant power regulators similar to existing crane setup.

Control System

The control system shall have adjustable speed integrators thatshall be fitted for exact and smooth crane control. All safety interlocks and limit switches for all major functions shall be integrated.

Prime Mover

Prime movers are:

Class of protection	IP 23
Voltage/frequency	3 ph. X 575 VAC, 60 Hz.

Motor Starting currents will not exceed 1.4 rated full load motor current and will be provided by an autotransformer type starter.

Electrical Data
Main power supply: 575V / 366 A / 60 Hz/ 3 Phases
Auxiliary power supply: 240V / 85 A / 60 Hz / 3 Phases

A safety switch or push button, located in the machinery control room, shall be designed in the start system of the crane to prevent it from starting without prior verification of sufficient power available. This interlock shall not interfere with the running of the crane once it is started.

Power Supply

Main power supply shall be 575 VAC, 3 Ph., 60 Hz.

Anti-condensation heating

Electric motor machinery room, slip-ring collector (if applicable) and driver's cabin shall be equipped with standstill anti-condensation heaters.

Control system:

A programmable logic controller (PLC) based control system shall be used and a user accessible fault tracing system interface shall be fitted for troubleshooting purposes.

The control system shall include a load monitoring system of the main hoist and both whip hoists. Loads shall be displayed for the operator to monitor at all times.

Materials

All materials shall be selected with appropriate impact properties for working in an ambient temperature of -40^{0C} to +35°C. Certificates shall be provided to the Technical Authority (TA).

Design Standards

The crane control system shall be Class Approved as suitable for marine use on board the intended vessel and meet the standards and regulations detailed in the references. Contractor shall provide the Class Approval documentation along with all originals of signed documentation for inspection and materials provided to the Technical Authority. The crane control system shall also comply with all require Transport Canada regulations for lifting devices. Once control system is replaced the contractor shall recertify the crane under Transport Canada regulations.

1.4.2 Crane Refit Specification

General

The new control system shall consist of a modern digital control system using up-to-date technology and utilizing the existing crane drives, pumps, cylinders and crane structure. The new crane control system shall use common industry standard equipment readily available in industry today to provide a highly reliable and easily maintained system for a minimum of 15 years. The new control system shall be open to future developments. The new control system shall maintain all capabilities of the existing crane control system except the relative movemets with sensor (RBKS)- Swell compensation system. Contractor shall be responsible for the decommissioning and removal of the existing control system as well as the installation, commissioning and training of the new control system.

1.4.2.1 Control system Design Criteria

The new control system shall include the following criteria;

- Designed for use in Marine environment and meet all Transport Canada and Classification Society approvals.
- Open to future expansion and upgrades
- Safety integrity level: equal to "SIL 2", under IEC 61508.

1.4.2.2 Cabin

The operators cab shall be completely reconfigured to provide an ergonomic work area for the crane operator. This reconfiguration shall include a new seat, new heat and ventilation system, control console and new operator joysticks. Contractor shall submit information on the seat, heat and ventilation and overall configuration of the cab for approval prior to installation.

Seat shall be adjustable type of durable construction to provide a high level of comfort for extended period of time in a commercial environment. Seat shall have shock absorbing base and rated for 300 lbs. weight capacity.

Contractor shall remove existing heating and ventilation equipment and replace with new. This new heating and ventilation equipment shall be designed to heat the cabin for comfortable operation of the crane in -35 ^{0}C ambient temperatures and provide adequate ventilation for the crane operator up to +30 ^{0}C ambient temperatures.

Console shall include all switches, warning lights and alarms as detailed in this document (refer to Console section). All switches and alarms shall be ergonomically designed to allow operator to comfortably reach, operate and acknowledge.

Contractor shall install a system monitor within the cab. This monitor shall be a LCD type suitable for use in a marine environment. This screen shall display various information to the operator about the cranes function (please refer to Monitor section). The screen shall be situated to allow the operator ease of visibility while not hinder the operators operation of the crane.

1.4.2.3 Monitor

The Monitor located in within the operators cab shall be of colour LCD type suitable for use in a marine environment. The monitor shall be a touch screen with adjustment to allow visibility in direct sunlight to dark no-light operation. The monitor shall display the following;

- Slewing Gear Overdrive
- Tare Load
- Rope Length Spent Out
- Slewing Position (including anti-collision warning)
- Operating Status of motor 1
- Operating Status of motor 2
- Status MOPS (refer to MOPS section)
- Status AOPS (refer to AOPS section)
- Load curve
- Ambient Temperature Outside
- Ambient Temperature Controls Room
- Brake Status
- Whip hoist 1 operation
- Whip Hoist 2 operation
- Warning Slack Rope
- Indication of crane parked

1.4.2.4 Operator Cabin Console

The crane has a cabin to accommodate the operator of the crane. The existing control console within the cabin shall be removed and replaced with new. The cabin shall have a control console equipped with;

- Heating controlled by thermostats and ventilation with controls located within the cabin
- Heated front window and overhead windows with thermostatic control.
- Circulation fan for climate control

- Crane controls for hoisting, lowering, slewing, luffing, whip hoist left and whip hoist right
- Selector switch for main hoist + whip hoist left or right
- Selector switch for whip hoist left + whip hoist right
- Crane start/stop (both aggregates independently)
- Emergency release button
- All required control system switch and alarms (Audible and Visual).
- Emergency stop
- Lighting control
- All indicator lights shall be LED type with single point dimmable control knob. There shall also be incorporated a "lamp test" button in determine any non-functioning indicator lights.
- Phone connection to ship's comm. system.
- Loud hailer/ Talk back system with the deck
- Front and overhead window wipers controls.
- Minimum of four 120V AC outlets provided in the cab

1.4.2.5 Anti-Collision System

The contractor shall incorporate an anti-collision system into the controls. This system shall stop the crane from colliding with ship structure such as the deckhouse. This system shall take into consideration both luffing and slewing angle when determining operational clearance. System shall warn crane operator prior to collision and stop crane just before point of collision. A manual override is required.

1.4.2.6 Maintenance monitoring

The new control system shall log operating time for motors, pumps, slewing gear, lift winches etc. and allow programmable maintenance limits for each variable. Once an item has exceeded the defined maintenance limit a warning shall display on the cab monitor.

1.4.2.7 System Monitoring

System shall be able to record and log running status as well as any errors for a period of 5 years. System shall provide the ability to access and copy data recorded for fault/failure tracking. Files shall be saved in .csv format. System shall provide ability to report if operator triggered a manual override and continue to operate or if the crane was shut down upon alarm.

1.4.2.8 Slack Rope Prevention

The new control system shall incorporate a slack rope prevention mechanism, which allows the winch to stop lowering if slack rope is detected. This function shall be equipped with a manual bypass option.

1.4.2.9 Swell Compensation

The existing RBKS system function shall be removed.

1.4.2.10 Constant Tension System

The contractor shall incorporate a constant tension system within the new controls. When activated it provides a tension in the hoist wire to a set value in both the upwards and downwards motion of the vessel. This system shall be provided with a manual override/ deactivation function.

1.4.2.11 AOPS (Automatic Overload Prevention System)

The new system shall have an automatic overload protection function that shall limit both lifting capacity and moments to within suitable capacities for the crane and vessel. AOPS shall trigger an acoustic alarm and be displayed on cabin monitor. Warning system shall deactivate once crane is operating within allowable operating condition for 5 seconds. This alarm system shall be equipped with a manual test function to ensure all alarms are operational.

1.4.2.12 MOPS (Manual Overload Protection System)

The new system shall incorporate a manual overload protection system. The system shall enable the crane operator to avoid an excessive overload situation by releasing the selected hoist rope by pressing a button. This manual release button shall be located in a convenient position within the operator's cab for ease of use.

This system shall be manual activated only. At any time this system shall be able to be reset by the operator. When activated the brakes shall be opened and the hydraulic system will maintain a retaining force in the hoisting system of approximately 10-20% of the maximum rated crane lift capacity. It shall allow the rope to be spooled completely off the drum.

The system shall be live as soon as the crane is activated and shall remain live during normal operating conditions, during normal stop, emergency stop and in the event of the cranes main power supply failure.

The MOPS system shall have indicators on the cab monitor to signal the status of the system.

1.4.2.13 Load Moment Limitation

The new system shall have a load moment limitation system integrated into it. This system shall be integrated into the cab monitor display and all variables shall be able to be inputted via the touch screen to provide a limited capacity for that set of operational criteria. This system shall display the following;

- Actual hook load
- Actual radius
- Selected crane configuration (selected hoist location, whip hoist etc.)
- Selected load chart
- Selected rated capacity

Warning shall be given when crane reaches 90% the rated capacity. An alarm will trigger once crane reaches 110% the rated capacity. All sensors for the Load Moment Limitation system shall be redundant in case on single system failure.

1.4.2.14 Heel / Trim Indication

The new crane control system shall display both heel and trim on the cab monitor. Audible and visual alarms shall trigger when heel and trim maximums are exceeded.

1.4.2.15 Sensors

All existing sensors shall be replaced with new modern digital type sensors. All sensors used for a safety function shall be of dual type with redundancy feature.

1.4.2.16 Safety Devices

The hoist gear shall be equipped with a limit switch for the upper and lower extreme hook position. When this position is reached the hoist gear shall stop automatically. It shall be capable of being driven in the reverse direction without any additional switching operations.

The hoisting and slewing gear shall be provided with a spring-activated hydraulically released brake, which automatically closes in case of power failure or pressure drop in the hydraulic circuit.

Overturning moment restriction shall be provided with the following function:

a) When the Main or Whip Hoist lines exceed design moment maximums both hoisting and luffing functions shall be stopped. Once the overload condition has ended the operator may select via a switch to resume operation. An operator override shall also be available to the crane driver.
b) Setting an alarm (audible) in the driver's cabin.
c) The same arrangement whenever the slewing designed moment has been reached.

In the event of a momentary power failure on the vessel, followed by restoration of the power supply, the crane shall remain switched off until restarted by the crane operator.

Hand-pump operation capability to release the brake for hoisting and slewing shall be provided.

With excessive side load above design load the boom shall give an indication of overload via an audible and visual alarm before slewing gear is affected.

1.4.2.17 Lighting

All existing lighting shall be removed and replaced with new. LED flood lights shall be provided to illuminate the load and surrounding deck area. Flood lights shall be of sufficient intensity and approved for marine use.

The lighting shall illuminate down the length of the crane boom, maintaining the focus of the lights downward during raising and lowering of the boom. The lighting shall not interfere with the bridge's or the crane operator's vision.

New lighting shall be provided in the driver's cabin and in the machine room.

1.4.2.18 Environmental Protection

All components located outside, including but not limited to sensors, encoders, junction boxes and cable connectors shall be to IP67 standard. CPU housing to be IP65 when flashcard reader is closed. No fan to be used for CPU housing.

1.4.2.19 Testing of device

Once control system is installed the contractor shall ensure the crane meets all lift test requirements and be capable of preforming the Transport Canada proof load test of 125% of the rated load.

1.4.2.20 Training

Contractor shall supply 2 days (14 hours) on-site training to ship's crew on operation and maintenance of new crane control system. This training shall consist of training approximately 10 people onboard the ship. Training shall consist of both class-room and practical on-site use of the crane. The class-room portion of the training shall be held onboard the vessel. Contractor shall supply suitable manuals and documentation to all trainees including documents on maintenance, fault finding and troubleshooting and operation.

The contractor shall provide a schedule of all training to be provided and samples of documents to be handed out during training to the TA for approval. The contractor to assume training will be held at the CCG Base in Parry Sound, Ontario.

1.4.2.21 Spare Parts and Tools

The Contractor shall supply a complete parts list for all items being supplied. From this list the Contractor shall identify consumable parts and those that perform a critical function and which should be carried as critical spares. Items that are readily available and off the shelf should be identified as such on the list.

Pricing for parts shall be included as part of the deliverables for the spares parts list.

1.4.2.22 Preliminary System Layout Drawing

The contractor shall provide a conceptual level single line diagram showing how new control system will integrate with existing components. Drawing shall show any required changes or replacement to existing equipment. Drawing shall be supplied in electronic format (.pdf or similar).

1.4.2.23 System Components

Contractor shall avoid custom or proprietary components within the new system if possible. Care shall be taken to design the new system using common, readily available industry standard components.

1.4.2.24 Documentation (Reports/Drawings/Programs/Manuals)

Documentation shall be supplied in the following formats: The Contractor shall supply 3 copies of all documentation in electronic format on CD-ROM media that is not password protected. All manuals shall be in Adobe PDF format and all drawings shall be in AutoCAD 2010 or later format.

The Contractor shall provide:

- Product data including dimensions, weights, centers of gravity, capacities, certifications, component performance, electrical characteristics, casing construction details, wiring interconnections, gauges and finishes of materials.
- All technical information relevant to the product being provided, including but not limited to all the information shown in the schedules of this specification. It is the responsibility of the Contractor to highlight any variances that the equipment has with the requirements of this specification whether or not pre-approval has been obtained. Provide the information in the same measurement units as indicated elsewhere in this specification.
- Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.
- Submit operation and maintenance data. Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.

All operating and control software shall be supplied by the contractor in a suitable format to ensure rapid reinstallation if any problems occur with the operating system. Contractor shall provide documentation, training and all necessary data cables to allow onboard staff to safely reinstall all critical operating software.

1.4.2.25 Approvals

The Contactor shall provide proof of certification of the various components in the structure as required by the specification. Specific attention shall be given to the requirements for plan approval drawings as required under the various Schedules of the Machinery Construction and Inspection Regulations of the Canada Shipping Act. Contractor shall provide CCG with all approval documentation including all original signed acceptance documents.

Appendix 1 – ANNEX A

COST BREAKDOWN TABLE – Refit Requirements

The following table is provided as a guide in responding to the P&A enquiry.

COMPONENT REQUIREMENTS			
Item	**Reference No.**	**Unit Cost (if applicable)**	**Total Cost**
Cabin			
Monitor			
Operator System Console			
Anti-Collision System			
Maintenance Monitoring			
System Monitoring			
Slack Rope Prevention			
Swell Compensation			
Constant Tension System			
AOPS (Automatic Overload Prevention System)			
MOPS (Manual Overload Protection System)			
Load Moment Limitation			
Heel/Trim Indication			
Sensors			
Safety Devices			
Lighting			
SERVICES & MAINTENANCE			
Testing of Device			
Training			
Spare Parts & Tools			
Documentation (Reports/ Drawings/ Programs/ Manuals			
1 year maintenance			