

CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

E-6 PORT AND STARBOARD BOILER CONTROLS RENEWAL

VESSEL LIFE EXTENSION WORK

General

E-6.1.

Contractor shall employ the services of two (2) authorized Alfa Laval Aalborg Field Service Representatives (FSR) for the installation of the new port and starboard boiler controls and associated components, and commissioning of the units. The Alfa Laval Aalborg Field Service Representatives shall be coordinated through Alfa Laval Inc.

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It is estimated that 2 Alfa Laval Aalborg FSRs shall be required for 12 days, working 12 hour days, for this project. The FSRs shall be reimbursed for their services, authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

E-6.2.

Contractor shall ensure that the work on the following specifications shall be completed prior to any testing of the new boiler burners and control systems:

- E-6.2.1. > L-~~7~~3 At least 1 feed pump motor shall be available when testing is required to fill the boilers with feed water
- E-6.2.2. > HD-7 FUEL TANK (SURVEY) for the day & settling tanks
- E-6.2.3. > E-2 "Main Steam Line testing".
- E-6.2.4. > HD-12 Boiler blow-down line. Note. When the boilers are drained, precautions shall be taken to ensure the dock area in the vicinity of the blow down discharge is clear if there is a need to discharge heated boiler water.

Contractor shall schedule the work accordingly so that no delays are incurred. If there are delays as a result of Contractor's scheduling of work, then Contractor shall be responsible for covering any additional costs associated with retaining the two Alfa Laval Aalborg FSRs.

E-6.3.

Contractor shall follow all manufacturers' installation instructions, FSR instructions for the installation and mounting of all GSM for this specification in order to maintain warranty of all components.

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E-6.4.

Contractor shall electrically and mechanically isolate the existing boilers to allow the removal of the components. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

Existing wiring shall be marked as per OEM drawings prior to removal, in case it can be reused. A drawing of the existing boiler controls will be provided to the Contractor to copy.

E-6.5.

Work shall not commence until the all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces.

E-6.6.

Contractor shall supply any gases, oxygen, acetylene, and argon necessary for the repair.

E-6.7.

Contractor shall supply all equipment enclosures, ventilation, staging, chain falls, crane, slings, and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as shall being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification shall be welded into place as per section 7 of the general notes.

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Scope of Work

E-6.8.

Contractor shall assist the Alfa Laval Aalborg FSR's with the following work on the port and starboard boilers:

- E-6.8.1. > Mobilise, including all transportation, and crantage required to carry out the work.
- E-6.8.2. > Open up for access.
- E-6.8.3. > Disconnect existing oil burner and forced draft fan.
- E-6.8.4. > Remove existing feed water pumps, motors and base.
~~Disconnect & remove existing water columns~~
~~Disconnect existing fuel oil pump group.~~
- E-6.8.5. > Disconnect and remove existing control panels.
- E-6.8.6. > Prepare and install new burner.
- E-6.8.7. > Install new control panel.
~~Installation of new oil pump group and new gas/air separator unit.~~
- E-6.8.8. > Install new feed water pumps and motors.
- E-6.8.9. > Modify feed water piping to and from new feed water pumps
- E-6.8.10. > Open up Hotwell tank for access
- E-6.8.11. > Install a new feed water discharge line from the crossover line to and inside the Hotwell.
- E-6.8.12. > Install new feed water proportioning valves for each boiler.
- E-6.8.13. > Install/replace new cables if necessary for connections to the new control panel.
~~Installation of new water level control & columns.~~
- E-6.8.14. > Installation of new water level control.
~~Installation of casing in way of repair.~~
- E-6.8.15. > Box up everything.
- E-6.8.16. > Pressure test piping and Hotwell to CGTA satisfaction
- E-6.8.17. > Make pre-inspection, commissioning and start up.
- E-6.8.18. > Demobilise.

For estimating purposes, Contractor shall supply 1 skilled Mechanical Technician - Welder-Fitter for 12 days, working 12 hours days with Alfa Laval Aalborg FSR. In addition, it is estimated that approximately 100 hours of various skilled trades' persons shall be required at various times throughout the installation. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice & time sheets.

E-6.9.

Contractor shall dismantle and return to CGTA for disposal by the Crown all components removed from the ship for this specification item. All parts must be specially handled to prevent damage, and placed in crates or on pallets for transport.

E-6.10.

Contractor shall determine if there are any interference items that need to be removed from around the boilers and include the cost of removal and reinstallation in their bid. Items which are electrically energized shall be electrically isolated at their supply breaker with the concurrence of the CGTA. All interference items shall be safely stowed by Contractor. Pipes shall be blanked off with suitable flanges and gaskets, or pipe caps, of the correct size. Any items that are not removed and are subsequently damaged during the removal or installation process shall be repaired at contractor expense.

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~~Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.~~

E-6.11.

The new boiler up-grade kits shall be delivered flat packed and will require assembly by the Aalborg FSR's. All electrical connections, glands, pipe sealant, flange gaskets, pipe and pipe fittings, fasteners, isolation valves, and other consumable products required for the installation shall be new and CFM. For estimating purposes, Contractor shall allow for \$5,000.00 for materials & supplies. Allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice.

E-6.12.

~~The new boiler control panels shall be installed in the same location as the existing ones. The new panel is larger than the existing panel and modifications shall be required to allow the new panels shall be fitted.~~

The new boiler control panels shall be installed in the same location as the existing ones. The new panels are larger than the existing panels. New brackets shall be made to extend the new panels out further from the bulkhead, as directed by the CGTA.

E-6.13.

Contractor shall properly secure all electrical cabling. All work shall be to code, as per TP127E & Canada Shipping Act. Contractor shall make arrangements to have TCMSS Surveyor to view the wiring installation as work progresses.

E-6.14.

~~Contractor shall fabricate the new fuel oil supply and return lines for each boiler. The route shall be determined by CGTA and the Aalborg FSR's. Contractor shall ensure that enough hangers are provided to properly secure the piping in place and prevent vibration. Contractor shall arrange to have a TCMSS Surveyor view the proposed changes to the fuel system piping prior to commencing this work.~~

E-6.15.

Contractor shall remove the two (2) existing feed water pumps along with the motors. These pumps are located in the main generator room at the tank top level, starboard side just aft of the distiller. Contractor shall take note of the existing arrangement of the piping and valve arrangement. There is a crossover pipe that allows operators to use either pump, to operate with either boiler. The new piping arrangement shall allow the new pumps to have the same capabilities. The new feed water pumps, GSM supplied, shall be installed in approximately the same location, as directed by CGTA.

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E-6.16.

The existing feed water supply, discharge and crossover valves plus associated piping shall be removed in the general area of the existing pumps in order to fit the new pumps, regulator valves and isolation valves. The original pump seat/base shall be removed and a new mounting seat fabricated and installed to accommodate the new pump units.

Contractor shall supply, fabricate and install new suction and discharge piping in order to connect the following items:

- New pumps
- Recirculation line to hot well with isolation valves and orifice plate
- Feed water PDI regulator valves with bypass lines and isolation valves

The existing suction piping is 1 ½ inch schedule 40 seamless ASTM A-53 Grade B black steel. The existing discharge piping is 1 inch schedule 80 seamless ASTM A-53 Grade B black steel. Contractor shall fit flange adapters to the 1 ¼ inch inlet and outlet ports of the new pumps to match the existing piping.

The configuration of the 2 pumping system isolation valves, regulators, recirculation valves, by-passes and piping shall be fitted in a neat orderly arrangement. The arrangement shall be logical to prevent any confusion to the operators. The regulators shall be fitted in such a manner that allows easy access/removal for servicing.

The final layout design shall be approved by CGTA and Aalborg FSR.

All valves shall have identification brass tags fitted. Each brass tag shall be engraved in black letters identifying the purpose of the valve. The brass tags shall be fitted to the valve wheel stems. CGTA will provide a list of identification tag names. A total of 12 brass identification tags are required

E-6.17.

All valves and regulators shall have 4 bolt hole flanged connection to allow easy removal. All Contractor supplied valves and flanges shall be rated for PN 40 or ANSI 300 steam service. Ball valves that are fitted must be fabricated with ball seat material that is rated for steam service at a minimum temperature of 180 degrees Celsius (ANSI 300 rating). All gasket material supplied and fitted shall be rated for steam, suggest "Durlon 9000 Blue" gasket material.

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E-6.18.

Contractor shall fit and install a new 1 inch seamless schedule 80 pipe from the new pump crossover pipe to the Hotwell. Contractor shall empty the Hotwell of the boiler feed water and remove the aft access cover. Contractor shall fit a recirculation stub pipe with compensation flange to the aft wall of the Hotwell tank. The stub pipe fitted inside the Hotwell shall be at least 12 inches long with an angled end to ensure the discharge is below the minimum operating level of the Hotwell tank.



Hot Well recirculation line
penetration location

Location of pipe penetration to Hotwell tank

An isolation flange connection 1 inch globe valve with a 1 inch flange orifice plate shall be fitted at the recirculation line inlet flange to the Hotwell. The size of the orifice shall be engraved on a brass tag, which shall be mounted to the Hotwell tank.

E-6.19.

For estimating purposes Contractor shall quote on supplying and fitting the following items:

- E-618.1. > 8 meters seamless schedule 80, 1 inch seamless ASTM A-53 Grade B black steel pipe
- E-618.2. > 2 meters seamless schedule 40, 1.5 inch seamless ASTM A-53 Grade B black steel pipe
- E-618.3. > 6 x 90 degree 1 inch socket weld elbows, ANSI 300
- E-618.4. > 1 x 1 inch socket weld Tee, ANSI 300
- E-618.5. > 23 slip on 4 bolt, 1 inch flanges ANSI 300
- E-618.6. > 4 x 1 inch SDNR flanged globe valve DN25 PN40
- E-618.7. > 1 x 1 inch SD flanged globe valve DN25 PN40
- E-618.8. > 2 x 1.5 inch SD flanged globe valve DN40 PN40
- E-618.9. > 2 x 1 inch flanged ball valve DN25 PN40
- E-618.10. > 2 x 1.5 inch to 1.25 inch adapters
- E-618.11. > 2 x 1.25 inch to 1 inch adapters

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E-6.20.

Contractor shall arrange to have TCMSS Surveyor view the proposed changes to the feed water piping prior to commencing this work.

E-6.21.

Contractor shall ensure that sufficient hangers, pipe clamps, brackets are supplied and fitted to properly secure the piping in place and prevent vibration.

E-6.22.

Contractor shall acid wash (pickle) all new steel pipe sections prior to final fitting where possible. Once cleaned, all pipe sections shall be fitted, flushed and pressure tested to CGTA's satisfaction. The Hotwell shall be isolated and air tested to a pressure of 2 psi. All vents and drain lines require "ballons" fitted to isolate the tank. All leaks found shall be repaired at the Contractors expense.

E-6.23.

Contractor shall install any interference items that had been removed at the completion of the boiler work.

E-6.24.

All areas that have been affected by this work shall be mechanically cleaned to SSPC-SP-11 standards. Upon completion of cleaning to SSPC-SP-11 standards, all affected areas shall receive 2 coats of primer and fire retardant white paint. This shall include all new pipework and associated brackets. Contractor shall allow sufficient curing time between the coats. Hotwell internal disturbed areas shall be coated with Dulux APEXIOR® No 1.

The disturbed insulation on the Hotwell tank shall be repair/replaced. The 1 inch recirculation line to the Hotwell shall be insulated from the upper-landing deck to the Hotwell isolation valve. The pipe insulation must be adequate in thickness to reduce the 90 degrees Celsius uninsulated temperature of the recirculation pipe to a safe to touch and hold temperature of 25 degrees Celsius maximum.

Commissioning

E-6.25.

Contractor shall ensure there is at least one Aalborg FSR on hand during the commissioning and setup work for both boilers. This includes the setup of the boiler controls, feed water systems and alarm systems and proves the correct operation of the entire system for both boilers.

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E-6.26.

Once the Boiler control systems are fully functional, Contractor shall make arrangements for TCMSS to witness the testing of various safety features of the Boiler controls. The testing shall be performed to the satisfaction of both the TCMSS Surveyor and the CGTA.

E-6.27.

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