F3019-12RM773

APPENDIX A

INSPECTION AND CERTIFICATION OF FOUR HEPBURN CRANES

Provide the equipment and labour to perform the work required for the inspection and five-year certification of four Hepburn cranes.

The work will be broken down into two stages. The two cranes on the ocean side will be done in the spring of 2012 and the other two in the fall of 2012.

Coordination of the work will be supervised by the Chief Engineer, assisted by the Chief Officer and with the collaboration of the Marine Safety Office (MSO). The Contractor will be responsible for coordinating the inspections with the various inspection authorities.

The Contractor will then have to set up and start the work safely and in compliance with on-board regulations.

Accurate measurements will be taken of all components and noted in a final report, which will describe all the work carried out. This will include the required electrical component measurements. This report must also include all the certificates, a description of the work performed and the list of the parts replaced. Three copies of this list must be provided to the Chief Engineer when the work is completed.

All parts found to be defective or too worn out will be replaced with equivalent parts supplied by the Contractor. The costs will be negotiated separately using Form 1379.

If hot work is required, before starting the work, the Contractor must obtain a hot work permit, signed by the Chief Engineer.

All work must be to the complete satisfaction of the PWGSC representative, the CCG project officer, the vessel's Chief Engineer and the TCMS inspector.

There will be no crane service available on board the vessel. The firm selected will have to provide the crane services it needs itself. The Contractor must provide the scaffolding and the crane services.

There will be no rooms available for the company's personnel.

The Contractor must leave the vessel in the same state of cleanliness as before the work started.

The electric work must be done by a firm with marine experience. The firm must provide certified electricians.

The hydraulic work must be done by a firm with marine experience.

An accurate hydraulic plan must be prepared after the work. The drawing must be done using AutoCAD and PDF. Provide the computer files.

The company may take the cranes to its workshop to facilitate the work. It may also do the work on board.

The following work must be done on the 4 cranes:

1. Disassemble the 3 cylinders, 6 pins and 6 bearings. Clean and measure them. The cylinder head packing must be replaced and so must the cylinder packing (seal kit). The Contractor will supply the parts.

2. Disassemble the 3 sheaves and 3 pins. Clean and measure them.
3. Verify all the lubrication points. Replace all the grease nipples with 316 high-pressure stainless steel nipples. All components must be lubricated with grease (Petro-Canada PXL2C30, Precision XL EP2) supplied by the Contractor.
4. Do a penetrant inspection of all pins to detect any fissures.
5. Prepare and do a magnetic particle inspection of the crane bases. An inspection report must be provided. Apply paint—KQA101 Interbond 501 Red—on the exposed metal.
6. Show the replacement parts and measurements to the TC/SS inspector.
7. Reassemble all the parts as described in the manufacturer's user guide.
8. The Contractor must supply and replace the filter elements in the hydraulic system. Clean the tank. (The Contractor will supply the oil—Petro-Canada HDMXV22P20, Hydrex MV Arctic 22). Expect to use 2 barrels of oil per crane. The old oil must be recovered and disposed of in keeping with environmental regulations. The remaining new oil will be recovered by the vessel. The empty barrels must be recovered by the Contractor.
   The cables and hoist hooks must be disassembled and inspected. After the inspection, if the cables are considered to be in good condition, they must be sent away to be certified. When they are returned, the certificate will be given to the Chief Engineer and the cables and hooks must be installed. The cables must be reversed.
9. Replace the control panel inside the cabin on the left side with a smaller one made of leakproof stainless steel. Install it at an angle like the original so that the pushbuttons can be easily seen. Replace and identify the terminal block and the fuse holders with new ones of the same size.

Replace the wiring going into the box. Each end of each wire must be identified based on the plan. Replace the ammeter with a new waterproof one. The graduated scale must be as similar to the original one as possible. Replace and identify the buttons and the signal light with new, heavy-duty leakproof ones. The new pilot lamp must be a green LED one. There is a green *Start/Départ* button, a red *Stop/Arrêt* button, a yellow *Horn/Klaxon* button and a black *Slack line override/Câble mou* button on the side. The 2 buttons for the heating and the electric components connected to them must be removed.

Current panel

New CCGS Amundsen panel

10. Check that the horn is working properly and make any necessary repairs.
11. Check that the windshield wipers are working. Make any necessary repairs.
12. Disassemble the following items and take them to the workshop for an overhaul and verification of their performance on the auxiliary pump: both hydraulic motors, the brake actuator, the brake cylinder, the operating control (levers) and the electrically controlled hydraulic valves. Make any necessary repairs. Replace the packing seals and the ball bearings. If other components are found to be damaged when parts are opened, they will be dealt with separately. Before opening any components, it is important to know whether the parts can be delivered within the contract deadlines. The vessel's cranes must be operational when it returns to sea. **The parts for the main pump are no longer available so obtain a new replacement pump with the same specifications from the same manufacturer.**
13. Overhaul the winding drum, clean it and paint it with bridge red Intergard 264 epoxy.
14. Ship the electric motor to a specialized firm for a complete overhaul, cleaning and replacement of the ball bearings, and to have it painted with grey epoxy.
15. Clean, degrease and mechanically sand off the rust inside the hydraulic compartment and inside the base to prepare these surfaces for painting. Paint the inside with bridge red Intergard 264 epoxy paint.

16. Check the hydraulic oil heating elements and supply the ground insulation resistance, the resistance of each element and the amperage of the current in each element. Check that the thermostats are functioning properly and replace them as necessary. Adjust them to the manufacturer's specifications.
17. Check the functioning of the thermostat that prevents the pump from starting up if oil temperature is below 10°C.
18. Visually inspect the hoses and hydraulic pipes and make any necessary replacements.
19. Seal any oil leaks observed during the work.
20. Replace the convection heater in the cabin and supply the ground insulation resistance, the resistance of each element and the amperage of the current in each element. The model to be installed is OVS1002-BL – convention wall heater –120V AC, 1000W, white with OVS-BS-BL – surface mount device – white, OVS-TB26 – double-pole bimetal thermostat, BOT15 Qt 4 – spare thermostat buttons.

Current heater

21. In the cabin, check the lighting and the electric outlet, and make any necessary repairs. Check that the exterior lighting is functioning and leakproof, and make any necessary repairs.

Exterior lighting

22. Check the motor's anti-condensation heating elements, the switch and the control panel, and supply the ground insulation resistance, the resistance of each element and the amperage of the current in each element. Repair any defective elements.

23. Clean and polish the slip rings.
24. Clean and polish the brushes. Check the tension of the springs. Check the connections; fix any loose connections. Change any brush holders with damaged threads.
25. Check that the limit switches are functioning properly and make any necessary replacements. There is one on the slewing and one for the slack line.
26. Check that the control pedals inside the cabin are functioning properly and make any necessary repairs.
27. Replace the worm gear switch on the winding drum. Install a tachometer/encoder. Check that the encoder is functioning properly, readjust the upper limit of the hook and test the lower limit of the hook (3 turns of the cable must remain on the drum).

Encoder installed on the CCGS Amundsen

28. Check the ground insulation of each distribution panel circuit breaker inside the cabin at 500V and provide a report.
29. The drum and crane brakes must be properly maintained. The brake bands may need to be replaced.
30. Replace the packing seals on all the crane doors. Mechanically clean the locations for the packings before installing new packings.
31. Conduct a leakage test on the windows and the various panels on the crane. Make any necessary repairs.
32. Replace the chair inside the 4 cranes.

Current chair

New AF00441 fabric chair supplied by Hepburn Enterprises Inc. See http://www.hepburnenterprises.com/seats.htm

33. The inside of the operating station must be cleaned with a degreaser made by International. The rust must be mechanically cleaned off down to bare metal. A layer of Interprime CPA primer

must be applied to the exposed places. Apply a layer of Interlac RAL 9003 (wall and ceiling) and red Interlac (floor) to the primed places and a complete layer to all inside surfaces. Care must be taken to avoid getting paint on the bridge, windows, hoses and other components. Supply the paint. The work must be done with brushes and rollers. Do not spray paint. Before painting, protect all the components pointed out by the Chief Engineer. Remove the protection when the work is finished.

34. Redo the ladders for getting into the operating stations of the 2 cranes. The 3 steps must be the width of the crane and they must be constructed in the same manner.

Back port side of the crane

Front port side of the crane

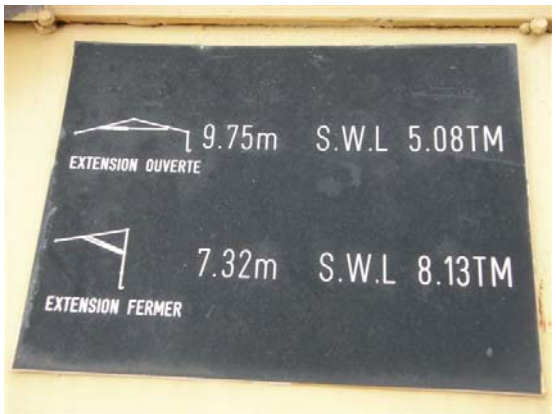
35. The back doors of the 4 cranes must be modified so that they open in 2 sections. They must close with a single-handle closing device. (See the helicopter fuelling station and the photos.) The hinges must be redone on the side where there are none. The rungs for climbing onto the crane must be moved to one of the two doors . A leakage test must be done after the work.

Current door

Suggested new system

36. Before installing the cables, the cranes must be cleaned with a degreaser from International. The rust on the cranes and its components must be mechanically cleaned off down to bare metal. A layer of primer and a layer of Interzinc 52 at 3 mils dry must be applied to the exposed places. Apply a layer of buff Intergard 764 at 2 mils dry to the previously painted places. Apply 1 layer of buff Interthane 990 finish at 2 mils (signal) to the cranes and their components. Care must be taken to avoid getting paint on the bridge, windows, hoses and other components. Supply scaffolding if necessary. Supply the paint. The work must be done with brushes and rollers. Do not spray paint. Before painting, protect all the components pointed out by the Chief Engineer. Remove this protection when the work is finished.
37. Once the paint has dried and to the satisfaction of the Chief Engineer, all the components must be lubricated with grease (Petro-Canada PXL2C30, Precision XL EP2) supplied by the Contractor.
38. If necessary, redo/touch up the symbols on both sides of the crane.

39. Supply and apply Petro-Tape to all the cylinder end covers and the hose connectors as necessary.
40. Supply and install 3 placards identical to those on the back starboard side of the crane. Placards must be installed on the other 3 cranes.



41. After each day's work ensure that the area around the cranes is clean and safe.
42. All painting and painting preparation work must be done according to International's latest recommendations.
43. Lift tests must be conducted in the presence of the TC/SS inspector at 125% of the cranes' maximum load. The CCG will supply the weights.