TENDER SPECIFICATION FOR REFURBISHMENT OF PROPULSION SYSTEM OF BNS DHALESHWARI

1. **Preamble.** Necessary refurbishment/ repair/ servicing/ upgradation of the complete propulsion system of BNS DHALESHWARI (Ex Castle Class Corvette of British Royal Navy) shall be carried out to rectify the existing defects of the propulsion system.

2. **Components of Propulsion System.** Propulsion system consists of the following components:

   a. 02 x RUSTON (Model: 12 RKCM) diesel main engines (ME) including 02 x Engine Control Systems (ECS) and associated peripheral equipment and sensors.

   b. 02 x SULZER BROS (UK) Controllable Pitch Propellers (CPP) including 04 x blades for each propeller, 02 x shafts, 02 x Oil Distribution (OD) Box and 02 x CPP power units.

   c. 02 x GEC MARINE (UK) Reduction Gearbox (RG) including Clutching System.

   d. Propulsion Control and Monitoring System (local and remote control) with cabling and wiring interface between and within Bridge Control Console, Bridge Monitoring Console, MCR (Machinery Control Room) Control Station, Engine Rooms, Engine Control System (ECS), and Machinery Control and Monitoring System interface.

   e. 2 x Shafts Support Systems with 2 x 'A' brackets with bearing, 2 x 'P' brackets with bearings, 2 x shafts seals, 6 x Plummer blocks, 2 x thrust blocks/bearings, 2 x stern tubes with bearing and 4 x shaft couplings.

3. **Engine/Machinery/System.** The existing engine/equipment/systems are of following manufacturers:

Equipment	Brand and Model	Country	Year	Manufacturer's Address
ME	RUSTON DIESELS Model:12 RKCM, 12 Cylinders	UK	1981	Ruston Diesels Ltd, Vulcan Works Willows, Merseside WA128RU, England. Telephone: 092552-5151, Telex: 62366 & 627131/2, Telegram: Enelectico Newton-Le-Willows
CPP	Twin Screw Controllable Pitch Propeller, IMO Screw B4F-038N1	UK	1981	Sulzer Bros, (UK) Ltd Controllable Pitch Propeller Division Pinehurst Avenue, Farnborough, Hampshire Telephone: (0252) 544311 Telex: 858771
RG	Airflex, 1 RH. RG560H	USA	1981	Airflex, Eaton Corporation, Airflex division, 9919 Clinton Road, Cleveland, Ohio 44144-1077, USA Phone: (216) 281-2211, Fax: (216) 281-3890
Propulsion Control System	**Existing System:** An indigenous system developed by CNRD (BN) in 2015 using a **Siemens S7-300 PLC.** Since then, both engines have been operated using this control system.			**Before 2015 from UK:** Servo-watch and Bond Instrumentation & Process Control Ltd. Model: Mitsubishi PLC, Servo Watch-B148

4. **Existing Defects of the Propulsion System.** The propulsion system including Main Engine (ME), Engine Control System (ECS), Reduction Gear (RG), Controllable Pitch Propeller (CPP) and shafts with support system are to be refurbished/ serviced/repaired for rectification of following defects:

a. **Main Engine**. The main engines of BNS DHALESHWARI are rated for a maximum 750 rpm, but in service they cannot be operated above 540 rpm. When speed exceeds 540 rpm, the freshwater (jacket water) outlet temperature rises to about 86°C which is close to the 90°C limit. Due to the age of the engines, the jacket-water and lube-oil coolers cannot remove enough heat at higher loads. Therefore, to maintain safe operating temperatures, engine speed is limited to 540 rpm or below. Besides, the seawater pump, freshwater (jacket-water) pump, gear-type lube-oil pump, intercooler (charge-air cooler), and lube-oil cooler on both main engines have experienced frequent breakdown. Additionally, lube-oil and fuel leaks have been observed at multiple locations in the engines. Excessive fuel and lube-oil consumption is also noticed in both engines.

b. **Controllable-Pitch Propeller (CPP)**. The ship-fitted controllable-pitch propeller (CPP) system is very old. As a result, the CPP hydraulic pump, the oil-distribution (OD) box, and the associated hydraulic oil lines show faults frequently. Although the design maximum pitch angle is 30°, the pitch cannot be increased beyond **18°**.

c. **Propulsion Control, and Monitoring System**. The control and monitoring system is very old and shows faults frequently. The temperature and pressure gauges are aged and often fail. Several sensors are obsolete and show repeated faults. The electro-pneumatic control system has recurring problems, including air leaks in the engine control pneumatic lines. The engine speed control card (governor control card) also fails frequently.

d. **Reduction Gear**. The Ship is fitted with two reduction gearboxes. These gearboxes have been in service since the ship was built. STBD gearbox generates an abnormal sound at lever positions 1.0 and 1.5. Both gearboxes consume excessive lubricating oil. The lube-oil coolers for both gearboxes were found leaky and were temporarily repaired using locally fabricated tubes. However, these locally made coolers leaks repeatedly on several occasions and water entered the gearboxes and contaminated the oil.

e. **Shafts with Support System**. The Ship has two shafts. Each shaft has three sections; main, intermediate, and tail. The shafts are supported by six Plummer blocks and two Thrust blocks. These supports are very old and consume excessive lubricating oil. The gland seals are cooled by two gland-cooling pumps. These pumps are also very old and show repeated defects. There are six shaft bearings in total—four to port and two to star board—of types MA (aftermost) and MT (tunnel). There are four shaft couplings, two on each shaft. The coupling types are OK HB 250 and OK HB 230. Their current performance is satisfactory. However, bearing staves and shaft seals (Model and Type) may need to be renewed.

f. **Auxiliary Machineries**. The auxiliary machinery including but not limited to priming pumps, standby pumps, fuel circulating pumps and gland-seal (gland-cooling) pumps experiences frequent faults due to age and wear leading to repeated failures and reduced reliability.

5. **Scope of Work/ Supply**. The propulsion system including Main Engine, Propulsion Control and Monitoring System, Reduction Gears, Controllable-Pitch Propeller, Shaft with Support System along with their auxiliaries are to be refurbished/ repaired/ serviced/ upgraded by the respective OEMs for regaining original condition as new one so that the propulsion system can run trouble free for next 12 years. The works under the title **REFURBISHMENT OF THE PROPULSION SYSTEM OF BNS DHALESHWARI** will include but not limited to followings:

a. **Main Engine**. Salient activities/works of Main Engine (ME) repair are as follows:

(1) The required 30,000-hour overhaul routine for the two main engines of the ship is to be carried out by expert technicians from recognized company as per OEM standard. Details of required maintenance works are listed in Annex A as per OEM maintenance manual. PURCHASER will assist with additional manpower and workshop facility as required under supervision of Bidder's Subject Matter Experts (SMEs).

(2) All prevailing defects as mentioned in para 4(a) are to be rectified.

(3) Both ME's crank shafts are to be inspected for crankshaft deflection and trueness and shall be rectified as per standard requirement. PURCHASER will provide workshop and machine tools support.

(4) Crankshaft of each of the engines are to be inspected and if necessary to be repaired or refurbished accordingly.

(5) All main bearings, big end bearings, small end bearings and injectors are to be replaced and renewed.

(6) Engine liners, pistons, connecting rods are to be inspected and repaired or renewed as necessary.

(7) All ME auxiliaries such as jacket water pumps, sea water pumps, fuel oil booster pumps, fuel feed pumps, high pressure fuel pumps etc are to be replaced or renewed as necessary.

(8) All ME sub systems (jacket water, fuel, air, and lube oil) are to be inspected thoroughly and all related sensors, meters and gauges (pressure, temperature, speed etc) are to be replaced or renewed. Associated pipelines may be repaired or renewed with their valves and reducers.

(9) All Turbo blowers (NAPIER Type SA-1050 fitted with main engines are to be checked for standard performance and trouble-free operation. Turbo blowers are to be repaired with necessary kit and if not possible, to be replaced as necessary.

(10) All other spares parts shall be replaced or renewed as per 30,000hour overhaul routine, OEM standard and based on actual need for smooth operation and full performance of the engines.

(11) All items, auxiliaries and spare parts required for the above repair, refurbishment and renewal works are to be supplied by the BIDDER.

b. **CPP System**. Salient works/ activities of the CPP system repair are as follows:

(1) Salient CPP system is to be thoroughly serviced or refurbished and replaced, as necessary by the expert technicians from the competent company including but not limited to OD box, oil tubes, propeller hub, propeller blades, pumps, filters, pipelines, valves and power pack.

(2) OD Boxes, Hubs Oil and Tubes are to be completely dismantled and all components are to be inspected and measured for wear and damage, and to be renewed as required. All rubber seals and O rings within the hub and oil tubes must be renewed. All parts of the CPP

System are assembled accurately for as per OEM protocol and standard so that CPP system can function without any trouble. Balancing of propeller (static and dynamic) is to be done after necessary work.

(3) Flushing is to be done by BIDDER before final filling of hydraulic oil as per the international standard (NASH). BIDDER will make necessary arrangement for such flashing. BIDDER has to arrange one complete flashing unit and NASH filter unit for achieving required standard. BN will provide only required flashing oil.

(4) All existing defects listed in 4(b) shall be rectified by BIDDER. Any components, special tools and spares required for the rectification and refurbishment of CPP system for correct operation shall be supplied by the BIDDER.

(5) CPP System is to be integrated with newly installed Control System. On completion of the refurbishment work, pitch angle is to be synchronized and calibrated with the Propulsion Monitoring and Control System.

c. **Propulsion Control and Monitoring System.** Salient activities/works of Propulsion Control and Monitoring System (PCMS) are as follows:

(1) The Salient CNRD built (Centre for Naval Research and Development) control system (electrical and pneumatic) is to be replaced and renewed by a PCMS connected to MEs, CPP and Gearboxes with full integration for necessary command, control and monitoring facilities.

(2) PCMS should be robust, reliable to allow minimum 15 years trouble free operation. It should be equipped with all required combinatory, sensors, displays, monitors, gauges, pipelines, control valves, solenoids, PCBs, control panels and wiring within it and between PCMS and integrated systems (ME, RG, CPP and necessary auxiliaries).

(3) PCMS should be laid and installed accordingly as to connect Engine Room (for local control), MCR (Primary Control) and Bridge (Secondary Control).

(4) A new combinator curve (pitch–RPM program) shall be designed by BIDDER. The control system shall be designed appropriately as to synchronize main engine's various speeds to appropriate propeller pitch angle so that propeller can generate maximum thrust without overloading the engines.

(5) Necessary drawings or circuit diagrams and manuals are to be provided to the Ship by the BIDDER.

d. **Reduction Gear Box.** Salient activities/works of Reduction Gear Box (RG) are as follows:

(1) Complete inspection and checking of mechanical, pneumatic, and electrical components (in both engaged and disengaged conditions) are to be done by the BIDDER.

(2) Servicing or replacement of all parts of the reduction gearbox, including GLOP, Priming Pump, Clutches and other auxiliaries shall be performed as necessary for the smooth and correct functioning of gearbox by the competent technicians from the recognized company.

(3) All items, auxiliaries and spare parts required for the above repair, and refurbishment works are to be supplied by the BIDDER.

e. **Shaft and Support System.** Salient activities/works of shaft and support system are as follows:

(1) All shafts and shaft support system (all bearings, keys, and couplings) are to be checked for misalignment, wear, damage, run-out, and geometry. Servicing or refurbishment of all such components are to be done by the BIDDER with expert technicians. Shaft trueness may be checked and corrected if necessary and BN will provide workshop facilities. Necessary components, spares and special tools will be provided by the BIDDER.

(2) 6 X Plummer block housings, caps, seals, end covers, and bearing inserts are to be opened, cleaned, and inspected. Radial/internal clearance and axial end-float are to be checked. Lubricant condition is to be checked. If necessary or damaged, bearings, seals, sight glasses, and breathers are to be renewed or replaced by BIDDER's technicians.

(3) 2 X Thrust block assembly (pads, collar, carrier, and housing) is to be dismantled and inspected. Pad rocking/pivot freedom, contact pattern, collar wear, and axial end-play are to be checked. If necessary or damaged, thrust components and liners are to be renewed or replaced by BIDDER technicians.

(4) All Couplings are to be opened, coupling bolts and keys are to be removed and are to be inspected and measured for fit, concentricity, and face condition. These are to be serviced or refurbished as necessary by BIDDER technicians. BN can support with additional manpower and lathe machine.

(5) MA and MT bearing shells/pads shall be repaired or renewed and journals to be machined or polished to OEM tolerances.

(6) MA seal elements (lip/face), garter springs, and O-rings/gaskets shall be replaced; the seal liner/sleeve shall be reconditioned or replaced if beyond wear limits, and hoses/pipes and wiper rings shall be renewed.

(7) The two gland-cooling pumps shall be replaced with new units.

(8) Plummer-block and thrust-block bushes, shells, and liners shall be overhauled or replaced as required.

(9) After completing all work, alignment and geometry shall be checked. If required, alignment shall be adjusted, and any misalignment shall be corrected by the BIDDER'S technicians.

(10) All necessary special tools including bearing puller and torque multiplier to be supplied by BIDDER. BN may supply only the available tools in Mongla Dockyard workshop.

f. **Setting to Work.** Carrying out setting to work as mentioned in paragraph 26.

g. **Documentations.** An evaluation of propulsion system covering all components and sub systems is to done by the BIDDER with a detail report prior commencement of the refurbishment work. BIDDER is to submit a report on completion of refurbishment work attaching all records and document related to changes, repair works and modifications. Detail documentation requirement is laid down in paragraph 20.

h. **Training.** Local training in Bangladesh for a group of operators/technicians (15 Personnel) has to be provided for 10 (ten) working days. The training will be conducted by competent foreign engineers/technicians after installation is completed (before/during HAT and SAT). Training should cover both practical and classroom session and should encompass whole propulsion systems (ME, gearbox, CPP, PCMS and Shaft Support System focusing operation, maintenance, and troubleshooting. Necessary training handout to be provided by the BIDDER.

j. **Software and Backup**. Necessary software (genuine and full version) with backup is to be provided by BIDDER on completion of work and during the training session. Software part is to be included in the training as well. Required updates of backup software are to be provided by the BIDDER for next 10 years without additional cost.

6. **Project Schedule/ Delivery Time.** Project Schedule/ Delivery Time will be as follows:

a. The BIDDER must complete the project within 12 (Twelve) months from the date of signing the contract including HAT and SAT. The actual onboard work period shall be coordinated between BIDDER and NHQ so that the ship remains non-operational for a short period of time only.

b. The BIDDER shall submit a complete project schedule covering initial evaluation, shipment of spares, repair/up-gradation works, docking period and test/trials in the offer. The sequence of repair work should be carefully planned as to affect the operational period, ships activities and other repair work to the minimum. Applicable logical and technical sequence should also be followed in consultation with the NHQ. Details may be discussed during pre-bid meeting.

7. **Spares Required.** The BIDDER should offer/supply all necessary spares required to complete the scope of work/supply mentioned in Paragraph 5 with itemized prices. If any spares mentioned for scope of works are not consumed during the servicing, it will be handed over as BN/Ship on completion of the project with a complete list and pattern number. If the spares from BN stock is used, the BN store is to be replenished by the BIDDER.

8. **Special Tools.** BN Dockyard/ Mongla Dockyard/ the Ship will provide available tools for the project works. The BIDDER will arrange all the special tools, if not held at BN Dockyard/Mongla Dockyard/Ship for the project work. The special tools are to be handed over to BN/Ship on completion of the works. The BIDDER, where necessary, may conduct survey to ascertain existing BN facilities at their own cost.

9. **Eligibility of the BIDDER.** The BIDDER shall be competent and experienced in similar repair/ refurbishment work onboard ship. The BDDER shall be any of the followings:

a. OEM of any of the systems (within the scope of works), or

b. Any reputed company who is competent and experienced in similar repair/ refurbishment work onboard ship, or

c. A reputed company who is authorized by OEMs of the systems (within the scope of works) or authorized by any reputed company who is competent and experienced in similar repair/ refurbishment work onboard ship.

10. **Eligibility of Technicians.** All technicians should be skilled and from the well-known relevant work field. The Technician should also be led and guided by subject matter expert (SME). The credentials, travel itinerary, passport, bio-data and other relevant documents including VISA of the technicians are to be submitted prior 01 (one) month of commencement of the actual works for approval of the PURCHASER. After vetting necessary credentials and security clearance form concerned authority The PURCHASER will notify the BIDDER about clearance of the technicians visit.

11. **Overall Coordination among the Multiple Work Groups.** The project may involve different experts from different countries/ companies. Their individual scope of work may be unique and different as well. Despite this difference, they will work simultaneously on the same platform to achieve the common objective i.e., repair/refurbishment work of propulsion system of the ship. For this mutual cooperation, coordination, information sharing, resource sharing etc. BIDDER or local agent on his behalf is to act as overall coordinator for such purpose.

12. **Supervision of Works.** The repair/refurbishment of propulsion system shall be done by the BIDDER'S technicians in presence of Ship and BN Dockyard personnel. The BIDDER shall deploy required number of expert technicians for successful completion of the project. The BIDDER is to appoint a competent **'Project Manager/ Supervisor'** on his behalf for supervising and coordinating all project works on site at BIDDER's arrangement. The Project Manager/Supervisor shall carry out survey of the Ship and Dockyard facilities within 01 (one) month of signing the contract. Project Manager/Supervisor shall be on site for total duration for which the actual work take place on site.

13. **Support from BN Dockyard/ Mongla Dockyard.** All administrative, logistic and transport facilities for the work on site are to be provided by the BIDDER. BN will provide available crane and forklift support within the naval premises. All repair/maintenance/installation materials, cablings, spares, tool set are to be provided by the BIDDER. BIDDER may use general workshop facilities available BN Dockyard/ Mongla Dockyard including docking of the ship. BIDDER may mention supports necessary from BN Dockyard/ Mongla Dockyard in the offer.

14. **Test, Trial and Acceptance.** Test and Trial and Acceptance will be carried out as follows:

a. Test and trials (HAT & SAT) of the Propulsion System is to be done by the BIDDER in the presence of BN representative/Acceptance Committee on completion of work. The BIDDER is to submit detailed HAT and SAT procedure at least 02 (Two) months before the commencement of test/trails to NHQ for approval. HAT and SAT procedure are to include condition of test/trial, test procedure and desired standard parameters for the test covering all sub systems of the propulsion system. The procedure will be finalized after incorporating the NHQ's comments. Following tests must be included in the HAT/SAT procedure:

(1) Both main engines should be tested for correct running parameters at harbour after maintenance.

(2) Both main engines shall be engaged with the gearbox and run at their maximum rated RPM. All parameters shall remain within their allowable limits while the engines are operating at maximum rated RPM (750 RPM).

(3) Both main engines should be operated at sea with maximum output reasonable period of time to measure running parameters in full load condition. Engine BHP to be measured by the BIDDER at full load condition with suitable measuring device (measuring the torque). Minimum allowable BHP is 95% of maximum rated maximum power of 2104 KW.

(4) Both main engines shall be operated for a reasonable period to verify that known issues have been rectified specifically; the inability to reach the rated maximum RPM, any parameters exceeding allowable limits, the exhaust "red hot" condition, and the CPP pitch angle problem mentioned in paragraph 4. band to confirm that none of these issues persist.

(5) Turbo blower and governor performance is to be inspected, compared and recorded for correct functioning.

(6) Stock of spares held onboard and supplied by the BIDDER are to be inspected, compared and listed.

(7) CPP performance should be monitored and recorded for proper functioning of each component and cross checked with the ship's speed table.

(8) RG/Gearbox performance is to be checked, monitored and recorded for correct functioning.

(9) Propulsion Control and Monitoring System are to be tested for correct calibration and functioning.

(10) All replaced/renewed/repaired sensors are to be checked for correct functioning.

b. Operating tests and performance checks for propulsion system should also include:

(1) Progressive Speed Trial (Ahead, Astern) with full power trial.

(2) One Shaft Speed Test.

(3) ME starting & control air system check.

(4) Operating Test for propulsion shaft seal and bearing.

(5) Integrated Operating Test for propulsion system.

(6) Operating Test for CPP at sea.

(7) Zero Pitch Test for CPP at sea.

(8) Ship's Endurance Test.

(9) Fuel Oil Consumption Test.

(10) Analog and digital parameters synchronization of complete propulsion system.

c. **Desired Parameters.** Considering existing operational conditions of the ship, followings are the desired parameters after completion of the repair/ refurbishment work:

Criteria	Desired Parameter
Speed at maximum continuous rating (at 750 rpm)(Allowable limit 95%)	18 knots at 1350 ton displacement
Endurance	Not less than 4,000 NM at cruising speed

d. After satisfactory test & trial (HAT/SAT), an Acceptance Certificate shall be provided by the BN/Ship/Acceptance Committee.

e. Necessary arrangements for SAT at sea shall be done by the BN/Ship. The BIDDER shall supervise accordingly. BIDDER is arrange the presence and supervision of experts of each subsystem during HAT and SAT.

15. **Insufficient Speed and Power.** Speed guarantee and continuous includes the followings:-

a. The BIDDER shall have to give guarantee that the repair/up-gradation will enable the ship to achieve the desired maximum continuous speed 18 knots (at 1350 ton load condition) and 95% of 2104 kW and endurance.

b. In case, the ship fails to achieve the maximum continuous speed and power as stated in the specification then penalties shall be imposed on the BIDDER for non compliance of the contract as per the following:

Ser	Speed Deviation from the Desired Speed	Penalty Counted in % of LC value
1.	Upto 0.25 knots	1.25%
2.	0.25 to 0.50 knots	2.5%

3.	0.50 to 0.75 knots	3.75%
4.	0.75 to 1.0 knots	5%
5.	1.0 to 1.25 knots	6.25%
6.	1.25 to 1.50 knots	7.5%
7.	1.50 to 1.75 knots	8.75%
8.	1.75 to 2.0 knots	10%

c. If the deficiency in actual maximum continuous speed of the ship is more than 2 (two) full knots below the speed guaranteed in the Contract, then BN, at its option, may, subject to the BIDDER'S right to effect alternations or corrections, cancel the Contract.

16. **On-site Inspection.** The BIDDER may inspect the Ship to assess the existing operational state of the ship before submitting their offer at BIDDER'S own cost.

17. **Warranty.** The BIDDER shall provide warranty period of minimum 01 (one) year after signing final acceptance by Acceptance Committee. During warranty period, all necessary service/repair of the propulsion system are to be done by BIDDER without any charge/payment. If any defect arises within these two years, BIDDER will rectify the defect by replacing the respective module. If the equipment remains non-operational for more than 03 (three) months (date count from the date of initial reporting to BIDDER or local agent) due to defect in any sub unit/component during the warranty period, the warranty period will further be extended for that period.

18. **Guarantee for Warranty.** The BIDDER shall furnish to DGDP a bank guarantee for warranty amounting 5% (Five percent) of the LC value after satisfactory test/trial (HAT/SAT), local training and acceptance by BN which shall remain valid until expiry date of the warranty period.

19. **Certificate.** The BIDDER is to furnish following certificates:

a. Guarantee Certificate.
b. Warranty Certificate.
c. In case, BIDDER himself is not accomplishing the repair or refurbishment work, necessary authorization certificate or proof of partnership from the company/ OEM/ organization doing the refurbishment/repair work are to be submitted with the tender.

20. **List of Documents.** Documents are to be submitted by the BIDDER in both hard and soft copies. The list of documents is:

a. Evaluation report on propulsion system and work plan before commencement of the work.
b. Complete report on the refurbishment work with necessary information, data and records.
c. Complete wiring diagram, installation diagram and operating manual of the control system.
d. HAT & SAT procedure document (before 2 months of test/trial).
e. Parts Catalogue for newly installed components.
f. All relevant certificates as mentioned in this document.
g. Final acceptance certificate.

21. **Factory Acceptance Test (FAT) for Control System.** Modalities of FAT are as follows:

a. Factory Acceptance Test (FAT) for Propulsion Control and Monitoring System will be carried out by 2 (two) BN officers for 5 (five) days (Excluding the journey period) at the PURCHASER's expense at manufacturer's premise. All types of movement/ transportation (air, sea, road, rail) of the BN officer within the manufacturer/ supplier's country, reception, and arrangement for entry into the

country/ concerned area for the FAT are to be borne by the supplier. The BIDDER should inform the PURCHASER about the date, schedule, and procedure of FAT at least 8 (eight) weeks prior to the commencement of the said FAT. After inspection, a joint inspection report will be prepared and signed by both the seller and PURCHASER's representatives.

b. On return from the country of supplier, the BN officers will submit a report to DNE. DNE, through DTS, will, in turn, forward the final decision along with the FAT report within 2 (two) weeks, based on which DGDP will render clearance for the shipment of stores to the supplier concerned. The supplier will not ship any item of the contract without clearance from the DGDP.

22. **Shipment and Delivery**. Shipment and delivery to be carried out as follows:

a. The BIDDER is to arrange shipment of all items by sea/air to Chattogram as per the scheduled timeline to the following address:

The Commanding Officer, Naval Stores Depot, New Mooring, Chattogram, Bangladesh.

b. All items are to be delivered in suitable protective packing to ensure safe transit.

c. All packages are to have packing notes showing their contents in detail and all packages shall be marked with the name and address of the consignee and gross weight.

d. BN will assist in completing custom formalities. The BIDDER will arrange transportation of all supplied items to NSD Chittagong.

e. **Port of Shipment**. Any port of the manufacturing country.

23. **Price Quotation.** The BIDDER is to offer full itemised price for supplies, spares, services and training for each of the components of the propulsion system. The PURCHASER will have the right to procure particular supplies, spares, services and training from the offered price quotation depending on actual requirements and OEM recommendations.

24. **Price.** If the item is imported against this order, price to be quoted without import duties.

25. **Terms of Payment.** Letter of Credit (LC) shall be opened for full amount of contract price in favor of BIDDER for the complete scope of supply with the following terms of payment:

a. 20% (Twenty percent) of total LC value will be paid on submission of the documents mentioned in Paragraph 20a (Evaluation Report and Work Plan) and on submission of a Bank Guarantee (BG) provided by the BIDDER amounting 20% (Twenty percent) of the LC value issued by any scheduled bank of Bangladesh. BG will be released prior payment of next installment (40%).

b. 40% (Forty percent) of total LC value will be paid on delivery of new PCMS, spare and tools, ME overhauling spares, new CPP control system and other relevant major components to the consignee

c. 20% (twenty percent) of total LC value will be paid on completion of all repair/refurbishment work under the scope of work/supply and carrying out setting to work (as per paragraph 26).

d. 20% (Twenty percent) of total LC value will be paid after satisfactory test/trial (HAT/SAT), local training and acceptance by BN and on submission a bank Guarantee for Warranty amounting 5% (Five percent) of the LC value issued by any scheduled bank of Bangladesh. The Guarantee and warranty shall remain valid until expiry date of the warranty period.

26. **Setting to Work.** Shall mean the following:

a. **Propulsion Control & Monitoring System.** The system should be ready to operate the propulsion system satisfactory after necessary repair/ replacement/ refurbishment. Necessary functional test is to be carryout and system is to be made fully operational.

b. **Main Engines (ME).** Running In is to be carried out by operating engine at different rpm. The engine should be ready for on load test/trial (HAT/SAT).

c. **Controllable Pitch Propeller (CPP).** Functional test at different pitch is to be carried out and ready for test/trial.

d. **Reduction Gearbox (RG).** Fully functional and ready for on load test/trial.

27. **Validity of the Offer.** The offer shall remain valid up to **June 2026**.

28. **Compliance Statement.** A clear and complete compliance statement of the tender specification supported by brochure/ booklet, etc in English is to be submitted with the offer. Any deviation from this specification is also to be clearly mentioned in the offer. Incomplete compliance statement may attribute to cancellation of the offer.

29. **Condition for Acceptance of Quotation.** Quotation may not be considered if detailed information/specifications, maker's brochures/booklet of offered item, accessories and scope of supply/work etc are not provided. The PURCHASER may purchase part or whole of the consumables/accessories/test equipment.

Enclosure:

A. Main Engine 30,000 hour's Scheduled Maintenance.
B. List of Pumps/Accessories.

MAIN ENGINE				
MAINTENANCE SCHEDULE			Organization and period of maintenance	
Maint Op No	JIC/ User No	Job Description	By Whom	Period
30000 Hrs (Major overhauling)				
1.	30000H$_1$	Engine to be completely taken apart and carried out overhauling its associated parts accordingly.	DY	30000 Hours Routine
2.	30000H$_2$	Examine the main bearing shells and determine the bearing clearances. Clean the bedplate. Inspect the main bearing bolt lower nuts and split pins before reassembly.	DY	
3.	30000H$_4$	Inspect the crankshaft for cracks; check the journals for wear and ovality. Clean and flush the oil ways. Check the crankshaft alignment when the engine is reassembled.	DY	
4.	30000H$_4$	Withdraw the balance shaft (8v engine) after checking the backlash in the gears. Calibrate the bearing clearance and end floats. Dismantle the balance weight and idler gear; inspect and calibrate.	DY	
5.	30000H$_5$	Flush through oil ways in the hubs.	DY	
6.	30000H$_6$	Clean, de-scale the crankcase.	SS	
7.	30000H$_7$	Remove and clean the cylinder liners, check the bores and renew the sealing rings.	DY	
8.	30000H$_8$	Dismantle the auxiliary drive and check the bearing clearance.	DY	
9.	30000H$_9$	Dismantle and inspect the oil and water pumps.	SSRR	
10.	30000H$_{10}$	Examine camshaft gears, shafts and bushes. Remove camshafts and check journals, couplings and bushes. Check running clearances.	DY	
11.	30000H$_{11}$	Fit new parts as necessary.	DY	
12.	30000H$_{12}$	Examine and lubricate the motor-driven speeder gear.	DY	
13.	30000H$_{13}$	Dismantle the over speed trip. Clean all parts and check for damage and/or wear. Renew parts as necessary.	DY	
14.	30000H$_{14}$	Renew big-end bearings and big-end bolts, nuts and washers.	DY	
15.	30000H$_{15}$	Check the fuel transfer pump and drive. Clean all parts and discard the oil seal. Renew any parts which are damaged	DY	30000 Hrs (Major overhauling)
16.	30000H$_{16}$	Clean out the bedplate lubricating oil suction pipes and strainer; renew all synthetic rubber hose connections and joints which have been disturbed.	SS	
17.	30000H$_{17}$	Descale the engine water spaces.	SS	
18.	30000H$_{18}$	Clean the air and water sides of the charge cooler. Clean the oil and water sides of the lubricating oil cooler. Clean the fresh and sea water sides of the heat exchanger. Renew all joints and hoses	DY	

Equipment Description: Main Engine (Model- 12RKCM), Diesel Engine

Schedule Number E-101

Schedule Title: 30000 Hours

Enclosure B

LIST OF PUMP ACCESSORIES OF MAIN ENGINE BNS DHALESHWARI/BIJOY

MAIN ENGINE:

1. Exhaust Manifold
2. F/W pump
3. S/W pump
4. Lub oil pump
5. Lub oil cooler
6. F/W cooler
7. Turbo super charger
8. Fuel feed pump

GEAR BOX:

1. Gear box standby pump
2. Gear box cooler

CPP:

1. CPP hydraulic oil pump
2. OD Box
3. CPP hydraulic oil cooler

PROPULSION:

1. MA Seal
2. Gland cooling pump
3. Deep Sea Seal

MANIFOLD EXHAUST:

Ser	Particulars	Description
1.	Name of Item	Manifold Exhaust
2.	Name of Main Equipment	Main Engine
3.	Quantity	08 (Left Side: 04, Right Side:04) Both Engine
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Ma nufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

FRESH WATER PUMP:

Ser	Particulars	Description
1.	Name of Item	Fresh water pump
2.	Name of Main Equipment	Main Engine
3.	Quantity	02
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

SEA WATER PUMP:

Ser	Particulars	Description
1.	Name of Item	Sea Water Pump
2.	Name of Main Equipment	Main Engine
3.	Quantity	02
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

LUB OIL PUMP:

Ser	Particulars	Description
1.	Name of Item	Lub Oil Pump
2.	Name of Main Equipment	Main Engine
3.	Quantity	02
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

LUB OIL COOLER:

Ser	Particulars	Description
1.	Name of Item	Lub Oil Cooler
2.	Name of Main Equipment	Main Engine
3.	Quantity	04
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

FRESH WATER COOLER:

Ser	Particulars	Description
1.	Name of Item	Fresh Water Cooler
2.	Name of Main Equipment	Main Engine
3.	Quantity	04
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

TURBO SUPER CHARGER:

Ser	Particulars	Description
1.	Name of Item	Turbo Super Charger
2.	Name of Main Equipment	Main Engine
3.	Quantity	02
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

FUEL FEED PUMP:

Ser	Particulars	Description
1.	Name of Item	Fuel Feed Pump
2.	Name of Main Equipment	Main Engine
3.	Quantity	04
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

FUEL HIGH PRESSURE PUMP:

Ser	Particulars	Description
1.	Name of Item	Fuel High Pressure Pump
2.	Name of Main Equipment	Main Engine
3.	Quantity	24
4.	Equipment Brand	Ruston
5.	Equipment Model	12RKCM
6.	Equipment Serial no	IH9063
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	UK
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Ruston Diesel (UK) Ltd
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

GEAR BOX STANDBY PUMP:

Ser	Particulars	Description
1.	Name of Item	Gear Box Standby Pump
2.	Name of Main Equipment	Main Gear Box
3.	Quantity	02
4.	Equipment Brand	GEC
5.	Equipment Model	RG560H
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	GEC Marine and Industrial Gears(UK)
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	GEC Marine and Industrial Gears(UK)
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

GEAR BOX COOLER:

Ser	Particulars	Description
1.	Name of Item	Gear Box Cooler
2.	Name of Main Equipment	Main Gear Box
3.	Quantity	02
4.	Equipment Brand	GEC
5.	Equipment Model	RG560H
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	GEC Marine and Industrial Gears(UK)
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	GEC Marine and Industrial Gears(UK)
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

CPP HYDRAULIC OIL PUMP:

Ser	Particulars	Description
1.	Name of Item	Cpp Hydraulic Oil Pump
2.	Name of Main Equipment	CPP
3.	Quantity	04
4.	Equipment Brand	-
5.	Equipment Model	IMO Screw E4-038N1/RJE
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	Sweden
8.	Country of Manufacture	Wier pumps Ltd, Sweden
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Wier pumps Ltd, Sweden
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

CPP HYDRAULIC OIL COOLER:

Ser	Particulars	Description
1.	Name of Item	Hydraulic Oil Cooler
2.	Name of Main Equipment	CPP
3.	Quantity	02
4.	Equipment Brand	-
5.	Equipment Model	IMO Screw E4-038N1/RJE
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	Sweden
8.	Country of Manufacture	Wier pumps Ltd, Sweden
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	Wier pumps Ltd, Sweden
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

OIL DISTRIBUTION BOX:

Ser	Particulars	Description
1.	Name of Item	Oil Distribution Box
2.	Name of Main Equipment	OD Box
3.	Quantity	02
4.	Equipment Brand	GEC
5.	Equipment Model	RG560H
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	GEC Marine and Industrial Gears(UK)
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	GEC Marine and Industrial Gears(UK)
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

DEEP SEA SEAL:

Ser	Particulars	Description
1.	Name of Item	Deep Sea Seal
2.	Name of Main Equipment	Propulsion System
3.	Quantity	02
4.	Equipment Brand	-
5.	Equipment Model	-
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	GEC Marine and Industrial Gears (UK)
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	GEC Marine and Industrial Gears (UK)
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A

GLAND COOLING PUMP:

Ser	Particulars	Description
1.	Name of Item	Gland Cooling Pump
2.	Name of Main Equipment	Propulsion System
3.	Quantity	02
4.	Equipment Brand	-
5.	Equipment Model	-
6.	Equipment Serial no	-
7.	Country of Origin (Main Equipment)	UK
8.	Country of Manufacture	GEC Marine and Industrial Gears(UK)
9.	Year of Manufacture (Spares)	2024 or later
10.	Source of Supply	OEM
11.	Port of Shipment	N/A
12.	Manufacture's Name and Address	GEC Marine and Industrial Gears(UK)
13.	Supplier/Local Agent	To be mentioned
14.	Certificate and Document of Authentication	OEM Certificate
15.	Packing/labeling	To be mentioned
16.	Warranty	At least 12 months from date of acceptance.
17.	Installation/Compatibility/Interfacing	N/A
18.	Test, Trial and acceptance	N/A
19.	Site visit (Focal Point)	N/A