

1. GENERAL INFORMATION

Name of Ship	MT Gas Nuri Arizona
Ship Owner	PT Pelayaran Ekanuri Indra Pratama
Ship Manager	PT Samudera Indonesia Ship Management
Classification	ABS
IMO Number	9113927
Class Number	95220528
Official Registry Number	GT.5176No.2862/BA
Call Sign	PNKR
Flag	Indonesia
Port of Registry	Jakarta
Date of Built	01 Jan 1995
Ship Builder	Kitanihon Shipbuilding Co., Ltd.
Type of Ship	Gas Carrier Type 2PG
Classification Character, Notations	A1, Liquefied Gas Carrier, AMS
Length Overall (LOA)	105
Length Perpendicular (LPP)	98.4
Breadth (B)	19.8
Depth (D)	8.6
Draft (Design) (T)	5.976
Deadweight	5590 tonnes
Gross Tonnage	5087
Net Tonnage	1527
Current Service Speed	10 knot
Cargo Tanks	HORIZONTAL, CYLINDRICAL PRESSURE TANKS. Tank. No.1 : 2,505.562 m3 Tank. No.2 : 2,507.765 m3 TOTAL CAP : 5,013.327 m3
Cargo Pump Capacity	300 MT/hr X 2 Sets
Ballast Water Capacity	2,339.81 ton
Propeller	KAMOME (4 BRADES KEYLESS PROPELLER)
Total Crew	19
Main Engine	
• Maker	AKASAKA DIESELS, Ltd.
• Kind of Engine	6UEC37LA
• Total Power	3089 KW / 210 rpm
Auxiliary Engine	
• Maker	Shinko Electric, Co., Ltd.
• Model	TVLI-A-605
• Total Power	320 kW
Navigation Equipment	
• Automatic Identification System	Japan Radio, Co., Ltd.; JHS – 180
• Autopilot Steering	Tokimec PR-2000
• Doppler Log	Yokogawa EML 201-HS1 S/N. 1674
• Echosounder	Japan Radio, Co., Ltd.; JFE – 570S No. 52872
• GPS Unit No. 1	Japan Radio, Co., Ltd.; JLR – 6000 Mk-II No. KD98383

• GPS Unit No. 2	Japan Radio, Co., Ltd.; JLR – 6000 Mk-II No. KD98383
• Gyro Compass	Tokimec TG-5000 No. 54533
• Navtex Receiver	Japan Radio, Co., Ltd.; NCR – 300A No. GD 19548
• Radar I	Japan Radio, Co., Ltd.; JMA 6252-6 No. LN 51159 (X-Band)
• Radar II	Japan Radio, Co., Ltd.; JMA 7252-6 No. LW 55838 (S-Band)
Date of Docking Planning	4 February 2018
Period	20 days

2. CLASS, INSTALLATION, AND STATUTORY SURVEY STATUS

Item	Remarks
Kind of Docking	Intermediate Survey V
Last Docking	15 July 2015
Item	Due Date
Special Survey	20 November 2019
Intermediate Survey	20 August 2016 – 20 February 2018 (Will be extended)
Annual Survey	20 August 2018 – 20 February 2019
Docking Survey	14 July 2018
No. 1 Propeller Shaft Survey	14 July 2020
Load Line Renewal Survey	20 November 2019
Load Line Annual Survey	20 August 2018 – 20 February 2019
Ship Safety Construction Certificate	12 April 2018
Ship Safety Equipment Certificate	12 April 2018
Ship Safety Radio Certificate	12 April 2018
IAPP Certificate	18 August 2019
IOPP Certificate	18 August 2019
ISPP Certificate	18 August 2019

3. GENERAL SERVICES

No./A/C	Job Description
3.1 144002	<u>Dry Docking and Dock Preparation</u> <ul style="list-style-type: none"> Ship to be drydocked on soft topped blocks of suitable height for cleaning and examination and then undocked upon completion of listed underwater work including damage discovered on the underwater area upon docking of ship. <p>Cost for 1st and 2nd day Cost per day for each Subsequent Day (Total 16 days)</p>
3.2 147002	<u>Mooring and Unmooring</u> <ul style="list-style-type: none"> Mooring and Unmooring of ship including installation and removal of gangway together with the assistance of yard's tugs, line handlers and dock master / pilot for berthing, unberthing, docking and undocking operations. <p>Condition of Mooring and Unmooring: 1st Mooring - Direct berthing on arrival and docking 2nd Unmooring - Unberthing for undocking and sailing</p>

	There shall be no additional cost for movement of the ship purely for the convenience of the shipyard.
3.3 144002	<u>Tugboat</u> <ul style="list-style-type: none"> To provide necessary services of tugboats to assist ship on arrival from anchorage to dock, from dock to yard wharfage or sea trial. Agency attendance during docking.
3.4 122026	<u>Fire Protection</u> <ul style="list-style-type: none"> To make all necessary shore fire hoses to the ship with maintaining pressure fore Fire Precaution at Main Deck and inside the Engine Room for 3 lines. Fire protection i.e. fire hoses to be kept under minimum pressure of 3 bar during repair period. <p>To quote unit price per line per day. Allowed for 3 lines</p> <p>Labour cost for connecting and disconnecting fire hoses. To quote unit price for connection and disconnection. Allowed for 3 connections and disconnections.</p>
3.5 147001	<u>Wharfage</u> <ul style="list-style-type: none"> To provide wharf facility for 4 days for ship berthing alongside to undergo afloat repairs. <p><u>Note:</u> Owner do not prefer double banking anytime when alongside berth. Damages to hull painting shall be on yard's account. Damages to the ship hull in case of any double banking to be on Yard's Account.</p>
3.6 144004	<u>Pilotage</u> <ul style="list-style-type: none"> To provide pilotage service during ship movement from anchorage to dock area, from dock to yard wharf to sea trial or sail out.
3.7 122025	<u>Fire Watchman</u> <ul style="list-style-type: none"> To provide fire watchman to patrol and make regular inspection of the entire ship during repair period. Fire watchman to report to the duty officer at regular interval. To furnish Fireman to be standby at Location on Deck, in Accommodation in adjacent in the Pump Room and Engine Room where “Hot Work” where carried out. <p>To quote unit price per man per day.</p>
3.8 122030	<u>Security Watchman</u> <ul style="list-style-type: none"> To provide security watchman onboard the ship round the clock, carry out regular inspection, and patrol throughout the repair period. <p>To quote unit price watchman per day. Allowed for 2 men during repair period.</p>

3.9 135001	<p><u>Shore Power Supply</u></p> <ul style="list-style-type: none"> To make all necessary connection and disconnection to the ship shore power connection box and supply electric shore power 440 V, 60 Hz, 3 Phase, 200 A during docking period. Electric power reading shall be acknowledge by Chief Engineer before and after electric supply. <p>To quote unit price for connection / disconnection. Allowed for 2 connection and disconnection.</p>
3.10 136001	<p><u>Cooling Water</u></p> <ul style="list-style-type: none"> To provide, maintain, and supply of cooling water at adequate pressre to ship's air conditioning system, domestic reefer system, and engine control room air condition system during docking period. Pressure shall not exceed 2.5 bar. To furnish labor for connecting and disconnecting shore water supply hoses. To furnish labor for connecting and disconnecting discharge hoses. <p>Total quote unit per line / day. Allowed for 6 lines (3 inlet and 3 outlet) during vessel in drydock</p> <p>Total quote unit cost per connection / disconnection. Allowed for 3 connections and disconnections.</p>
3.11 137001	<p><u>Compressed Air</u></p> <ul style="list-style-type: none"> To provide compressed air manifolds on deck and engine room for general use and also for ship's crew maintenance work. Air pressure to maintain at 5 bar. <p>To quote unit cost per manifold per day. Allowed for 2 manifolds during vessel in drydock.</p> <p>To quote unit cost for connection and disconnection manifold. Allowed for 2 connections and disconnections.</p>
3.12 136002	<p><u>Fresh Water</u></p> <ul style="list-style-type: none"> To supply fresh water to the ship 200 tons later as instructed by Owner Surveyor. Furnish labor for connect and disconnect shore hoses. <p>To quote unit price / ton. Allowed to supply for 200 tons.</p> <p>To quote cost per connection and disconnection. Allowed for 2 connection and disconnection.</p>
3.13 171002	<p><u>Bilge Pump</u></p> <ul style="list-style-type: none"> To arrange yard's portable pneumatic pump to pump bilge water from Engine Room, Pump Room, and location indicated during repair period, or as per O/S Instruction. <ol style="list-style-type: none"> Chain locker x 1 pump x 1 day and connection / disconnection: Engine room x 1 pump x 1 days and connection / disconnection: Oily bilge pumping in Engine room (Sludge tank / Bilge tank/ Stuffing box tank).

3.14 171003	<p><u>Staging – Unstaging</u></p> <ul style="list-style-type: none"> To arrange staging and unstaging for work assistance as follows: <ol style="list-style-type: none"> 1. Ultrasonic Thickness Measurement for Class Survey 2. High and Low Sea Chest 3. Propeller 4. Propeller Shaft 5. Rudder 6. Funnel Painting 7. Replating, if applicable 8. Others if needed, Superstructure Painting, Cargo Hose Crane, Masthead, etc. Est. total scaffolding = 1,500 m³
3.15 135002	<p><u>Temporary Lighting</u></p> <ul style="list-style-type: none"> To provide additional cables with lights as requested by O/S to spaces as needed by vessel's crew or owner's contractor during the repair period. Electric power consumption include. <p>To quote unit cost per lighting per day during vessel in drydock</p>
3.16 136003	<p><u>Ventilation Fans, Blowers, and Lights</u></p> <ul style="list-style-type: none"> To provide and maintain forced ventilation fans, blowers, and lights to confine space such as All LPG Cargo Tanks, All Ballast Water Tanks, Cofferdam, and/or Pump Room during repair period. To furnish labor for connecting and disconnecting electric power to above fans and blower. To confirm the quantity of blowers and lighting to O/S before arrangement. <p>To quote unit cost / day (including cables and ducts). Allowed for 16 days. (Power consumption based on actual meter reading shall be charged separately under item "Shore Power Supply").</p> <p>To quote unit cost for connection and disconnection. Quote 10 unit / day.</p>
3.17 125002	<p><u>Crane Service</u></p> <ul style="list-style-type: none"> To furnish yard shore crane service for loading and unloading of ships provision and running store as required by O/S. <p>To quote unit price / hour usage. Allowed for 10 hours usage.</p>
3.18 144003	<p><u>Ballasting and Deballasting</u></p> <ul style="list-style-type: none"> To connect and later disconnect sea water line to ship and supply sea water into ballast water tank for undocking purpose and adjust vessel trim for undocking as per calculation from C/O. <p>Estimated quantity = 1,000 tons.</p> <p>To quote cost per ton of sea water for ballasting. Allowed for 1,000 tons.</p>

	<p>To deballasting quote cost per ton of sea water. Allowed as per ton.</p> <p>To quote cost per connection and disconnection. Allowed for 4 connections and disconnections.</p>
3.19 146001	<p><u>Gas Free Inspection</u></p> <ul style="list-style-type: none"> To provide yard's chemist for detection of gas condition and all Cargo Oil Tanks, Fuel Oil Tanks, Bunker Oil Tanks, Double Bottom Tanks, Pump room, Void Space Tanks, Cofferdam during repair period. The gas free inspection shall be carried out at least two time each day the mean morning time before working progress and after lunch period. Estimated for 16 days To arrange gas free certificate for hot works and issue certificate, include yard's chemist for subsequent days.
3.20 146002	<p><u>Port Chemist Inspection</u></p> <p>To arrange Government or Independent surveyor certified chemist to detect Gas condition and check compartments and surrounding area "Hot Work" upon completion of detection issue "Fit For Hot Work Certificate".</p>
3.21 123006	<p><u>Alleyway Covering</u></p> <p>To provide Covering Accommodation alleyway during repair with waterial of cartoon and tapes, detail position at main deck and 1st Deck.</p>
3.22 171001	<p><u>Garbage and Galley Refuse Disposal</u></p> <ul style="list-style-type: none"> To keep clean during repair period. Garbage and refuse to be removed from the galley daily. Deck (including Cargo Holds and Tanks), Engine Room, Accommodation and other compartments, specially the areas where repair works were carried out to be thoroughly cleaned, after completion of the job. Furnish a receptacle on board for garbage at poop deck, collection and disposed off daily. <p>To quote unit price per day. Allowed for 16 days.</p>
3.23 123001	<p><u>Final Cleaning</u></p> <ul style="list-style-type: none"> The ship will arrive at the yard with a clean machinery space and dry bilges. During repair, all rubbish to be removed daily and on completion of repairs, all areas on deck, accomodation space, cargo tanks, pump rooms, engine room and any other locations dirtied by yard as a result of repair work are to be cleaned up and ship to sail out with above spaces mentioned in a state at least to that on arrival. <p>If it is yard's policy to charge for above, then yard to quote as follows:</p> <ul style="list-style-type: none"> To provide labours and materials to maintain all decks, accomodation, cargo tanks, pump rooms and engine room in a clean and dry state during entire period ship in shipyard. Final

	cleaning to carry out upon completion of all repairs.																																				
3.24 123005	<p><u>Engine Room Bilges and Sludge</u></p> <ul style="list-style-type: none">• To furnish labour, material and equipment to pump out engine room bilge water during entire repair period. To provide oil tank at the dock bottom and quay side for storing bilge water as deemed necessary.• To provide certificates of proof indicating bilges and sludge removed from ship stating quantity, time, date, location, tank from which fluid was pumped and any other associated information. <p>To quote unit price / day for rental of pump.</p> <p>To quote unit price / ton for sludge disposal. Allowed for disposal 1 ton of sludge.</p> <p>To quote cost / ton for bilge water disposal. Allowed for disposal 1 ton of bilge water.</p> <p>To quote unit cost for connection / disconnection.</p>																																				
3.25 262001	<p><u>Bottom Plugs</u></p> <ul style="list-style-type: none">• To remove only plugs at the expressed instruction of Owner's Representative and to be re-fitted and cemented before flooding. The screw thread on plug and socket to be thoroughly inspected prior to reinstalling of plug. If screw thread found damaged, same to be brought to the Attention of O/S.• To quote unit price for removal and refitting. Allowed for removing and refitting a total of 22 drain plugs. <p><u>Note:</u> Do not open drain plugs of Fuel oil tanks.</p> <p>Removal of any bottom plugs, shall be recorded and witnessed by a ship's officer. No plugs are to be removed from tanks containing fuel oil or lubricating oil unless specifically required and this is to be carefully checked and recorded.</p> <p>Material SUS-304</p> <ul style="list-style-type: none">• After refitting, the plugs is subjected to vacuum test to confirm tightness and integrity, thereafter covered with cement in presence of chief officer and/or O/S.• To quote unit price to carry out vacuum test. Allowed for testing of 22 plugs. <table><tr><th>No</th><th>Tanks Name</th><th>Frame. No</th><th>Capacity</th><th>Quantity Plugs</th><th>Mark (Bead weld)</th></tr><tr><td>1</td><td>FPT</td><td>133-F.E</td><td>136.15</td><td>1</td><td>FPT</td></tr><tr><td>2</td><td>NO.1 WBT-P</td><td>118-133</td><td>211.44</td><td>1</td><td>1WB</td></tr><tr><td>3</td><td>NO.1 WBT-S</td><td>118-133</td><td>211.44</td><td>1</td><td>1WB</td></tr><tr><td>4</td><td>NO.2 WBT-P</td><td>96-107</td><td>73.00</td><td>1</td><td>2WB</td></tr><tr><td>5</td><td>NO.2 WBT-S</td><td>96-107</td><td>73.00</td><td>1</td><td>2WB</td></tr></table>	No	Tanks Name	Frame. No	Capacity	Quantity Plugs	Mark (Bead weld)	1	FPT	133-F.E	136.15	1	FPT	2	NO.1 WBT-P	118-133	211.44	1	1WB	3	NO.1 WBT-S	118-133	211.44	1	1WB	4	NO.2 WBT-P	96-107	73.00	1	2WB	5	NO.2 WBT-S	96-107	73.00	1	2WB
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4	NO.2 WBT-P	96-107	73.00	1	2WB																																
5	NO.2 WBT-S	96-107	73.00	1	2WB																																

	6	NO.3 WBT-C	85-96	244.65	2	2WB
	7	NO.4 WBT-C	74-85	279.24	1	4WB
	8	NO.5 WBT-C	63-74	289.96	2	5WB
	9	NO.6 WBT-C	52-63	285.60	1	6WB
	10	NO.7 WBT-C	41-52	264.77	2	7WB
	11	NO.8 WBT-C	30-41	213.49	1	8WB
	12	No.1 FWT (P)			1	1FW
	13	No.1 FWT (S)			1	1FW
	14	APT-P	A.E-8 (F.W)	40.56	1	APT
	15	APT-S	A.E-8 (F.W)	48.00	1	APT
	16	Rudder (C)			2	RUDD
	17	C.W.T (C)			1	CWT
	18	STERN FRAME			1	SF
3.26 108002	<u>Drawings</u> <ul style="list-style-type: none"> To submit drawing to owner showing shell, included ultrasonic gauge test as requested by class (6 copy each). 					
3.27 151002	<u>Basin Trial</u> <ul style="list-style-type: none"> To arrange Basin Trial as requested by O/S and provide tugs and insurance wire for above operation. 					
3.28 151003	<u>Sea Trial and Compass Adjuster</u> <ul style="list-style-type: none"> To furnish labour, necessary tools, equipment and material in order to carry out sea trial after completion of all repairs to the satisfaction of the O/S. All machineries repaired by shipyard personnel to be thoroughly checked for working and to make any final adjustment as found necessary. Workers to be stationed around the Main Engine, Turbo chargers, Fuel Pump, and Exhaust Valves during sea trial. Any leakage or defect to be corrected accordingly. To provide work boat to send O/S and yard workers back to yard premises on completion of sea trial. The shipyard shall provide Satisfaction Report of Sea Trial Result signed by O/S, Master, and C/E. 					

4. DRY DOCKING

No.	Job Description
4.1 205006	<p><u>Ultrasonic Thickness Measurement</u> PIC: Chief Officer and Technical Superintendent</p> <ul style="list-style-type: none"> To be measured plate thickness by ultrasonic gauge as instructed by Class Surveyor as per Class Requirement for Special Survey III. To be measured est. 5000 spots as suspected area and submit record for class and owner copies each.
4.2 203002	<p><u>Hull Cleaning Preparation</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <ul style="list-style-type: none"> To be carried out hand scrap the barnacle on ship's hull from keel to light load line. To be washed down ship hull from keel to deep load line including rudder blade, stern frame and sea chest with High Pressure Fresh Water Washing (HPFWW) about 350 - 700 bar prior to painting include consumption of fresh water for above jobs. The standard and result of HPFWW shall be accepted by O/S prior to further work on the Hull Coatings. To be installed wooden plugs to ship side scupper openings to keep hull dry during painting and remove prior to completion. <p>The area shall be carried out the Hull Preparation as follows:</p> <ul style="list-style-type: none"> ➤ Flat Bottom Area = 1,172 m² ➤ Vertical Side Area = 1,591 m²
4.3 203003	<p><u>Bottom Area: 1,172 m²</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <ul style="list-style-type: none"> To be carried out Sweep – Spot Sand-blasting to min. SA 2 30 % of total area as appointed. Paint Specification (Refer to Last Docking) as follows: <ul style="list-style-type: none"> ➤ 1 x F/C Anti-Corrosive ➤ 1 x F/C Sealer Coat ➤ 1 x F/C Anti-Fouling System To be carried out fresh water washing cleaning upon completion of Anti-Corrosive Coat and Sealer Coat. <p>Paint <u>supply by Owner.</u></p> <p><u>Note:</u> Coating Advisor, as on behalf the Owner, with Shipyard Representatives shall check actual condition after the ship has been docked in graving dock immediately. The result of arrival condition checking will be highly considered to be main specification of coating at this area and shall be reported and approved by O/S. To take photograph as evidence.</p>

4.4 203003	<p><u>Vertical Side Area: 1,591 m²</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crane to accomplish the following works:</p> <ul style="list-style-type: none"> To be carried out Sweep – Spot Sand-blasting to min. SA 2 30 % of total area as appointed. Paint Specification (Refer to Last Docking) as follows: <ul style="list-style-type: none"> ➤ 1 x F/C Anti-Corrosive ➤ 1 x F/C Sealer Coat ➤ 1 x F/C Anti-Fouling System ➤ 1 x F/C Anti-Fouling System To be carried out fresh water washing cleaning upon completion of Anti-Corrosive Coat and Sealer Coat. <p>Paint <u>supply by Owner.</u></p> <p><u>Note:</u> Coating Advisor, as on behalf the Owner, with Shipyard Representatives shall check actual condition after the ship has been docked in graving dock immediately. The result of arrival condition checking will be highly considered to be main specification of coating at this area and shall be reported and approved by O/S. To take photograph as evidence.</p>
4.5 203003	<p><u>Topside and Bulwark Area: 1,051 m²</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crane to accomplish the following works:</p> <ul style="list-style-type: none"> To be carried out Sweep – Spot Sand-blasting to min. SA 2 30% of total area as appointed. Paint Specification (Refer to Last Docking) as follows: <ul style="list-style-type: none"> ➤ 1 x F/C Anti-Corrosive ➤ 1 x F/C Polyurethane Coat To be carried out fresh water washing cleaning upon completion of Anti-Corrosive Coat. <p>Paint <u>supply by Owner.</u></p> <p><u>Note:</u> Coating Advisor, as on behalf the Owner, with Shipyard Representatives shall check actual condition after the ship has arrived at yard area immediately. The result of arrival condition checking will be highly considered to be main specification of coating at this area and shall be reported and approved by O/S. To take photograph as evidence.</p>
4.6 203003 275023	<p><u>Mark Painting</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crane to accomplish the following works:</p> <ul style="list-style-type: none"> To be carried out repainting while all hull marks to be painted in using paint compatible

	<p>with the coating underneath as follows:</p> <ul style="list-style-type: none"> ➤ Draft marks P/S forward and After ➤ Midship P/S ➤ Plimsol and class mark P/S ➤ The ship name P/S forward includes ship registry and IMO number ➤ Ekanuri (EIP) logo for funnel.
4.7 262010	<p><u>Sea Chest and Gratings</u> PIC: Chief Engineer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <p>Port and starboard 2.0 sqm x 2 sets Port 0.5 sqm x 1 set</p> <ul style="list-style-type: none"> • To be removed sea chest gratings 3 pcs (466 mm x 416 mm of each). To be washed down gratings and interior of sea chests with high pressure fresh water with 175 kg/cm² and thoroughly scrapped, cleaned, and removed of marine growth. To be sand-blasted rusty areas in the sea chest. To be painted sea chests and gratings as per under water hull painting scheme. • To be replaced Anode inside Sea Chest. If required bolts used for grating to be renewed. Yard to be supplied the necessary bolts, Stainless Steel (SUS), and split pins for locking. • To be carried out lapping test and prepare press test 5 bar witnessed by Class Surveyor. To be issued certificate after job completion. • To be applied special paint by apexion for internal surface of valve and strainer. • To be erected and removed necessary staging for above work and shall be confirmed by O/S. <p><u>Note:</u></p> <ol style="list-style-type: none"> 1. Quotation shall be included erecting and dismantling of necessary staging required for the job. 2. The renewed material shall be confirmed by O/S.
4.8 227001	<p><u>Sea, Discharge, and Scupper Valves</u> PIC: Chief Engineer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <ul style="list-style-type: none"> • To be opened up valves for overhaul and survey. • To be cleaned internally all globe valves by scraping or wire brushing to sound metal and then coated with two coats of yard supply apexior #3 compound. • To be allowed for grinding or lapping of valve lids and seats and to box up valves with new gland packing and jointing. • To be replaced damaged nuts and bolts accordingly and same to be greased prior to assembly. • To be carried out leak test. • All butterfly valves where their interior are accessible for inspection from the exterior side shell of the ship are not to be dismantled from piping connection unless specifically

	<p>directed by the O/S. These butterfly valves are to be washed and their interiors examined from the sea chest. During examination, valves to be operated to confirm ease of operation and tightness. All butterfly valves where their interior are not accessible for inspection are to be removed from the pipe lines for cleaning and internal inspection and pressure tested to confirm tightness. Defective valve seat ring to be renewed accordingly.</p> <ul style="list-style-type: none"> • All ship side nozzles for ship side valves and sea chest valves are to be specifically examined for corrosion wastage. All suspected nozzles to be brought to the attention of the superintendent immediately for his further action. • To be reinstalled in proper condition /as per original location. <p>The list of valves as follows:</p> <ol style="list-style-type: none"> 1. After Draft Valve Starboard Side (Globe Valve 10K32, 1 pc). 2. Discharge Valve SW Pump No. 1 and No. 2 (Angle Globe Valve 5K-250). 3. Main SW Overboard Valve (Globe Valve 10K-250). 4. Fire G&S Overboard Valve (Angle Valve 16K250, 1pc). 5. Steam Blow Down Valve (Globe Valve 16K40, 2 pcs). 6. FWG Ejector Pump Overboard Valve (Globe Valve 10K80, 1 pc). 7. Sewage Overboard Valve, Storm Valve with Handle Angle Type 10K85A, 1 pc. To be repaired. 8. SW Valve Inlet LT Cooler, Butterfly Valve Type Worm Gear Actuator size 100 mm. To be renewed. 9. Coverboard Valve from Galley Storm Valve Angle with Handle 10K80, 1pcs. To be repaired. 10. Accommodation P/S Storm Valve Angle with Handle 10K125, 4 pcs
4.9 631001	<p><u>Propeller</u> PIC: Chief Engineer</p> <p>Specification: To be furnished labour, necessary tools, materials, and stagings to accomplish the following:</p> <ul style="list-style-type: none"> • To be carried out high pressure washing and removed marine growth for Propeller Blades and boss. Barnacles and marine growth unable to be removed by washing to scrape off. • To be polished the propeller blades and boss in place using disc sander. • To be sharp edges of propeller blades to be dressed up as necessary using disc grinder. • To be carried out dye check propeller blade roots for cracks. Same to be witnessed by O/S or C/E. • To be protected against paint spray during painting of the external hull on completion propeller to be coated with a layer of fish oil or soft soap. • To be carried out calibration of pitch and static balancing. • To be repaired propeller missing B blade due to hair crack.
4.13 401001 402026 218006	<p><u>Rudder Blade and Rudder Trunk</u> PIC: Chief Engineer and Technical Superintendent</p> <p>To be furnished labour, necessary tools, materials, and stagings to accomplish the following:</p> <p><u>4.13.1 Rudder Blade</u> Type: Semi-Spade Rudder To be measured pintle and neck bearing clearance.</p>

	<ul style="list-style-type: none"> To be submitted record for Class Inspection. To be cropped rudder bottom pintle closing plate or locking device for access. To be refitted and welded as per original position, as instructed by Class Surveyor. To be opened up rudder blade bottom plug to be inspected by Class Surveyor and reinstalled as per original later. To be replaced rudder stock gland packing as per O/S confirmation (yard supply). To be carried out Pressure Test with Air or Vacuum Test to be inspected by O/S and Class Surveyor. <p><u>4.13.2 Rudder Trunk</u></p> <ul style="list-style-type: none"> To be opened up manhole of rudder trunk. To be cleaned water or muds debris inside of tank for preparing inspection, later assembled manhole with new packing using existing nut as per original condition.
4.14 431021	<p><u>Anchor and Anchor Chain</u> PIC: Chief Officer</p> <p><u>Anchor Specification:</u> Anchors: 4320kg x 2 sets / JIS Stockless Type Material-SC, 42</p> <p><u>Anchor Chain Specifications:</u> Diameter 50 mm (grade 2); 9 shackle portside & 10 shackle starboard</p> <p>To be provided labour, necessary tools, and crane to accomplish the following works:</p> <ul style="list-style-type: none"> To be lower down anchor and chain cable on dock's floor by release the bitter ends with the emergency release mechanism, To be washed down with high pressure water jet about 350 - 500 bar. To be carried out hard chipping rusty area, included consumption of water for the job. To be disconnected the first 3 length (P/S) anchor chain and reconnected to the bitter end of the chain. To be reconnected anchors to new chain ends. To be renew swivel chain cable (P/S), dia.Chain : 50 mm = 2 units. (<u>owner supply</u>). To be calibrated and measured all shackles connection in presence of O/S and submitted record Chain Cable P/S. To be renewed anchor chain ,dia. 50 mm = 5 shackle (<u>Owner supply</u>) To be shot marking (P/S) chain cables in way of joining shackles and applied finish fish oil. To be applied bituminous coating for both anchor (<u>owner supply</u>). To be restowed anchors and cables on completion. To be adjusted cable as necessary such that the cable stopper drops over a horizontal link.
4.15 246031 285051	<p><u>Chain Locker (Class Inspection)</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> To be pumped out remaining water or muds inside of Chain Locker P/S by portable pumps (<u>yard supply</u>) estimate 3 tons dispose ashore. To be washed down both lockers with high pressure water about 350 – 500 bar.

	<ul style="list-style-type: none"> To be removed perforated bottom plating on bottom of chain locker. To be carried out hard chipping, clean, and apply one full coat (owner supply) epoxy paint-bituminous. To be opened up both suction strainer, cleaned, carried out hard chipping, applied one full coat (owner supply) epoxy paint-bituminous, and restored the strainer. To be released and blow with compressed air to ensure free flowing both suction pipes and sounding pipes clogged by mud. To be tested the ejector system witnessed by C/O or O/S. To be dried up the chain lockers. To be painted both locker floors and walls with coal tar epoxy paint (owner supply) to a height of 2 meter.
4.16 278001 288001	<p><u>Corrosion Protection</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <p><u>4.16.1 Aluminium Anode for Hull</u> Anode Size : 300 x 150 x 40 (B-12) bolt fit type Total: 54 pcs</p> <ul style="list-style-type: none"> To be erected necessary stagings at sea chests, rudder, and stern part (approx. 200 m³). To be broken off putty covering the securing nuts. To be unbolted the nuts and removed all wasted anodes. To be replaced all damaged stainless steel stud bolts as necessary. To be refitted with new anodes after the surface beneath the anodes have been treated and painted. To be cemented the bolt holes with epoxy putty. To be covered the new installed anodes with masking tapes and same to be removed prior to undocking. <p>The position of the Aluminum Anode to be installed as detailed as follows:</p> <ol style="list-style-type: none"> Rudder Plate both side 6 pcs Bilge Keel Plate (P/S), 26 pcs Stern area (P/S), 10 pcs Sea Chest, 10 pcs Rudder Trunk 2 Pcs <p><u>Note:</u></p> <ol style="list-style-type: none"> Anode Size: 300 x 150 x 40 (B-12) bolt fit type The missing bolt and nut shall be renewed with SUS Material (yard supply) and as confirmed by O/S. <p><u>4.16.2 Aluminium Anode for Ballast Water Tank</u> Type: Clamp Fitting Type & Anode Weight 11 Kg/Pcs Total: 86 pcs</p> <ul style="list-style-type: none"> To be cropped and renewed the Anode for BWT. <p>The position of the AL Anode to be installed as detailed as follows:</p>

	<p>a. No. 3 BWT total 10 pcs b. No. 4 BWT total 10 pcs c. No. 5 BWT total 10 pcs d. No. 6 BWT total 10 pcs e. No. 7 BWT total 10 pcs f. Fore Peak Tank total 6 pcs g. No. 1 BWT total 6 pcs h. No. 2 BWT total 6 pcs i. No. 8 BWT total 6 pcs</p> <p>All Alumunium Anodes for Hull and BWT are <u>supplied by owner</u>.</p> <p><u>4.16.3 EM-Log (aluminum anode)</u> To be fabricated as pattern and fitted one piece of EM-Log Anode by yard. 120 mm dia x 15 mm thickness c/w four 10 mm dia holes.</p>

5. DECK DEPARTMENT

5.1 216021	<p><u>Fresh Water Tank Cleaning</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> To be opened manhole, cleaned manually, and prepared for Class Inspection the following tanks: <ul style="list-style-type: none"> ➢ Aft Peak Tank Fresh Water Tank (P) Volume : 40.56 M3 ➢ Aft Peak Tank Fresh Water Tank (S) Volume : 48.00 M3 ➢ No. 1 Fresh Water tank (P) Volume : 68.42 M3 ➢ No. 1 Fresh Water tank (S) Volume : 68.42 M3 To be disposed to the ashore the excessive mud around 2 ton. To be grinded corroded area inside of mentioned tanks. To be applied touch up 2 times application by special paint (<u>owner supply</u>). To be reinstalled manhole cover using new rubber joint and existing nuts as per O/S Instruction. To be carried out hydropressure test of the manhole witnessed by C/O, upon completion of work.
5.2 230031	<p><u>Ballast Water Tank Cleaning</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <p>Following manhole cover to be opened / closed by shore gang and the ships C/O is requested to checked each manhole packing condition and make sure to closed all manhole cover before ballasting or un-docking operation.</p>

No	Tanks Name	Size and Type	Remarks	Quantity Manhole	Mark (Bead weld)
1	FPT	350 X 450 "B"	IN BOS'N ST	1	FPT
2	NO.1 WBT-P	350 X 450 "B"	IN BOS'N ST	1	1WB
3	NO.1 WBT-S	350 X 450 "B"	IN BOS'S ST	1	1WB
4	NO.2 WBT-P	400 X 600 "B"	NO.1 CARGO SP	2	2WB
5	NO.2 WBT-S	400 X 600 "B"	NO.1 CARGO SP	2	2WB
6	NO.3 WBT-C	400 X 600 "B"	NO.1 CARGO SP	2	2WB
7	NO.4 WBT-C	400 X 600 "B"	NO.1 CARGO SP	2	4WB
8	NO.5 WBT-C	400 X 600 "B"	NO.2 CARGO SP	2	5WB
9	NO.6 WBT-C	400 X 600 "B"	NO.2 CARGO SP	2	6WB
10	NO.7 WBT-C	400 X 600 "B"	NO.2 CARGO SP	2	7WB
11	NO.8 WBT-C	400 X 600 "B"	NO.1 CARGO SP	2	8WB
12	No.1 FWT (P)	400 X 600 "B"	NO.2 CARGO SP	2	1FW
13	No.1 FWT (S)	400 X 600 "B"	NO.2 CARGO SP	2	1FW
14	APT-P	350 X 450 "B"	IN STEER RM	3	APT
15	APT-S	350 X 450 "B"	IN STEER RM	3	APT
16	C.W.T	350 X 450 "B"	IN ENG ROOM	1	CWT
17	Rudder Trunk	250 X 450 "B"	IN STEER RM	1	RUDO
TOTAL : 31 PCS ("A" TYPE : 100M/M COAM) ("B" TYPE: FLAT) TOTAL Ballast Capacity 2282.74 m3					
<ul style="list-style-type: none"> To be cleaned all ballast tank as mentioned above To be disposed to the ashore the excessive mud around 4 tons. To be grinded corroded area inside of mentioned tanks. To be applied touch up 2 times application by special paint (owner supply). To be reinstalled manhole cover using new rubber joint and existing nuts as per O/S Instruction. To be carried out hydropressure test of the manhole witnessed by C/O, upon completion of work. 					
5.3 501010 502002 503001	<u>Safety Equipment</u> PIC: Chief Officer To be arranged service engineer from authorised service center and carried out routine servicing of the system such as inspection, testing, calibration, and certificate renewal. The job scope shall include but not limited to the following: <u>5.3.1 Lifeboat (P/S)</u> Specification: Enclosed Type L: 5.7 M X B: 2.26 M X H: 2.8 M – Port & Starboard				

- 1) Both life boat transfer to work shop and carry out following work.
 (condition to be discussed with Supt before start work)
 - To be carried out annually service of lifeboat and davit by expert or company approved by maker. Tobe issued certificate on completion.
 - Quick release gear to overhaul and test if class required.
 - Repaint of all over of boat shell by epoxy orange.
 - Reflective tapes (SOLAS Grade) to newly apply after painted.
 - Restore both lifeboats.
- 2) To be carried out periodic servicing of launching appliance and on-load release gear as SOLAS Reg. III/20.II amended to require launching appliance a thorough examination at annual surveys by the manufacture's representative or a person appropriately trained and certified by the manufacturer.
 - A dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the lifeboat without persons on board.
 - Lifeboat on-load release gear shall be subjected to a thorough examination and operational test.
 - Oxygen bottles at lifeboat must be refill (200 Bar) and doing hydrostatic test all bottles (total 6 bottles).
- 3) Both lifeboats falls wire to be renewed (last renewal : sept 2009) (**Supply Owner**)

5.3.2 Fixed And Portable Gas Detector Calibration

- To be rechecked, calibrated, tested, and issued certificate
 - **Fixed type combustible gas alarm monitor**
 Type: Riken Keiki Co., Ltd: Type GP-631A-3S
 - **Portable Combustible Gas Detector**
 Type: Riken Keiki Co.Ltd, Model GP 226 : 2 set.
 - **Portable Portable Oxygen Meter**
 Type: Toka Seiki Co.Ltd, Type TIP-OXF Serial No. 72532F : 1 set.
 - **Portable Oxygen Meter**
 Type: Riken Fine Co.Ltd Type OX-1 Serial No. 489020001 : 1 set
 - **Portable Oxygen Meter**
 Type: Riken Fine Co.,Ltd: Type OX-1C Serial no. 489020030 : 1 set.
 - **Personnel Multi Gas Detector**
 Type: Riken Keiki Co.Ltd Model GX-2012 (Ex.Type B) : 1 set

5.3.3 Fire Fighting Equipment

- To be serviced, weighted, and tested fire fighting system.
 - To be issued certificate after completed by authorized party.
- 1) Co2 Fire Extinguishing system (Engine room / Cargo compressor room)
 Kawasaki Safety Service Inc.
 Co2 cylinders to be measured the weight and recorded.
 68 liter x 35 bottles
 - 2) Dry Chemical powder fire extinguishing system
 Kashima Co.,Ltd.
 Dry chemical tank unit 700 kg x 1 set
 360 kg x 1 set

	<p>N2 gas cylinder to be measured the weight and recorded. 68 liters x 5 bottles To be checked total unit system with N2 bottles and monitor unit / Local hose reel unit</p> <p>3) Portable fire extinguisher</p> <ul style="list-style-type: none"> - Portable foam fire extinguisher : 14 Sets (5-deck / 9-engine room) - Portable dry chemical powder : 6 Sets (5-deck / 1-engine room) - Movable foam fire extinguisher : 1 set x 45 ltrs form - Stationary dry chemical powder : 1 set x 40 kg - Portable foam applicator unit : 1 set x 20 ltr x 2 sets <p>4) Breathing air apparatus To be service and issued certificates the following items :</p> <ul style="list-style-type: none"> a. Kawasaki / Life Gem KS-8C 8.0L x 7 sets b. Spare bottle 8.0L x 20 cyps c. Life Gem KS-4E 4.0L x 22 sets d. EEBD KS-2E x 8 sets <p>5) Medical Oxygen resuscitator 2.1 l x 2 cyps To be service, refill and issued certificate oxygen resuscitator.</p> <p>6) Fire detection equipment Nippon Hakuyo electronics, Ltd. Model: FF-3061D-10 Fire alarm x 1 set. Opto electric Type Smoke Detector x 24 sets. Fixed temperature type Spot detector x 2 sets. To be rechecked, calibrated, tested, and issued certificate</p> <p>7) Life boats air-bottles 50 ltr x 200 bar x 4 bottles.</p>
5.4 201001	<p><u>Replating</u> PIC: Technical Superintendent</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <ul style="list-style-type: none"> • Areas of Replating will be determined upon Dry Docking and Intermediate Survey V commence. Est. 20 ton = 20,000 kg • Replating internal member & frame estimate 5 tons <p><u>Notes:</u></p> <ol style="list-style-type: none"> 1. Steel Plates shall be grit-blasted or sand-blasted with SA 2 of standard and applied one full primer coat. (owner supply). 2. Material: <u>Mild Steel for Marine Use, IACS Certified</u>, ($\rho = 7.85 \text{ ton/m}^3$)
5.5 432001 434001	<p><u>Forecastle Deck</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p>

	<ul style="list-style-type: none"> • <u>Renew hawser pipe anchor chain Port & Starboard, 2 x 3.7 m x(t.10 mm), Dia. 54 cm</u> • Renew Forecastle air duck vent. Size : A125 X 1100 mm and elbow 90° X 2 • Renew support cable blower forecastle. Plat strip Size 25mm X 3mm X 50 mm. • Renew ralling forecastle (galvanice pipe) Size : A25 X 5670 mm. • Renew wire (labrang) for pillar foward <ul style="list-style-type: none"> Size wire : 24mm x 9.6 mtr X 1 Size wire : 24mm x 10.7 mtr X 1 Size wire : 24mm x 10.8 mtr X 1 • Renew Dry Chemical hose unit pipe line size : A32 X 90 mm and flange 1 • Renew rubber packing locker dry chemical hose unit's door . • Welding/Repair anchor stopper P/S. • Renew winch cooling pipe line diam. 2.5 inch x 11500 mm <i>sch 40.(galvanice)</i> • Renew pipe ballast FPT ventilation port side.(<i>galvanice pipe</i>) <ul style="list-style-type: none"> Size : A125 X 6000 mm X 2 Size : Elbow 45° X 2 Size : Elbow 90° X 2 • Forecastle Eductor pipe (<i>galvanize</i>) <ul style="list-style-type: none"> Size : A50 X 1000mm, A32 X 2000mm, Elbow 90° X 1 • Support foundation catwalk <ul style="list-style-type: none"> Angle bar(besi siku) size :100mm x100mm x5mm Size :250mm X 2
5.6 269001 534016	<p><u>Main Deck and Cargo Tank No. 1 - No. 2 Area</u></p> <p>PIC: Chief Officer</p> <p>To be provided labour, necessary tools, material, and crange to accomplish the following works:</p> <p>STARBOARDSIDE</p> <ol style="list-style-type: none"> 1) Check and Repair WBT No. 1 S head of ventilation : 2 set 2) Check and Repair WBT No. 2 S head of ventilation.: 2 set 3) Renew sounding pipe WBT No.1S,2S,3S,5S,7S,8C size. Diam. 2 inch x L 9600 mm. 4) Check and service vent head of WBT No.3/C : 2 sets 5) Check and servive vent head of WBT No. 4/C.: 2 set 6) Renew vapour pipe line manifold starboardside size : diam. 6 inch x 4000mm. 7) Check and Repair vent head BWT No 5C/S = 2 sets 8) Check and Repair vent head BWT no. 6C/S = 2 sets. 9) Check and Repair vent head BWT No. 7C/S = 2 sets. 10) Check and Repair vent head BWT No. 8C/S = 2 sets. 11) Repair portable gangway ladder = 1 set. <p>PORTSIDE</p> <ol style="list-style-type: none"> 1) Check and Renew support valve 3C Port side. 2) Check and Repair WBT No. 1 P head of ventilation : 2 set 3) Check and Repair WBT No. 2 P head of ventilation.: 2 set 4) Renew sounding pipe WBT No.1P,2P,3P,4C,5P,6P,7P size. Diam. 2 inch x L 9600 mm. 5) Check and service vent head of WBT No.3C/ P : 2 sets 6) Check and service vent head of WBT No. 4C/ P.: 2 set 7) Check and Repair vent head BWT No 5C/ P = 2 sets 8) Check and Repair vent head BWT no. 6C/P = 2 sets. 9) Check and Repair vent head BWT No. 7C/P = 2 sets.

10) Check and Repair vent head BWT No. 8C/P = 2 sets.

CARGO TANK AREA

- 1) Renew plate clamp for rubber circumference doom cargo tank
 - Dismantle plate clamp for rubber circumference doom cargo tank
 - Dismantle rubber circumference doom cargo tank
 - Plate 400 mm x circumference 2 cargo tanks estimate 180 m x thickness 10 mm
 - Renew bolt&nut circumference 2 cargo tanks
 - Reinstall rubber circumference doom cargo tank
- 2) Renew sampling pipe line COT no. 1 & no. 2, diam. 36 mm x 7000 mm.= 2 Sets Sch 80
- 3) Calibrated and renew packing (inside) slip tube COT No. 1 & No. 2 = 24 sets
- 4) Check and Calibrated Digital sounding COT No.1 & no. 2 = 2 unit.
- 5) Renew grating catwalk size 1000 mm x 720 mm = 49 Pcs
- 6) Renew grating catwalk of COT no.1 and no.2 size 1250 mm x 400 mm.=2 pcs
- 7) Renew grating catwalk front of COT no. 1 size 1570 mm x 400 mm.
- 8) Renew grating catwalk front of COT no. 1 size 790 mm x 400 mm.
- 9) Renew grating catwalk front of COT no. 1 size 1320 mm x 400 mm.
- 10) Renew grating catwalk front of COT no. 1 size 1750 mm x 1000 mm.
- 11) Renew grating catwalk front of COT no. 1 size 1000 mm x 900 mm.
- 12) Check, test and calibrated Alarm release tank above COT no. 2.
- 13) Renew emergency shower pipe line for cargo
 - Size : 1.5 inc x 500mm = 52 pcs
 - 3.0 inc x 16000mm = 4 pcs
 - 3.0 inc x 4500 mm = 2 pcs and elbow 45°x4
 - 3.0 inc x 8000 mm = 2 pcs and elbow 90°x8,45°x6
 - 1.75 inc x 10000 mm and elbow 90°x3, 45°x1
- 14) Renew sea water shower pipe line for cargo
 - Size : 2.0 inc x 16000mm = 4 pcs
 - 2.0 inc x 4000 mm = 2 pcs and elbow 45°x4
 - 2.0 inc x 8000 mm = 2 pcs and elbow 90°x4,45°x6
- 15) Check, test and calibrated Emergency Stop Device = 3 sets (Above COT no.1 & no. 2 and manifold).
- 16) New install Emergency Eyewash & Drench showers Combination, type free standing, fresh water supply 1-1/4 inch with Pipe line diam. 1-1/4 inch x 35000 mm.
- 17) Repair CARGO LEVEL MONITORING COT NO.1

18) Material for cargo piping:

- Cargo pipe : low carbon steel pipes for pressure service to be classed by the Society. KSTPG 38 (KLPG For REHEATER)
- Flanges : Carbon steel forgings to be classed by the society. KSF 45 (KLFB for REHEATER)
- valves : Carbon steel casting classed by the society.KSC 49 and SCPF2 (less than 3") (KLCB/SCPL For Reheater)
- Gasket : NON ASBEST (V-7020)

Cargo piping system shall be designed according to the followings.

Liquid line : 0° C 20kg/cm2g

	<p>(-45°C for piping system associated REHEATER)</p> <p>Vapour line :0° C 20kg/cm2g</p> <p>A. Renew Cargo liquid and vapour pipe tank no.1</p> <ul style="list-style-type: none"> - 20K 150 =1000 cm x1 Elbow 90° x3 Flange x3 T pipe x1 - 20K 150 =500 cm x1 Flange x2 <p>Renew Cargo vapour pipe tank no.1</p> <ul style="list-style-type: none"> - 20K125 = 110 cm x1 Elbow 90° x1 Flange x3 T pipe x1 - 20K125 = 500 cm x1 Elbow 90° x1 Flange x3 T pipe x1 <p>B. Renew Cargo liquid and vapour pipe tank no.2</p> <ul style="list-style-type: none"> - 20K150 = 500 cm x3 Flange x6 - 20K150 = 240 cm x1 Elbow 90° x1 Flange x2 T pipe x1 Reduser 20K150 to 20K100 x1 - 20K100 = 280 cm x1 Elbow 90° x1 Elbow 45° x1 Flange x1 - 1.5' inch = 200 cm x1 Elbow 90° x1 Flange x2 <p>Renew Cargo vapour pipe tank no.2</p> <ul style="list-style-type: none"> - 20K125 = 110 cm x1 Elbow 90° x1 Flange x3 T pipe x1 - 20K100 = 310 cm x1 Elbow 90° x1 Elbow 45° x1 Flange x2 - 20K100 = 550 cm x1 flange x2 <p>C. Renew Cargo liquid and vapour pipe Manifold.</p> <ul style="list-style-type: none"> - 20K200 = 300 cm x1 Reduser 20K200 to 20K150 x2 Flange x3 - 20K200 = 900 cm x1
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	<p> 20K150 = 50 cm x1 T pipe 20K200 x1 T pipe 20K200 to 20K150 x1 Flange 20K200 x3 Flange 20K150 x1 Renew Cargo liquid from manifold to reheater - 20K150 = 200 cm x1 Elbow 90° x2 Flange x2 - 20K150 = 500 cm x1 Elbow 45° x1 Flange x2 Renew Cargo vapour manifold - 20K125 = 320 cm x2 T pipe x1 x2 Elbow 90° x1 x2 Elbow 45° x2 x2 Flange x3 x2 - 1.5 ' inch = 30cm x2 Flange x2 x2 - 20K125 = 1000 cm x1 T pipe x2 Flange x2 19) Renew Reheater Sea Water pipe 5K200 = 500 cm Elbow 45° x3 Flange x2 </p>
5.7 513001 435030	<p><u>Poop Deck and Accommodation Room</u></p> <p>PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> • Renew spill box P/S size : 1400 mm x 400 mm x 560 mm x 60 mm = 6 sets • Renew mess room vinyl size 9000 mm x 5500 mm. • Renew Bathroom and Toilet Door material aluminium. Size 1660 mm x 632 mm = 4 sets. • Renew Toilet Door material wood and aluminium. Size 1600 mm x 565 mm = 2 sets • Renew Mess Room Door out material wood and aluminium. Size 1660 mm x 800 mm = 1 sets • Service door gang crew include renew heavy anti-corrosive door = 2pcs. • Service door gang Officer include renew heavy anti-corrosive door = 2pcs.
5.8 201064	<p><u>Boat Deck, Bridge Deck, and Navigation Deck</u></p> <p>PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p>

	<ul style="list-style-type: none"> • Check and repair provision store crane 1 unit • Renew Filter exhaust officer's WC diameter 170 mm x 1 set • Renew antenna pipe support for cable MF/HF transmitter size diam. 2 inch x 1000 mm. • Service electric compressor of whistle box.
5.10 285053	<p><u>Tank Coating No. 1 (P/S) and No. 2 (P/S) Void Space Tanks</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> • To be opened manhole, cleaned manually, and prepared for Class Inspection. • To be carried out chipping inside void space approx. 500 sqm • To be disposed to the ashore the excessive mud and scale around 2 ton. • Clean tank top from any scale, rust and dust prior application coating • To be applied full coat 2 times application on tank top by special paint (owner supply), as instructed upon determining specification on site approx 7000 sqm. • To be applied coating on vertical side 500 mm from tank top • To be reinstalled manhole cover using new rubber joint and existing nuts as per O/S Instruction.
5.12 155056	<p><u>Cargo Pressure Tanks for Class Survey</u> PIC: Chief Officer</p> <p>Cargo Tanks No.1 dan No.2 specification: Cargo Type : Liquified Petroleum Gas Containment Type : Independent Type C Maximum Cargo Pressure : 18.0 bar Cubic Factor : 5000 CuM</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> • To be carried out Internal Inspection. • To be carried out Non-Destructive test. (UT Flow) • To be carried out pressure relief cargo tank quick closing shut off valve including fail closing system. • To be carried out performance test for mechanical ventilation system around cargo area. • To be carried out gas detector test on alarm system.
5.13 155056	<p><u>Air Pressure Test for Cargo Tanks</u> PIC: Chief Officer</p> <p>To be provided labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> • To be carried out air pressure test for No. 1 and No. 2 Cargo Tank. • To be carried out Cargo Line Air Test.
5.14 155056	<p><u>Air Pressure Test Pipelines</u> PIC: Chief Officer</p>

	<p>To be provided labour, necessary tools to accomplish the following works:</p> <ul style="list-style-type: none"> To be carry out air pressure test for existing cargo line and valve in way of pneumatic pressure test 10 kg/cm². Cargo Line pressure test certificate to be issued. To be carry out air pressure test for bunker line in way of pneumatic pressure test 10 kg/cm². Bunker Line pressure test certificate to be issued. To be carry out Popping test of safety relief valves on cargo tanks and cargo lines (should indicated each serial number of safety valves in the certificates) To be provided connecting and disconnecting air pressure and installed temporary blank flange as necessary.
5.15 146002 146003	<p><u>Purging / Gassing Up of Cargo Tanks and Cargo Pipeline</u> PIC: Chief Officer</p> <ul style="list-style-type: none"> Purging N₂ above pressure tank and cargo pipeline with N₂ (Nitrogen Gas), before starting hot works for gas free and submit record certificate arranged by yard or later as instructed. Purging to be carried out at alongside berth. The N2 tank lorry can enter yard and stay alongside of the vessel near the vessel manifold. NOTE: Purging process may cause bad smell at area near vessel. Existing manhole to be opened up for 2 in no cargo tanks and installed later in position with use new teflon packing on completion to protect manhole, nut, and bolt with use putty to service existing bolt and nut M36 x 24 pcs / tank manholes. On completion for working on cargo tanks and after ensuring air tightness of manhole by air pressure test 6.8 kg/cm², the tank shall be air purged with inner gas (N₂) for releasing oxygen (O₂). To be installed staging internal cargo tanks for purpose cleaning and removed cargo pump for internal inspection by Class Surveyor. To be removed staging upon completion, provided maintain lighting and ventilation internal cargo tanks during work and internal inspection period included electric power consumption. To be collected debris / remains and disposed to shore. To be carried out air pressure test as instructed by Class Surveyor, 18.0 kg/cm², and installed temporary blank flange as necessary. 4 in nose pressure relief valve on top of each cargo tanks 125A @ 150A to be opened completely for Class Survey. To be transported to workshop, overhauled, grinded in valve seat, and cleaned. After completed, to be reassembled as original, used new packing, carried out pressure test 2 in nose 18.0 kg/cm², and 2 in nose 6.3 kg/cm². Existing bolt and nut to be renewed as necessary and protected by putty. Indicating panel above each tank and whell house for safety valve to be serviced and calibrated by maker specialist. To be provided certificate. 8 in nose pressure relief valve cargo tanks 80A set, pressure 20.0 kg/cm² to be opened completely for Class Survey. To be transported to workshop, overhauled, grinded in valve seat, and cleaned after inspection. To be assembled as original use new packing and carried out return back to ship for installing in position. Existing bolt and nut to be renewed as necessary and protected by wax. Size = 25A x 5 pcs; size = 50A x 2 pcs; size = 80A x 1 pc. 2 in nose attached globe valve 150A for safety valve. 2 in nose rrot valve of th elow pressure safety valve 150A to be opened up completely for Class Survey. To be transported to workshop, overhauled, grinded in valve seat, and cleaned after inspection. To be transported to workshop, overhauled, grinded in valve seat, and cleaned after inspection. To be

	<p>assembled as original use new packing and carried out return back to ship for installing in position. Existing bolt and nut to be renewed as necessary and protected by wax. 1 L no flame arrester to be removed and opened up for Class Survey later installed in position as original use new packing.</p> <ul style="list-style-type: none"> To be fitted on top of dome of each cargo tank: 4 in nose slip tube type level gauge for each cargo tank. Maker: Nakakita Saisaki, Co., Ltd. No. 1 from bottom su 50 mm – 245 mm No. 2 from bottom su 2,010 mm – 4,030 mm No. 3 from bottom su 3,995 mm – 6,015 mm No. 4 from bottom su 5,980 mm – 8,000 mm To be opened up completely for Class Survey. To be transported to workshop, overhauled, grinded in valve seat, and cleaned after inspection. To be transported to workshop, overhauled, grinded in valve seat, and cleaned after inspection. To be assembled as original use new packing and carried out return back to ship for installing in position. To be tested and issued certificate, existing bolt, and nut to be renewed as necessary and protected by wax. To be provided 2 set of vacuum cleaner and necessary labor to cleaning tank no 1 and no 2.
5.17 432001	<p><u>Deck Machinery</u> PIC: Chief Officer and Chief Engineer</p> <p>To be arranged Service Engineer with necessary tools and material to service and inspect the Equipment. The work scope shall include but not limited to the followings:</p> <p><u>5.17.1 Windlass</u> (NO. 1 & 2 HYDR. PUMP FOR WINDLASS) CLASS SURVEY</p> <ul style="list-style-type: none"> To be opened up and renewed windlass brake lining and foundation included countersunk brass bolt and nut with detail as follows: <ul style="list-style-type: none"> ➢ Brake Lining size: 6,000 mm x 130 mm x 12 mm, 6 sets. ➢ Counter sunk screw and nut (brass): M8 x 50 mm, 400 sets. Opened hyd. Oil pump of windlass for visual class survey and reassemble back in good order for Class Survey. To be submitted record completion to install as original and filled new grease. Renew Hydraulic pipe Windlass Size : A32 X 100 mm x 2 and flange X 2 <u>Recondition Jypsi anchor chain Port & Stb, due worn out.</u> To be carried out chain cable running test and break holding test (P/S) and rendering test witnessed by C/E and O/S. <i>Certificate of Brake Test for windlass & Mooring winches to be issued</i>
5.19 414001	<p><u>Radio and Navigation Equipment</u> PIC: Chief Officer</p> <p>To be arranged Service Engineer with necessary tools and material to service and inspect the Equipment. The work scope shall include but not limited to the followings:</p> <ul style="list-style-type: none"> Gyrocompass & Autopilot; Tokimec Inc Type: TG5000 (Gyrocompass), Tokimec Type PR-2000 (Auto Pilot)

	<p>Gyro compass & Auto pilot not working to be general checked.</p> <ul style="list-style-type: none"> • Marine Radar No. 1; JRC JMA 5312 series no.554362 To be general check performance test. • Marine Radar no. 2 JRC JMA 7252-6 series no. 55838 To be general check • Electro Magnetic Log ; Yokogawa Denshikiki Co.,Ltd, Type: EML 201-HSI Not working To be checked and repaired • Magnetic Compass; Tokimec Inc. Type: SH-165A To be carried out deviation correction at sea trial by compass adjuster. Certificate to be issued and submitted to the ship master • AIS (Automatic Identification System); Maker : SIMRAD V5035 To be general check. • Weather Fax; JRC JAX-9A Not working to be general checked up • Echosounder; JRC JFE -570S To be general checked up and calibrated. • GPS ; GPS Navigator model JLR-7500 To be general checked up. • Public Addresser; JRC NVA-1700mk II Tape and Radio not working, To be service and general checked up. • Course recorder; Tokimec Inc ,Type : CR-1 To be general checked up. • VDR (Voyage Data Record) ; JRC JCY-1850 To be general check up. • Navigation light panel ; NUC Light not function To be general checked and repair • Wind indicator ; Nippon Electric Instrument Speed Indicator to be check • SSAS To be general check and repair • LRIT To be general check and repair • VHF (2 unit) ; JRC JHS-32A Low signal , need replaced antenna by new one To be general checked up. • MF/HF ; JRC NCH – 700 Printer JRC NKG - 800 Power transmit Error To be service and general checked up. • Inmarsat C JRC NDZ-127C To be general checked up. • NAVTEX JRC NCR-333 To be general checked • EPIRB JOTRON Need to Annual Test and certificate to be issued
5.20	<p><u>Cargo Equipment (Class Survey)</u></p> <p>PIC: Chief Officer</p>

To be arranged Service Engineer with necessary tools and material to service and inspect the Equipment. The work scope shall include but not limited to the followings:

1. Safety Valve For Cargo Tanks And Pipe Lines

a) Safety Relief valves on cargo tanks (pilot operated type)

	High Pressure	Middle Pressure	Low Pressure
No. 1 Cargo Tank	18.0 Kg/cm ² (2 pcs)	13.0 kg/cm ² (2 pcs)	6.2 kg/cm ² (2 pcs)
No. 2 Cargo Tank	18.0 Kg/cm ² (2 pcs)	13.0 kg/cm ² (2 pcs)	6.2 Kg/cm ² (2 pcs)

Throat Dia : 135mm Lift 74.3 mm

Nominal Dia : 6 – 8 mm

Total 12 safety relief valves to be removed and transferred work shop or competent third Party facility and overhauled and cleaned inside.

To be assembled to original, high / middle / low pressure test to be carried out in the presence of Supt / Class surveyors.

b) Safety valves on cargo lines and others

Following safety valves to be removed and transferred to dock workshop and carry out popping test in the presence of Supt/ Class surveyor. And issue the certificate by dockyard.

To be renewed packing and necessary packing to be provided by dockyard.

Size of safety valve (Inlet x Outlet) / Pressure / Quantity

50 x 80 mm / 20 kg/cm² / 1 set

25 x 50 mm / 20 kg/cm² / 5 sets

Location of valves:

1 pc on Cargo manifold

3 pcs on cargo liquid lines

1 pc on cargo re-heater

1 pc Knock out drum (in cargo compressor room).

2. Calibration For Thermometer & Pressure Gauge

Following thermometer & pressure gauge to be calibrated with issuance of certificate. Disconnection and refitting thermometer & pressure gauge to be carried out by crew Hands.

a) Thermometer : Mercury in steel thermometer

Type : Mercury actuated thermometer / range -20 C – 80 C

No.1 cargo tank : Top -1 pc / Middle -1 pc / Bottom -1 pc

No.2 cargo tank : Top- 1 pc / Middle -1 pc / Bottom – 1 pc

Spare Thermometer: 3 pcs (Top / Mid / Bot).

Center Manifold : 1 pcs.

	<p>Total: 10 pcs of thermometer gauges</p> <p>b) Pressure Gauge</p> <p>No.1 cargo tank x 1 pc</p> <p>No.2 cargo tank x 1 pc</p> <p>Spare pressure gauge x 1 pc</p> <p>Total: 3 pcs of pressure gauges</p> <p>3. <u>Cargo Monitoring Panel And Cargo Level Gauge (No.1 & No.2 Tanks)</u></p> <p>Makers: SATOH ELECT. CO.,LTD.</p> <p>Following safety devices to be general checked each monitoring indication and issue Certificate.</p> <ul style="list-style-type: none"> a) Tank high temperature alarm (45 degrees) b) Tank low temperature alarm (0 degrees) c) Cargo Tank high level alarm (10.64 m) d) Cargo Tank high high level alarm (10.93 m) with ESD shut-down. e) Cargo Tank (Low side) pressure alarm (5.8 kg/cm²) f) Cargo Tank (High side) pressure alarm (17.6 kg/cm²) g) Flash tank high level alarm h) Hydraulic low pressure (18.0 kg/cm²) and ESD shut-down i) Re-heater sea water low flow alarm trip (trouble with disconnected cable) j) Confirm that the siren and rotating light working condition <p>CARGO LEVEL GAUGE (MUSASHINO CO.,LTD: LEVEL MASTER AND LEVEL SWITCH TYPE)</p> <p>High level alarm and high high level alarm to be tested and confirm the siren and rotary red alarm lamp. To be re-calibrated the level gauges float position and check the high high level and high level.</p> <p>4. <u>Cargo Re-Heater</u></p> <p>Maker : Fuji Car Manufacturing</p> <p>Surface area : 86.5 m²</p> <p>Type : Horizontal Shell / Tube</p> <ul style="list-style-type: none"> a) Sea water side covers to be removed with sea water pipe. b) Cleaned sea water tube inside. c) Pressure test to be carried out in the presence of Supt. Sea water side : 5 kg/cm² by sea water Cargo side : 10 Kg/cm² by Air or N₂ d) Zinc plates to be replaced with new one provided by owner. <p>5. <u>Cargo Pumps</u></p> <p>Maker : Niigata Worthington</p> <p>Type : Electric Motor Driven Deep well pump</p>
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	<p>Model : 14M-160-4 + 1</p> <p>a) To be checked mechanical seal condition and replace in found any defective.</p> <p>b) Cargo pump motor No.1 & No.2 to be checked and chemically cleaning electrical windings.</p> <p>6. <u>Liquid line pipe and vapour line pipe to be Hydrostatic pressure test 20kg/cm² for cargo line and issued certificate.</u></p>
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6. ENGINE DEPARTMENT

6.1	<p><u>Main Engine Plant</u> PIC: 2nd Engineer, Chief Engineer, and Technical Superintendent</p> <p> Maker : AKASAKA DIESEL CO.,LTD Model : 6UEC-37LA Engine Number : 37231 Cylinder Bore : 370 mm Max Continuous Rating: 3089 kW Number of Cylinders : 6 Piston Stroke : 880 mm Revolutions at MCR : 210 rpm </p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <p><u>6.1.1 M/E Air Intercooler (601055)</u> To be open up cover of ME Air cooler</p> <ul style="list-style-type: none"> To be opened up and transported to workshop for chemically cleaning water and air side. To be opened up both covers and applied apexior No. 3 to inner surface. To be renewed Zinc Anode upon completion restore above as original and carried out hydrostatic pressure test 7 kg/cm² witnessed by C/E and O/S. <p><u>6.1.2 M/E Auxiliary Blower</u></p> <ul style="list-style-type: none"> To be overhauled the blower No. 1 and No. 2. Renew ball bearing and roller bearing. To be tested for balancing fan blade and recorded. To be cleaned Electro Motor and renew ball bearing for Electro Motor. To be checked Mugger Test and recorded. <p><u>6.1.3 M/E Governor (601088)</u> To be arranged Service Engineer with necessary tools and material from maker's approved service center to carry out overhaul of the Governor. The scope of work to include but not limited to the following:</p> <ul style="list-style-type: none"> To be brought to the workshop for maintenance and calibration purpose. To be carried out running test during sea trial. <p>Note: The Renewal Parts must be confirmed by O/S.</p> <p><u>6.1.4 M/E Safety Device (601068)</u></p> <ul style="list-style-type: none"> To be arranged expert or specialist company for maintenance and testing all safety device.
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	<ul style="list-style-type: none"> To be carried out running test witnessed by C/E, O/S, and Class Surveyor. To be issued certificate as reported to Class Surveyor. <p><u>6.1.5 M/E Turbocharger (601053)</u> Maker: Mitsubishi Heavy Industries .,LTD Model: MET 42SC</p> <p>To be appointed an authorised service center to carry out overhaul of the Turbocharger :</p> <ul style="list-style-type: none"> To be allowed for dismantling of the Turbocharger and removed of the rotor assembly to workshop for cleaning and dynamic balancing. To be allowed for fly ash blasting of turbine blades and fairing of rotor blade tips if found bent. To be allowed filter casing and silencer to remove to workshop for steam or chemical cleaning. To be ensured both air filter and silencer are completely dry before installing back. To be removed nozzle ring. To be allowed for fly ash blasting of nozzle ring and the thoroughly inspected. To be reported any defect to superintendent immediately. To be refitted nozzle ring. To be carried out ultrasonic measurement of wall thickness around the cooling water space and partition wall and record all readings for future reference. To be reassembled M/E Turbocharger to original using bearings, Lub Oil Pumps, and sealing bushes (owner supply). All necessary clearances and shaft deflections to be taken and recorded and witnessed by C/E. To be replenished Lub Oil Sump with ship supplied turbine oil to required level. To be reinstalled back all connections e.g. tachometer pick up, thermometers, etc. <p><u>6.1.6 Scavenger Unit & Vibration Damper.(crew)</u> To be clean scavenger unit and check vibration damper.</p> <p><u>6.1.7 Starting and Reversing Unit.(CREW)</u></p> <ul style="list-style-type: none"> To be check starting air unit. To be check air distributor unit. <p><u>6.1.8 Starting and Reversing Unit.(CREW)</u></p> <ul style="list-style-type: none"> To be CHEMICAL clean OF cyl head & cylinder block no 1,2,3,4,5 and 6. <p><u>6.1.9-Main Engine :</u></p> <ul style="list-style-type: none"> Overhaul ME Cylinder No.5 and renew Cylinder Liner and O ring.
6.2	<p><u>Auxiliary Engine Plant no 1 & 2</u> PIC: 2nd Engineer</p> <p>Maker: Yanmar Type: S165L-UN X 400 KVA x 2 No. of cylinder / bore / stroke: 6 x 165 mm x 210 mm</p> <p>To be provided labours, necessary tools, material, crange, and transportation to accomplish the following works. To be arranged Maker's Service Engineer to supervise the entire overhaul. Service Engineer attendance cost to be included in the yard's quotation.</p>

	<p><u>6.2.1 Auxiliary Engine No. 1, No. 2</u></p> <ul style="list-style-type: none"> To be checked condition and timing of camshaft for valve and fuel injection pump, renewed if necessary. To be measured and recorded all unit and taken picture for evidence . To be renewed LO carter and cleaned crankcase for all G/E. <p><u>6.2.2 A/E Air Cooler</u></p> <ul style="list-style-type: none"> To be opened up and transport to workshop for chemically cleaning water and air side. To be opened up both covers and apply apexior to inner surface. To be renewed zinc anode, upon completion restore above as original To be carried out hydrostatic pressure test 4 kg/cm2 witnessed by C/E and O/S. <p><u>6.2.3 A/E Alternator No. 1 and No. 2 (861011)</u> Model: SHINKO TVLI-GJ-605 Maker: SHINKO ELECTRIC</p> <ul style="list-style-type: none"> To be checked and cleaned Alternator by electric cleaner, refurbished if necessary. To be checked condition of Alternator bearing, renewed if necessary. To be checked and tested safety device for Alternator and recorded for all jobs <p><u>6.2.4 A/E Safety Device (651068)</u></p> <ul style="list-style-type: none"> To be arranged expert or specialist company for maintenance and testing all safety device. To be checked and tested all safety devices for all G/E must be done and result good in order to and recorded. To be renewed part for safety device if any once faulty. <p><u>Note:</u> All parts renewed to be subjected to O/S approval and spare stock from ship to be utilized.</p> <p><u>6.2.5 Exhaust Gas Turbocharger No. 1,2, (Type: RU110-1A)</u></p> <ul style="list-style-type: none"> Dismantling and draw out rotor Cleaned rotor turbine blade, turbine nozzle ring and casing Renew inner part (yard supply) Balancing, measure and record of clearance. <p><u>6.2.6 Governor</u> Governor no 1, 2 to be sent to specialist company for service and calibration .The parts renewed should be confirm by OS.On Completion to re-install in original condition , running test witness by CE or OS Safety equipments install, governor servomotor and synchronizing system should be test and adjusted for class surveyor inspection .On completion to issued certificate.</p> <p><u>6.2.7 LO and FW Attach Pump</u></p> <ul style="list-style-type: none"> To be overhaul LO & HT Attach Pump Renew ball bearing, mechanical seal. On completion, restore as original condition and doing running test.
6.3 403001	<p><u>Steering Gear</u> PIC: 2nd Engineer</p> <p>Tobeprovided labors, necessary tools, materials, transportation, and all necessary</p>

	<p>accessories works to carry out the following works:</p> <ul style="list-style-type: none"> To be isolated power supply. To be removed cable to electric motor. To be disconnected suction and delivery connections. To be removed mounting bolts for motor pump unit and then place aside. To be uncoupled pump from electric motor. To be pumped then to strip down completely. To be cleaned all parts for inspection. To be checked drive and driven gear teeth surfaces. To be checked bearing metals and bearing housing for abnormal wear. To be checked drive and driven shafts for flaws on sliding surface. To be checked pump casing for erosion wear. To be reassembled pump in reversed order with new jointing. To be coupled back motor and pump unit. To be remounted and secured motor pump unit. To be coupled back motor and pump coupling. To be reconnected suction and delivery connections. To be reconnected cable to electric motor. To be re-established power supply. To be removed all dust and dirt accumulated in the pump starter panel. To be got service all magnetic contactors and tighten all terminal connections. To be refilled system oil, tested pump, and confirmed operation is satisfactory. To be simulated low level alarm in hydraulic oil tank and confirmed activation of the safety valve system, visual and audible alarm. To be checked, calibrated, and tested Safety Device.
6.4 800001	<p><u>Engine Room Pumps</u> PIC: 2nd Engineer</p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <ul style="list-style-type: none"> To be removed from bed plate, bring to the workshop, overhauled completely, and measured clearance. To be conducted wearing down parts that renewed as confirmed by O/S. To be checked, measured, and recorded clearance of mouth ring, impeller, ball bearing and bushing metal. To be renewed spare parts as necessary. To be restored as original condition on completion and carried out running test witnessed by C/E and O/S. To be submitted record for Class Surveyor. <p>The pumps below shall be carried out the above job standards:</p> <p>Centrifugal Pump</p> <p>6.6.1-1. Main Cooling SW Pump No. 1 6.6.1-2. M/E FW Cooling Pump No. 1 and No. 2 6.6.1-3. SW Service Pump 6.6.1-4. Fire & GS Pump 6.6.1-5. Fire & Bilge Ballast Pump 6.6.1-6. FW Service Pump no 1 and 2 6.6.1-7. IGG Cool SW Pump</p> <p>Screw and Gear Pump</p> <p>6.6.2-1. Main Engine LO pump 6.6.2-2. Main Engine FO supply Pump 6.6.2-3. Heavy FO transfer pump 6.6.2-4. DFO Transfer Pump</p>

	6.6.2-5. LO Transfer Pump 6.6.2-6. Cyl.Oil Transfer Pump 6.6.2-7. Sludge Pump
6.5 731021	<p><u>Main Air Compressor</u> PIC: 2nd Engineer</p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <p>Maker : YANMAR Type : SCION TF</p> <ul style="list-style-type: none"> • To be overhauled Main Air Compressor No. 2 • To be renew Piston Ring, Piston if necessary • To be renew cylinder liner. • To be changed or renewed all valves by spare. • To be renew LO Carter. • To be measure and record all units of parts and taken picture for evidence. • To be repair for Auto-Operation and Safety Device to be installed and tested for safetyoperation. • On completion to reassembled all components as original and carry out running test.
6.6	<p><u>Main Air Reservoir</u> PIC: 2nd Engineer</p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <p>i. Main Air Reservoir No 1 & 2 Maker: Kanazawa CO, Ltd. Specification: WP: 25 Kg/cm, Hydraulic TP: 48.5 bar, Capacity 1,100 liters</p> <ul style="list-style-type: none"> • To be opened up, checked, and cleaned inside part from sludge, and prepare for Class Surveyor inspection.To renew gasket door (yard supply). • To be lapping valve check, test, and record safety device as follows: <ol style="list-style-type: none"> a) Main valve 1 pc b) Discharge valve 1pc c) Auto drain trap 2 sets. d) Pressure reducing valve 2 sets, setting pressure = 9 kg/cm2. e) Safety valve 2 sets, setting pressure = 33 kg/cm2. • To check and test auto-start and auto-stop for operation Main Air Compressor. • To be test Safety with pressure 33 kg/cm2 and witness by CE or OS • On completion, restore above as original. <p>ii. Emergency Air Reservoir Maker : YANMAR, Ltd. Specification: WP: 25Kg/cm2, Hydraulic TP: 48.5 bar, Capacity 100 liters</p> <ul style="list-style-type: none"> • To be open up manhole • To be checked and cleaned inside part from sludge, tested pressure, and recorded by

	<p>issue certificate. Prepare for Class Surveyor Inspection.</p> <ul style="list-style-type: none"> To be renewed gasket manhole by yard supply. To be open, lapping & service The following valves : <ol style="list-style-type: none"> Main valve Globe valve Drain valve Manometer valve Safety valve To be test Safety with pressure 7.7 kg/cm² and witness by CE or OS On completion, restore above as original. <p>iii. Service Air Reservoir</p>
6.7	<p><u>Heat Exchangers</u> PIC: 2nd Engineer</p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <ul style="list-style-type: none"> To be open up and transported to workshop for cleaning chemically by using water and air side. To be opened up both covers and applied apexior No. 3 to inner surface. To be renew Zinc Anode. To be restore above works as original upon completion. To be carried out hydrostatic pressure test 13.5 kg/cm² witnessed by C/E and O/S. To be loosen tightening nuts for pressure plate. To be shifted backward the pressure plates. To be removed cooler plate stack and send to authorized service center for cleaning and checking .Plates of cooler to soak in chemical (inhibited acid) bath to remove scale deposit and then washdown with fresh water. To be carried out crack test on each plates with dye penetrant under UVlight inspection. To be checked and confirmed all gasket on plates are in good condition. To be renewed gasket as necessary with (yard supply) material. To be delivered back onboard cooler plate stacks. To be cleaned up the surface on the frame end plates, checked, and confirmed lining on connections are in good condition and then reassemble plate stacks and pressure plates as original position. To be carried out pressure test on the cooler and confirmed tightness. To be Renew cover M/E LO Cooler cover Inlet side. <p>List of Heat Exchangers to be carried out scope of works above as follows:</p> <ul style="list-style-type: none"> FO Heater for FO Purifier No. 1 & 2. Main FO Heater M/E. Heater FO settling tank. Heater FO service tank. Heater FO sludge tank. Air Conditioning Condenser. M/E Jacket FW Cooler And Repair Cover. M/E LO Cooler. Refrigerators Condenser and Repair Cover.
6.8 489087	<p><u>MARPOL Equipments</u> PIC: Chief Engineer and Technical Superintendent</p>

	<p>To arrange maker's Service Engineer, Expert or specialist company with necessary tools and material to carry out general servicing and inspection of the equipment. The work scope shall include but not limited to the followings:</p> <p><u>6.9.1 Incinerator Plant</u> Maker: MIURA Model: BGW-10</p> <ul style="list-style-type: none"> • To be check, clean, and re cemented wall inside burning chamber if necessary . • To be check and cleaned condition of primary blower. • To be repair or renew if necessary solenoid air valve for operating burning sludge. • To be renew gasket for door chamber by shore supply. • To be check and test safety device and record. • To be renew solenoid valve for FO and check electric system <p><u>6.9.2 Oily Water Separator</u> Maker: Taiko Kikai Industries,.Co Ltd Type : MSC-10 To be Renew 1st Filter and 2nd Filter.</p> <ul style="list-style-type: none"> • To be clean inside the Tube and Filters. • To be overhaul condition of bilge pump, overhaul if necessary. • To be check and test all alarm system and clean tube sensor for 15 ppm alarm. <p><i>Calibration Certificate to be issued</i></p> <p><u>6.9.3 Sewage System Plant</u> Maker: Taiko Kikai Industries, Co., Ltd. Type: SBT-25</p> <ul style="list-style-type: none"> • To be clean inside the tank by circulating SW or FW. • To be overhaul of Ejector Pump and Discharge Pump. • To be check and repair Auto-Operation for discharging Pump and Blower.
220056 220057	<p><u>Engine Room Tank Cleaning</u> PIC: 2nd Engineer</p> <p>To provide labour, necessary tools, ventilation, and lighting to accomplish the following works:</p> <ul style="list-style-type: none"> • To be opened up manhole. • To be cleaned manually the below listed of tanks: <ol style="list-style-type: none"> 1) No. 1C FO Tank capacity 370 m3 2) No. 2C FO Tank capacity 96 m3 3) No. 3C FO Tank capacity 94 m3 4) NO 4P,S FO Tank capacity 69x2 m3 5) NO 5P,S DO Tank capacity 72.98x2 m3 6) NO 6C DO Tank capacity 53.4 m3 7) Incinerator Waste Oil Tank capacity 1.0 m3 8) MDO Service Tank capacity 1.5 m3 9) MDO Settling Tank capacity 1.5 m3 10) Oil Bilge Tank capacity 12.4 m3 11) Scavenge Air Drain Tank capacity 4.0m3 12) Sludge Tank capacity 8.2 m3

	13) Stuffing Box LO Drain Tank capacity 3.4 m3 14) G/E LO settling tank 15) M/E LO Settling tank 16) M/E LO Sump tank 17) Residue Oil Tank and check heater coil pipe. 18) Bilge Tank and check heater coil pipe. <ul style="list-style-type: none"> To be removed and disposed shore excessive mud around 250 litres totally. To be prepared the above tanks for Class Survey. 																										
6.9	<p><u>Electrical System</u> PIC: Chief Engineer and Technical Superintendent</p> <p>To arrange maker's Service Engineer, Expert or specialist company with necessary tools and material to carry out general servicing and inspection of the equipment. The work scope shall include but not limited to the followings:</p> <p>1) <u>Electric Panel Main Switch Board in Engine Control Room and Emergency Switch Board in Emergency Generator Room</u></p> <ul style="list-style-type: none"> The safety device of main switchboard to be check and maintenance by expert. The synchronizing , over current trip and release power check and test should be done witness by surveyor/OS. On completion of the above, should be issued certificate report. To be checked condition and cleaned. The meters equipments to be calibration by specialist and adjusted/correction.for 3 Generator (Voltmeter, Ampere meter, Hz meter, kW) and issued certificate. To be check and calibrated Ampere meter, Voltmeter, Insulation meter for 440V feeder panel and 220V feeder panel and issued certificate. To be measure insulation resistance and record submitted to OS. <p>2) <u>Electromotor (898001)</u></p> <ul style="list-style-type: none"> To be overhauled completely by chemically cleaning rotor and stator bake and varnish. To be renewed ball bearings. To be reassembled properly upon completion. To be carried out running and load test witnessed by C/E nad O/S. To be measure insulation resistance and record submitted to OS. <p>List of the electromotors as follows:</p> <table> <tr><td>1) Main Cooling SW Pump No. 1</td><td>: 11 KW</td></tr> <tr><td>2) FW Cooling Pump No. 1 and No. 2</td><td>: 3.7 KW</td></tr> <tr><td>3) SW Ejector Pump</td><td>: 19 KW</td></tr> <tr><td>4) Fire GS Pump and Fire Bilge Ballast Pump</td><td>: 37 KW</td></tr> <tr><td>5) SW Service Pump</td><td>: 11 KW</td></tr> <tr><td>6) Spray Pump</td><td>: 90 KW</td></tr> <tr><td>7) IGG Pump</td><td>: 11 KW</td></tr> <tr><td>8) Main Air Compressor No. 1& 2</td><td>: 9.6 KW</td></tr> <tr><td>9) FW Hydrophore Service Pump No. 1 and No. 2</td><td>: 3.7 KW</td></tr> <tr><td>10) Hot Water Circulating pump</td><td>: 0.75 KW</td></tr> <tr><td>11) Main LO Pump No. 1 and No. 2</td><td>: 18.5 KW</td></tr> <tr><td>12) Cylinder Oil Transfer Pump</td><td>: 1.5 KW</td></tr> <tr><td>13) LO System Transfer Pump</td><td>: 1.5 KW</td></tr> </table>	1) Main Cooling SW Pump No. 1	: 11 KW	2) FW Cooling Pump No. 1 and No. 2	: 3.7 KW	3) SW Ejector Pump	: 19 KW	4) Fire GS Pump and Fire Bilge Ballast Pump	: 37 KW	5) SW Service Pump	: 11 KW	6) Spray Pump	: 90 KW	7) IGG Pump	: 11 KW	8) Main Air Compressor No. 1& 2	: 9.6 KW	9) FW Hydrophore Service Pump No. 1 and No. 2	: 3.7 KW	10) Hot Water Circulating pump	: 0.75 KW	11) Main LO Pump No. 1 and No. 2	: 18.5 KW	12) Cylinder Oil Transfer Pump	: 1.5 KW	13) LO System Transfer Pump	: 1.5 KW
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14) LO Purifier No. 1 and No. 2	: 3.7 KW
15) FO Purifier No. 1 and No. 2	: 5.5 KW
16) FO Supply Pump No. 1 and No. 2	: 1.25 KW
17) FO Transfer Pump	: 1.5 KW
18) DO Transfer Pump	: 1.5 KW
19) Bilge Transfer Pump	: 1.5 KW
20) Sludge Pump	: 2.2 KW
21) Refrigeration Compressor No. 1 and No. 2	: 3.5 KW
22) Elmot Compressor AC Accommodation	: 34.5 KW
23) Elmot hyd steering gear no 1 & 2	: 11 KW
24) Elmot sanitary exhaust fan	

3) **Monitoring Control System (Safety Device)**

- To arrange expert for check , maintenance and repair the Machinery monitoring system parameter including all Press. Gauge and thermo control.
- The all sensing parameter fitted to be calibration ,visual alarm, temperature and audible alarm function check and test ,and safety device function trip test witness by OS and CE
-
- The parts need to change must be confirm by OS
- Issued certificate on completion of that item.
- The items of equipments need to check, maintenance and repair is bellows;
 - Main Engine : LO trip ,Lo low press ,over speed, fresh water temp ,FO Leakage. Thermocouple of Exhaust gas and in/ out TC
 - Aux. Engine : LO trip ,LO low press ,fresh water temp ,over speed.
 - Boiler system : Low water level ,low low water level ,miss fire
 - Separator : FO leakage alarm
 - Steering system : LO low press , auto steering alarm.
 - Power pack Unit
 - Purifier
 - Main air compressor

4) **Main Lighting Section Board/s, Protective device & Fittings.**

- To check and service the Lighting system of vessel install. Monitoring control system of lighting to be test witness by Surveyor and OS.
- The all parts renewed should be confirm by OS.
- Emergency Lightings of vessel install to be test witness by Surveyor and OS.
- On completion of the above progress to issued certificate.

5) **Accommodation Alarm System.**

- To carried out check and maintenance the alarm for accommodation by specialist with scope :
 - general alarm system
 - public addressor
 - Visual and audible alarm of fire detection system
- The above parts must be in good order, the repair or renewed parts needed must be confirm by OS. On completion to carried out test witness by surveyor.

6) **Auto-Telephone System**

	<ul style="list-style-type: none"> To be repair telephone unit for common battery telephone at Steering Room, renewed if necessary. <p>7) <u>Bilge Level Detection System</u></p> <ul style="list-style-type: none"> To carried out check and maintenance for bilge Level Detection system of E/R space area by specialist. Floater parts and sensing should be calibration and certificate issued. Test equipments to carried out witness by surveyor. <p>8) <u>Fire detection system</u></p> <ul style="list-style-type: none"> To carried out check and maintenance of Fire detection system by specialist. The smoke and heat sensing should be calibration by special tools witness by surveyor. On completion of above process, carried out function test and certificate issued <p>9) <u>Controller Equipment</u> Pneumatic electro controller for three way valve</p> <ul style="list-style-type: none"> To be check and repair if necessary for controller valve with the following: <ol style="list-style-type: none"> M/E Jacket FW Cooler To be carried out calibration and test after finished jobs and record. <p>10) <u>Multi Monitor for F.O & LO purifier</u></p> <ul style="list-style-type: none"> To be check and repair multi monitor for FO / LO Purifier. To be renew approximate switch for sensor pressure if result faulty. To be calibrate to be carry out and record <p>11) <u>Hydraulic Valve Remote Control</u> Hydraulic Valve Remote Control Pump, 2 units</p> <ul style="list-style-type: none"> To be clean electromotor and renew bearing motor. To be carried out Mugger Test and recorded. To be check and repair solenoid valve for operation. To be check and test safety device and record. <p>12) <u>Actuator Valve on Main Deck</u></p> <ul style="list-style-type: none"> To be check actuator valve in Ballast Water Tank and Void Space. <p>13) <u>E/R Crane</u> Maker: Dongnam Marine Crane, Co., Ltd. Model: Chain Hoist</p> <ul style="list-style-type: none"> To be check and repair remote control for operating crane. To be check limit switch for safety device crane. To be carried out running test and record all jobs. <p>14) <u>Battery</u></p> <ul style="list-style-type: none"> To be renew battery for Life boat engine To be renew battery UPS for UMS in ER To be renew battery for cargo monitoring system. <p>15) <u>Checked and tested all alarm in ER</u></p> <ul style="list-style-type: none"> Bilge Alarm Engineer call alarm Dead man alarm
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	<ul style="list-style-type: none"> All tank level alarm.
6.10 269003	<p><u>Piping System at Engine Room</u> PIC: 2nd Engineer</p> <p><i>All Sea Water Pipeline shall used seamless pipe Sch. 40</i></p> <ol style="list-style-type: none"> To be renew Overboard Sewage valve To be renew overboard Ballast and GS Pump butterfly valve To be renew body filter sea Chest and Cover Upper side and Lower side. To be Clean sea chest pipe line. To be renew butterfly valve by pass Ballast and GS pump SW Cool suction Service Pump. <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 4" : 1840 mm - Flange : 5 paces - Elbow 900 : 2 Pc SW Cool discharge for A/E <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 2.5" : 2350 mm - Flange : 6 paces - Elbow 90O : 4 pc - Pipe 6" : 150mm SW Cool AE from GS Pump <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 4" : 1200 mm - Flange : 4 pcs Ventilation pipe from DO 6C <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 2.5" : 3100 mm - Flange : 2 pcs - Elbow 90o : 1 pc SW suction ME service Pump from sea chest <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 5" : 590 mm - Flange : 2 pcs - Elbow 90o : 1 pc SW pipe inlet service pump from sea chest <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe 3" : 2000 mm - Flange : 3 pcs - Elbow 45o : 3 pcs - Globe valve 5k80 : 1 Pcs SW pipe to Intercooler M/E <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe A80 : 1500 mm - Flange : 2 pcs - Elbow : - pc SW pipe to LO cooler M/E <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe A80 : 1000 mm - Flange : 2 pcs - Elbow 90o : 1 pc SW pipe distributor suction SWC M/E <ul style="list-style-type: none"> Material: <ul style="list-style-type: none"> - Pipe A125 : 1000 mm

	<p>- Flange : 3 pcs</p> <p>o. SW pipe for OWS Material: - Pipe A32 : 3500 mm - Flange : 3 pcs - Elbow 450 : 2 Pcs</p> <p>p. SW pipe for air pipe sea chest STBD Material: - Pipe A32 : 2000 mm - Flange : 1 pcs - Elbow 900 : 1 Pcs</p> <p>q. SW Pipe for discharge SWC M/E to cooler Material: - Pipe A80 : 2000 mm - Flange : 2 pcs - Elbow 900 and 450 : 1 Pcs</p> <p>r. SW pipe cooling for AC Accommodation Material: - Pipe A65 : 3600 mm - Flange : 6 pcs - Elbow 450 : 3 Pcs</p> <p>s. SW pipe for FWG Material: - Pipe A80 : 3100 mm - Flange : 6 pcs - Elbow 900 : 4 Pcs - Elbow 450 : 1 Pcs</p> <p>t. SW Pipe cooling for expansion Main Air Compressor Material: - Pipe A25 : 2000 mm - Flange : 2 pcs - Elbow 900 : 2 Pcs</p> <p>u. SW Pipe cooling for distributor Service Pump Material: - Pipe A125 : 1000 mm - Flange A125 : 1 pcs - Flange A80 : 1 Pcs - Flange A65 : 1 pcs - Flange A40 : 1 Pcs - Flange A25 : 1 Pcs - Elbow 900 : 1 Pcs.</p>
6.11 899001	<p><u>Miscellaneous</u> PIC: Chief Engineer and Technical Superintendent</p> <p>To be provided labours, necessary tools, and material to accomplish the following works:</p> <p>i. E/R Ventilation Fan P & S</p> <ul style="list-style-type: none"> • To be Overhaul ER Fan P & S. • To be renew ball bearing. • To be renew air mesh filter. • To be carried out balancing. • To be checked and repaired flaps damper for E/R Fan (P/S). <p>ii. Fresh Water Generator</p>

	<ul style="list-style-type: none"> • To be clean plate for condenser and evaporator by chemical. • To be renew gasket for evaporator plate. • To be carried out leakage test by running the SW Ejector pump. • To be renew cover plate Evaporator side • To be renew gasket plate Evaporator side and Condenser side • To be renew all Thermometer and Pressure gauge <p>iii. Air Conditioner Compressor and Fan</p> <ul style="list-style-type: none"> • To be Check shaft mechanical seal. • To be Check Pulley for Compressor and Motor as per original size V-belt. • To be clean Electromotor, furnished if necessary, renewed bearing F&A, carried out mugger test, and recorded. • To be checked, carried out balancing fan, renewed bearing F&A. • To be clean Electromotor for fan, furnished if necessary, renewed bearing F&A, and carried out mugger test, and recorded. • To be repair Casing Evaporator or renew. • To be installed new Compressor unit completed (before only one compressor) • To be checked, tested safety device properly, and recorded. <p>iv. Air Control Reducer Valve in engine room</p> <ul style="list-style-type: none"> • To be checked and repaired condition of air dyer machine by shore technician. • To be renewed spare part (yard supply), if necessary. <p>v. FO Purifier No. 1 and No. 2.</p> <ul style="list-style-type: none"> • To be overhauled bowl part FO Purifier No. 1 and LO Purifier No. 2. <p>vi. MGPS SYSTEM</p> <ul style="list-style-type: none"> • To be checked and repaired by shore technician due to not working properly. • To be renewed electrode cathodes (yard supply) <p>vii. Refrigerated Machine</p> <ul style="list-style-type: none"> • To be repair capillary pipe system. • Cleaned condenser and repair cover condenser. • Renew insulation tape. • Renew solenoid valve for meat pipe. • Renew expansion valve for meat and vegetable. <p>viii. Renew any plate in Engine Room especially Ground floor</p> <p>ix. Earth Shaft Propeller</p> <ul style="list-style-type: none"> • To be Repair cable or renew • To be renew carbon brush • To be renew carbon brush plate. <p>x. Service all watertight door & renew seal</p> <p>xi. Spare Part Room.</p> <ul style="list-style-type: none"> • To be renew day lighting with Fluorescents Lamp (TL Lamp). • To be renew day lighting special tools room with TL Lamp. <p>xii. Fresh Water calorifier system</p> <ul style="list-style-type: none"> • To be Overhaul Fresh water pump for calorifier system. • To be renew ball bearing. • To be check heater and cleaning heater. • To be carried out balancing of pump. • To be check pipe line to accommodation.
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Approved by,	Reviewed by,
<u>Alfonsus Siregar</u> Fleet Manager Date: _____	<u>Yacob Andayan</u> Amal Hilmana Docking Team Date: 10 January 2018

Prepared by,
Master Chief Engineer Chief Officer Date: _____