Jamaica Public Service Company Limited

REQUEST FOR PROPOSAL

SPECIALIST CONTRACTOR SERVICES

ROCKFORT DIESEL STATION

UNIT #2

MAJOR OVERHAUL 2022

RFP# 883112

MAY, 2021

Contents

1. Background

Jamaica Public Service Company Limited (JPS) is an integrated electric utility company engaged in the generation, transmission and distribution of electricity throughout the island of Jamaica. JPS owns and operates 28 generating units and also purchases power from seven independent power producers (IPP). JPS assets include conventional thermal plants (374 MW), hydro and wind (29.12 MW), 50 substations, approximately 1200 km of transmission lines and 20,534 km of distribution lines.

The common shares of JPS are held 40% by Marubeni Corporation through its subsidiary Marubeni Caribbean Power Holdings ("MCPH"); 40% by Korea East West Power Company ("KEWP"); 19.9% by the Government of Jamaica ("GOJ") and the remaining 0.1% by a group of minority shareholders.

The Office of Utilities Regulation ("OUR") is the independent regulatory agency with responsibility for regulating the electricity sector in Jamaica.

The Rockfort Diesel Station Unit #2 is scheduled to undergo its biennial major maintenance in January 2022 for a period of 35 calendar days. During this period a series of inspection and maintenance activities will be performed. The objectives of the overhaul are to improve the efficiency and reliability of the unit without any safety incidents.

The company is requesting proposals from specialist contractors to perform inspection and maintenance services on the Rockfort Diesel Station Unit #2 as outlined in this RFP document.

2. Scope of Works

The works involved in the major overhaul shall include but not limited to the following:

2.1 Crankcase Deflection.

- Measure crankcase deflection after Engine shut down and before Engine Start up

2.2 Main Bearing work Inspection / Replacement

Inspect and replace if necessary four (4) Main Bearings #3, 4, 5 & 8.

• To remove line from Main Bearing.
• Loosen & Remove Thrust Bolts
• Remove cap from Main Bearing
• Remove Main Bearing
• Inspect Main bearing/ journal & polish as necessary
• Install Main bearing
• Install cap to main Bearing Install Lube Oil lines to Main Bearing

2.3 Bottom –End Bearing Inspection / Replacement

Inspect and replace if necessary four (4) bottom –End Bearing #4, 5, 7 & 8.

- To remove crankpin cap
- To remove crankpin bearing
- To inspect crankpin bearing
- To inspect crankpin
- To polish crankpin to install crankpin bearing to install crankpin bearing cap

2.4 Cross Bearing Work Inspection / Replacement

Inspect and replace if necessary eight (8) Cross Bearing #1, 2, 3, 4, 5, 6, 7 & 8.

- To loosen four (4) bearing trust bolts
- To remove cap from crosshead bearing
- To lift Crosshead Pins out of saddle
- To remove lower half Crosshead bearing shell
- To inspect Crosshead Pin & polish if necessary
- To inspect Saddle
- To Inspect Guide shoe
- To Install lower half Bearing Shell
- To install Crosshead Pin
- To install cap to Crosshead Bearing
- To Tighten four (4) bearing trust bolts.

2.5 Cross Head lubricating links (knee Levers)

Inspect, In-situ machining and / or replacement if required eight (8) Crosshead Pins # 1, 2, 3, 4, 5, 6, 7 & 8.

2.6 Cylinder Liner Works

All the Cylinder Liner are to be measure and then remove from engine. Inspect the exhaust gas passage, grinded landing surfaces for all cylinder block and all cylinder cover.

- To grind all Cylinder Block landing surfaces
- To grind all Liners landing surfaces (upper & lower)
- To replace all liners check valves
- To grind all Cylinder covers landing surfaces.
- To remove all Cylinder Liners from Main Engine.
- To measure all cylinder Liners
- To remove all wear ridges in Cylinder liners.
- To install all cylinder line into Main Engine (Nb. Install new liners as required)

2.7 Cylinder lubricating quills

All the cylinder lubricating quills are to be removed from the Engine, dismantled, cleaned, inspected and replace all worn parts

2.8 Main Engine Starting Air Valve

To inspect, test and overhaul as required

2.9 Cylinder Lubricating Pump.

To inspect, test and overhaul all cylinder lubricating pumps.

2.10 Cylinder Block Works.

Check the torque on all tie rod bolts and lateral bolt, especially between # 5 & 6 engine bolts.

2.11 Cylinder Cover works.

All cylinder covers to be removed, cleaned, Inspected and replaced and landing surface to be ground.

2.12 Piston Work

Before pulling Pistons,

- To remove all piston cooling stand pipes to be removed for inspection and measurement.
- Then all the Piston are to be removed, cleaned, inspected and replaced.
- Renew all the piston rings and record piston crown stamps,
- To record Piston skirt stamps and as found Piston rings stamping.

2.13 Piston Rod Stuffing Boxes works

All Piston rod stuffing boxes to be removed, cleaned, Inspected and replaced.

2.14 Cam shaft works.

Perform Visual inspection of all Fuel Cams & Rollers, and measure bearing clearance.
Inspect both horizontal regulating linkages.

- To measured camshaft bearing clearance
- To inspect the camshaft Bearing
- To tighten camshaft fuel cam lobe
- To measured cam shaft bearing Clearance (final)
- To measured and change Fuel linkages

2.15 Fuel Pump Block & Linkages.

Overhaul four (4) Fuel oil Pump Block by cleaning, inspecting, calibrating and replacing worn parts.

- To dismantle & remove tension covers.
- To remove Pump Blocks
- To dismantle Pump block components
- To clean Pump Blocks
- To inspect & service components (valves, push rod and plungers)
- To reassemble Pump Block Components
- To inspect & service Fuel block Isolation valves
- To inspect & service Fuel block Safety cut out devices.
- To reinstall Fuel Pump Block
- To reinstall tension covers.

2.16 Start-up and Commissioning Support

The contractor be required to Oversee the following:

- The RF2 running program to MCR
- RF2 Main Engine Operating parameters / conditions
- Assess the performance of the BOP auxiliary components for RF2 Main Engine

2.17 Miscellaneous Main Engine Overhaul Support / Quality Assurance

- To inspect Main Engine Cylinder Block & Exhaust Ports for crack to determine the need for Metal Stitching.
- To support the Main Engine Lube Oil Systems Flushing & Piping normalization
- To check all Tie rod bolts, lateral & Turning Gear Bolts

3. Optional : Supply of Spare Parts (New and Reconditioned)

JPS will be responsible for the supply of spare parts required for the overhaul.

4. JPS Labour Assistance

JPS will outsource and provide local labour assistance as needed. At least seven (7) helpers.

5. Accommodation and Transportation in Jamaica

JPS will provide hotel accommodation and Transportation for Specialist Contractor Crew Members

6. Schedule

Considering all activities that can be done concurrently, the contractor shall complete all works within 23 calendar days. See appendix for Schedule requirements.

7. Equipment OEM Part Drawings and Technical Information

Contractor shall be responsible for obtaining OEM detailed drawings that will aid in the disassembly and reassembly of engine components.

8. JPS Specialized Tools Available

JPS will supply the following main specialized tools listed below to complete the overhaul.
The contractor will be required to supply all other specialized tools with relevant certification.

a. Special tools for cylinder covers assemble & disassemble
b. Special tools for Piston & Skirt assemble & disassemble
c. Cylinder Liner lifting tool
d. Grinding Tool for Liners and Cylinder liner landing surface & Cylinder

9. HSE (Health Safety and Environment) Policy

The contractor will be expected to abide by JPS HSE Policy and Procedures

10. Quality and Workmanship

JPS will engage an independent third party consultant to provide quality oversight services to include but limited to the following:

Review, verification and assessment of the overhaul measurement records of major components.

- Crankshaft deflection
- Surface roughness of main bearings, bottom end bearings, crosshead bearings and pins.

Any portion of the contractors work in which JPS determines to be inconsistent with accepted quality standards shall be corrected by the contractor.

Contractor will be required to furnish a proposed Quality Assurance and Quality Control plan as a part of the proposal submission.

11. Insurance

The contractor must provide comprehensive insurance to protect their property and workers.

12. Division of Responsibility

Resource / Service	Contractor	JPS
Supply of Utilities (Compressed Air , Electricity , Water)		X
Heavy Duty Equipment and Tools / certificates must be included	X	X
Office Facilities for Specialist Contractors		X
Workshops , access to Workshop Equipment and workshop tools		X
Safety Equipment	X	
Shipping and Logistic Support	X	X
Custom Clearance		X
Local Transportation of Equipment		X
Hotel Accommodation for Contractor Workers		X
Local Transportation of Contractor Workers		X
Participate in update meetings (measurement, inspection and findings)	X	X
Participate in daily debrief meetings	X	X

13. Deliverables and Schedules

ITEMS	TASKS AND DELIVERABLES	DATES	RESPONSIBILITY
1	RFP invitations to selected contractors	May 31, 2021	JPS
2	Bid Walkthrough / Site Visit / Clarifications	June 9, 2021	JPS / Specialist Contractors
3	Question submitted by Bidder	June 11, 2021	Specialist Contractors
4	Response to question	June 15, 2021	JPS
5	Bidder provide their intention to bid	June 17, 2021	Specialist Contractors
6	Completion of RFP and deadline for submission of bids to JPS	11:59PM June 22, 2021	Specialist Contractors
7	Bid Opening	June 23, 2021	JPS

14. General Instructions to Bidders

14.1 Points of Contact (POC)

All communications and questions with JPS regarding the RFP must be directed to the following points of contact (POC).

Name**:** **Mr. Kolonje McKenzie**
CC: Mrs. Ann-Marie Woodham, Ms. Melisa Richmond
Address: Jamaica Public Service Company Ltd
113 Washington Boulevard

Kingston 20, Jamaica WI

Email: komckenzie@jpsco.com **cc:** aaiken@jpsco.com mcrichmond@jpsco.com

14.2 Communication Regarding the RFP

a. Unauthorized communications concerning this RFP with other company employees, executives or contractors may result in immediate disqualification.

b. All communication and questions should be submitted in writing, electronically to the POC. In order to ensure consistency in the information provided to the RFP Contractors, responses to questions received will be communicated to all participants without revealing the source of the inquiries.

c. Only written responses will be considered official and binding. JPS reserves the right, at its sole discretion, to determine appropriate and adequate responses to questions and request for clarification.

d. Bidders contact information shall be provided for RFP and thereafter contained within all correspondence containing questions and clarifications arising.

Requirements include:

i. Company's name, company address and phone number, contact person, email address, position
ii. References to specific points within the RFP using section number as reference
iii. Clear and concise questions.

14.3 RFP Amendment and Cancellation

JPS retains sole right to amend or cancel any portion of the work described herein at any time prior to the deadline for submission.

14.4 Written Clarification

JPS reserves the right, at its sole discretion, to request clarifications of any Proposal or to conduct discussions for the purpose of clarification with any or all contractors. The purpose of any such discussions will be to ensure full understanding of the proposal. Discussions will be limited to specific sections of the proposal identified by JPS and, if held, will be after initial evaluation of the Proposal.

If clarifications are made as a result of such discussion, the contractor will submit such clarifications electronically.

Refusal to respond to JPS request for clarifications may be considered non-responsive and be used as grounds for rejection of the Proposal.

14.5 Oral Clarification

If requested, the vendor will make an oral presentation to the Proposal Evaluation Team and other designated Company representatives. All expenses for the presentation will be borne by the vendor.

14.6 Bid Walkthrough / Site Visit

The contractor will be invited to attend a bid walkthrough. JPS will provide adequate notification to contractors of the date, time and location of the walkthrough.

14.7 Late RFP Response

Any RFP Response received by the Company after the deadline for submission of RFP Responses prescribed by the Company will be rejected and/or returned unopened to the RFP Response Contractors.

14.8 RFP Responses Submission

Only Electronic submissions will be accepted, using ShareFile by Citrix. All uploads will be confidential. Additional information on this software can be accessed by clicking the links below:

- Basic Client Guide https://citrix.sharefile.com/share/view/s1bff52f8d434781a
- Training (video) https://www.sharefile.com/support/training

RFP Activities are guided by the dates stated in the Calendar of Events highlighted in Section 11 of this RFP. Observing these dates,

1) A combined response to questions will be shared at the time specified in the RFP.
2) Respondents must confirm their intention to bid in order to be setup in JPS ShareFile folder
3) Access to individual vendor folders will be given 1 weeks before the bid closes to eliminate any issues for bid upload by RFP deadline.
4) Files must be accurately labelled/named. Commercial Information must be a separate file from your Technical Overview.
5) ShareFile Access will be removed when the bid closes.

15. RFP Response Format

15.1 RFP Response Prices

The Bidders shall indicate the unit prices and total RFP Response Price of the service it proposes to supply under the Contract.

The Bidders shall propose the payment terms, and a detailed element of cost for each activity for undertaking the RFP response.

Agreed prices for the selected Bidder shall be fixed in the contract up to end of calendar year 2022.

15.2 Technical Response

TECHNICAL PROPOSALS must include the following:

- A detailed description of the work scope and associated activities with sufficient detail
- A schedule of major activities
- Logistic Plan for the project
- Identification of proposed sub-contractors to be used by the contractor
- Quality Assurance and Quality Control Plan
- Acknowledgement of Addendum, if applicable
- A list of similar projects completed in the last five years
- Provide information for workshop capability for reconditioning spare parts
- Safety Statistics of the contractor and any subcontractors Ex. DAWC, DART, TRIR etc.
- Company Brochure
- Other information in the contractor's view that is fit for consideration

15.3 Proposed Withdrawal

The Bidders may modify or withdraw its proposal after submission, provided that written notice of the modification or withdrawal is received by the Purchaser/JPS prior to the deadline prescribed for submission of proposals.

To withdraw a proposal, the Bidders must submit a written request electronically or signed document by an authorized representative before the deadline for submitting proposals. After withdrawing a previously submitted proposal, the Bidders may submit another proposal at any time up to the deadline for submitting proposals.

15.4 Cost of Proposal Preparation

The Bidders shall bear all costs associated with the preparation and submission of its RFP Response. JPS will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the RFP Response process.

15.5 Proposal Rejection

Bidders must comply with all of the terms of this RFP. JPS may reject any proposal as being non-responsive that does not comply with the terms, conditions and characteristics of this RFP or the key criteria for selection.

JPS reserves the right, at its sole discretion, to reject any and all proposals or to cancel this RFP in its entirety, and to accept a proposal other than the lowest price or proposal presented outside of this RFP that meets the company's requirement.

JPS assumes no responsibility for delays caused by any mail/bearer delivery service.

16. Evaluation Criteria

The evaluation of Proposal will be carried out for each technical proposal, taking into account (a) the contractor's relevant experience for the assignment, (b) the quality of the methodology proposed (c) the qualifications of the key staff proposed. (d) technical capability, cost of service and ability to meet target dates deadlines.

16.1 Award Criteria

JPS will evaluate proposals using an internal scoring method that weighs various parameters to give the evaluation team insight into the strengths of each proposal relative to JPS needs. JPS internal scoring method values the following proposal attributes (Order of presentation here does not reflect priority).

TECHNICAL EVALUATION

CRITERIA	Score
Technical capability	Pass/Fail
Experience with JPS model (RLB) engine or similar	Pass/Fail
Number of Similar Overhauls conducted in the last 10 years	Pass/Fail
Safety Record	Pass/Fail
Ability to meet deliver within schedule	Pass/Fail

COMMERCIAL EVALUATION

CRITERIA	Score (%)
Price	90
Terms of payment	10
Total	100

16.2 RFP Response Currency

Prices should be quoted in USD.

16.3 Award of Contract

16.3.1 Award or Rejection

The Purchaser/JPS will award the contract to the successful Contractor whose RFP Response has been determined to be substantially responsive. The Purchaser/JPS reserves the right not to accept the lowest RFP Response if it does not meet JPS requirement.

Issuance of this RFP Response does not constitute a commitment by JPS to award any contract or purchase services offered.

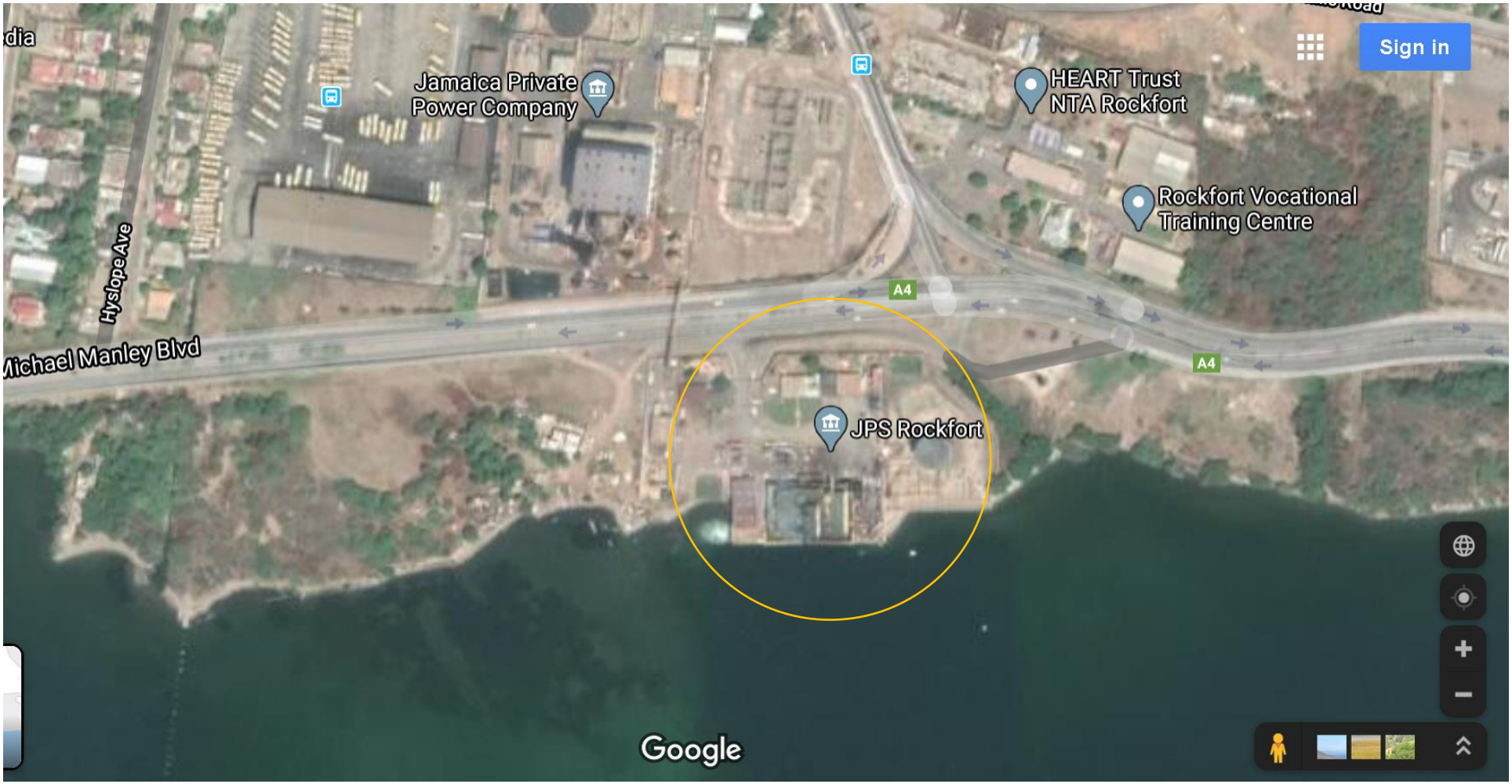
The Purchaser/JPS reserves the right to accept or reject any RFP Response, and to annul the RFP Responding process and reject all RFP Responses at any time prior to award of Contract, without thereby incurring any liability to the affected RFP Response Contractors or any obligation to inform the affected RFP Response Contractors of the grounds for the Purchaser/JPS's action.

16.4 Notification of Award

Prior to the expiration of the period of RFP Response validity, the Purchaser/JPS will notify the successful RFP Response Contractor in writing by email or fax, that its RFP Response has been accepted. All unsuccessful RFP Response contractors will be notified.

17. Appendix

17.1 Location of the Rockfort Diesel Station



17.2 Unit Information

Plant Location	Eastern side of Kingston Harbour
Commission Date	December 1985
Technology	Two (2) Slow Speed Diesel Engine Driven Generators
Installed Capacity	40 MW
Current MCR	40 MW
Operating Regime	Base Load
Manufacturer	Mitsubishi Heavy Industries / Sulzer
Type & Model	Sulzer – 8RLB90F
Number of Cylinders. & RPM	8 / 100
Horsepower	28,160
Cylinder Bore	900 mm
Piston Stroke	1900 mm
Running Hours as	-
GENERATOR DATA	
Manufacturer	Meidensha Electric Mfg. Co. Ltd.
Type	Synchronous
Rated Output	20,000kW ; 13,800V
Frequency	50 Hz
Generator Rated Current	1,046 A
No. of Poles	60

17.3 Summary Rate Sheet

SUMMARY RATE SHEET – MAIN ENGINE SCOPE OF WORK

6.0 TURBINE & AUXILIARY SCOPE	COST- DOUBLE SHIFT (24HRSX 7DAYS)
1 Crank shaft deflection	
2 Main Bearing Works	
3 Bottom end Bearing Works	
4 Crosshead bearing Works	
5 Cross head pins works	
6 Crosshead Lubrication links	
7 Cylinder Liner Works	
8 Cylinder Lubricating Quills works	
9 Cylinder Lubricating Pump works	
10 Cylinder Block works	
11 Cylinder Covers Works	
12 Piston works	
13 Piston rod stuffing boxes	
14 Camshaft works	
15 Fuel Pump and fuel Regulating linkage works	
16 Start-up and Commissioning Support	
17 Miscellaneous	
TOTAL	

17.4 Schedule Requirements

ROCKFORT No.2 MAJOR OVERHAUL_JAN. 2022	24.71 days	Fri 1/7/22	Mon 1/31/22
RF 2 BOP MAINTENANCE. ACTIVITIES	19.83 days	Fri 1/7/22	Wed 1/26/22
MECHANICAL MAINTENANCE DEPT. MAINTENANCE	19.83 days	Fri 1/7/22	Wed 1/26/22
PERMITS ACQUISITION & CANCELLATION	19.83 days	Fri 1/7/22	Wed 1/26/22
Acquire LOTO (MMD) on Main engine systems	1 hr	Fri 1/7/22	Fri 1/7/22

Cancel LOTO on Mechanical systems	1 hr	Wed 1/26/22	Wed 1/26/22
RF No.2 MAIN ENGINE SYSTEMS	19.75 days	Fri 1/7/22	Wed 1/26/22
TURBOCHARGERS OVERHAUL - H. REID	19.46 days	Fri 1/7/22	Wed 1/26/22
CYLINDERS 1- 8; OVERHAUL (INCLUDE PISTONS AND CYLINDER LINERS)	18.92 days	Fri 1/7/22	Tue 1/25/22
No.2 M.E. ACCESS DOORS OPENING	0.5 days	Fri 1/7/22	Fri 1/7/22
Remove Bolts and open all M.E Lantern doors	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove bolts and open all M.E crankcase doors	4 hrs	Fri 1/7/22	Fri 1/7/22
Remove bolts and open liners plug space doors	1 hr	Fri 1/7/22	Fri 1/7/22
Remove bolts and open all M.E lower and upper scavenge space doors	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove bolts and open manifold doors	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove bolts and open M.E economizer doors	4 hrs	Fri 1/7/22	Fri 1/7/22
Remove bolts and open all M.E PUP doors	4 hrs	Fri 1/7/22	Fri 1/7/22
DISASSEMBLY OF PISTON,LINERS AND OTHER	2.33 days	Fri 1/7/22	Sun 1/9/22
Inspect all piston and liners for leaks after shutdown	1 hr	Fri 1/7/22	Fri 1/7/22
Remove M.E. 1-8 cylinder cover accessories	4 hrs	Fri 1/7/22	Fri 1/7/22
Loosen nuts and remove M.E. 1-8 cylinder covers (Nuts to be loosened prior to the start of Crankshaft deflection)	4 hrs	Fri 1/7/22	Fri 1/7/22
Loosen and remove M.E. 1-8 cylinder piston nuts (Nuts to be loosened prior to the start of Crankshaft deflection)	3 hrs	Fri 1/7/22	Fri 1/7/22
Remove M.E 1-8 Cylinder pistons	6 hrs	Fri 1/7/22	Fri 1/7/22
Remove M.E 1-8 cylinder piston rod stuffing boxes	4 hrs	Sat 1/8/22	Sat 1/8/22
Remove Cylinder Studs (33) (Check if this is necessary)	1 min	Sat 1/8/22	Sat 1/8/22
Remove M.E 1-8 cylinder, lubricating Quills	8 hrs	Fri 1/7/22	Fri 1/7/22
Remove M.E cylinder liners (as required)	12 hrs	Sat 1/8/22	Sun 1/9/22
Remove M.E 1-8 cylinder jacket ring (insert)	8 hrs	Sat 1/8/22	Sat 1/8/22
Remove M.E stand pipes	4 hrs	Sat 1/8/22	Sat 1/8/22
Remove M.E 1-8 cylinder piston cooling gland boxes	4 hrs	Sat 1/8/22	Sat 1/8/22
INSPECTION & SERVICING OF ENGINE PARTS	14.33 days	Fri 1/7/22	Fri 1/21/22
Clean and conduct DYE penetrant testing on M.E 1-8 cylinder blocks for cranks and repairs	8 hrs	Wed 1/12/22	Thu 1/13/22
Clean and conduct DYE penetrant testing on # 1 M.E 1-8 exhaust ports	8 hrs	Thu 1/13/22	Fri 1/14/22
Conduct DYE penetrant testing on #1 M.E 1-8 cylinder covers	24 hrs	Fri 1/14/22	Sat 1/15/22
M.E.1 - 8 Cylinder liners; overhaul (new liners were replaced)	48 hrs	Tue 1/11/22	Sat 1/15/22
M.E 1 - 8 Cylinder covers; overhaul	24 hrs	Fri 1/14/22	Sat 1/15/22

M.E.1 - 8, Cylinder pistons(Crown, Rod, Skirt, Ring); Overhaul	96 hrs	Fri 1/14/22	Fri 1/21/22
M.E.1 - 8, Cylinder stand pipes; Overhaul	24 hrs	Fri 1/7/22	Sun 1/9/22
M.E.1 - 8, Cylinder, lubricating quills; Overhaul	36 hrs	Fri 1/7/22	Mon 1/10/22
M.E.1 - 8, Cylinder piston rod stuffing boxes; Overhaul	48 hrs	Sat 1/8/22	Tue 1/11/22
M.E.1 - 8, Cylinder piston cooling gland boxes; Overhaul (16)	24 hrs	Tue 1/11/22	Thu 1/13/22
M.E.1 - 8, Cylinder fuel injectors; Overhaul	24 hrs	Fri 1/7/22	Sat 1/8/22
M.E.1 - 8, Cylinder covers relief valves; Overhaul	8 hrs	Sat 1/8/22	Sun 1/9/22
M.E.1 - 8, Cylinder starting air valve; Overhaul	32 hrs	Sun 1/9/22	Tue 1/11/22
M.E.1 - 8, Cylinder jacket cooling water inlet butterfly valves(8); inspect and service	16 hrs	Tue 1/11/22	Thu 1/13/22
M.E.1 - 8, Cylinder jacket cooling water outlet valves; inspect and service	8 hrs	Thu 1/13/22	Thu 1/13/22
M.E.1 - 8, Cylinder piston cooling water sight glasses; Inspect and clean	24 hrs	Thu 1/13/22	Fri 1/14/22
M.E.1 - 8, Cylinder lantern door sight glass; Inspect and clean	24 hrs	Sat 1/15/22	Sun 1/16/22
M.E.1 - 8, Cylinder flame arresters; Overhaul	8 hrs	Thu 1/13/22	Fri 1/14/22
M.E.1 - 8, Cylinder cover studs. Inspect and service if necessary	8 hrs	Fri 1/14/22	Fri 1/14/22
REASSEMBLY OF PARTS INCLUDE PISTON, LINERS	16.5 days	Sun 1/9/22	Tue 1/25/22
Clean & tap threads before Installing new Cylinder Studs (33) Not needed)	1 min	Sun 1/9/22	Sun 1/9/22
Install new gasket and close 1-8 liners plug space doors	12 hrs	Tue 1/18/22	Wed 1/19/22
Install M.E 1-8 cylinders jacket rings	4 hrs	Fri 1/14/22	Fri 1/14/22
Install M.E. 1 - 8, Cylinders piston cooling gland boxes	8 hrs	Tue 1/11/22	Tue 1/11/22
Install M.E. Cylinders liners as per removal	16 hrs	Tue 1/18/22	Wed 1/19/22
Install M.E. 1 - 8 Cylinders lubricator quills	24 hrs	Wed 1/19/22	Fri 1/21/22
Prove lubrication	24 hrs	Wed 1/19/22	Fri 1/21/22
Install M.E. 1- 8, Cylinders piston rod stuffing boxes	8 hrs	Tue 1/18/22	Wed 1/19/22
Install 1 - 8 Pistons and measure clearances between piston skirt and liner	24 hrs	Fri 1/21/22	Sat 1/22/22
Tighten M.E. 1 - 8, Cylinder piston rod nuts	10 hrs	Fri 1/21/22	Fri 1/21/22
Install M.E. 1 - 8, Cylinders stand pipes	16 hrs	Sat 1/22/22	Sun 1/23/22
Install M.E. 1 - 8, Cylinders covers	8 hrs	Tue 1/25/22	Tue 1/25/22
Install L Accessories on M.E. 1 - 8, cylinder covers	8 hrs	Tue 1/25/22	Tue 1/25/22
M.E. MISCELLANEOUS MTCE. ACTIVITIES	11.75 days	Thu 1/13/22	Tue 1/25/22
Unit NO.2 tie-rod bolts; check, verify tightness and replace as necessary	30 hrs	Thu 1/13/22	Sat 1/15/22
Unit NO.2 M.E Lateral bolts; Check, Verify tightness and replace as necessary	32 hrs	Sat 1/15/22	Tue 1/18/22
Unit NO.2 M.E. foundation bolts; check and tighten	24 hrs	Tue 1/18/22	Thu 1/20/22

Modify the frwd and aft fuel inkage covers as to easy access to FQS	8 hrs	Thu 1/20/22	Thu 1/20/22
Side stays overhaul	4 hrs	Fri 1/21/22	Fri 1/21/22
Turning gear check	4 hrs	Fri 1/21/22	Fri 1/21/22
T/C air seal vent check/clean	4 hrs	Mon 1/24/22	Mon 1/24/22
Scavenging air water drain orifices check	6 hrs	Mon 1/24/22	Tue 1/25/22
No.2 M.E. ACCESS DOORS CLOSING	1.67 days	Thu 1/20/22	Sat 1/22/22
Renew gaskets & close economizer doors	4 hrs	Thu 1/20/22	Thu 1/20/22
Renew gaskets & close liners plug space doors	4 hrs	Thu 1/20/22	Fri 1/21/22
Renew gaskets & close M.E. Lantern doors	2 hrs	Fri 1/21/22	Fri 1/21/22
Renew gaskets & close M.E. Upper & lower scavenge space doors (upper complete)	4 hrs	Fri 1/21/22	Fri 1/21/22
Renew gaskets & close M.E. Crankcase side doors	2 hrs	Fri 1/21/22	Fri 1/21/22
Renew gaskets & close M.E. Pup doors	2 hrs	Fri 1/21/22	Fri 1/21/22
Renew gaskets & close manifold doors	1 hr	Sat 1/22/22	Sat 1/22/22
SCAVENGE AIR RECIEVER MAINTENANCE	8.41 days	Fri 1/7/22	Sat 1/15/22
Remove all reed valves (Scavenge door)	4 hrs	Fri 1/7/22	Fri 1/7/22
Remove all water separators	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove, Clean, repair & reinstall scavenge air receiver drain lines (2) FWD. & AFT.	16 hrs	Fri 1/7/22	Sat 1/8/22
Remove, Clean & reinstall sight glasses (2) for pup space	2 hrs	Sat 1/8/22	Sat 1/8/22
Overhaul pup flap mechanism	8 hrs	Sat 1/8/22	Sun 1/9/22
Repair damaged areas and apply epoxy to these areas (as required)	24 hrs	Sun 1/9/22	Tue 1/11/22
Inspect & service reed valves (Scavenge air valves) (56)	32 hrs	Tue 1/11/22	Fri 1/14/22
Reinstall reed valves (scavenge air)	8 hrs	Fri 1/14/22	Fri 1/14/22
Reinstall water separators	8 hrs	Fri 1/14/22	Sat 1/15/22
Scavenging air water separators air gap check	2 hrs	Sat 1/15/22	Sat 1/15/22
M.E. STARTING AIR SYSTEM	2.38 days	Fri 1/7/22	Sun 1/9/22
AUTOMATIC SHUT OFF VALVE	0.38 days	Fri 1/7/22	Fri 1/7/22
Inspect & service automatic shut off valve	4 hrs	Fri 1/7/22	Fri 1/7/22
Starting air drain & test piping; inspect for blockage & clean (Starting air valve)	4 hrs	Fri 1/7/22	Fri 1/7/22
STARTING AIR DISTRIBUTOR & DISTRIBUTION VALVES (8)	1.38 days	Sat 1/8/22	Sun 1/9/22
Starting air distribution valves (8); Inspect & service	8 hrs	Sat 1/8/22	Sat 1/8/22
Starting air distributor; Inspect & service	8 hrs	Sun 1/9/22	Sun 1/9/22
MANIFOLD COMPENSATORS INSPECTION & MAINTENANCE - H. REID	3.42 days	Fri 1/7/22	Mon 1/10/22

Cooling down of exhaust manifold	24 hrs	Fri 1/7/22	Sun 1/9/22
Inspect M.E. 1 - 8 sections of exhaust manifolds for cracks	8 hrs	Sun 1/9/22	Sun 1/9/22
Inspect manifold doors (FWD. & AFT.)	2 hrs	Sun 1/9/22	Mon 1/10/22
Check foundation bolts	8 hrs	Mon 1/10/22	Mon 1/10/22
MAIN ENGINE AUXLILIARY SYSTEMS	18.46 days	Fri 1/7/22	Tue 1/25/22
UNIT No 2 COOLERS & PIPES CLEANING (11 hrs.)	12.79 days	Fri 1/7/22	Wed 1/19/22
SCAVENGE AIR COOLERS	12.75 days	Fri 1/7/22	Wed 1/19/22
SCAVENGE AIR COOLER_FWD. (upper & lower)	6.38 days	Fri 1/7/22	Thu 1/13/22
Remove sea water pipes	2 hrs	Fri 1/7/22	Fri 1/7/22
Unbolt & remove coolers covers	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove scavenge air coolers from cooler housing & plant	4 hrs	Fri 1/7/22	Fri 1/7/22
Soak coolers (cooler was change)	16 hrs	Fri 1/7/22	Fri 1/7/22
Clean cooler fins	12 hrs	Sat 1/8/22	Sun 1/9/22
Rod clean cooler tubes	24 hrs	Sun 1/9/22	Tue 1/11/22
Install new anodes to cooler covers	3 hrs	Tue 1/11/22	Tue 1/11/22
Pressure test cooler & check for leaks (local)	4 hrs	Tue 1/11/22	Tue 1/11/22
Inspect & clear vent / drain pipes	2 hrs	Tue 1/11/22	Tue 1/11/22
Reinstall cooler to housing	6 hrs	Tue 1/11/22	Wed 1/12/22
Replace gasket, O-ring & install cooler covers	4 hrs	Wed 1/12/22	Wed 1/12/22
Reinstall scavenge air coolers sea water pipes	4 hrs	Wed 1/12/22	Thu 1/13/22
SCAVENGE AIR COOLERS_AFT. (Peppe) (upper & lower)	6.38 days	Thu 1/13/22	Wed 1/19/22
Remove sea water pipes	2 hrs	Thu 1/13/22	Thu 1/13/22
Unbolt & remove cooler covers	2 hrs	Thu 1/13/22	Thu 1/13/22
Remove scavenge air coolers from cooler housing & plant	4 hrs	Thu 1/13/22	Thu 1/13/22
Soak coolers (Cooler was change)	18 hrs	Thu 1/13/22	Fri 1/14/22
Clean cooler fins	12 hrs	Fri 1/14/22	Sat 1/15/22
Rod clean cooler tubes (Sea water side)	24 hrs	Sat 1/15/22	Mon 1/17/22
Install new anodes to cooler covers	3 hrs	Mon 1/17/22	Mon 1/17/22
Pressure test cooler & check for leaks (local)	4 hrs	Mon 1/17/22	Tue 1/18/22
Inspect & clear vent / drain pipes	8 hrs	Mon 1/17/22	Tue 1/18/22
Reinstall cooler to housing	6 hrs	Tue 1/18/22	Wed 1/19/22
Replace gasket, O-ring & install new cooler covers	4 hrs	Wed 1/19/22	Wed 1/19/22
Reinstall scavenge air coolers sea water pipes	4 hrs	Wed 1/19/22	Wed 1/19/22

PISTON COOLER (SEA WATER SIDE)	1.04 days	Fri 1/7/22	Sat 1/8/22
Remove cooler covers	1 hr	Fri 1/7/22	Fri 1/7/22
Inspect & clear vent pipes	1 hr	Fri 1/7/22	Fri 1/7/22
Clean cooler sea water side	4 hrs	Fri 1/7/22	Fri 1/7/22
Inspect anodes & replace as necessary	4 hrs	Fri 1/7/22	Fri 1/7/22
Replace piston cooler gasket & reinstall cooler covers	2 hrs	Fri 1/7/22	Sat 1/8/22
JACKET COOLER (SEA WATER SIDE)	1.04 days	Sat 1/8/22	Sun 1/9/22
Remove cooler covers	1 hr	Sat 1/8/22	Sat 1/8/22
Inspect & clear vent pipes	1 hr	Sat 1/8/22	Sat 1/8/22
Clean cooler sea water side	4 hrs	Sat 1/8/22	Sat 1/8/22
Inspect anodes & replace as necessary	4 hrs	Sat 1/8/22	Sat 1/8/22
Replace jacket cooler gasket & reinstall cooler covers	2 hrs	Sun 1/9/22	Sun 1/9/22
LUBE OIL COOLER (SEA WATER SIDE)	1.04 days	Sun 1/9/22	Mon 1/10/22
Remove cooler covers	1 hr	Sun 1/9/22	Sun 1/9/22
Inspect & clear vent pipes	1 hr	Sun 1/9/22	Sun 1/9/22
Clean cooler sea water side	4 hrs	Sun 1/9/22	Sun 1/9/22
Inspect anodes & replace as necessary	4 hrs	Sun 1/9/22	Mon 1/10/22
Replace lube oil cooler gasket & reinstall cooler covers	2 hrs	Mon 1/10/22	Mon 1/10/22
PIPES CLEANING	1.92 days	Mon 1/10/22	Wed 1/12/22
M.e. 1 - 8, cylinder fuel injector cooling water inlet & outlet headers	4 hrs	Mon 1/10/22	Mon 1/10/22
Lantern space drain pipe to piston rod pack tank	8 hrs	Mon 1/10/22	Tue 1/11/22
Remove, clear M.e. jacket plug drain line & reinstall after	8 hrs	Tue 1/11/22	Wed 1/12/22
ECONOMIZER CLEANING	1.21 days	Tue 1/18/22	Wed 1/19/22
Water wash economizer (power wash) (valves to remove based on inspection)	16 hrs	Tue 1/18/22	Wed 1/19/22
UNIT NO.2 PUMPS MAINTENANCE	11.42 days	Fri 1/7/22	Tue 1/18/22
MAIN ENGINE No.2 AUX. VALVES OVERHAUL / INSPECTION & SERVICING	14.04 days	Fri 1/7/22	Fri 1/21/22
MISCELLANEOUS EQUIPMENT MAINTENANCE (VALVES ETC.)	18.17 days	Fri 1/7/22	Tue 1/25/22
SOOT BLOWER SYSTEM	1.17 days	Fri 1/7/22	Sat 1/8/22
2A SOOT BLOWER	0.29 days	Fri 1/7/22	Fri 1/7/22
Soot blower gear train ;Inspect and service	2 hrs	Fri 1/7/22	Fri 1/7/22
Puppet valve; Inspect and service	2 hrs	Fri 1/7/22	Fri 1/7/22
Inspect & Replace packing if necessary	2 hrs	Fri 1/7/22	Fri 1/7/22
2B SOOT BLOWER	0.88 days	Fri 1/7/22	Sat 1/8/22

Soot blower gear train; Inspect and service	2 hrs	Fri 1/7/22	Fri 1/7/22
Puppet Valve; Inspect and service	2 hrs	Sat 1/8/22	Sat 1/8/22
Inspect & replace packing if necessary	2 hrs	Sat 1/8/22	Sat 1/8/22
LUBE OIL FLUSH (Pipes to be properly labelled prior to removal)	18.17 days	Fri 1/7/22	Tue 1/25/22
Lube oil system piping; Inspect & clean as necessary	8 hrs	Fri 1/7/22	Fri 1/7/22
Reinstall piping	4 hrs	Fri 1/7/22	Sat 1/8/22
Install hoses, blind flanges & Collection bags for lube oil system flushing	8 hrs	Mon 1/24/22	Tue 1/25/22
Restore piping to normal after line oil flush	5 hrs	Fri 1/7/22	Fri 1/7/22
MMD CORRECTIVES	5.38 days	Fri 1/7/22	Wed 1/12/22
INTER DEPARTMENTAL. PROJECTS ACTIVITIES	2.46 days	Fri 1/7/22	Sun 1/9/22
SERVICES DEPT. ACTIVITIES	13.38 days	Fri 1/7/22	Thu 1/20/22
STATUTORY INSPECTION (Nigel)	2.17 days	Fri 1/21/22	Sun 1/23/22
WARTISILA MAIN ENGINE WORK ACTIVITIES	24.71 days	Fri 1/7/22	Mon 1/31/22
WARTSILA MAIN ENGINE BEARINGS INSPECTION / REPLACEMENT(Initial Crankshaft deflection, Pistons removal before Bearings works)	20.79 days	Fri 1/7/22	Thu 1/27/22
PERMT ACQUISITION & CANCELLATION	20.79 days	Fri 1/7/22	Thu 1/27/22
Start Main engine Overhaul	0 hrs	Fri 1/7/22	Fri 1/7/22
Acquire LOTO. For main engine bearings inspection / replacement (MMD / Wartsila)	1 hr	Fri 1/7/22	Fri 1/7/22
Cancel LOTO For main engine bearings inspection / replacement (MMD/ Wartsila)	1 hr	Thu 1/27/22	Thu 1/27/22
CRANKSHAFT DEFLECTION	20.42 days	Fri 1/7/22	Thu 1/27/22
Measure Crankshaft deflection & Bearing clearances - Initial	4 hrs	Fri 1/7/22	Fri 1/7/22
Measure Crankshaft deflection & Bearing clearances - Final (to be done after all pistons are installed)	4 hrs	Thu 1/27/22	Thu 1/27/22
WATER SEPARATOR MODIFICATION	3 days	Sat 1/15/22	Tue 1/18/22
Install blind into water separator housing as is necessary	72 hrs	Sat 1/15/22	Tue 1/18/22
Complete water separator modification	0 hrs	Tue 1/18/22	Tue 1/18/22
MAIN ENGINE BEARINGS OVERHAUL	20.25 days	Fri 1/7/22	Thu 1/27/22
ENGINE MAIN BEARING INSPECTION / REPLACEMENT	19.29 days	Sat 1/8/22	Thu 1/27/22
ENGINE MAIN BEARING #2 INSPECTION / REPLACEMENT	1.21 days	Sat 1/8/22	Sun 1/9/22
Remove Lines from Main Bearing	1 hr	Sat 1/8/22	Sat 1/8/22
Loosen & remove Thrust Bolts	2 hrs	Sat 1/8/22	Sat 1/8/22
Remove Cap from Main Bearing	1 hr	Sat 1/8/22	Sat 1/8/22
Remove Main Bearing	2 hrs	Sat 1/8/22	Sat 1/8/22

Inspect Main Bearing / Journal & polish as necessary	4 hrs	Sat 1/8/22	Sat 1/8/22
Install Main Bearing	2 hrs	Sat 1/8/22	Sun 1/9/22
Install Cap to Main Bearing	2 hrs	Sun 1/9/22	Sun 1/9/22
Install Lube Oil Lines to Main Bearing	2 hrs	Sun 1/9/22	Sun 1/9/22
ENGINE MAIN BEARING #5 INSPECTION / REPLACEMENT	1.71 days	Mon 1/17/22	Wed 1/19/22
Remove Lines from Main Bearing	1 hr	Mon 1/17/22	Mon 1/17/22
Loosen & remove Thrust Bolts	2 hrs	Mon 1/17/22	Mon 1/17/22
Remove Cap from Main Bearing	1 hr	Mon 1/17/22	Mon 1/17/22
Remove Main Bearing	2 hrs	Mon 1/17/22	Tue 1/18/22
Inspect Main Bearing / Journal & polish as necessary	4 hrs	Tue 1/18/22	Tue 1/18/22
Install Main Bearing	2 hrs	Tue 1/18/22	Tue 1/18/22
Install Cap to Main Bearing	2 hrs	Tue 1/18/22	Tue 1/18/22
Install Lube Oil Lines to Main Bearing	2 hrs	Tue 1/18/22	Wed 1/19/22
ENGINE MAIN BEARING #7 INSPECTION / REPLACEMENT	1.25 days	Wed 1/19/22	Thu 1/20/22
Remove Lines from Main Bearing	1 hr	Wed 1/19/22	Wed 1/19/22
Loosen & remove Thrust Bolts	2 hrs	Wed 1/19/22	Wed 1/19/22
Remove Cap from Main Bearing	1 hr	Wed 1/19/22	Wed 1/19/22
Remove Main Bearing	2 hrs	Wed 1/19/22	Wed 1/19/22
Inspect Main Bearing / Journal & polish as necessary	4 hrs	Wed 1/19/22	Wed 1/19/22
Install Main Bearing	2 hrs	Wed 1/19/22	Thu 1/20/22
Install Cap to Main Bearing	2 hrs	Thu 1/20/22	Thu 1/20/22
Install Lube Oil Lines to Main Bearing	2 hrs	Thu 1/20/22	Thu 1/20/22
ENGINE MAIN BEARING #1 INSPECTION / REPLACEMENT	1.71 days	Mon 1/24/22	Wed 1/26/22
Remove Lines from Main Bearing	1 hr	Mon 1/24/22	Mon 1/24/22
Loosen & remove Thrust Bolts	2 hrs	Mon 1/24/22	Mon 1/24/22
Remove Cap from Main Bearing	1 hr	Mon 1/24/22	Mon 1/24/22
Remove Main Bearing	2 hrs	Tue 1/25/22	Tue 1/25/22
Inspect Main Bearing / Journal & polish as necessary	4 hrs	Tue 1/25/22	Tue 1/25/22
Install Main Bearing	2 hrs	Tue 1/25/22	Tue 1/25/22
Install Cap to Main Bearing	2 hrs	Tue 1/25/22	Tue 1/25/22
Install Lube Oil Lines to Main Bearing	2 hrs	Tue 1/25/22	Wed 1/26/22
ENGINE MAIN BEARING #6 INSPECTION / REPLACEMENT (If time allows)	1.25 days	Wed 1/26/22	Thu 1/27/22
Remove Lines from Main Bearing	1 hr	Wed 1/26/22	Wed 1/26/22

Loosen & remove Thrust Bolts	2 hrs	Wed 1/26/22	Wed 1/26/22
Remove Cap from Main Bearing	1 hr	Wed 1/26/22	Wed 1/26/22
Remove Main Bearing	2 hrs	Wed 1/26/22	Wed 1/26/22
Inspect Main Bearing / Journal & polish as necessary	4 hrs	Wed 1/26/22	Wed 1/26/22
Install Main Bearing	2 hrs	Thu 1/27/22	Thu 1/27/22
Install Cap to Main Bearing	2 hrs	Thu 1/27/22	Thu 1/27/22
Install Lube Oil Lines to Main Bearing	2 hrs	Thu 1/27/22	Thu 1/27/22
CROSSHEAD BEARING & PIN INSPECTION / REPLACEMENT	15.08 days	Sun 1/9/22	Mon 1/24/22
CROSSHEAD BEARING & PIN #1 INSPECTION / BEARING REPLACEMENT	1.77 days	Sun 1/9/22	Tue 1/11/22
Loosen (1) bearing trust bolts	2 hrs	Sun 1/9/22	Sun 1/9/22
Remove Cap from Crosshead Bearing	2 hrs	Sun 1/9/22	Sun 1/9/22
Lift Crosshead Pin out of saddle	2 hrs	Sun 1/9/22	Sun 1/9/22
Remove Lower Half Crosshead Bearing Shell	0.5 hrs	Mon 1/10/22	Mon 1/10/22
Inspect Crosshead Pin & polish if necessary	3 hrs	Mon 1/10/22	Mon 1/10/22
Inspect Saddle	1 hr	Mon 1/10/22	Mon 1/10/22
Inspect Guide Shoe	1 hr	Mon 1/10/22	Mon 1/10/22
Install Lower Half Bearing Shell	0.5 hrs	Mon 1/10/22	Mon 1/10/22
Install Crosshead Pin	2.5 hrs	Mon 1/10/22	Mon 1/10/22
Install Cap to Crosshead Bearing	2 hrs	Mon 1/10/22	Mon 1/10/22
Tighten (1) bearing trust bolts	1 hr	Mon 1/10/22	Tue 1/11/22
CROSSHEAD BEARING & PIN # 8 INSPECTION / REPLACEMENT	2.06 days	Tue 1/11/22	Thu 1/13/22
Loosen (8) bearing trust bolts	2 hrs	Tue 1/11/22	Tue 1/11/22
Remove Cap from Crosshead Bearing	2 hrs	Tue 1/11/22	Tue 1/11/22
Lift Crosshead Pin out of saddle	2 hrs	Tue 1/11/22	Tue 1/11/22
Remove Lower Half Crosshead Bearing Shell	0.5 hrs	Tue 1/11/22	Tue 1/11/22
Inspect Crosshead Pin & polish if necessary	3 hrs	Tue 1/11/22	Wed 1/12/22
Inspect Saddle	1 hr	Wed 1/12/22	Wed 1/12/22
Inspect Guide Shoe	1 hr	Wed 1/12/22	Wed 1/12/22
Install Lower Half Bearing Shell	0.5 hrs	Wed 1/12/22	Wed 1/12/22
Install Crosshead Pin	2.5 hrs	Wed 1/12/22	Wed 1/12/22
Install Cap to Crosshead Bearing	2 hrs	Wed 1/12/22	Thu 1/13/22
Tighten (8) bearing trust bolts	1 hr	Thu 1/13/22	Thu 1/13/22
CROSSHEAD BEARING & PIN # 7 INSPECTION / REPLACEMENT	4.06 days	Thu 1/20/22	Mon 1/24/22

Loosen (7) bearing trust bolts	2 hrs	Thu 1/20/22	Thu 1/20/22
Remove Cap from Crosshead Bearing	2 hrs	Thu 1/20/22	Fri 1/21/22
Lift Crosshead Pin out of saddle	2 hrs	Fri 1/21/22	Fri 1/21/22
Remove Lower Half Crosshead Bearing Shell	0.5 hrs	Fri 1/21/22	Fri 1/21/22
Inspect Crosshead Pin & polish if necessary (Was replaced)	3 hrs	Fri 1/21/22	Fri 1/21/22
Inspect Saddle	1 hr	Fri 1/21/22	Fri 1/21/22
Inspect Guide Shoe	1 hr	Fri 1/21/22	Fri 1/21/22
Install Lower Half Bearing Shell	0.5 hrs	Mon 1/24/22	Mon 1/24/22
Install Crosshead Pin	2.5 hrs	Mon 1/24/22	Mon 1/24/22
Install Cap to Crosshead Bearing	2 hrs	Mon 1/24/22	Mon 1/24/22
Tighten (7) bearing trust bolts	1 hr	Mon 1/24/22	Mon 1/24/22
CROSSHEAD BEARING & PIN # 5 INSPECTION / REPLACEMENT	1.31 days	Tue 1/11/22	Wed 1/12/22
Loosen (5) bearing trust bolts	2 hrs	Tue 1/11/22	Tue 1/11/22
Remove Cap from Crosshead Bearing	2 hrs	Tue 1/11/22	Tue 1/11/22
Lift Crosshead Pin out of saddle	2 hrs	Tue 1/11/22	Tue 1/11/22
Remove Lower Half Crosshead Bearing Shell	0.5 hrs	Tue 1/11/22	Tue 1/11/22
Inspect Crosshead Pin & polish if necessary	3 hrs	Tue 1/11/22	Tue 1/11/22
Inspect Saddle	1 hr	Tue 1/11/22	Wed 1/12/22
Inspect Guide Shoe	1 hr	Wed 1/12/22	Wed 1/12/22
Install Lower Half Bearing Shell	0.5 hrs	Wed 1/12/22	Wed 1/12/22
Install Crosshead Pin	2.5 hrs	Wed 1/12/22	Wed 1/12/22
Install Cap to Crosshead Bearing	2 hrs	Wed 1/12/22	Wed 1/12/22
Tighten (5) bearing trust bolts	1 hr	Wed 1/12/22	Wed 1/12/22
CROSSHEAD BEARING & PIN # 6 INSPECTION / REPLACEMENT	1.77 days	Wed 1/12/22	Fri 1/14/22
Loosen (6) bearing trust bolts	2 hrs	Wed 1/12/22	Wed 1/12/22
Remove Cap from Crosshead Bearing	2 hrs	Wed 1/12/22	Thu 1/13/22
Lift Crosshead Pin out of saddle	2 hrs	Thu 1/13/22	Thu 1/13/22
Inspect Crosshead Pin & polish if necessary	0.5 hrs	Thu 1/13/22	Thu 1/13/22
Remove Lower Half Crosshead Bearing Shell	3 hrs	Thu 1/13/22	Thu 1/13/22
Inspect Saddle	1 hr	Thu 1/13/22	Thu 1/13/22
Inspect Guide Shoe	1 hr	Thu 1/13/22	Thu 1/13/22
Install Lower Half Bearing Shell	0.5 hrs	Thu 1/13/22	Thu 1/13/22

Install Crosshead Pin	2.5 hrs	Thu 1/13/22	Thu 1/13/22
Install Cap to Crosshead Bearing	2 hrs	Thu 1/13/22	Fri 1/14/22
Tighten (6) bearing trust bolts	1 hr	Fri 1/14/22	Fri 1/14/22
BOTTOM END (BIG END) BEARING INSPECTION	16.04 days	Fri 1/7/22	Sun 1/23/22
BOTTOM END (BIG END) BEARING # 1 INSPECTION / REPLACEMENT	1.25 days	Thu 1/13/22	Fri 1/14/22
Remove crankpin bearing cap	3 hrs	Thu 1/13/22	Thu 1/13/22
Remove crankpin bearing	2 hrs	Thu 1/13/22	Thu 1/13/22
Inspect crankpin bearing	1 hr	Thu 1/13/22	Thu 1/13/22
Inspect crankpin	1 hr	Thu 1/13/22	Thu 1/13/22
Polish crankpin	4 hrs	Thu 1/13/22	Fri 1/14/22
Install crankpin bearing	3 hrs	Fri 1/14/22	Fri 1/14/22
Install crankpin bearing cap	2 hrs	Fri 1/14/22	Fri 1/14/22
BOTTOM END (BIG END) BEARING # 3 INSPECTION / REPLACEMENT	1.71 days	Fri 1/14/22	Sun 1/16/22
Remove crankpin bearing cap	3 hrs	Fri 1/14/22	Fri 1/14/22
Remove crankpin bearing	2 hrs	Fri 1/14/22	Sat 1/15/22
Inspect crankpin bearing	1 hr	Sat 1/15/22	Sat 1/15/22
Inspect crankpin	1 hr	Sat 1/15/22	Sat 1/15/22
Polish crankpin	4 hrs	Sat 1/15/22	Sat 1/15/22
Install crankpin bearing	3 hrs	Sat 1/15/22	Sat 1/15/22
Install crankpin bearing cap	2 hrs	Sat 1/15/22	Sun 1/16/22
BOTTOM END (BIG END) BEARING # 4 INSPECTION / REPLACEMENT	1.25 days	Sun 1/16/22	Mon 1/17/22
Remove crankpin bearing cap	3 hrs	Sun 1/16/22	Sun 1/16/22
Remove crankpin bearing	2 hrs	Sun 1/16/22	Sun 1/16/22
Inspect crankpin bearing	1 hr	Sun 1/16/22	Sun 1/16/22
Inspect crankpin	1 hr	Sun 1/16/22	Sun 1/16/22
Polish crankpin	4 hrs	Sun 1/16/22	Mon 1/17/22
Install crankpin bearing	3 hrs	Mon 1/17/22	Mon 1/17/22
Install crankpin bearing cap	2 hrs	Mon 1/17/22	Mon 1/17/22
BOTTOM END (BIG END) BEARING #8 INSPECTION / REPLACEMENT	0 days	Thu 1/13/22	Thu 1/13/22
CAMSHAFT INSPECTION / SERVICING (Visual inspection of #1,2,3 4,5,6,7,8)	16.04 days	Fri 1/7/22	Sun 1/23/22
Cam carriers & fuel cam inspection	4 hrs	Wed 1/19/22	Wed 1/19/22
Measured camshaft bearing clearances	4 hrs	Wed 1/19/22	Wed 1/19/22
Inspection of camshaft bearings	4 hrs	Wed 1/19/22	Thu 1/20/22

Tightening of fuel cams	4 hrs	Thu 1/20/22	Thu 1/20/22
Measured camshaft bearing clearances (final)	4 hrs	Thu 1/20/22	Thu 1/20/22
FUEL PUMP BLOCK (4) & LINKAGE INSPECTION / OVERHAUL	16.04 days	Fri 1/7/22	Sun 1/23/22
PUMP BLOCK #1	14.35 days	Fri 1/7/22	Fri 1/21/22
Dismantle & remove the tension covers	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove the fuel pump block	4 hrs	Fri 1/7/22	Sat 1/8/22
Dismantle of fuel pump block components	6 hrs	Sat 1/8/22	Sat 1/8/22
Clean the fuel pump block components	2 hrs	Sat 1/8/22	Sat 1/8/22
Inspect service components (valves, push rod and plungers)	6 hrs	Sat 1/8/22	Sun 1/9/22
Reasamble pump block components	2 hrs	Sun 1/9/22	Sun 1/9/22
Inspect&service fuel pump block isolation valve	2 hrs	Sun 1/9/22	Sun 1/9/22
Inspect&service fuel pump block safety cut out	6 hrs	Sun 1/9/22	Mon 1/10/22
Dismantle fuel pump intermediate piece	2 hrs	Mon 1/10/22	Mon 1/10/22
Clean up the space	2 hrs	Mon 1/10/22	Mon 1/10/22
Dismantle& inspection& service of fuel pump driving piston	2 hrs	Mon 1/10/22	Mon 1/10/22
Dismantle& inspection& service of fuel pump driving piston guide bush	4 hrs	Mon 1/10/22	Tue 1/11/22
Reinstall the guide bush	4 hrs	Tue 1/11/22	Tue 1/11/22
Reinstal the driving pistons	4 hrs	Tue 1/11/22	Tue 1/11/22
Reinstal the fuel pump components	2 hrs	Fri 1/21/22	Fri 1/21/22
PUMP BLOCK #2	14.35 days	Fri 1/7/22	Fri 1/21/22
Dismantle & remove the tension covers	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove the fuel pump block	4 hrs	Sat 1/8/22	Sat 1/8/22
Dismantle of fuel pump block components	6 hrs	Sat 1/8/22	Sun 1/9/22
Clean the fuel pump block components	2 hrs	Sat 1/8/22	Sun 1/9/22
Inspect service components (valves, push rod and plungers)	6 hrs	Sun 1/9/22	Sun 1/9/22
Reasamble pump block components	6 hrs	Sun 1/9/22	Mon 1/10/22
Inspect&service fuel pump block isolation valve	1 hr	Sun 1/9/22	Sun 1/9/22
Inspect&service fuel pump block safety cut out	6 hrs	Mon 1/10/22	Mon 1/10/22
Dismantle fuel pump intermediate piece	2 hrs	Mon 1/10/22	Tue 1/11/22
Clean up the space	1 hr	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston	2 hrs	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston guide bush	2 hrs	Tue 1/11/22	Tue 1/11/22
Reinstall the guide bush	6 hrs	Tue 1/11/22	Wed 1/12/22

Reinstal the driving pistons	6 hrs	Wed 1/12/22	Wed 1/12/22
Reinstal the fuel pump components	2 hrs	Fri 1/21/22	Fri 1/21/22
PUMP BLOCK #3	14.94 days	Fri 1/7/22	Sat 1/22/22
Dismantle & remove the tension covers	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove the fuel pump block	4 hrs	Sat 1/8/22	Sat 1/8/22
Dismantle of fuel pump block components	6 hrs	Sun 1/9/22	Sun 1/9/22
Clean the fuel pump block components	2 hrs	Sun 1/9/22	Sun 1/9/22
Inspect service components (valves, push rod and plungers)	6 hrs	Mon 1/10/22	Mon 1/10/22
Reasamble pump block components	6 hrs	Mon 1/10/22	Mon 1/10/22
Inspect&service fuel pump block isolation valve	1 hr	Sun 1/9/22	Sun 1/9/22
Inspect&service fuel pump block safety cut out	6 hrs	Mon 1/10/22	Tue 1/11/22
Dismantle fuel pump intermediate piece	1 hr	Tue 1/11/22	Tue 1/11/22
Clean up the space	1 hr	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston	2 hrs	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston guide bush	2 hrs	Tue 1/11/22	Tue 1/11/22
Reinstall the guide bush	6 hrs	Wed 1/12/22	Wed 1/12/22
Reinstal the driving pistons	6 hrs	Wed 1/12/22	Thu 1/13/22
Reinstal the fuel pump components	2 hrs	Fri 1/21/22	Sat 1/22/22
PUMP BLOCK #4	15.75 days	Fri 1/7/22	Sun 1/23/22
Dismantle & remove the tension covers	2 hrs	Fri 1/7/22	Fri 1/7/22
Remove the fuel pump block	4 hrs	Sat 1/8/22	Sun 1/9/22
Dismantle of fuel pump block components	6 hrs	Sun 1/9/22	Sun 1/9/22
Clean the fuel pump block components	4 hrs	Sun 1/9/22	Sun 1/9/22
Inspect service components (valves, push rod and plungers)	6 hrs	Mon 1/10/22	Tue 1/11/22
Reasamble pump block components	6 hrs	Tue 1/11/22	Tue 1/11/22
Inspect&service fuel pump block isolation valve	1 hr	Mon 1/10/22	Mon 1/10/22
Inspect&service fuel pump block safety cut out	6 hrs	Tue 1/11/22	Tue 1/11/22
Dismantle fuel pump intermediate piece	1 hr	Tue 1/11/22	Tue 1/11/22
Clean up the space	1 hr	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston	2 hrs	Tue 1/11/22	Tue 1/11/22
Dismantle& inspection& service of fuel pump driving piston guide bush	2 hrs	Tue 1/11/22	Tue 1/11/22
Reinstall the guide bush	6 hrs	Wed 1/12/22	Thu 1/13/22
Reinstal the driving pistons	6 hrs	Thu 1/13/22	Thu 1/13/22

Reinstal the fuel pump components	2 hrs	Sat 1/22/22	Sun 1/23/22
FUEL PUMP REGULATING LINKAGE	9.31 days	Wed 1/12/22	Fri 1/21/22
Remove fuel regulating linkage	1 hr	Wed 1/12/22	Wed 1/12/22
Fuel linkage mechanism; Inspect and service	2 hrs	Wed 1/12/22	Wed 1/12/22
Re-Install fuel regulating linkage	2 hrs	Wed 1/12/22	Wed 1/12/22
Fuel pump timing	8 hrs	Thu 1/20/22	Fri 1/21/22
GRINDING ACTIVITIES (32 surfaces); 2 persons required for check valves replacement	14.13 days	Thu 1/13/22	Thu 1/27/22
Grinding of Cylinder Block landing surfaces (All 8 surfaces)	32 hrs	Thu 1/13/22	Sun 1/16/22
Grinding of Liners landing surfaces & replace check valves (lower) (All 8 surfaces)	1 min	Sun 1/16/22	Sun 1/16/22
Grinding of Liners landing surfaces (upper) (All 8 surfaces) (2,3,7&8)	20 hrs	Sun 1/16/22	Tue 1/18/22
Grinding of cylinders Covers landing surfaces (All 8 surfaces)	72 hrs	Tue 1/18/22	Tue 1/25/22
End Main engine Overhaul	0 hrs	Thu 1/27/22	Thu 1/27/22
INSTALLATION OF WATER SEPARATOR GAP SEAL	1.38 days	Mon 1/17/22	Tue 1/18/22
Install gap seal into water separator	16 hrs	Mon 1/17/22	Tue 1/18/22
ICM INSTALATION	18.38 days	Fri 1/7/22	Tue 1/25/22
Instalation of pressure transducers	8 hrs	Tue 1/25/22	Tue 1/25/22
Instalation of angle transducer	8 hrs	Fri 1/7/22	Fri 1/7/22
Instalation of pressure transducers plugs	8 hrs	Mon 1/10/22	Mon 1/10/22
Instalation of connection box	8 hrs	Tue 1/11/22	Tue 1/11/22
Puling the cable	8 hrs	Wed 1/12/22	Wed 1/12/22
Comisioning ICM	8 hrs	Thu 1/13/22	Thu 1/13/22
OIL MIST DEFLECTOR WORKS	1.38 days	Tue 1/11/22	Wed 1/12/22
Check/clean up all sensors	4 hrs	Tue 1/11/22	Tue 1/11/22
Remove all sensor and store them in a safe place	4 hrs	Tue 1/11/22	Tue 1/11/22
Install all sensors after overhaul	4 hrs	Wed 1/12/22	Wed 1/12/22
Test the system in service	4 hrs	Wed 1/12/22	Wed 1/12/22
METAL STICHING	2.9 days	Wed 1/12/22	Sat 1/15/22
Repair crack identified in Main Engine Cylinder Blocks Exhaust Pipe (as required)	16 hrs	Wed 1/12/22	Fri 1/14/22
Metal stitching of damaged areas of Exhaust manifolds (as required)	16 hrs	Fri 1/14/22	Sat 1/15/22
WARTSILA MISCELANEOUS MAIN ENGINE OVERHAUL SUPPORT / QUALITY ASSURANCE	24.71 days	Fri 1/7/22	Mon 1/31/22
Calibrate # 1 to 8 liners (prepare for further use liners in normal limits,)	8 hrs	Thu 1/13/22	Fri 1/14/22
Inspection of engine cylinder block & exhaust ports for cracks	16 hrs	Thu 1/13/22	Sat 1/15/22

Inspection & verification of main engine tie rod bolts tightness	16 hrs	Sun 1/16/22	Mon 1/17/22
Inspection & verification of main engine foundation bolts	12 hrs	Mon 1/17/22	Tue 1/18/22
Inspection, measurements & necessary polishing of liners	24 hrs	Tue 1/11/22	Thu 1/13/22
Inspection & verification of main engine lateral bolts tightness	24 hrs	Fri 1/14/22	Sun 1/16/22
Inspection & measurements of pistons crowns, skirts and rings	42 hrs	Thu 1/27/22	Mon 1/31/22
Support main engine lube oil system flushing & piping	5 hrs	Mon 1/31/22	Mon 1/31/22
Inspection/calibration of stand pipes and stuffing boxes	36 hrs	Fri 1/7/22	Sat 1/8/22
Inspection/calibration of piston rod stuffing boxes	8 hrs	Thu 1/13/22	Fri 1/14/22
Inspection/calibration of piston rods	16 hrs	Fri 1/14/22	Tue 1/18/22
Monitor engine bearings condition at engine run-in	24 hrs	Tue 1/18/22	Fri 1/21/22
Cylinder block water plugs; stop leakage	16 hrs	Fri 1/21/22	Tue 1/25/22
Final inspection of engine spaces & verification of components	16 hrs	Tue 1/25/22	Thu 1/27/22
Oil Mist Control Unit	0.33 days	Thu 1/27/22	Thu 1/27/22
Oil Mist deflector (1 to 9) ;Inspect and service.	8 hrs	Thu 1/27/22	Thu 1/27/22
MAIN ENGINE CYLINDER OIL LUBRICATING SYSTEM MAINTENANCE	2.25 days	Fri 1/7/22	Sun 1/9/22
Main engine cylinder oil lubricating pump (FWD); Inspect and service	0.58 days	Fri 1/7/22	Sat 1/8/22
Sight glasses/flow indicators (FWD); Inspect and clean	4 hrs	Fri 1/7/22	Fri 1/7/22
Lubrication lines(FWD); Check and clear lines	4 hrs	Fri 1/7/22	Fri 1/7/22
Inlet strainer (FWD); clean	6 hrs	Fri 1/7/22	Sat 1/8/22
Main engine cylinder oil Lubricating pump (AFT); Inspect and service	0.71 days	Sat 1/8/22	Sun 1/9/22
Sight glasses/ flow indicators (AFT); Inspect and clean	4 hrs	Sat 1/8/22	Sat 1/8/22
Lubrication lines(AFT); Check and clear lines	4 hrs	Sat 1/8/22	Sat 1/8/22
Inlet strainer(AFT); clean	6 hrs	Sat 1/8/22	Sun 1/9/22
Check the lubrication quills	4 hrs	Sun 1/9/22	Sun 1/9/22
RF #2 THRUST BEARINGS INSPECTION	4.38 days	Fri 1/7/22	Tue 1/11/22
Thrust bearing inspection/ Angle transducer instalation	4.38 days	Fri 1/7/22	Tue 1/11/22
Remove flywheel cover	2 hrs	Fri 1/7/22	Fri 1/7/22
Clean flywheel for inspection	4 hrs	Fri 1/7/22	Fri 1/7/22
Carry out inspection of flywheel	4 hrs	Fri 1/7/22	Mon 1/10/22
Inspect thrust bearing pads forward	4 hrs	Mon 1/10/22	Mon 1/10/22
Inspect thrust bearing pads aft	4 hrs	Mon 1/10/22	Tue 1/11/22
Install angle transducer	2 hrs	Tue 1/11/22	Tue 1/11/22
Install Lube Oil Lines to Main Bearing	2 hrs	Tue 1/11/22	Tue 1/11/22

Re-install cover to flywheel	2 hrs	Tue 1/11/22	Tue 1/11/22
End of RF #2 Major Overhaul 2022	0 hrs	Mon 1/31/22	Mon 1/31/22