

<b>AOH Scope of work - Boiler, ESP, Ducts &amp; Dampers for FY' 2025-26</b>					
Sr. No.		Scope of Work - Description	UOM	Qty	Remarks
1	HEAD	Access and Scaffolding/Approach for Boiler and Critical Pipes upto Turbine Inlet	LUMPSUM	1	
	1.01	Boiler all Manhole Doors Opening & Air Lancing			
	1.02	Full Cuplock scaffolding inside Boiler from 9 meter to 60 meter elevation (Furnace Roof) consisting of Bottom Sealed Blanketing/Top side full blanketing below PSH-DSH and coil approach for PHS-DSH-PRH-FRH & spacer tubes and approach for roof tubes. All Burner nozzle zones, full approach with landing platform, all four level wall sootblower peripheral platform with handrails, all corners SOFA nozzle platforms, 30-50 Degree slope Staircase with footsteps and handrails including landing platform for approach at all level of scaffolding from 9 meter Seal-off platform. Complete Cuplock material will be under Contractor's scope includes bottom base frames/angles/channels/beams. Supplied scaffolding shall be as per IS/BIS standard. Scaffolding quality shall be duly certified by HEL HSE team during installation. Safety nets - 2 Layers (Burner Bottom & Burner Top)			1. All Scaffolding materials including Painted Perforated Scaffolding Boards/Gratings with hooks as Working Platforms shall be in Contractor's Scope  2. Scaffolding shall be inspected and certified by HEL HSE team before use by Engineers.
	1.03	Proper Scaffolding for Economiser Inlet Header and Bottom Ring Header Level (i.e. above Eco Hopper Zone)			
	1.04	Scaffolding, if required, in S-Panel Bottom Dead Chamber, for Support Rectification			
	1.05	Necessary scaffolding/platform erection for proper approach for Final RH, Platen RH, Platen SH, Final SH, in between Pendant/Divisional SH Bank upto Roof, LTSH Terminal Tube, Water Walls, Backpass Screen Tubes and other area, as required, for proper inspection, slag cleaning, thickness gauging and tube/bends rectification/replacement job.			
	1.06	All other auxiliary platforms/scaffolding jobs for thickness gauging / tube repair & replacement / shielding job / other AOH activities.			
	1.07	Eco Hopper & casing area inside scaffolding and inspection, repairing of Baffle plate/diversion plate, if required. Cleaning of Economiser Hopper after completion of all Boiler back-pass jobs.			
	1.08	Complete Scaffolding for All Critical Pipes' Supports Cleaning/Checking/Rectification, Cold & Hot Readings, for both Boiler & TG Area upto Turbine Inlet			
	1.09	Complete Removal of all scaffolding materials, debris and scraps from inside the Boiler Frontpass, Intermediate Pass & Backpass, Bottom and Vestibule Dead Chambers, after job completion with proper housekeeping.			
2	HEAD	Boiler Water Lancing (LP JET CLEANING)	LUMPSUM	1	
	2.01	Water washing of Front Pass, Intermediate Pass & Back Pass including LTSH coils, ECO coils & Back Pass water walls by DM WATER			
	2.02	Water washing of Divisional, Platen & Final SH, RH Coils, Wall RH tubes etc. by DM WATER			
3	HEAD	Boiler Thickness Gauging & Physical Inspection	LUMPSUM	1	
	3.01	Physical Inspection and Condition Assessment of Complete Boiler & Pressure Parts by Contractor's competent supervisor and submission of reports to HEL's EIC for decision making for necessary corrective measures within AOH.			
	3.02	Separate Thickness Gauging/Demetering Agency shall be deployed by HEL. However all necessary assistance like cleaning manpower, light including scaffolding will be under Contractor's Scope.	Demetering Points	14000	Approx.
4	HEAD	Boiler Pressure Parts Inspection & Repair	LUMPSUM	1	
	4.01	Complete Boiler Pressure Parts' 1st and 2nd Pass (i.e. Water walls, Burner panels, Waterwall Screen Tubes and Hanger tubes, Div SH, Platen SH, Platen RH, Final RH, Final SH, WW relief tubes, Backpass front screen tubes, Backpass walls, Wall RH, LTSH, Economiser, LTSH hanger tubes, both pass Roof SH, Extended Walls of SH & RH etc.) - Physical inspection and tube / bend repair / replacement / buttering / insert, as required.			Hydraulic Tube Bending Machine, required for tube bending, during AOH, shall be under the Contractor's Scope.
	4.02	All Pendant Coils' Spacer and Spacer tubes checking and repairing; Locking Checking of Steam Cooled Spacer Tubes			
	4.03	Complete SLAG removal and cleaning inside Boiler: Front Panel Div SH, Platen SH, Platen RH, Wall RH, Water Walls and from BURNER adjacent FURNACE wall including checking and rectification			
	4.04	Repair/Replacement of Tubes and Valves, based on thickness gauging and physical inspection & feedback by Contractor's Competent Supervisor, as per instruction of EIC of HEL.			Min. 200 Nos. High Pressure/IBR joints (includes Joints for Valve replacement) to be considered in the Offer.
	4.05	Final SH/Div SH/Platen SH/Platen RH/Final RH coils' individual tube male-female fixture correction/installation which includes welding process as per metallurgy of tubes			
	4.06	LTSH Coils checking & inspection by making gaps between adjacent Coils (all Banks) and rectification as required. Tubes/Bends replacement and Metal build-up, as required. Fixing of Protection Guards on all eroded coil tubes and restoration of all attachments. Replacement of damaged protection guards at various zones, as required.			All necessary arrangement & T&Ps for coil gapping / coil lifting, platform etc. will be under Contractor's Scope.
	4.07	Inspection of all erosion shields of all LTSH banks (fixed at LTSH coil tubes adjacent to hangers) and rectification / re-installation, as required, which includes coil gapping, normalization & alignment. Shield plate cutting as per requirement / suit at site, to be done by contractor. 1-1.5 meter length, half round SS shield plates will be provided by HEL.			
	4.08	Economiser Bank eroded tube/bends replacement by coil gapping / lifting and alignment / normalization, as required, after physical assessment and thickness gauging reports			
	4.09	LTSH/ECO Coil fixtures inspection and rectification, as required			
	4.10	All Wallblower & LRSB nozzle & sleeve inspection from inside and its repair/alignment, replacement of sleeve & support fin with water wall or back pass wall, as required.			Nozzle replacement, Cutting and Welding shall be considered as HP Joints/IBR Joints.
	4.11	Any previously balance fin welding or leakage point in wall sootblower area to be re-welded; All fins repair and rectification by full welding wherever gap observed.			
	4.12	Wall RH inlet header guide support checking/repairing, if required			

	4.13	Top Dead Chamber (Rear Arch) Checking & Sealing; Bottom Dead Chamber <b>Support (incl. Fasteners)</b> & S-Panel Sealing Checking & rectification, if required; PENTHOUSE sealing checking and rectification;			All sealing rectification, if required (to be observed by ash leakage points)
	4.14	NEW Erosion Shield Plate erection as per instruction of HEL's Engineer-in-Charge.			Approx. Qty-200 Nos.
	4.15	DAMAGED Erosion Shield Plate removal/rectification/installation inside Boiler.			Approx. Qty-600 Nos.
	4.16	Furnace Bottom Sealing (Dipper Plate) and its Attachment Checking and rectification, if required.			
	4.17	Drum Manhole opening, inside inspection, sample collection, dismantling/assembly of one/two sets of Scrubbers & Cyclone Separators, Inside Cleaning and rectification, if required.			
	4.18	Drum End Numbering - 1 End	End	1	
	4.19	All Horizontal & Vertical Buckstays/leveller guides/buckstay-connecting pins/plates - Inspection and rectification, if required			
	4.20	Dry Inspection & Hydrotest for IBR Statutory Requirement, necessary IBR formalities and obtaining Steaming Certificates. Unit#2: Renewal of Steaming Certificate Unit#1: Extension of Steaming Certificate [without hydrotest & without stopping the Boiler]	Unit / Boiler	2	<b>Internal Hydrotest</b> must be performed <b>48 hrs.</b> before IBR Hydro
	4.21	Scaffolding dismantling and removal from Boiler Inside (After Hydrotest) & Box-up			
	4.22	<b>Assistance</b> to Valves Repairing Agency with supporting manpower (riggers/helpers) and T&Ps (mainly Chain-Pulley Blocks, Welding Support, if required) for <b>maintenance of all critical valves</b> (i.e. Scaffolding, Tripods, Platform, Approach, Argon welding support).	Nos.	35	<b>Approx. nos.</b> These Valves' Dismantling and Lapping/Machining are not in Contractor's Scope.
	4.23	Support to EMD for dismantling and installation of Actuators (Motorised/Pneumatic) of Valves			
	4.24	DP Test/Radiography/Preheating /PWHT of 100% HP/IBR Joints etc. as applicable. <b>DP Test of 1st and 2nd stage Attemperator's Nozzles etc.</b>			<b>All Equipment &amp; necessary arrangement will be under Contractor's Scope.</b>
	4.25	Physical checking and DP Tests of root/stub joints of all Sampling Lines, PG Test Points, Pressure Tappings, Instrument Tappings, Valve Socket Joints, etc. in Boiler Area incl. Penthouse & Drum Enclosure and Critical Piping upto Turbine inlet. Welding and necessary rectification, if required.	Points / Joints	1000	<b>Approx. [IN BOTH BOILER AND TURBINE AREA]</b> <b>Approach and insulation removal only, for this job will be under Contractor's Scope.</b>
	4.26	All Preparatory Jobs for BLU and Trevi Safety Setting by NICCO for all Safety Valves incl. Deaerator Safety Valves, after Synchro with Coal.	No. Valves	7	Manpower Assistance required
<b>5</b>	<b>HEAD</b>	<b>Coal/Air Nozzles &amp; Tips repair/replacement, SADC &amp; Windbox Inspection/Repair (In-situ)</b>	<b>LUMPSUM</b>	<b>1</b>	
	5.01	Coal Burner panels-Inspection in running condition to assess quantum of leakage from all corner burner panels. Thorough inspection of burner panel internal structure for cracks, DP Test and repair (after removal of all coal nozzles and tips). HEL EIC to give clearance for coal nozzle/tip fitment.	Corner	4	Insulation removal and application between inside and outside burner panels is in Contractor's Scope.
	5.02	Coal Nozzles & Nozzle Tips Replacement - <b>24 Sets</b> ; Coal Nozzles, Secondary Air, CCOFA & SOFA nozzles thorough inspection and in-situ rectification/repairing by welding/hardfacing as per condition assessment. Inspection of Coal Nozzle lock pin/pivot and burner tilting/freeness checking/rectification as required. Flame scanner removal/repair/new re-installation, <u>for which IBR Welding/Grinding support required.</u>			Installed Quantities:- Air Nozzles-28 nos. CCOFA-8 nos. SOFA-8 nos. For detailed Job Procedure, may please refer detailed Guidelines in other Sheet.
	5.03	Repairing/Replacement of Coal Bends:- 1. Repairing of bends will be done by fixing ceramic tiles/putties at the location, where tiles are missing/uprooted. All loose tiles lying inside coal bends shall be removed from inside. 2. Erection and Replacement of Coal Pipe Bend, if required.			
	5.04	Attending all Windbox leakages, identification of source of leakages from Expansion Bellow & its sealing points with Water Walls and rectification of all leakage points.			IBR Welders to be deployed for attachment welding for this job.
	5.05	Truss buckstay inside windbox, its welding lugs & connection, windbox inside hanger support - Inspection & rectification.			
	5.06	Complete SADC inspection & rectification i.e. SADC delinking from C&I Actuator, approach platform erection inside Windbox upto all SADC levels at all four corners, SADC dampers freeness checking and linking actuator; Joint checking with Operation Team.			Scaffolding inside Windbox for SADC checking, is under Contractor's Scope
<b>6</b>	<b>HEAD</b>	<b>Hangers &amp; Support Checking, Cleaning, Inspection/Rectification</b>	<b>LUMPSUM</b>	<b>1</b>	
	6.01	Internal Inspection & cleaning and rectification of all hangers and supports of all Critical Pipes, as per Drawings. Hangers inspection at Penthouse Inside & Outside, cleaning and includes SHO, HRH, CRH, Feed water pipe & Boiler riser pipes hanger & fixed support, Downcomer, SOFA Duct Constant Hanger Supports etc. Protocol to be maintained for all supports.			
	6.02	Checking and taking Hot and Cold Readings of all Hanger Supports of Critical Pipes and Submission of Reports.			
	6.03	SHO/RHO headers restraint support inspection, cleaning and rectification, if required. Protocol to be maintained for all supports.			
	6.04	Inspection & Cleaning of all Hanger Supports of all critical pipings and necessary rectification, if any <b>(MS/HRH/CRH/Feed water upto Turbine inlet)</b>			Critical Pipes' Support Checking/Serviceing in both Boiler & TG Area, are under Contractor's Scope.
<b>7</b>	<b>HEAD</b>	<b>Ash cleaning</b>	<b>LUMPSUM</b>	<b>1</b>	
	7.01	<b>Ash cleaning from following locations (includes removal, transportation from point of origin to designated location includes transportation vehicle, gunny bag arrangement).</b>			
	7.02	Boiler Penthouse, Rear Arch Gallery Top Dead Chamber, S-Panel Bottom Dead Chamber, SH Floor, Drum Enclosure, Boiler outside/buckstay Area			
	7.03	Windbox			
	7.04	Hot PA, Hot Secondary ducts includes mill inlet duct			

	7.05	Flue gas duct (from Boiler to ID Fan outlet)			
	7.06	Complete Ash Cleaning inside APH			
<b>8</b>	<b>HEAD</b>	<b>Ducts, Dampers &amp; Gate, Coal Pipe, Metallic/ Non-Metallic bellows</b>	<b>LUMPSUM</b>	<b>1</b>	
	8.01	Complete Air & Flue Gas Ducts including De-NOx ducts - Complete Visual inspection, random thickness survey as per requirement & its recording; Damaged duct plates repair/replacement as instructed by HEL's EIC.			Separate Thickness Gauging Agency to be deployed by HEL; Contractor to assist.
	8.02	Hot Secondary, Hot PA and De-Nox Ducts' Aerofoil Inspection, Cleaning & Repair	Nos.	10	Approx.
	8.03	Scaffolding as per requirement for rectification & inspection of Ducts, Dampers & Bellows			Scaffolding must be inspected and certified by HEL HSE team
	8.04	Duct support inside Bracings repairing/rectification/shielding (including Air and flue path)	Mtrs.	350	Approx.
	8.05	Economizer to APH inlet duct diverter area inspection and repairing including scaffolding & platform erection, as already mentioned			
	8.06	APH Inlet Flue path Damper (Pass-A and Pass-B) Double deck Damper Blades to be replaced with new seals (fabricated)	Sets	15	Replacement
	8.07	APH inlet flue path damper (Pass-A and B) Double deck Damper Blades Body to be repaired with new seals replacement (fabricated)	Sets	15	Repair
	8.08	All Air & Flue gas path and De-Nox Ducts, Dampers & Gates - Inspection and Rectification includes damper freeness, link repairing, lip seal repairing/replacement, shaft, gland replacement/addition, bearing freeness/greasing/repair & replacement. Actuator foundation inspection & strengthening, as per requirement. For all dampers, separate protocols to be maintained for freeness / repair / rectification			Comprehensive List of Gates and Dampers, installed, are enclosed in Separate Sheet.
	8.09	Mill side Hot PA duct damper gland, shaft, gland bush repairing & rectification and gland addition	Sets	18	
	8.10	Mill inlet Hot Air gates- Complete dismantling of gate and cylinder, replacement of sealing packing rope and rectification of any other abnormalities. Repaired cylinders will be provided for re-installation	Sets	6	
	8.11	All Metallic Expansion Bellows between Economiser outlet flue path to APH inlet (both passes) and APH outlet to ESP inlet (both passes) - Protection Sleeve cutting for leaf inspection from inside and necessary repair.	Nos.	15	Special tools / Small size Argon torch as required for bellow repairing/welding to be arranged by the Contractor.
	8.12	Leakage attending, New additional protection sleeve fitting & welding on Metallic Expansion Joints from inside of De-Nox ducts	Nos.	12	Small size Expn. Joints
	8.13	Replacement of PA DUCT INLET TO APH-A inlet COLD end Bellow (Non-Metallic)	No.	1	
	8.14	Replacement ESP Inlet and Outlet Bellows (Non-Metallic)	Nos.	3	
	8.15	Replacement of PA Fan Discharge Bellows (Non-Metallic)	Nos.	2	
	8.16	Air & Flue Gas Duct & Coal Pipes Supports (Hanger + Fixed support + Movable Support) Cleaning, Inspection and Rectification as required. Protocol to be maintained for the same.			
	8.17	PF piping-Leakage points of metallic expansion bellows and flange joints of all PF pipings from Mill Bay to Boiler - To be repaired & rectified	Nos.	15	Involvement of Scaffolding jobs
	8.18	De-coupling, dismantling and re-coupling of actuators of dampers, as required by E&I department	Nos.	40	Approx.
<b>9</b>	<b>HEAD</b>	<b>Refractory &amp; Insulation Work</b>	<b>LUMPSUM</b>	<b>1</b>	
	9.01	Inspection of Refractory at Penthouse, S-panel Bottom Dead Chamber, Furnace Hopper Slope, Rear Arch Gallery Top Dead Chamber, Screen Tube zones, Headers, Manholes, Peepholes and repairing/re-casting, as required.			
	9.02	Application of plastic refractory, around all 72 nos. of Wall Soot Blowers and on Burner Panels, S-panels and other Manhole area as per HEL's EIC.			
	9.03	Refractory application on all Loose Headers inside BackPass, if required.			
	9.04	Refractory at SH Floor and Duct Side Wall - Checking/Rectification.			
	9.05	Removal and Application of Ceramic Insulation between Inner and Outer Doors of Burner Panels			For other major Insulation Jobs, separate agency shall be deployed by HEL.
<b>10</b>	<b>HEAD</b>	<b>Valves Servicing &amp; Maintenance</b>	<b>LUMPSUM</b>	<b>1</b>	
	10.01	Valve Gland Packing Renewal/Addition (in Nos. of Valves of different sizes from 1" to 4")	Nos.	120	Approx.
	10.02	Assistance with Manpower & T&Ps for servicing of 7 nos. of Safety Valves	Each	7	OEM Service Engg. & Skilled Technician to be called upon by HEL.
	10.03	Servicing, Lapping, Bearing maintenance of Boiler & TG side valves of different sizes, including Seal Replacement of HRH Isolator Valve	Nos.	80	Approx.
<b>11</b>	<b>HEAD</b>	<b>ESP</b>	<b>LUMPSUM</b>	<b>1</b>	
	11.01	DOOR OPENING AND CLEANING			
	11.02	Receive PTW after proper isolation with safety permit			
	11.03	Open all door (DERM insulator chamber, CERM floor and Inlet duct door with communication with duct side job owner.			
	11.04	Fixing life line for each row and each elevation with ensure safety person.			Lifelines to be provided by HEL. However, to be returned back intact.
	11.05	Opening expansion bellow/adaptor piece above ash vessel.			
	11.06	Cleaning each field with air jetting after ensuring require amount of air flow by ID fan and balance draught.			
	11.07	Ensure adequate (low voltage-24Volt DC) illumination inside ESP.			
	11.08	Ensure the cleanliness quality by supervisor/team leader.			
	11.09	Opening fluidising pad and hopper door after ensuring hopper emptiness.			
	11.10	INSPECTION AND NECESSARY RECTIFICATION OR REPLACEMENT FOR CERM.			
	11.11	Inspection and necessary rectification of all CERM shaft and bearing.			
	11.12	Inspection and necessary rectification of rapping hammer assembly.			
	11.13	Inspection and necessary rectification of Shock bar, Anvil and if required, then replace.			
	11.14	Inspection and necessary rectification of collecting plate condition through out the length.			

	11.15	Inspection and necessary rectification of collecting plate support frame and cleat welding at required positions.			
	11.16	Inspection and necessary replacement of CERM Gear Box along with it's coupling.			
	11.17	Field trip chain to be checked and missing chains to be fitted back.			
	11.18	INSPECTION AND NECESSARY RECTIFICATION OR REPLACEMENT FOR DERM.			
	11.19	Inspection and necessary rectification of all DERM shaft and bearing.			
	11.20	Inspection and necessary rectification of hammer impact point support plate. Metal Build up on hammer impact zone.			
	11.21	Inspection and necessary rectification of small wheel, Big wheel, thrust block, thrust pad, Hammer, vertical shaft all 5 nos. bush, dust guard etc.			
	11.22	Inspection and necessary rectification of emitting electrode. If required, then replace the emitting electrode with proper arrangement.			
	11.23	<b>Approx. 3200 nos. of identified Emitting Coil replacement in 1st field, 4 chambers of both Passes</b>	Nos.	<b>3200</b>	
	11.24	Inspection and necessary rectification of Emitting Frames			
	11.25	Inspection and necessary replacement of DERM Gear Box along with it's coupling.			
	11.26	INSPECTION AND NECESSARY RECTIFICATION OR REPLACEMENT FOR GDPRM including outlet GD plate			
	11.27	Inspection and necessary rectification of all GDPRM shaft and bearing.			
	11.28	Inspection and necessary rectification of hammer, horizontal bush etc.			
	11.29	Inspection and necessary rectification of hammer impact point support plate			
	11.30	Inspection and necessary rectification of inlet and outlet GD plate and it's bracing pipe. <b>Plate thickness gauging to be done.</b>			
	11.31	Inspection and necessary replacement of GDPRM Gear Box along with it's coupling.			
	11.32	INSPECTION AND NECESSARY RECTIFICATION OR REPLACEMENT FOR Insulator(shaft and support) chamber.			
	11.33	<b>Replacement of defective shaft bearing (above shaft insulator)</b>			
	11.34	Inspection and necessary replacement of damaged shaft insulator and support insulator			
	11.35	Inspection and necessary rectification of shaft insulator chamber and it's door frame.			
	11.36	Inspection and necessary rectification of support insulator chamber top cover bolts.			
	11.37	Inspection and necessary replacement of shaft insulator chamber door fixing eye bolt			
	11.38	INSPECTION AND NECESSARY RECTIFICATION OF HOPPER AND ITS ACCESSORIES			
	11.39	Hopper inside accumulated ash to be cleaned and all welding joint thorough checking to be done.			
	11.40	Hopper O/L defective KGV, bellow to be replaced.			
	11.41	Hopper vent line leakages to be attend, line de-choking to be done. If required, then vent line Y-piece and spool piece to be replaced.			
	11.42	Fluidising pad frame welding to be done			
	11.43	Hopper spoiler plate checking and necessary rectification to be done.			
	11.44	Hopper bracing pipes checking and necessary rectification to be done.			
	11.45	INSPECTION AND NECESSARY RECTIFICATION OF AMMONIA DOSING SYSTEM AND STRUCTURE SUPPORT			
	11.46	Inspection and necessary rectification of ammonia dosing pipes and it's guard angle			
	11.47	TRIAL RUN OF RAPPING DRIVE.			
	11.48	Ensure there are no loose material inside ESP. Life line is properly fitted and not touching with rotary part.			
	11.49	Ensure that there will be no manpower inside ESP from top to bottom. No manpower should be there outside hopper area.			
	11.50	Ensure that all replaced material is properly tightened.			
	11.51	Give clearance for trial and take trial. Fitter with proper manpower should be present at all three elevation inside ESP with HEL officer during trial to check any defect is there or not. Write down the defect for rectification purpose.			
	11.52	After completion of trial, take again isolation ptw to attend those defects.			
	11.53	FINAL BOLT TIGHTENING AND TAG WELDING			
	11.54	After attending defects( arise during trial)final bolts tightening and tack welding to be done.			
	11.55	BOX UP AND MEGGER TEST			
	11.56	Remove the life line. Check inside and ensure that there is no scrap/loose material inside ESP.			
	11.57	Ensure no manpower inside ESP.			
	11.58	Close all the Door of ESP(from top to bottom) with good conditioned rope and hold tite in presence of your safety personel as wel as HEL safety personel.			
	11.59	Give clearance for Megger test			
	11.60	Housekeeping			
	11.61	If Megger value is ok, then final housekeeping to be done and all scraps to be shifted designated Scrap Yard and to be returned Good Condition materials to HEL Store with proper count.			
	11.62	A Report of exact quantities of each & every spare material, consumed during AOH, to be submitted.			
<b>12</b>	<b>HEAD</b>	<b><u>Special/Additional</u></b>			
	12.1	Economiser Coil lifting for necessary maintenance & normalization, if required	Each	1	Rate per Coil Lifting to be quoted, separately, as additional activity, if required
	12.2	LTSH Coil lifting for necessary maintenance & normalization, if required	Each	1	Rate per Coil Lifting to be quoted, separately, as additional activity, if required
	12.3	Dismantling of Complete Drum internals, inspection and re-assembly (if at all imposed by IBR inspector)	LUMPSUM	1	ADDITIONAL
	12.4	Extra HP/IBR joints beyond 200 joints, mentioned above.	Nos.	1	Extra Joint Rate per Joint to be quoted, separately

			Scope Matrix	
Consumables for AOH (Applicable for all Areas)			HEL	Contractor
1		DA/Oxygen/Argon gas	NO	YES
2		Cutting/Grinding/Emery/Buffering wheels/Emery papers/Wire Brush	YES	YES
3		Cotton Waste/Marking Cloth/Sari Cloth/Jute/Purging Paper/Purging Tape	NO	YES
4		Rustolene/WD-40/Molycoat/Sealant/Threadlocker/Lapping Paste/Hylomer etc.	YES	NO
5		Structural & Non-Pressure Parts Electrodes & Fillers - 6013, 7018, 308L, 309L of D&H Secheron/Bohler make only	NO	YES
6		Electrodes & Fillers for all HP/IBR/Attachment/Pressure Parts Welding Joints and all Special Electrodes	YES	NO

Common Points under Contractor's Scope (Applicable for all Areas)		
1		<b>AOH Schedule: 18 days (Sync. to De-Sync.)</b>
2		<b>Apart from the above list of jobs, Contractor's representative shall have to visit Site 15 days in advance before AOH and shall collect list of all existing/prevalent defects at that time and plan for attending those defects during AOH.</b>
3		Scaffolding erection and dismantling for valve maintenance includes scaffolding material
4		Support services (including manpower, Tools & tackles ) required for E&I service jobs
5		Labour License liasoning will under contractor scope
6		Coordination with IBR (Boiler inspector) for succesful hydro test and for obtaining steaming certificates for both Units and liasion with factory inspector for obtaining labour license, during AOH shall be in the scope of Contractor
7		Contractor have to follow HEL's Safety Norms
8		All T&Ps including lifting tools and tackles, hydraulic jacks, Measuring Instruments for jobs are in Contractor's Scope
9		Pre and Post weld Heat treatment for applicable weld joints with Machine
10		Radiography testing of valve joints and power cycle piping tubes/pipes. Complete arrangement & RT source will be under Contractor's Scope
11		Material Handling including the arrangement of adequate nos. of Hydraulic/Mobile Cranes/Hydras will be under Contractor's Scope on round the clock basis with Operator, TO COMPLETE AOH within Schedule
12		Ash removal upto our desinated place including Tractor-trolley set/or other device arrangment on round the clock basis. Big jumbo bags/gunny bags to be arranged by Contractor
13		Signed Protocols and Job Reports to be submitted as per HEL EIC's guidelines

BURNER, SADC AND COAL BENDs JOBS			
1	Locking of Coal pipe	Removal of insulation & cladding from coal pipe. Anchoring/fixing of coal pipe by welding the supporting channel/angle with coal pipe and nearby platform/structure	All four corners (24 nos. required to lock)
2	Removal of hoses & pipes of LDO station	All oil guns should be removed then flexible hoses & pipes should be removed. Removal should be done from flanged end.Qty-12 nos	
3	Removal of side panel doors & insulation from its inside	Removal of Side panel external (From Top to bottom) door by removal of all fasteners then removal of insulation and finally removal of inside door panel by removing its fasteners	
4	Removal of first coal bend and gate valve (before removal of coal nozzle)	All bolts should be loosened and removed from flanged joints(top to bottom). After removal of bend downside bend should be covered up properly so that no material can go inside it.	
5	Removal of front panel door & Insulation	Removal of all bolts of external front door and then removal of door(top to bottom). Thenafter removal of insulation.	
6	Removal of Coal nozzles with tip along with its accessories.	All pins should be removed from turn-buckle, nozzle tip should be in horizontal position by arrangement of belt sling, arrangement of chain pulley block should be made for pulling coal nozzle assembly from compartment. Before removal, Coal nozzle & its tip both should be fastened together with belt sling so that both parts come together. For lifting and positioning on permanent platform proper chain pulley block arrangement should be made. Qty-24	
7	Complete assessment of coal nozzle, tip and other associated parts and its Repairing/Replacement	Coal nozzle assembly should be placed on permanent platform.Marking of top-bottom on coal nozzle and tip should be done. After joint assessment, repairing/replacement action should be taken. <b>Removal-24 nos.</b> <b>Repairing of Coal nozzles-12 nos. (Tentative)</b> <b>Replacement of coal nozzle-12 nos. (Tentative)</b>	
8	Servicing of Tilting mechanism	All external and internal pin joints, turn-buckles, lever arm etc should be properly cleaned and thenafter inspection to be done. After inspection, repairing/replacement action should be taken. At each interconnection joint, pin,lever arm, turn-buckle joint molykote spray should be applied properly.All four corners in set	
9	Repairing/Replacement of Air Tip, Oil tip including OFA	1.All four corners air tip & Oil tip should be inspected from inside of furnace by sky-climber. 2. After joint inspection further course of action will be taken for repairing/replacement. 3. For Replacement air tip or oil tip should be pulled outside with proper arrangement of chain pulley (suitable capacity 1T) 4. Air tip and Oil tip should be removed outside for assistance for burner tube job (pressure parts), if required, Quantity shall be finalised after job assessment of pressure parts gang. 5. Thenafter, gate valve and coal bend should be restored. QTY-36 nos	

10	<b>After repairing, restoration and Boxed up Coal nozzle assembly, gate valve and bends.</b>	<ol style="list-style-type: none"> <li>1. After repairing/replacement of coal nozzle &amp; its tips, assembly will be done for its restoration.</li> <li>2. Insertion of Coal nozzle assembly shall be done after alteration of assembly arrangement.</li> <li>3. Before load release from chain pulley block, coal nozzle assembly should be placed in coal compartment and thereafter proper fastening should be done for any unwanted incident</li> </ol>	
11	<b>Restoration/Boxed up of Air tip &amp; Oil tip</b>	Repaired/Replaced air tip & oil tip should be properly fixed with its mechanical linkage and pin should be properly fixed.	
12	<b>Checking of Zero setting of Burner for all four corners</b>	<ol style="list-style-type: none"> <li>1. After fixing of All coal nozzles and air/oil tips, pin and linkage mechanism will be restored (delinking with tilting actuator). Tilting mechanism will be fixed at horizontal position. Now, angle of each coal nozzle and air/oil tip will be checked from inside by bevel protector and zero position will be adjusted by turn buckles accordingly.</li> <li>2. All four corners should be checked and adjusted.</li> </ol>	
13	<b>Linking of tilting actuator and witness by Operation Department</b>	<ol style="list-style-type: none"> <li>1. Using sky-climber witnessing of tilting mechanism to be done after linkage of tilting actuator.</li> <li>2. As per Operational practices tilting will be checked by MPO and subsequently adjustment will be done, if any required.</li> </ol>	
14	<ol style="list-style-type: none"> <li>1. Final Boxup of Panel doors inside-outside and insulation</li> <li>2. restoration of oil gun/barrel and LDO station pipes/hoses.</li> </ol>	<ol style="list-style-type: none"> <li>1. After successful zero setting and witnessing of tilting mechanism, inside panel door then insulation and finally external door will be closed.</li> <li>2. Oil gun/barrel should be inspected before installation, if required repairing to be done.</li> </ol>	
15	<b>Lifting/Lowering of material and restoration of other system</b>	<ol style="list-style-type: none"> <li>1. Available coal nozzle/tip/air tip/oil tip should be shifted/lifted/lowered to/from different platforms by winch machine (5T/10T capacity).</li> <li>2. All removed handrail/structure whichever has been cut for ease of installation should be restored at the same location.</li> <li>3. All scraps from different platforms should be cleaned and witnessed to concerned officers.</li> </ol>	
16	<b>SECONDARY AIR DAMPER CONTROL (SADC) JOB</b>	<p>Inspection, repairing and servicing of SADC dampers (all elevation and all four corners)</p> <ol style="list-style-type: none"> <li>1. At each corner, from inside of windbox, scaffoldings should be made and subsequently platforms should be fixed so that inspection can be done properly.</li> <li>2. Joint inspection for dampers will be done for its free operation/movement.</li> <li>3. De-linking from actuator may also be required for proper inspection of dampers.</li> <li>4. Full opening and full closing should be checked and should be adjusted, if required, as per instruction.</li> <li>5. All pins should be properly lubricated by high temperature grease.</li> <li>6. After witness healthy operation, all arrangements made inside windbox should be cleared before final box up of wind box.</li> </ol>	All four corners in set

17	<b>COAL BEND JOB</b>	<p>Internal inspection of Coal bend tiles,qty-24 nos</p> <ol style="list-style-type: none"> <li>1. Inspection of coal bends from Boiler to Mill shall be inspected by Robotic system, for this sufficient and dedicated manpower assistance should be given.</li> <li>2. Based on inspection, decision will be taken for replacement/repairing of bends.</li> </ol>	
		<p>Repairing/ Replacement of coal bend -As per assesement (tentative 4 nos.)</p> <ol style="list-style-type: none"> <li>1. Repairing of bends will be done by fixing tiles at the location where tiles are missing/uprooted. All tilles lying inside coal bend should be removed from inside.</li> <li>2. The bend which will be decided to replaced. For that proper arrangement for its removal,lowering on ground, lifting from ground(new one) should be done.</li> <li>3. For hoisting these tools manual chain pulley block should be used.</li> <li>4. Cutting, welding and assembly of coal bends should be done on ground as much as possible.Only site joint shall be welded on location after proper fixing.</li> <li>5. All temporary platforms/scaffolings should be dismantled before giving final clearance.</li> </ol>	



UNIT-2	
DAMPERS AND GATES	
Sl. No.	Description
1	FD fan-A discharge damper
2	FD fan-B discharge damper
3	FD fan-A to APH-A inlet (Cold sec) damper
4	FD fan-B to APH-B inlet (Cold sec) damper
5	APH-A hot secondary outlet damper
6	APH-B hot secondary outlet damper
7	FD fan-A to Hot secondary duct bypass damper
8	FD fan-B to Hot secondary duct bypass damper
9	PA fan-A outlet damper
10	PA fan-B outlet damper
11	PA fan-A to APH-A inlet (Cold primary) damper
12	PA fan-B to APH-B inlet (Cold primary) damper
13	APH-A hot primary outlet damper
14	APH-B hot primary outlet damper
15	Seal Air Fan-A suction damper
16	Seal Air Fan-A discharge damper
17	Seal Air Fan-B suction damper
18	Seal Air Fan-B discharge damper
19	Mill-A Cold Air damper
20	Mill-B Cold Air damper
21	Mill-C Cold Air damper
22	Mill-D Cold Air damper
23	Mill-E Cold Air damper
24	Mill-F Cold Air damper
25	Mill-A Hot Air damper
26	Mill-B Hot Air damper
27	Mill-C Hot Air damper
28	Mill-D Hot Air damper
29	Mill-E Hot Air damper
30	Mill-F Hot Air damper
31	Mill-A Cold Air gate
32	Mill-B Cold Air gate
33	Mill-C Cold Air gate
34	Mill-D Cold Air gate
35	Mill-E Cold Air gate
36	Mill-F Cold Air gate
37	Mill-A Hot Air gate
38	Mill-B Hot Air gate
39	Mill-C Hot Air gate
40	Mill-D Hot Air gate
41	Mill-E Hot Air gate
42	Mill-F Hot Air gate
43	APH-A flue gas inlet damper
44	APH-B flue gas inlet damper

45	ESP pass-A Ch-1 guillotine gate
46	ESP pass-A Ch-2 guillotine gate
47	ESP pass-B Ch-1 guillotine gate
48	ESP pass-B Ch-2 guillotine gate
49	ESP pass-A Ch-1 outlet damper
50	ESP pass-A Ch-2 outlet damper
51	ESP pass-B Ch-1 outlet damper
52	ESP pass-B Ch-2 outlet damper
53	ESP outlet common duct damper
54	ID fan-A inlet damper
55	ID fan-B inlet damper
56	ID fan-A IGV
57	ID fan-B IGV
58	ID fan-A outlet damper
59	ID fan-B outlet damper
60	FD-A Recirculation duct gate (9 mtrs)
61	FD-B Recirculation duct gate (9 mtrs)
62	De-Nox SOFA inlet dampers (4 corners)

### APH Scope Of Work

Sl. No.	Activity
<b>1</b>	<b>Pre AOH Job - Preparatory work</b>
1.1	Installation of winch machines - 4 Nos of 2 Ton Capacity
1.2	Making accesses, Removal & extension of platforms & hand Rails for Safe working
1.3	Scaffolding Material Shifting to APH floor both side
1.4	Erection of Scaffolding at Axial Sector plate area, baskets removal area .
1.5	Insulation Removal from Axial Sector Plate, Center section, GB Area & APH Casing
<b>2</b>	<b>In-situ repair/replacement of sector plates and Trunnion Spool Piece.</b>
2.1	Ash cleaning & Insulation removal from center section
2.2	Track rod freeness - Repair/Removal & Replacement
2.3	Sector Plate freeness - Repair/Removal & Replacement
<b>3</b>	<b>Replacement of Rotor Drive Gearbox</b>
3.1	Removal of Motor
3.2	Removal of Pinion & Replacement of Gear Box
3.3	Restoration & Alignment of Pinion & Pin Rack, Gear Box Motor
<b>4</b>	<b>HOT END BASKET - REMOVAL OF OLD &amp; REPLACEMENT</b>
4.1	Installation of Lifting Arrangement of Basket from Front & Rear side of Both APH
4.2	Removal & Replacement with New Baskets
<b>5</b>	<b>HOT INTERMEDIATE END BASKET - REMOVAL OF OLD &amp; REPLACEMENT</b>
5.1	Installation of Lifting Arrangement of Basket from Front & Rear side of Both APH
5.2	Removal & Replacement with New Baskets
<b>6</b>	<b>COLD END BASKET - REMOVAL OF OLD &amp; REPLACEMENT</b>
6.1	Installation of pulling Arrangement of Basket from LHS & RHS side of Both APH
6.2	Seal-Off Scaffolding for Cold end Basket Removal & Seal Replacement
6.3	Removal & Replacement with New Baskets
<b>7</b>	<b>APH Seal Replacement and Setting</b>
7.1	Rotor leveling
7.2	Sector Plate leveling
7.3	Setting and Replacement of Hot and Cold End Radial Seals.
7.4	Setting and Replacement of Axial and Bypass Seals Hot and Cold End.
7.5	Setting and Replacement of Rotor Post Seal Hot and Cold End.
7.6	Setting and Replacement of Static seal of Hot and Cold End sector plates.
<b>8</b>	<b>Inspection and Servicing of Guide Bearing and Support Bearing &amp; Air seal assembly :-</b>
8.1	Inspection and Servicing of Guide Bearing
8.2	Inspection and Servicing of Support Bearing
8.3	Inspection and Servicing of Lube oil system of Guide Bearing & Support Bearing
8.3	Adjustment of sector plates during running condition
<b>9</b>	<b>Structure Work Repair and Replacement</b>
9.1	Bracing Pipe Repair & Replacement
9.2	Repairing & Strengtening of APH Connecting Duct
9.3	Repairing & Strengtening of Fire Fighting header
9.4	Repairing & Strengtening of APH Washing Service water header
9.5	Repairing & Strengtening of APH Soot Blower accessories & Support
9.6	Repairing & Strengtening of APH sonic Soot Blower horn
9.7	Replacement of APH Sootblower lance tube and gland packing

9.8	<b>Removal/Breaking of refractory with pneumatic hammers</b> , repair the centre section, HE casing & application of refractory
11	Ash Removal & House Keeping Job
11.1	Ash removal from Gude bearing , support bearing , PA -SA HE passage and gearbox area.
11.2	Insulation will be removed by Third party but necessary scaffolding need to provide.

<b>1.0 Scope of Work:</b>		
	<b>1</b>	<b>Pre Outage Job and Inspection of Areas of APH:-</b>
	1.1	Pre outage job has to be started 5 Days before AOH Zero date.
	1.2	Mobilisation of Tools and Tackles, Gate Pass Preparation and Workers's Training to be completed before Zero date.
	1.3	Installation of winch machine and TPI testing (With system certification- pulley, rope, machine..etc)
	1.4	Erection of scaffolding for the removal of insulation from 1. Hot end & Intermediate & cold end Basket removal door -One permanent and One temporary. 2. Axial Sector Plate area
	1.5	Insulation Removal of required area and Manhole opening after PTW .
	1.6	Fixing of lighting arrangements required for inspection of Internal & External portions.
	1.7	Shifting of all the materials/spares/seals from HEL Central store to designated area & area barrication to be done
	1.8	During inspection, all internal sub components like all types of seals, sector plates & axial seal plate, Drive unit / Gear Box, Rack and Pinion Assembly, Hot End and Cold End Baskets, stiffener & bar supports, Diaphragm plates, Fire suppression System, Centre section, bracing supports, connecting plate & corner duct assembly are to be checked and damages / abnormalities to be identified and listed out for recording the healthiness of equipment before overhauling.
	1.9	Any site correction, site modification to be done if required is in the scope of the vendor.
	1.10	All the Electrical Tools and Tackles are to be certified and tagged by HEL E&I Dept.
	1.11	All the lifting Tools/Tackles and Machinery to be certified by TPI and HEL Safety department.
	1.12	All spare parts, Special electrodes / Alloy electrodes and consumables except Argon, Oxygen and DA will be supplied by HEL.
	1.13	All types of Tools and tackles, material handling equipment like Hydra, winch machine set, trailer truck/tractor, hydraulic hand pallet truck etc. will be in the Vendor's scope. All material handling equipment, tools etc. shall conform to statutory requirement.
	1.14	The Vendor has to arrange adequate welding machines, grinding machines, argon cylinders, Oxygen, DA, scaffolding pipes , clamps , jallis, slippers, jute bags/gunny bag for ash cleaning etc.
	1.15	The Vendor shall ensure adequate illumination at all the job fronts as required to safely execute the jobs. The contractor shall be responsible for providing temporary power supply / illumination required for the work as and when required.
	1.16	HEL will provide a single power source for APH overhauling. The Vendor has to arrange local distribution of power up to the job location with proper wiring.
	1.17	Job shall be carried out round the clock basis.
	<b>2</b>	<b>Inspection and Servicing of Guide Bearing and Support Bearing &amp; Air seal assembly:-</b>
	<b>2.1.1</b>	<b>Inspection and Servicing of Guide Bearing</b>
	2.1.2	Before start of inspection all the ash and insulation to be removed.
	2.1.3	The bearing housing cover, air pipeline connections and fittings with basement frame are to be dismantled.

	2.1.4	Draining of oil from bearing housing.
	2.1.5	Breather to be cleaned & replaced if required.
	2.1.6	Guide bearing locking nut to be adjusted if necessary.
	2.1.7	Inspection and cleaning of all subcomponents is to be carried out.
	2.1.8	Clearance between housing and bearing, roller and outer race to be recorded.
	2.1.9	Bearing healthiness to be checked and if found damage to be replaced.
	2.1.10	Re assembly of components as per the instruction of EIC.
	2.1.11	All soffhoods -gaskets,O-Ring & ropes are to be replaced.
	2.1.12	Guide fixtures of bearing housing are to be checked and rectified.
	2.1.13	Guide bearing housing level to be checked and rectified.
	2.1.14	Reassembly of all the connections to the bearing housing.
	2.1.15	Replacement of gasket/Gland rope of air seal assembly
	2.1.16	Box up the guide bearing & Fill the oil quantity or quality as per OEM instructions.
	2.1.17	DPT of bearing housing to be done
	2.1.18	Complete renewal of Guide bearing oil.
	<b>2.2.1</b>	<b>Inspection and Servicing of Support Bearing</b>
	2.2.2	Inspection of all components, cleaning & level checking for support bearings.
	2.2.3	Clearance between housing and bearing, roller and outer race to be recorded.
	2.2.4	Bearing healthiness to be checked and if found damage to be replaced.
	2.2.5	All soft hoods - gaskets, O-Ring and ropes to be replaced.
	2.2.6	Re assembly of components and oil filling in the housing as per OEM instructions.
	2.2.7	Guide fixtures of the bearing housing are to be checked and rectified.
	2.2.8	Bearing housing level to be checked and recorded.
	2.2.9	Installation of Kaowool.
	2.2.10	Complete renewal of Guide bearing oil.
	<b>2.3</b>	<b>Inspection &amp; servicing of Air seal Asembly</b>
	2.3.1	Inspection of all components, cleaning & level checking for air seal assembly .
	2.3.2	cleaning the adjustent area from ash and damaged rope assembly.
	2.3.3	Install new gland rope assembly.
	2.3.4	Removal , cleaning and refixing of tension spings .
	2.3.5	Application of silastick material and covering with new nut Bolts.
	<b>3</b>	<b>Inspection and Servicing of Lube oil system:-</b>
	3.1	Cleaning/replacement of LOP discharge filter
	3.2	Servicing of LOP, change of coupling and spider.
	3.3	Oil cooler cleaning and hydrotest.
	3.4	Attend all oil Leakage.
	3.5	Cleaning of oil skid
	<b>4.1</b>	<b>All types of Seal Replacemnt and setting</b>
	4.1.1	<b>Levelling of Hot, Cold End Radial Sector Plate and Axial Seal Plates:-</b>
	4.1.2	Fix the Aluminium finger tabs at inboard and outboard for all three sector plates.
	4.1.3	Record the previous setting readings of sector plates.
	4.1.4	Level all the three sector plate as per the directions of EIC.

	4.1.5	Repair/replace the sector plate & Its lifting mechanism if required.
	4.1.6	Locking of sector plate adjusting bolts after completion of levelling.
	4.1.7	Replacement of gland in stuffing box of Tracking rod
	4.1.8	One Team Maning to be done for 24x7 comprising of (5+5) person, for on line adjustment of sector plate and leakage arresting.
	4.1.9	Inspect , repair & replacement and alighment of Statc seals .
	<b>4.2</b>	<b>Checking of Rotor Run Out and Rotor Levelling: -</b>
	4.2.1	Run out of both top and bottom flanges of air heater rotor as well as rotor radius to be checked and recorded.
	4.2.2	High point of rotor flanges to be marked.
	4.2.3	Rotor to be levelled as per the norms by adjusting the jacket of guide bearing housing.
	4.2.4	Foundation bolts have to be tightened.
	4.2.5	Defective fasteners /lock plates, U type Shims found damaged are to be repaired or replaced.
	<b>4.3</b>	<b>Setting and Replacement of Hot and Cold End Radial Seals: -</b>
	4.3.1	Fix the radial straight edge to set seals at pre-determined seal leaf to sector plate gap & hot end spool ring gap, as per the direction of EIC.
	4.3.2	Loosen all the fasteners of seals to be set.
	4.3.3	Replace all worn-out/damaged fasteners and seals.Repair damage diaphragm plates.
	4.3.4	Set all the seals one by one against straight edge and tighten all the seal with holding strips fixing bolts &nuts lock the adjusting mechanism.
	4.3.5	Washers to be provided on both sides of seals
	4.3.6	Set all the seals of every sector in the same way.
	4.3.7	Remove the straight edge and check free rotation of the rotor by hand.
	4.3.8	Check seal gap reading as instructed by EIC and record the same future purpose .
	<b>4.4</b>	<b>Setting and Replacement of Axial and Bypass Seals Hot and Cold End: -</b>
	4.4.1	Loosen all the fasteners of seals to be set.
	4.4.2	Fix the straight edge to set seals at pre-determined gap, as directed by EIC.
	4.4.3	Repair/replace bypass seal angle and strip at both Hot & Cold ends.
	4.4.4	Replace all worn-out/damaged fasteners and seals.
	4.4.5	Set all the seal with holding strip one by one and tighten all the seal fixing fasteners.
	4.4.6	Check seal gap reading as instructed by EIC and record the same future purpose .
	4.4.7	Check the free rotation of the rotor by hand.
	4.4.8	Attend the defects if any.
	<b>4.5</b>	<b>Setting and Replacement of Rotor Post Seal Hot and Cold End: -</b>
	4.5.1	Cut the all-rotor post seal & set the pre-determined gap with Rotor post & trunnion assembly if required.
	4.5.2	Install new seals and weld as per the drawing.
	4.5.3	Check seal gap reading as instructed by EIC and record the same future purpose .
	4.5.4	Attend the defects if any.
	<b>5</b>	<b>In-situ repair/replacement of sector plates and Trunnion Spool Piece.</b>
	5.1	Cutting and grinding the eroded portion.

	5.2	Repair the eroded portion by patch of plates & welding work
	5.3	Intallation, alignment & welding of spool piece
	<b>6</b>	<b>Adjustment of sector plates during running:-</b>
	6.1	Full range smooth movement of sector plate to be checked
	6.1	Gap between the radial sector plate and the rotor to be set as per the instruction of Engineer.
	6.1	Hot adjustment of sector plate (with APH on load).
	6.1	Gap between the Axial sector plate and the axial seal to be set as per the instruction of Engineer.
	6.1	Position indicator and stopper to be provided for indicating /guiding the movement of the sector plate.
	<b>7</b>	<b>Structure work Repair and Replacement and Complete Refractory Removal &amp; Application</b>
	7.1	Repair/Replace damage fire fighting pipes.
	7.2	Replace Fire Fighting pipe nozzles, if found defective.
	7.3	Repairing of APH Casing
	7.4	Repairing of APH casing support bracing
	7.5	Repairing of APH casing to duct expansion bellow and its liner
	7.6	Repairing of flue gas side duct bracing above APH.
	7.7	Any kind of welding, repairing, patching, support welding, scaffolding to be done to attend the job.
	7.8	Repairing & Strengtning of APH Washing Service water header line and its nozzles.
	7.9	Repairing & Strengtning of APH Soot Blower accessories & Support
	7.1	Repairing & Strengtning of APH Sonic Soot Blower Horn
	7.11	Replacement of APH Sootblower lance tube and gland packing
	7.11	Removal/Breaking of refractory by pneumatic hammer from centre section , repair the centre section and apply of new refractory after work.
	<b>8</b>	<b>REMOVAL OF OLD &amp; INSTALLATION OF NEW HOT END BASKET (144 NOS. PER APH)</b>
	8.1.1	Opening of basket removal door and installation of scaffolding for basket & insulation removal.
	8.1.2	Cutting of APH cell near soot blower for basket locking strip cutting and welding work.
	8.1.3	Installation of door in APH cell near soot blower.
	8.1.4	Cutting of basket locking strip
	8.1.5	Removal of hot end basket with adequeate nos. of <b>2T Electric chain block</b> . (CONTRACTOR'S SCOPE)
	8.1.6	Shifting of basket from APH to both ends on <b>hydraulic hand pallet truck</b> .(Hand Pallet in vendor`s scope)
	8.1.7	Lowering to ground floor from 14 mtr elevation with the help of winch machine.
	8.1.8	Shifting of basket with forklift to designated place for scrapping.
	8.1.9	Weight measurment of individual basket before lifting.
	8.1.10	Lifting of new baskets from ground to 14 mtr elevation
	8.1.11	Shifting of basket from both ends to APH on hydraulic hand pallet truck.(Hand Pallet in vendor`s scope)
	8.1.12	Installation of new baskets.
	8.1.13	Welding of basket locking strip.



	<b>8.2</b>	<b>REMOVAL of OLD &amp; INSTALLATION OF NEW HOT-INTRMEDIATE BASKET (144 NOS. PER APH)</b>
	8.2.1	Cutting of basket locking strip
	8.2.2	Removal of hot intermediate basket with adequate nos. <b>2T Electric chain block.</b> (CONTRACTOR'S SCOPE)
	8.2.3	Shifting of basket from APH to both ends on <b>hydraulic hand pallet truck.</b> (Hand Pallet in vendor`s scope)
	8.2.4	Lowering to ground floor from 14 mtr elevation with the help of winch machine.
	8.2.5	Shifting of basket with forklift to designated place for scrapping.
	8.2.6	Weight measurment of individual basket before lifting.
	8.2.7	Lifting of new baskets from ground to 14 mtr elevation
	8.2.8	Shifting of basket from both ends to APH on hydraulic hand pallet truck.(Hand Pallet in vendor`s scope)
	8.2.9	Installation of new baskets.
	8.2.10	Welding of basket locking strip.
	<b>8.3</b>	<b>REMOVAL of OLD &amp; INSTALLATION OF NEW COLD END BASKETS (144 NOS. PER APH)</b>
	8.3.1	Cutting of basket locking strip
	8.3.2	Removal of cold end basket (Side Pulling, by cutting openings)
	8.3.3	Shifting of basket from APH to both ends on <b>hydraulic hand pallet truck.</b> (Hand Pallet in vendor`s scope)
	8.3.4	Lowering to ground floor from 12.5 mtr elevation with the help of winch machine.
	8.3.5	Shifting of basket with forklift/trailor truck to designated place for scrapping.
	8.3.6	Weight measurment of individual basket before lifting.
	8.3.7	Lifting of new baskets from ground to 12.5 mtr elevation
	8.3.8	Shifting of basket from both ends to APH on hydraulic hand pallet truck.(Hand Pallet in vendor`s scope)
	8.3.9	Installation of new baskets.
	8.3.10	Welding of basket locking strip.
	<b>9</b>	<b>Reducer Gearbox &amp; Motor replacement job (2 nos. for 2 APHs)</b>
	9.1	Decoupling of AC & DC motor side coupling
	9.2	Removal of old Gearbox & Motor with 2T Electric chain block. (Electric Chain block in vendor`s scope)
	9.3	Lowering to ground floor from 14 mtr elevation with the help of winch machine.
	9.4	Shifting of reducer gearbox with hydra to designated place as instructed by HEL EIC.
	9.5	Lifting of serviced gearbox to 14mtr elevation using winch.
	9.6	Installation of new gearbox & motor & coupling
	9.7	Inspection and servicing of Rack and pinion
	9.8	Checking of rack & pinion axial & radial clearance during installation
	9.9	Replacement of old Oil with recommended Oil
	9.10	Cleaning of filters/breathers
	9.11	Allignment of AC & DC motor with gear box
	9.12	Replacement of old spider of DC motor side coupling
	9.13	Installation of magnetic coupling, setting & checking of air gap.
	<b>10</b>	<b>House Keeping</b>

	10.1	Ash to be cleaned and shifted in poly bags (Vendor's Scope).
	10.2	Old/used material to be shifted to zero mtr on daily basis.
	10.3	Old/used material to be shifted From zero mtr. to allocated area on daily basis.
	10.4	Old, Damaged refractory need to be shifted to designated place.
<b>2.0 Quantity:</b>		
		Total numbers of APHs: 02

3.0 Post OH- 5

### FAN Scope of Work

1.1	PARTIAL OVERHAUL OF FD FANS 2A and 2B (2 NOS.)	Remarks
1.1.1	Scaffolding, both from inside and outside, for safe approach and for Full Set of Silencer Splitters Renewal. Complete Handling & Erection arrangement with WINCH MACHINE.	Pre-survey Job, to be completed before zero date
1.1.2	REPLACEMENT OF INLET SILENCER SPLITTERS ( <b>SCAFFOLDING PIPES, GRATINGS, CHAIN-PULLEY BLOCKS, WINCH ARRANGEMENT, GAS CUTTING, WELDING, GRINDING INVOLVED</b> ); <b>2 SETS SILENCERS FOR FAN A &amp; FAN B; EACH CONSISTS OF 7 NOS. OF SPLITTERS. So total 14 nos. of Silencer Splitters, considering 2 Fans.</b>	Pre-survey + Survey
1.1.3	Cleaning and repairing of silencer hood & mesh; cleaning and air lancing of suction & discharge duct of the fan, suction guide vanes.	
1.1.4	Replacement and handling of Motors, Coupling dismantling and refitting. Fan-Motor alignment.	
1.1.5	Replacement of Fan Driving End Oil Seals and Sleeves.	
1.1.6	Servomotor leakage oil measurement and replacement of Control & Lube Oil Hoses.	
1.1.7	<b>Disconnection of blade pitch control regulating drive link, removal of rotary oil seal and hydraulic hoses</b> , before pulling out diffuser.	
1.1.8	Removal of diffuser and inspection of blades, hub internals, regulating arms/levers, gliding blocks, guide pins etc.	
1.1.9	Proper Marking of blades, Outer & Inner Cone etc. W.R.T to Impeller, before dismantling.	
1.1.10	Check clearance between blade tip and casing for reference value before and after servicing, as per manual.	
1.1.11	Removal, Cleaning, Inspection of Fan Blades and DP Test of Fan blades, recording of blade defects with blade nos. Weighment of all Blades. <b>Weigh Machine in contractor's scope up to 3 decimals.</b>	
1.1.12	Checking floats of blade shafts for reference values, <b>both before and after servicing of blade bearing assembly.</b>	
1.1.13	Blade Bearings Dismantling and Assembly, Inspection, greasing and renewal	
1.1.14	Replacement of HAD (Hydraulic Adjustment Device/Servomotor) including <b>run out correction within 0.01/0.02 mm</b>	
1.1.15	Servicing of Blade Pitch Control links, levers, Check freeness of Sliding block with Thrust Disc, Lubrication of Sliding Blocks.	
1.1.16	Servicing of Blade Pitch regulating drive assembly, including bearing replacement.	
1.1.17	Calibration of Blade Pitch Actuator & Servomotor both from Local and DCS.	
1.1.18	Fan final box-up and assistance for re-commissioning & trial of fan.	
1.1.19	Assistance in Balancing (drilling and fixing up of balancing blocks), if required. If balancing required, diffuser to be again pulled out	
1.1.20	Cleaning & servicing of lube oil system components like lube oil tanks both from inside and outside (Tank Top Cover removal reqd.), filters, guage glasses, Lube Oil replacement by connecting flushers, replacement of Filters, Valves etc. <b>IBR FITTER, WELDER, GRINDER MAY BE REQUIRED FOR ANY WELDING JOB IN LUBE OIL PIPELINES.</b>	
1.1.21	Cleaning, Flushing & Hydro test of Cooler	
1.1.22	Servicing of Lube Oil Pumps & Seals, Renewal of couplings, spiders, if required	
1.1.23	Removal of Lube oil pump-motors & handing over to EMD and Installation of the same after receipt of overhauled motor.	
1.2	PARTIAL OVERHAUL OF PA FANS 2A AND 2B (2 NOS.)	

1.2.1	Replacement and handling of Motor, Coupling dismantling and refitting. Fan-Motor alignment and correction. <b>One Motor is to be renewed</b> ; for other Motor, Journal bearings inspections (Top & Side Clearance measurement, visual check, DP Test and UT); Bearing and labyrinth seals renewal, if required.	
1.2.2	Cleaning of Silencer hood mesh, Thorough Cleaning of Silencer Splitters, Suction & Discharge duct of the fan.	
1.2.3	Removal of top casing after pre-dismantling checks; Check clearance between blade tip and casing for reference values.	
1.2.4	General cleaning of fan casing & cleaning/greasing/oiling of all components, repair of damaged parts, if required.	
1.2.5	Proper Marking of blades, Outer & Inner Cone, Covers etc. W.R.T to Impeller, before dismantling.	
1.2.6	Removal, Cleaning, Inspection of Fan Blades and DP Test of Fan blades, recording of blade defects with blade nos. Weighment of all Blades. <b>Weigh Machine in contractor's scope up to 3 decimals.</b>	
1.2.7	Lifting and Shifting of Rotor assembly to TG Maintenance Bay, by Hydra, for overhauling.	
1.2.8	Overhauling of Impeller Hub Assembly ( <b>one fan, 2A</b> ) includes servicing & cleaning of blade bearing assembly, renewal of bearing balls, bearings, seal kits, Sliding blocks, grease renewal, freeness checking and lubrication of Sliding blocks with Thrust discs.	One ready spare Rotor Assy. to be replaced in 2B
1.2.9	Dismantling/Assembly of Servomotor; <b>Run-out correction within 0.01 mm/0.02 mm.</b>	
1.2.10	Servicing of Blade Pitch Control actuating shaft bearings, coupling bush etc. & <b>Actuator replacement.</b>	
1.2.11	Servomotor leakage oil measurement and replacement of Control & Lube Oil Hoses.	
1.2.12	Calibration of Blade Pitch actuator & Servomotor both from Local and DCS.	
1.2.13	Fan final box-up and assistance for re-commissioning & trial of fan.	
1.2.14	Assistance in balancing (welding of balancing blocks), if required (for balancing, top casing to be opened and closed for multiple times)	
1.2.15	Cleaning & servicing of lube oil system components like lube oil tanks both from inside and outside (Tank Top Cover removal reqd.), filters, guage glasses, Lube Oil replacement by connecting flushers, replacement of Filters, Valves etc. <b>IBR FITTER, WELDER, GRINDER MAY BE REQUIRED FOR ANY WELDING JOB IN LUBE OIL PIPELINES.</b>	
1.2.16	Cleaning, Flushing & Hydro test of Cooler	
1.2.17	Servicing of Lube Oil Pumps & Seals, Renewal of couplings, spiders, if required	
1.2.18	Removal of Lube oil pump-motors & handing over to EMD and Installation of the same after receipt of overhauled motor.	
<b>1.3</b>	<b>PARTIAL OVERHAULING OF SEAL AIR FAN 2A AND 2B (2 NOS.)</b>	
1.3.1	Inspection of Impellers and inside ash cleaning	
1.3.2	Inspection of DE & NDE bearings, cleaning and clearance checking	
1.3.3	Decoupling and Replacement of Coupling Bush	
1.3.4	Flushing and replacement of bearing oil	
1.3.5	One no. Motor replacement, if required	
1.3.6	Alignment checking of Fan & Motor. Correction if required.	
1.3.7	Arresting of Air leakages from impeller shaft and casing by dismantling and replacing air seals (both DE & NDE);	
1.3.8	Servicing/ Cleaning/ Replacement of Suction Filter, Valve, Damper & Bellow	
1.3.9	Servicing/ Cleaning/ Replacement of Discharge - Bellow & Swing Flap	

<b>1.4</b>	<b>OVERHAULING OF SCANNER AIR FAN AC AND DC (2 NOS.)</b>	
1.4.1	Assist EMD in replacement of Motor bearing; Pulling out impeller and re-assembly.	
1.4.2	Assistance in balancing of impeller, if required.	
1.4.3	Filter cleaning/replacement; Casing Gasket renewal.	
1.4.4	Base strengthening, if required, due to high vibration.	
1.4.5	Inspection/repairing of discharge V-flap.	
1.4.6	Repair/Replacement of bellow, suction strainer.	

<b>1.5</b>	<b>OVERHAULING OF ID FAN 2A AND 2B (2 NOS.) [RADIAL FANS]</b>	
1.5.1	Erection of scaffolding and making safe approach to 3 manholes per fan [2 manholes for suction chamber and 1 manhole for discharge chamber]. Removal & restoration of insulation, if required.	Pre-Survey Job, to be completed before zero date
1.5.2	Motor lowering to ground and re-erection; Coupling removal and re-assembly to enable EMD for bearing replacement.	
1.5.3	Opening of Manholes and making safe approach inside suction and discharge chambers.	
1.5.4	Ash Cleaning and removal from Suction & Discharge chamber for proper inspection	
1.5.5	Cleaning, Inspection and thickness gauging of impeller/vanes.	
1.5.6	Cleaning, Inspection and tightness checking of Suction Cone bolts from both suction and discharge sides, by making scaffolding.	
1.5.7	DE & NDE bearings sump cleaning, bearing visual inspection, clearance checking, seal rings checking, felt seals, "O" rings renewal; <b>ZERO OIL LEAKAGE MUST BE ENSURED FROM BRG. HSG. LABYRING SEAL AFTER BOX-UP</b>	
1.5.8	General cleaning of Fan and Voith components & cleaning/greasing/oiling of all components, repair of damaged parts, if required.	
1.5.9	Inspection /cleaning of Voith Coupling Tank by VOITH Top Cover removal, Filter elements; All leakage arresting by "O" ring replacement / Gasket replacement; Oil replacement through Flushers and assistance in connection & disconnection of flushers.	
1.5.10	2A VOITH Coupling complete Overhauling incl. bearing replacement; <b>a dedicated gang to be allocated for VOITH O/H in presence of OEM expert</b> ; Lowering and transporting of VOITH Runner assembly, by Hydra, to TG Mtc. Bay, for O/H of VOITH	OEM Expert to be called upon by HEL
1.5.11	Final Box-up; Alignment of Motor to Voith and Voith to Fan	
1.5.12	Cleaning & servicing of lube oil system components like lube oil tanks both from inside and outside (Tank Top Cover removal reqd.), filters, guage glasses, Lube Oil replacement through flushers, replacement of Filters, Valves etc. <b>IBR FITTER, WELDER, GRINDER MAY BE REQUIRED FOR ANY WELDING JOB IN LUBE OIL PIPELINES.</b>	
1.5.13	Cleaning, Flushing & Hydro test of both Lube Oil and Working Oil Coolers	
1.5.14	Servicing of Lube Oil Pumps & Seals, Renewal of couplings, spiders, if required	
1.5.15	Removal of Lube oil pump-motors & handing over to EMD and Installation of the same after receipt of overhauled motor.	

**NOTE: FINAL BILL SHALL BE CERTIFIED ONLY AFTER SUBMISSION OF COMPLETE O/H REPORTS WITH SIGNED**

## HALDIA ENERGY LIMITED

**MINIMUM TENTATIVE REQUIRED TOOLS FOR O/H OF ID, FD & PA FANS  
(APART FROM THE BELOW LIST OF ITEMS, ANY OTHER TOOLS AS DEEMED NECESSARY BY THE  
CONTRACTOR, FOR SMOOTH COMPLETION OF THE JOB, SHALL HAVE TO BE MOBILISED)**

SL NO	NAME OF THE TOOLS WITH DESCRIPTION	QTY	UNIT	Remarks
1	DIAL GAUGE	8	NOS.	
2	MAGNETIC STAND FOR DIAL GAUGE	8	NOS.	
3	MIRROR	6	NOS.	
4	VERNIER SCALE 0-150 MM	2	NOS.	
5	VERNIER SCALE 0-300 MM	2	NOS.	
6	VERNIER SCALE 0-450 MM	1	NOS.	
7	INSIDE MICROMETER 0-50 MM	1	NOS.	
8	INSIDE MICROMETER(50MM-300MM)	1	NOS.	
9	OUTSIDE MICROMETER(0MM-150MM)	1	NOS.	
10	OUTSIDE MICROMETER(0MM-300MM)	1	NOS.	
11	HYDROLIC JACK 50 TON WITH PUMP	4	NOS.	
12	20 TON JACK APPROX HEIGHT 30 MM WITH PUMP	2	NO.	
13	100 TON JACK WITH PUMP	2	NO.	
14	FILLER GAUGE(150 MM)	2	NOS.	
15	FILLER GAUGE(300 MM)	2	NOS.	
16	FILLER STRIPS 150 MM	2	NOS.	
17	COPPER ROD(1" X 200 MM)	4	NOS.	
18	COPPER ROD(2" X 200 MM)	4	NOS.	
19	ALLEN KEY SET(MM )	4	SET	
20	ALLEN KEY SET (INCH )	2	SET	
21	ALLENKEY 12 MM	2	NOS.	
22	ALLENKEY 14 MM	3	NOS.	
23	ALLENKEY 17 MM	3	NOS.	
24	ALLENKEY 19 MM	2	NOS.	
25	ALLENKEY 22 MM	2	NOS.	
26	HAMMER(BALL PIN)-800GM	4	NOS.	
27	HAMMER-1000GM	3	NOS.	
28	HAMMER-2000GM	2	NOS.	
29	HAMMER-5000GM	2	NOS.	
30	HAMMER-7500GM	1	NOS.	
31	NYLON MALLET HAMMER	2	NOS.	
32	HAMMERING SPANNER-24MM	6	NOS.	
33	HAMMERING SPANNER-27MM	6	NOS.	
34	HAMMERING SPANNER-30MM	6	NOS.	
35	HAMMERING SPANNER-32MM	4	NOS.	
36	HAMMERING SPANNER-36MM	4	NOS.	
37	HAMMERING SPANNER-41MM	6	NOS.	
38	HAMMERING SPANNER-46MM	6	NOS.	
39	HAMMERING SPANNER-48MM	2	NOS.	
40	HAMMERING SPANNER-50MM	3	NOS.	
41	HAMMERING SPANNER-55MM	2	NOS.	
42	HAMMERING SPANNER-60MM	2	NOS.	
43	HAMMERING SPANNER-65 MM	1	NOS.	
44	HAMMERING SPANNER-70 MM	1	NOS.	
45	HAMMERING SPANNER-75 MM	1	NOS.	
46	HAMMERING SPANNER-80 MM	1	NOS.	

47	HAMMERING SPANNER-85 MM	1	NOS.	
48	HAMMERING SPANNER-90 MM	1	NOS.	
49	HAMMERING SPANNER-95 MM	1	NOS.	
50	HAMMERING SPANNER-100 MM	1	NOS.	
51	HAMMERING SPANNER-105 MM	1	NOS.	
52	RING & DE SPANNER-6/7	3	SET	
53	RING & DE SPANNER-8/9	3	SET	
54	RING & DE SPANNER-10/11	3	SET	
55	RING & DE SPANNER-12/13	3	SET	
56	RING & DE SPANNER-14/15	3	SET	
57	RING & DE SPANNER-16/17	6	SET	
58	RING & DE SPANNER-18/19	6	SET	
59	RING & DE SPANNER-20/22	2	SET	
60	RING & DE SPANNER-24/26	2	SET	
61	RING & DE SPANNER-24/27	6	SET	
62	RING & DE SPANNER-25/28	2	SET	
63	RING & DE SPANNER-30/32	4	SET	
64	RING & DE SPANNER-32/36	2	SET	
65	RING & DE SPANNER-41/46	2	SET	
66	RING & DE SPANNER-21/23	2	SET	
67	RING & DE SPANNER-36/41	4	SET	
68	RING & DE SPANNER-41/46	2	SET	
69	RING & DE SPANNER-46/50	2	SET	
70	RING & DE SPANNER-50/55	2	SET	
71	RING & DE SPANNER-60/65	2	SET	
72	BOX SPANNER(8MM -32MM)	1	SET	1. ALLEN SOCKET RATCHED SET 8 MM TO 32 MM WITH RATCED ,ALLEN
73	GUTI SPANER (16 to 24 mm)	1	SET	
74	ADJUSTABLE SPANNER-12"	2	NOS.	
75	PLIERS(INSIDE & OUTSIDE) 8"	2	NOS.	INDUSTRIAL CIRCLIP PLIER INSIDE AND OUTSIDE BOTH SET , SMALL TO DIFFERENT SIZE
76	SHIM CUTTER	1	NOS.	
77	PIPE WRENCH (12",18",24", 36",48")	2	NOS.	
78	SCREW DRIVER -8"	3	NOS.	
79	SCREW DRIVER -10"	3	NOS.	
80	SCREW DRIVER -12"	3	NOS.	
81	SCREW DRIVER -18"	3	NOS.	
82	CENTRE PUNCH-4"	3	NOS.	
83	CENTRE PUNCH-6"	3	NOS.	
84	NUMBER PUNCH	3	SET	
85	LETTER PUNCH	3	SET	
86	HOLE PUNCH 8,10,12,16,20 MM	2	SET	
87	CHISEL-6"	3	NOS.	2 NOS.
88	CHISEL-10"	3	NOS.	2 NOS.
89	CHAIN BLOCK-3T	2	NOS.	2 NOS. CHAIN LENGTH 30 MTR REQUIRED
90	CHAIN BLOCK-2T	4	NOS.	2 NOS. CHAIN LENGTH 30 MTR REQUIRED , 2 NO. CHAIN LENGTH 3 MTR REQUIRED
91	WEB SLING-1T	6	NOS.	WEB BELT SLING 1 TON 3 MTR 2 NOS, 4 MTR 4 NOS.
92	WEB SLING-2T	5	NOS.	WEB BELT SLING 2 TON 3 MTR 2 NOS, 4 MTR 3 NOS.

93	WEB SLING-3T	5	NOS.	WEB BELT SLING 3 TON, 4 MTR 5 NOS.
94	WEB SLING-4T	4	NOS.	WEB BELT SLING 4 TON, 3 MTR 2 NOS. ,4 MTR 2 NOS.
95	WEB SLING-5T	4	NOS.	WEB BELT SLING 5 TON, ,4 MTR 4 NOS.
96	WEB SLING-6T	1	NOS.	
97	WEB BELT SLING 10 TON 6 MTR	4	NOS.	
98	WIRE ROPE SLING			WIRE ROPE SLING 6MM 1.5 MTR I SIZE 150, 6 MM 2MTR I SIZE 400, 8MM I SIZE 400 2.5MTR.,10MM I SIZE 250, 300,350,450 2 MTR ,12 MM I SIZE 400 2.5 MTR 450 MTR 2,5 AND 4 MTR, , 16 MM I SIZE 350, 400 2.5 MTR EACH, 18 MM 1.5 MTR, 25 MM ISIZE 600 6 MTR AND 2 MTR, 30 MM I SIZE 900 5 MTR, 40 MM I SIZE900 5.5 MTR EACH WIRE ROPE SLING 2NOS.
99	DE-SACKLE-1T	8	NOS.	
100	DE-SACKLE-2T	8	NOS.	
101	DE-SACKLE-3T	8	NOS.	
102	DE-SACKLE-4T	8	NOS.	
103	DE-SACKLE-5T	8	NOS.	
104	DE-SACKLE-6T	4	NOS.	
105	DE-SACKLE-10 T	6	NOS.	
106	DE-SACKLE-17 T	4	NOS.	
107	EYE BOLT 6 MM	4	NOS.	
108	EYE BOLT 8 MM	4	NOS.	
109	EYE BOLT 10 MM	4	NOS.	
110	EYE BOLT 12 MM	4	NOS.	
111	EYE BOLT 16 MM	4	NOS.	
112	EYE BOLT 20 MM	4	NOS.	
113	EYE BOLT 24 MM	4	NOS.	
114	EYE BOLT 30 MM	4	NOS.	
115	GRINDING M/C-AG5	2	NOS.	
116	GRINDING M/C-AG4	3	NOS.	
117	NEEDLE FILE	2	SET	
118	FILE (ROUND,HALF ROUND,TRINGAL)	3	NOS.	
119	RIGHT ANGLE (6",12")	3	NOS.	
120	GRINDING GOGGLES	3	NOS.	
121	AG5 KEY	1	NOS.	
122	CUTTING WHEEL-5"	15	NOS.	
123	WELDING M/C	4	NOS.	One Argon Set, as and when required
124	CUTTING SET(RED & BLUE)	1	SET	MIN. 3 SET CUTTING SETS REQUIRED EXCLUSIVELY FOR FAN JOBS
125	O2 REGULATOR	2	NOS.	
126	DA REGULATOR	2	NOS.	
127	FLASH BACK ARRESTOR	4	NOS.	
128	CUTTING TORCH	2	NOS.	
129	O2 KEY	1	NOS.	
130	SPARK LIGHTER	2	NOS.	
131	CUTTING NOZZLE(B 1/16)	1	NOS.	
132	CUTTING NOZZLE(B 1/32)	1	NOS.	



133	CUTTING NOZZLE(B 3/34)	1	NOS.	
134	CUTTING NOZZLE(A 1/16)	1	NOS.	
135	CUTTING NOZZLE(A 1/32)	1	NOS.	
136	CUTTING NOZZLE(A 3/34)	1	NOS.	
137	CUTTING GOGGLES	2	NOS.	
138	HAND LAMP WITH WIRE	6	SET	
139	INDUSTRIAL BOARD	6	NOS.	
140	SAFETY HELMET		NOS.	
141	TORCH LIGHT	6	NOS.	
142	OIL STONE	5	NOS.	
143	1 MTR SCALE	2	NOS.	
144	SAFETY BELT		NOS.	
145	POLYPOLINE ROPE (16,18,20 MM)	4	ROLL	
146	MEASUREMENT TAPE (3 MTR, 5MTR)	4	NOS.	
147	TARPOLIN -12 FEETX18 FEET	12	NOS.	
148	SCAFFOLDING MATERIALS	1	LOT	
149	WELDING CABLE	50	MTR	
150	LEAD WIRE			
151	BLOWER			2 NOS.
152	FIRE BLANKETS			
153	NORMAL HAND GLOVES			
154	HEAT RESISTANCE HAND GLOVES FOR BEARING /COUPLING FITTING			4 PAIRS
155	BEARING PULLER			3 LEG 6",8" 2 LEG 6",8" 1 NO. EACH
156	24 V DC CONVERTER/LED LIGHTS FOR CONFINED SPACE			2 NOS.
157	HAND HELD DRILL MACHINE			1 NO
158	DRILL BIT 1 TO 13 MM			1 SET
159	5 MM DRILL BIT			6 NOS.
160	TAP SET 6,8,10,12,16,20,24,30			1 SET
161	HAND OIL PUMP			1 NO
162	TORQUE WRENCH 37NM-800NM			1 SET
163	REQUIRED SOCKET ADAPTER MATCHING WITH THE TORQUE WRENCH AND BOLT SIZE 8,10,12,16,20,24,30,36 BOLT BOTH ALLEN AND HEX BOLT			1 NO. EACH
164	ROTARY CUTTER MACHINE WITH BIT			1 NO.
165	OIL TRAY			6 NOS.
166	SPIRIT LEVEL			1 NO
167	BEARING TEMP GUN			2 NOS.
168	CHAPSA MACHINE			1 NO
169	PACKING GUTKA MS FOR JACK 60 MM DIA 130 MM LENGTH			1 NO.
170	PACKING GUTKA MS FOR JACK 45 MM DIA 125 MM LENGTH			2 NO.
171	PACKING GUTKA MS FOR JACK 80 MM DIA 50 MM LENGTH			10 NOS.
172	HOLE BARI			2 NOS.
173	SETTING CHAP BARI 12 MM DIA 300 MM LENGTH			4 NOS.
174	CHAP BARI DIA 24 MM , L 600MM			4 NOS.
175	CHAP BARI DIA 16 MM , L 800MM			4 NOS.
176	CHAP BARI DIA 24 MM , L 850MM			4 NOS.
177	CHAP BARI DIA 16 MM , L 850MM			6 NOS.
178	CHAP BARI DIA 16 MM , L 600MM			3 NOS.

179	PIPE BARI			4 NOS.
180	SOLID BARI 36 MM DIA 1 MTR			4 NOS.
181	WOODEN GUTKA			
182	WOODEN SLIPPERS			
183	CUTTING SET COVER			2 NOS.
184	CUTTING SET TROLLEY			2 NOS.
185	RUBBER GASKET CUTTING KNIFE			1 NO.
186	HOSIERY CLOTHS & SARI & CLEAN MARKING CLOTHS			LOT REQUIRED

**MMD ASSISTANCE REQUIRED U#2- SURVEY 2025-2026**

Sl no.	Job Description	Type of Assistance	Remarks
1	MILL-2A TO 2F PA FLOW AEROFOIL INSPECTION JOB	FIRM SCAFFOLDING AND DEDICATED APPROACH FOR INSPECTION OF THE AEROFOILS.	
2	DISMANTLING AND REFIXING OF MILL-2A TO 2F HAG POWER CYLINDERS FOR SEAL KIT REPLACEMENT JOB.	MANPOWER FOR DISMANTLING AND REFIXING THE CYLINDER. SEAL KIT REPLACEMENT AND POWER CYLINDR BOX-UP WILL BE DONE BY E&I	
3	DISMANTLING AND REFIXING ACTUATOR WITH GEARBOX FOR SERVICING JOB BY S.R ENTERPRISE	MANPOWER FOR DISMANTLING AND REFIXING THE ACTUATOR WITH GEARBOX	LIST MENTIONED AT ANNEXTURE-1
4	DECOUPLE & COUPLING OF THE ACTUATOR WITH GEARBOX FROM DAMPER	MANPOWER FOR DECOUPLE AND COUPLING THE ACTUATOR WITH GEARBOX. IF ANY FAULT OCCURS THEN ONLY DISMANTLING AND REFIXING THE ACTUATOR WITH GEARBOX REQUIRED.	LIST MENTIONED AT ANNEXTURE-1
5	Boiler Pent House Metal Thermocouples to be checked	INSULATION REMOVAL	
6	1st stage super heater attemperation line actuator replacement for oil sepage	ACTUATOR REPLACEMENT	
7	2nd stage super heater attemperation line actuator replacement	ACTUATOR REPLACEMENT	TAG : 20LAE42AA020
8	Physical checking of Secondary Air aerofoil in both pass and purging job	A PASS SIDE MANUAL DOOR OPENING AND MIDDLE PORTION SCAFFOLDING FOR B PASS.	
9	FO guide pipe hose portion replcement for all 36 nos Flame Scanners	GRINDER & WELDER SUPPORT REQUIRED	
10	ALL LOP MOTORS BEARING REPLACEMENT & SERVICEING	DECOUPLING & RE-COUPLING OF MOTOR AFTER SERVICING	
11	WELDING INSPECTION HUFFING DEVICE OF SECONADRY AIR FLOW TX IN BOTH PASS	INSULATION REMOVAL	
12	DISMANTLING AND REFIXING ACTUATOR WITH GEARBOX FOR SERVICING JOB BY ROTORK	MANPOWER FOR DISMANTLING AND REFIXING THE ACTUATOR WITH GEARBOX	1. IDF 2A-IGV 2. IDF 2B-IGV 3. PAF 2A-BLADE PITCH 4. PAF 2B-BLADE PITCH 5. FDF 2A-BLADE PITCH 6. FDF 2A-BLADE PITCH
13	DISMANTLING OF 02 NO.S POWER CYLINDER FOR BOTTOM ASH HOPPER FEEDWATER GATE	MANPOWER FOR DISMANTLING THE POWER CYLINDER AND FIXING BACK WITH GATE AFTER SEAL KIT REPLACEMENT	
14	BFP-2A SUCTION MOV- ACTUATOR DISMANTLING FOR INSPECTION OF INTERNALS.	DECOUPLING & RE-COUPLING OF ACTUATOR AFTER SERVICING	
15	U#2 EXTRACTION-8 MOV ACTUATOR DISMANTLING FOR SERVICING	DECOUPLING & RE-COUPLING OF ACTUATOR AFTER SERVICING	
16	U#2- DEAERATOR TO CONDENSER MOV ACTUATOR DISMANTLING FOR ARRESTING OF OIL SEEPAGE.	DECOUPLING & RE-COUPLING OF ACTUATOR AFTER SERVICING	
17	REMOVAL OF INSULATION FOR TURBINE EXTRACTION- 3,4,5,6,7,8 PIPE METAL TEMPERATURE WELD PAD INSPECTION JOB.	INSULATION REMOVAL FOR INSPECTION.EXACT LOCATION WOULD BE SHOWN BY E&I SO THAT MINIMUM AMOUNT OF INSULATION IS REMOVED.	
18	LP-1/2 EXTRACTION TEMPERATURE ELEMENT CHECKING AND THERMOWELL FIXING (IF REQUIRED) AND CHECKING OF CONEDNSER NECK TEMPERATURE ELEMENT.	FIRM SCAFFOLDING AND DEDICATED APPROACH FOR INSPECTION INSIDE CONDENDER NECK .FIXING OF THERMOWELL TO BE DONE BY MMD, THERMOWELL WILL BE PROVIDED TO MMD.	

19	REMOVAL OF INSULATION BENEATH HP-CASING AREA AT 6.3 METRES FOR MAL DRAIN VALVES ACTUATOR SEAL KIT REPLACEMENT JOB.	INSULATION REMOVAL FOR INSPECTION.EXACT LOCATION WOULD BE SHOWN BY E&I SO THAT MINIMUM AMOUNT OF INSULATION IS REMOVED.	
20	GENERATOR H2-DRIER BLOWER MOTOR -1 AND 2 BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
21	BFP-2A,2B AND 2C AOP MOTOR DISMANTLING AND REFIXING FOR BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
22	VACUUM PUMP-2A AND 2B RECYCLE PUMP MOTOR DISMANTLING AND REFIXING FOR BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
23	EH OIL PUMP-A AND B MOTOR BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
24	EH OIL CIRCULATING PUMP-MOTOR FITMENT CHECKING WITH KIRLOSKAR MAKE MOTOR.	DECOUPLING AND REFIXING OF MOTOR AFTER FITMENT CHECKING.	
25	AIR SIDE SEAL OIL AC MOTOR DE AND NDE BEARING REPLACEMENT JO B.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
26	H2 SIDE SEAL OIL AC MOTOR DE AND NDE BEARING REPLACEMENT JO B.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
27	STATOR WATER PUMP-A AND B MOTOR DE AND NDE BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
28	ESP hopper heater ash leakage	Heater well to be repair.	
29	ESP Shaft and support heater inspection	removal and fixing of damage insulator.	
30	Rapping motor bearing sound inspection	Fixing of new Rapping motor.	
31	AHP BAH cylinder replacement job	Cylinder need to be replaced with spare Cylinder.	
32	ID fan motors 2A and 2B bearing change	Decoupling of motor,Coupling Hub removal and shifting of motor from its base and turn as per requirment.	
33	FD fan motor 2A/2B bearing change	Decoupling of motor,Coupling Hub removal and shifting of motor from its base and turn as per requirment.	
34	FD fan motor 2A/2B replacement job	One FD fan to be replaced with spare FD fan motor	
35	CEP motor swapping	Unit-2 CEP motor swapping required	
36	CEP motor cable removal support	Scaffolding platform near CEP for Cable removal job	
37	PA fan 2A motor replacemnt job	Motor to be replaced with repaired motor.	
38	APH MOTOR-A AND B MOTOR DE AND NDE BEARING REPLACEMENT JOB.	DECOUPLING AND REFIXING OF MOTOR. BEARING REPLACEMENT WOULD BE DONE BY E&I.	
39	GENERATOR CT INSPECTION	Scaffolding platform for Cable, CT terminal inspection	
40	Cable Insulation checking near HT Room, U#2	Scaffolding platform for Cable inspection	
41	<b>Generator-2 Exciter Slipring</b>	<b>Yet to decided.</b>	

SR. No.	APPLICATION	REMARKS
1	APH-A OUTLET PRIMARY AIR DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
2	APH-B OUTLET PRIMARY AIR DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
3	APH-A FLUE GAS INLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
4	APH-A FLUE GAS INLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
5	APH-A FLUE GAS INLET DAMPER-C	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
6	APH-B FLUE GAS INLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
7	APH-B FLUE GAS INLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
8	APH-B FLUE GAS INLET DAMPER-C	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
9	ESP PASS-A CH-1 INLET GATE DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
10	ESP PASS-A CH-2 INLET GATE DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
11	ESP PASS-B CH-1 INLET GATE DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
12	ESP PASS-B CH-2 INLET GATE DAMPER	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
13	ESP PASS-A CH-1 OUTLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
14	ESP PASS-A CH-1 OUTLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
15	ESP PASS-A CH-2 OUTLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
16	ESP PASS-A CH-2 OUTLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
17	ESP PASS-B CH-1 OUTLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
18	ESP PASS-B CH-1 OUTLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
19	ESP PASS-B CH-2 OUTLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
20	ESP PASS-B CH-2 OUTLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
21	ESP INTERCONNECTING DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
22	ESP INTERCONNECTING DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
23	ID FAN -2A INLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
24	ID FAN -2A INLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
25	ID FAN -2B INLET DAMPER-A	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
26	ID FAN -2B INLET DAMPER-B	DISMANTLING & REFIXING FOR GEAR BOX SERVICING
27	APH-A INLET SECONDARY AIR DAMPER-A	DECOUPLE & RE-COUPLE
28	APH-A INLET SECONDARY AIR DAMPER-B	DECOUPLE & RE-COUPLE
29	APH-B INLET SECONDARY AIR DAMPER-A	DECOUPLE & RE-COUPLE
30	APH-B INLET SECONDARY AIR DAMPER-B	DECOUPLE & RE-COUPLE
31	APH-A INLET PRIMARY AIR DAMPER	DECOUPLE & RE-COUPLE
32	APH-B INLET PRIMARY AIR DAMPER	DECOUPLE & RE-COUPLE
33	APH-A OUTLET SECONDARY AIR DAMPER-A	DECOUPLE & RE-COUPLE
34	APH-A OUTLET SECONDARY AIR DAMPER-B	DECOUPLE & RE-COUPLE
35	APH-B OUTLET SECONDARY AIR DAMPER-A	DECOUPLE & RE-COUPLE
36	APH-B OUTLET SECONDARY AIR DAMPER-B	DECOUPLE & RE-COUPLE

SI No.	Scope of Work-Bottom Ash System & Fly Ash system
1	All manhole opening at bottom ash Hopper
2	Complete internal inspection of bottom ash hopper and necessary rectification job.
3	Damage Refractory Breaking, Removal and application of fresh refractory [Quantum: Approx. <b>20 MT</b> , as per previous experience]; ICE REQUIRED DURING MIXING REFRACTORY & CURING MUST BE AS PER REFRACTORY OEM GUIDELINES. Refractory Mixing Machine is in Contractor's scope.
4	Removal of damaged SS ducts & refractory Anchors and fixing of new ducts & anchors inside bottom ash hopper
5	Repairing/Replacement of hopper view glass inside & outside structure, if reqd
6	Inspection & renewal of screen panel as per requirement
7	Erection of complete internal scaffolding as required for refractory application and screen panel renewal, up to Boiler S-Panel & removal of the same after entire job completion.
8	Replacement of defective feed gate power cylinders and servicing of feed gates.
9	Hopper plate repairing and All HP jetting nozzles inspection & renewal if required
10	Seal Box renewal (Fabricated Seal Box available)
11	Damaged pipe, Bend & support Structure renewal at BAH area
12	Maintenance of all HP & LP line valves at BAH
13	U-2 slurry line rotation and throughout patch welding at top, by cutting U-Clamps and cutting & rewelding pipes at 4 locations only and refixing U-Clamps. Approx. Length of Pipe to be rotated-200 mtrs.
14	CG jet pump line straightening (cutting & rewelding) alongwith support
15	Repairing of seal trough structure as required
16	Silo-2 bag filter cleaning or replacement as per requirement.
17	Unit-2 Conveying Air receiver and Common receiver internal inspection.
18	Unit-2 ESP All vessel one flow pad removal, and box-up after ESP Gang clearance
19	Unit-2 ECO & APH all vessel bottom bellow removal & box-up as per instruction
20	Diverter valve replacement at silo-2 top (Approx. 3 nos.)
21	Damaged spools and PiP replacement at Silo top and its vertical portion
22	ECO hopper damage refractory removal
23	ECO and APH vessel-vessel PIP inspection & replacement, if reqd
24	Damage PIP (35 nos.) and spools replacement (Unit-2 A & B pass and ECO line )
25	RVF-2 Overhauling (2 nos.)
26	U-2 OTP line seam welding (Approx. 50 mtrs. At staggered locations)
27	Installation of 3 nos. of isolation valves in DMCC water pipelines at Boiler
28	ESP 1st Field Vessels' Vent Lines Renewal with Y-pieces - 8 set (Max.)

**General LD Clause**

Sr. No.	Activity	Condition	Guarantee	Defect
			Duration	liability
<b>1</b>	<b>Fans:</b>			
1.1	Rotor Assy Replacement	Oil Leakage from hoses	6 Months	10% of activity cost
		Increase in Fan Vibration & High Current from last value	6 Months	10% of activity cost
		BPC jamming & Malfunction	6 Months	10% of activity cost
1.2	Catastrophic Failure of Equipments	Attributed to faulty workmanship	6 Months	50% of activity cost
<b>2</b>	<b>APH:</b>			
2.1	Basket Replacement & Seal Setting	Air Leakage	6 Months	10% of activity cost
2.2	Forced outage in case of Poor Quality in job	Upto full load and stable operations for 10 days	6 Months	50% of activity cost
2.3	Catastrophic Failure of Equipments	Attributed to faulty workmanship	6 Months	50% of activity cost
<b>3</b>	<b>Burner &amp; SOFA:</b>			
3.1	Coal nozzle and tip replacement	jamming observed in burner tilt	6 Months	10% of activity cost
		coal leakage from knife gate or coupling	6 Months	10% of activity cost
3.2	SOFA Tip replacement	jamming observed in SOFA tilt	6 Months	10% of activity cost
<b>4</b>	<b>Schedule (18 days De-Sync. to Sync.)</b>	Overrun beyond 18 days	Timeline	5% of activity cost
<b>5</b>	<b>Housekeeping:</b>			
5.1	Houese keeping	Shifting of used/old material	immediate	50% of activity cost
		Shifting of scrap	immediate	50% of activity cost
		Area cleaning	immediate	50% of activity cost