ANNEXURE 05

ODISHA POWER GENERATION CORPORATION LTD

IB THERMAL POWER PLANT

2 X 660 MW, Unit 3 & 4

AOH SCOPE OF WORK

"Annual Overhaul Work of Boiler Pressure Parts, Fuel Firing System equipments, Hangers and Miscellaneous Works of Unit # 3 & # 4, FY 2021-22"

SCOPE OF WORK

Purpose and Intent of the Work

Boiler is a very critical equipment of any Thermal Power Plant. Pressure parts is one of the important area in Boiler where utmost attention is required and huge amount of work need to be done in limited time but with highest quality standard. Hence, it is necessary that prospective bidders should understand the purpose and intent of this contract.
Bidders are advised to take a note of following points:

a. It is the intent of this contract that the unit must run without a tube leakage from overhaul to overhaul. For this neither a defective/weak tube is to be left in the boiler nor should any new defect be introduced in the boiler by maintenance.
b. Therefore the agency is required to assist OPGC in inspection work so that all such tubes are identified early in the shutdown period and replaced during overhaul.
c. It is also the intent of this contract to achieve "ZERO DEFECTS" during maintenance. So, the maintenance work done in the boiler needs to be of highest possible quality standards. The maintenance work must not induce any defect in the boiler which may result in to tube leakage or other problems. This means the quality of tube cutting» edge preparation, fit up and welding must be world class. The agency must deploy skilled and competent manpower and supervisors. The agency shall be accountable for achieving these objectives.
d. The agency shall establish a proper supervision and quality assurance system in consultation with OPGC Engineers.
e. Agency shall deploy sufficient number of working gangs, Skilled manpower like HP welders, Key resources like welding machines and supervisors so that the work is done in even pace and last minute rush is avoided.
f. Agency shall deploy adequate T&P to maintain the pace of work.
g. The agency shall take all the precaution to ensure safety at work so that the activities are not hindered by accidents.

Brief Description of the Work

This SOW of the contract consists of all boiler components in first pass, horizontal pass and second pass. Broad area in first pass and horizontal pass are Separator, Spiral Wall, Vertical Wall, Pent house, Platen super heater, Final Superheater, Reheater(including attachments, sealing, coverings and supports),Extended Wall from water wall inlet headers up to Screen tubes in horizontal pass including roof tubes of the same .

Broad areas in second pass are Headers, Front Screen tubes, Steam cooled walls, LTRH, Economizer, Back pass tubes with associated roof and Structures.

For this work, once the NTP is issued to the agency, he is expected to start mobilizing on top priority, so as to achieve the targets set by EIC under schedule.

The scope for one boiler overhaul extends, briefly, till all identified works are completed, scaffolds are dismantled, Boiler hydraulic test got witnessed by the Boiler Inspector, all

men and material are removed from the boiler inside and outside, boiler boxed - up and trial run support is given.

The agency shall depute his resident engineer and site - in - charge regularly as specified by the EIC to meet him, to submit programs and reports, to discuss strategies and to receive instructions / guidelines.

Overall responsibility for coordinating with all concerned agencies including EIC and to carry out a successful overhaul of the boiler pressure parts, while abiding quality and safety norms and achieving a defect tree defect liability period of 90 days from date of BLU(Boiler Light Up) after each unit overhaul shall be in the scope of the agency.

In case of any ambiguity/ dispute in any schedule of scope of work, special terms and conditions etc. decision of EIC shall be final and binding on agency.

THIS CONTRACT IS AWARDED TO CATER THE BOILER PRESSURE PARTS OVERHAULING FOR TWO UNITS OF OPGC PHASE-II: 2X660 MW, AS PER THE ENCLOSED SCOPE OF WORK AND TERMS & CONDITIONS OF THE CONTRACT. ACCORDINGLY, THE VENDOR HAS TO MOBOLIZE ITS RESOURCES TWICE FOR OVERHAULING OF INDIVIDUAL UNIT BOILER PRESSURE PARTS AS PER INSTRUCTION OF THE ENGINEER-IN-CHARGE.

THE SCOPE OF WORK IS GIVEN FOR OVERHAULING OF ONE UNIT WHICH HAS TO BE FOLLOWED FOR OVERHAULING OF OTHER UNIT ALSO.

1. Furnace Air Tightness Test :

a. Ensure PTW.
b. Scope includes inspection of penthouse area, boiler manhole doors, peephole doors, furnace, wind box, ducts, APH, mills.
c. Arranging lighting & ventilation inside penthouse, APH, Duct, wind box.
d. While any additional ATT done during that period to check the leakages attended, shall not be paid additionally.
e. Leakages to be checked with the help of soap bubble solution, physically, cloth, etc. as instructed by EIC wherever applicable.
f. Manpower to be equipped with sufficient safety gears for checking in ducts, any other areas where height work is necessitated.
g. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
h. Payment shall be done on lump sum basis for checking ATT only per Boiler, attending leakages by welding/rope replacement shall be paid on separate schedule.
i. Minimum 6 groups (3 no. manpower per group) shall be deputed for the above activity as ATT checking shall be done stringently with stipulated time period specified by EIC. Distribution shall be as follows :

i. Penthouse – 1 group
ii. Boiler furnace and 2nd pass – 1 group
iii. SA,PA, Flue gas duct – 3 groups
iv. APH & Mills – 1 group

j. All the identified leakages points shall be clearly marked with permanent marker, chalk wherever applicable and details report shall be submitted to OPGC EIC for further corrective actions.
k. During attending the points, same group has to guide as and when required during any confusion of identification.
l. Failing to properly guide or identify the points later on will attract penalty of Rs 100/- per point.
m. It is the responsibility of the contractor to check the ATT with utmost care to avoid missing of any point, as payment shall be executed only after successful rectification of all the points and zero leakages in further ATT checking. Contractor has to deploy manpower for ATT checking till all the points are successfully attended. No additional payment shall be done in this regard.

b. Water washing of Back pass Extended Water Wall Panel(Butterfly panel) :

a. Butterfly panel to be cleaned properly as per the EIC instructions with water jetting with low pressure. Manpower has to go inside the Boiler for washing. Being a restricted space, only skilled and trained manpower to be deputed for the same.
b. Source of water – Fire fighting hydrant point available in Boiler elevations.
c. After final inspection of tubes & clearance from EIC only, instructions shall be given for demobilization.
d. All temporary lighting inside the boiler will be under contractor scope. All electrical connections, safety supervision is under Contractor's scope.
e. Hydrant hose pipes will be supplied from OPGC.
f. Approximate area of ash to be cleaned in Butterfly panel – 20mtr X 10mtr X 3mtr.
g. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
h. Payment shall be done on lump sum basis for cleaning of Butterfly panel ash per Boiler.
i. Job shall be carried out continuously till complete cleaning of the Butterfly panel on day- night basis. Sufficient manpower shall be deployed for the same. As further activities planned in Pressure parts area in AOH can only be started after this activity.
j. Maximum permitted duration of the activity shall be 24 hours.
k. Delay in deploying manpower for the same and final delay beyond 24 hours shall attract penalty on hourly pro rate basis, to be calculated on BOQ.

c. Boiler furnace cup lock scaffolding (80 M) erection and dismantling :

a. Shifting of complete boiler scaffolding materials from the storage shed to the site. Any vehicles required for shifting and mobilization such as Hydra, Trailer, Truck, and Pick up Van is under Contractor's scope.
b. Any scaffolding required for shifting of materials to specified location as per EIC instructions is to be carried by contractor. However separate payment will be done as per the scaffolding supply, erection & removal schedule. Winch, rope, pulleys required for shifting is under contractor's scope.

c. The scaffolding components are tailor made and very costly items. They are supplied in fixed quantity for erection; hence utmost care shall be taken during shifting and erection of scaffolding materials to avoid its failure/ damage and loss. The loss of scaffolding materials or its damage during shifting and erection shall attract heavy penalty.
d. As winches will reduce time for erection and dismantling of scaffolding, Erection & Dismantling shall be carried out with the help of winches only, hence it is mandatory for agency to bring at least 6 nos. winch machines for shifting of scaffolding materials inside furnace and up to various elevations. Minimum 6 tested 0.5-1 Ton winch machine to be used at site for faster movement of materials. The penalty shall be imposed for balance number of winches not bought at site at the rate of Rs. 25000/- (Rs. twenty thousand) per winch per overhaul.
e. All the jobs to be carried out with utmost importance and care being given to Safety, if any lapses observed or activity results in safety hazard, stop work will be immediately implemented. Same to be rectified and any lost time due to the above will be included in the erection time for calculating final penalty due to delay in job if any.
f. Job being critical in nature, only trained and skilled workforce should be engaged in the work, if at any time during the course of work it is found that manpower engaged are incompetent, or not giving importance to safety, they shall be replaced or mobilized for training. Time lost during above mobilization and training will be included in erection timing and agency cannot claim for the delay on the account of above.

g. All electrical connections, safety supervision is under Contractor's scope. Illumination inside furnace is under contractor's scope. Contractor shall arrange sufficient numbers of illumination lights to avoid any delay of work. Portable Emergency lights shall be kept with each group during erection and dismantling so as to keep themselves safe during short power failures.
h. Contractor shall keep their electrician round the clock for assistance in maintaining lights, power supply etc for avoiding delay in erection and dismantling of scaffolding. These electricians shall get all the information of electrical supply from OPGC before start of job.
i. Erection of scaffolding up to the roof level starting from the bottom S-panel, Furnace, Burners, Platen SH up to roof of the furnace first pass.

j. Furnace size – 80.5mtrX20.998mtrX18.44mtr (Length X Width X Depth). Erection of stair cases, handrails, toes guards with landing platforms up to the roof from the bottom of the furnace.
k. Erect the S - panel sealing scaffold at 10 meters. Make this scaffold completely sealed by covering it with sheets, asbestos cloth, and insulation/refractory at the sides.
l. After completion of the overhauling jobs all the scaffolding materials are to be dismantled and are to be shifted to the designated storage area as instructed by EIC. Scaffolding material shall be stacked properly in each container to the satisfaction of EIC. If stacking is not proper, then restacking had to be carried as per instruction and satisfaction of EIC.

m. All the removed scaffolding materials are to be cleaned by air/water as directed by EIC and then to be shifted back to stores.
n. Contractor has to deploy minimum 60 nos. of manpower for the above job for facilitating round the clock work during scaffolding erection and dismantling to complete the job within stipulated period of time on shift hour basis. However for completion within time frame, contractor has to provide extra manpower if required.
o. Contractor has to complete the erection of scaffolding within 6 days from the date of receiving PTW and dismantling and removal of scaffolding within 5 days after EIC clearance. Delay in completion or removal of scaffolding by 1 day will attract penalty of Rs 50,000/- beyond the stipulated period mentioned above. However, if final boiler box-up time target is met by putting extra efforts, without leaving any of the identified works/inspections and without violating quality standards, then this deduction may be waived by EIC.
p. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
q. Contractor has to mobilize manpower at least 7 days before start of Zero date for shifting and arranging all the scaffolding materials at designated Boiler elevations as per EIC instructions.
r. Scaffolding Platforms & other components descriptions are as follows :

1	Main Tower Scaffolding (FROM HOPPER TILL GOOSE NECK)
2	Full working platform below Manhole at one level.@ 11570mm level (Approx.)
3	Full working platform at Below Gooseneck location at one level @58070 mm level (Approx.)
4	Peripheral working platform above hopper till gooseneck at 13 levels (@ 2.5m till top of burner and @ 3.5m above burner) (Including extended platform at burner location @ 07 height wise)
5	Main Tower Scaffolding In Super Heater Zone
6	Peripherial Working platform in Super Heater Zone at (06 levels for Water walls, 06 Levels for SH Platern Assembly and 05 Levels for RH Finish Assembly)
7	STAIRCASE ARRANGEMENT (from Hopper level platform till below Roof level.) (height : 68 mtr)
8	Peripherial Working platform in Hopper Area @ 3 nos at Section - GG, Section-HH, & Section - I I

d. Boiler 1st pass high pressure water jet washing :

a. Boilers first pass furnace water wall, Platen SH and Roof SH high pressure water jetting. The work to be completed with continuous working day - night within max four days.

b. Transportation of 6 sets of High Pressure and High capacity Jet cleaning machines along with accessories and 8 nos. of nozzles with 140 m of hose each to site location. The High Pressure Jet Pumps, nozzles, hoses and other accessories required for cleaning of heat transfer surfaces will be in the scope of agency.

c. Installation of machines at identified location by Contractor and electrical & water line connections.

d. 4 nos. of jet pumps to run with 8 nos. of nozzles. 2 nos. of pumps are to be kept in ready standby condition. There should be no time delay attributable to pump failure. In case of delay of job due to any unsafe act and stop work, electrical failure, pump failure same shall be added in the total time for completion to calculate the penalty.

e. It is mandatory for the Contractor to bring at least 4 Nos. of High pressure (Min.) jet pumps of capacity (Min.) with 8 Nos. of nozzles of equivalent capacity. In case contractor fails to mobilize above number of pumps, the penalty shall be imposed for balance number of jet pumps not bought at site at the rate of Rs.10000/- (Rs. ten thousand) per jet pumps per overhaul.

f. Installation and testing of pumps and nozzles at work location to be done at

least 1 day in advance of start of work. Agency has to show the operability of their pumps and nozzle to EiC. All 8 nozzles with hose should be in working condition

g. If work is extended beyond the stipulated period of 4 days, penalty of Rs 40000/- per day will be levied.

h. First pass water wall, Platen SH & Final RH jet washing to be done on Furnace cup lock scaffolding.

i. After cleaning of the Water wall, platen super heater by water jetting & washing, manual cleaning by scrappers, coconut ropes, brushes shall be carried out if necessary.

j. It is to be ensured that there should not be any ash, slag, clinker accumulation at any part of Boiler.

k. After final inspection of tubes & clearance only, instructions shall be given for demobilization.

l. All temporary lighting inside the boiler will be under contractor scope. All electrical connections, safety supervision is under Contractor's scope.

m. Water jet machines shifting for installation at site, housekeeping & return of materials.

n. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.

o. Furnace size – 80.5mtrX20.998mtrX18.44mtr (Length X Width X Depth). Number of Platen SH coils are 32 located in the radiant zone besides rear arch.

p. Payment will be done only after completion of the above jobs to the satisfaction of EIC.

q. After cleaning of heat transfer surfaces by jet cleaning, the mud and scales to be cleaned by water jet from boiler quick erect scaffold platforms. Complete cleaning of erected QES components shall be carried out with water concurrently with hydro jet cleaning in order to complete the same within the time frame of boiler Jet cleaning only. The debris shall be collected and disposed off to specified locat'1on. The above work shall be carried out with extra safety to avoid any accident as it involves working at height. Failing to clean the debris as mentioned above shall attract heavy penalty @ of 10% of SOQ rate.

e. Boiler 2nd pass water washing :

a. 2nd pass – (LTRH, Economizer coils) to be cleaned properly as per the EIC instructions with water jetting with low pressure. Manpower has to go inside the Boiler for washing. Being a restricted space, only skilled and trained manpower to be deputed for the same.

b. Source of water – Fire fighting hydrant point available in Boiler elevations.

c. After final inspection of tubes & clearance only, instructions shall be given for demobilization.

d. All temporary lighting inside the boiler will be under contractor scope. All electrical connections, safety supervision is under Contractor's scope.

e. Hydrant hose pipes will be supplied from OPGC.

f. 2nd pass – Total 5 banks (3 –LTRH + 2-Economizer banks) – Economizer coils – 203, LTRH coils – 101 in each bank. 2nd pass size - 25mtr X 15mtr X 20mtr.

g. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
h. Payment shall be done on lump sum basis for cleaning of complete 2nd pass as mentioned above up to the satisfaction of EIC.
i. Cleaning criteria – No deposited ash lumps shall be visible, tube surface shall be clearly visible for further inspection. All the coils intermediate position shall be cleaned and visible.
j. Minimum 2 groups shall be deployed from both the LHS and RHS of each bank. Sufficient illumination shall be deployed accordingly.
k. Job shall be carried out continuously till complete cleaning of the 2nd pass on day- night basis. Sufficient manpower shall be deployed for the same. As further activities planned in Pressure parts area in AOH can only be started after this activity.
l. Maximum permitted duration of the activity shall be 48 hours.
m. Delay in deploying manpower for the same and final delay beyond 48 hours shall attract penalty on hourly pro rata basis, to be calculated on BOQ.

f. Tube thickness measurement in 1st pass and 2nd pass :

a. Thickness Survey is to be done at specified points/ Tubes.
b. Contractor has to arrange Ultrasonic thickness meter for thickness measurement.
c. At least 6 sets have to be maintained at all times for thickness survey in Boiler & Aux. area. For facilitating thickness survey, at least 18 persons should accompany.
d. Each group shall comprise 1 supervisor/technician for recoding measurements and inspection, 1 technician for operating the thickness meter and 1 manpower for grinding/cleaning the tube or plate surface.
e. Group shall contain every time the following items :
    i. Thickness meter
    ii. Grease with can
    iii. Hand lamp and spare bulbs
    iv. Register
    v. Emery paper/buffing wheel/grinding machine
    vi. Permanent white marker, chalk
    vii. Cotton waste cloth
f. All measuring device should have valid calibration certificate at all times.
g. Various areas include water wall/second pass/FSH/FRH
h. Tube OD vary from 15 mm to 90mm.Thickness to be measured may vary from 4mm to 30mm.
i. Contractor has to take the measurements and send reports/data to the OPGC in the OPGC prescribed format.
j. Payment will be done per point basis as certified by OPGC EIC.

k. Numbering of water wall tubes around the WB, WW hopper, above burner zone & burner panel tube, rear arch area on RH tubes, ww screen tubes, ww hanger tubes, rear arch bottom tubes, extended ww tubes, final super heater tubes, LTRH coil top & bottom, economiser coil top & bottom, SH hanger tubes, LTRH terminal tubes, Eco. Hanger tubes, Eco. Inlet header tubes and SH bottom ring header for thickness measurement.
l. Clean the tube surface by buffing wheel and emery paper.
m. Carry out physical inspection of tube surface in 1st & 2nd pass as per the instruction of the E-I-C.
n. All electrical connections, safety supervision is under Contractor's scope. Illumination inside furnace is under contractor's scope.
o. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
p. Payment will be done per point basis as certified by OPGC EIC.
q. In case of delay in executing the specified number of points in given time frame, 2 times of Schedule price will be penalized for each unattended point.

g. Eco Header Stub repairing :

a. Erection of scaffolding in Eco I/L header area for approach. Approach for Scaffolding to be started from above Eco hopper at 29mtr and scaffolding to be prepared at Eco I/L header at 37mtr elevation. Ladder arrangement to be done from 29mtr to 37mtr by scaffolding pipes. Separate payment for scaffolding shall be applicable.
b. Cutting of SS protection shield of Eco header. Cutting to be done only by grinding machine, gas cutting or plasma cutting not allowed.
c. Eco I/L header stub joint socket joints with header is facing crack issues, so the socket joint of size 44.45mm can be accessed after cutting SS shield plates.
d. DPT/MPI of Eco I/L header stub joints.
e. Cutting of welding joints, preparation of header socket by grinding.
f. Preparation of tube bends, if required.
g. Socket welding of stub and PWHT to be carried.
h. Re-fixing of SS protection shield. SS shield welding shall be paid on separate schedule.
i. Welding of joints shall be paid on separate schedule. Welding to be carried by IBR certified welder only.
j. Removal of scaffolding.
k. PWHT kit is under contractor's scope.
l. DPT/MPI consumables is under contractor's scope
m. Level-II personnel required for carrying out DPT/MPI.
n. Mode of payment – Payment shall be done on rectification of socket joint per joint basis.
o. Socket joint inspection shall be done as per instructions of EIC.
p. Payment shall be executed only after proper restoration of all SS plates and any other attachments up to EIC satisfaction.

h. DP Test of Header Stub/Dissimilar Tube Joints :

a. DPT is to be carried out at various locations inside Boiler pressure parts as per EIC instructions.

b. DPT shall be done in Boiler tube welding joints, fin plate welding; however for 350mm length of fin plate welding 1 BOQ shall be paid.

c. DPT kit, marking cloth, wire brush, etc. are under contractor's scope.

d. Level-II personnel required for carrying out DPT/MPI.

e. As per site conditions, Technician has to work in temporary scaffolding as erected.

f. Contractor has to prepare and submit report of the test results for further actions.

i. Boiler Rear Arch Expansion joint inspection and leakage attending :

a. Scope includes mobilization of manpower for erecting scaffolding and attending the Boiler Rear Arch expansion joint fly ash leakage.

b. Scaffolding materials is under contractor's scope. However payment will be under the schedule of "Scaffolding supply, erection and removal".

c. Shifting of materials to be done to the location before Boiler shutdown. Accordingly manpower mobilization is to be done earlier as per EIC instructions.

d. Erection of scaffolding around the Rear arch expansion joint – approx dimension – 80mtrX4mtrX4mtr. However it may increase based on quantum of leakage after inspection. So, additional scaffolding materials need to be mobilized.

e. Removal of insulation – approx dimension – 60mtrX2mtr and cleaning the expansion joint area by air. Re-fixing of insulation after completion of job. Insulation job will be paid under schedule of Insulation fixing job.

f. Inspect the expansion joint – Repair by cutting, welding & patching of expansion joint – approx length - 60mtrX2.

g. Damaged sealing rope to be replaced as per site requirements – total length – 60mtr approx.

h. Removal of scaffolding and housekeeping.

i. Any site modifications if proposed by EIC to be conducted accordingly.

j. Cutting and fabrication of plate to be done for expansion joint patching.

k. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.

l. All electrical connections, illuminations are under contractor's scope.

m. Above scope of work to be completed within 15 days of receiving PTW. So, sufficient manpower are to be deployed at site – minimum 3 scaffolding groups, 3 fitter and welder groups and 3 insulation fixing groups are to be deployed.

n. Delay in job beyond the stipulated period of 15 days shall attract penalty of Rs 10,000 per day.

o. Complete job except insulation, refractory and scaffolding will be paid on lump sum basis. For any unfinished job, equivalent deduction will be done as follows :

    i. 2 times of Remaining bellow length out of total length of bellow.

j. Roof Super heater tube modification :

a. Ensure PTW.
b. Mobilize necessary manpower and materials for repair/replacement work.
c. Engage IBR class welder (certified IBR welder with TIG welding experience and having valid license for welding of carbon steel, alloy steel & Stainless steel from Chief Inspector of Factories and Boiler, Orissa.
d. Arrange scaffolding, T&P, cutting set, grinding machine, argon set and welding machine etc.
e. Any material required to be issued/returned from the main stores is under this scope.
f. Cutting of Super heater connecting pipe spool and replacement with Tee – 2 nos. Size – Ø323.90X50mm, Material – SA – 335 – P12. Approximate HP joints – 6nos.
g. PWHT of the welding joints to be carried. Induction heating machine/ Resistance heating machine of applicable coil size to be used for carrying PWHT of joint - Ø323.90X50mm.
h. Cutting of damaged finned ROOF Super heater Tube -2 nos. in furnace and extended panel. Approximate Length – 30mtr per tube. Size – Ø57.15X8.33mm SA – 213 –T12.
i. Approximate HP joints – 10 nos.
j. Temporary scaffolding to be prepared inside furnace. Already Furnace Cup lock scaffolding will be available.
k. At the outlet of Roof header, scaffolding to be prepared for approach to fit up and welding joint.
l. Fit up and welding of Bends – 2 nos. between Tee joint nipple and Roof SH tube.
m. For Roof SH tube cutting, skin casing plate to be removed and then again to be fixed after tube replacement. Skin casing plate to be seal welded.
n. Wherever, applicable, seal welding of the tube with fins to be done.
o. All scaffolding materials and other T&Ps required for the job is under Contractor's scope.
p. Radiography and PWHT is under Contractor's scope.
q. General cleaning & housekeeping of the equipment & surrounding areas to be ensured after completion of job.
r. Any material required to be issued/returned from the main stores is under this scope.
s. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
t. All electrical connections, illuminations are under contractor's scope.
u. Separate payment shall be done for scaffolding schedule, fin welding, attending IBR welding joints.
v. The scope of this activity covers mobilization for above jobs, pre-assembly, fit-up and restoration of all the skin casing plate. Payment shall be done on lump sum basis for carrying out above jobs.

w. This activity shall be completed within 7 days from receiving of PTW with utmost care should be given to safety. Delay in activity shall attract applicable penalty on pro rate basis beyond the stipulated period of 7 days owing to contractor negligence or constraints.
x. Hold points – Contractor has to take permission from OPGC EIC on the following hold points before proceeding further :
    i. Inspection of tube internal, pipe internal after cutting.
    ii. Inspection of fit-up and groove preparation of spool pipes, tubes, bends, Tees.
    iii. PWHT report checking.
    iv. Radiography report checking.

k. Fixing of Erosion protection SS shield over tubes :

a. Fix SS/MS shields over tubes with proper welding as & when required as per the instruction of E-I-C.
b. Remove old damaged shields and fix new shields.
c. Shields can be of straight shield or bend shield.
d. Each shield to be fixed and welded by at least 2 nos. of clamps. Shields should properly fix and match the tube circumference. No gap between tube and shield is allowed.
e. Wherever required, shield to be locked by appropriate stopper.
f. OPGC EIC will do checks of shielding installation, any loose shield fitment or any weld spatter marks to be immediately rectified free of cost.
g. If any defect arises out of the shielding job after boiler in service or during hydro test in defect liability period, contractor has to attend it free of cost. Same shall also be penalized Rs 200/- per instance.
h. Erect scaffolding for shield fixing work as per requirement.
i. The shield will be provided by ITPS free of cost in length of 500mm to 1000mm.
j. Special electrodes for welding shall be supplied free of cost.
k. Tube shielding welding to be done only by certified 6G welder tested at OPGC premises..
l. Locking of shields with clamps.
m. Shifting of shields from Stores to location.
n. Payment shall be per number shields installed in Boiler.

l. Cassette Baffles cleaning & repair work :

a. Cassette baffles inspection to be done for any damages.
b. Cassette baffles locking to be done if damaged. Welding to be performed wherever required for rectification. SS electrodes will be supplied from OPGC.
c. Cassette baffles to be removed from coils and inside ash cleaning to be done.
d. Any damaged cassette baffles to be rectified.
e. Repair of top cover sheets, stiffeners, clamps etc of the cassette baffle in position. In this case, such repair of 06 cassette baffles shall be considered as equivalent to replacement of one cassette baffle.

m. Boiler tubes weld joints :

a. Scope includes cutting of old welding joint, replacement of spool tubes, bend tubes, header stub joints, header inspection hole, WW panel tubes, SH, RH, LTRH, Eco coil tubes.
b. For removing tubes, bends, fin plate cutting, clamp cutting, buck stay pad cutting shall be done wherever applicable. While cutting and welding of fin, etc. shall be paid under separate schedule.
c. Following points to be taken extra care during and after cutting of tubes :
    i. All the tubes to be cut only by grinding machine/saber saw/reciprocating saw machine.
    ii. All the attachment/fin plate to be cut only by grinding/saber saw/reciprocating saw machine. If gas cutting required, permission to be taken from EIC before start.
    iii. After cutting cleanliness of tube profile to be ensured. All cut joints to be covered by cloth/plate to avoid foreign material ingress.
    iv. Spool tubes/bends to be properly cleaned before start of job.
    v. Wherever applicable, pre-heating, PWHT to be carried and followed as per welding procedure received from EIC. Separate payment schedule is applicable for PWHT.
    vi. Welding process – GTAW/SMAW as specified by EIC.

d. Engage IBR class welder (certified IBR welder with TIG welding experience and having valid license for welding of carbon steel, alloy steel & Stainless steel from Chief Inspector of Factories and Boiler, Orissa.
c. Arrange scaffolding, T&P, cutting set, grinding machine, argon set and welding machine etc.
d. Any material required to be issued/returned from the main stores is under this scope.
e. Cut the boiler tubes, fins, supports & remove refractory if required for approach to the PSH, SH, RH, Burner Profile Tube, Water wall, LTRH and Economizer and re-weld it after repair work.
f. Cut shield plate, protection mesh, plate wherever applicable for access to tubes. Re-weld the plate after completion of successful radiography test. Payment shall be under separate schedule.
g. Repair the weld joint again if the joint fails in Radiography test/Hydro test without any cost to OPGC.
h. Fabricate required size bends from straight tubes, if ready-made bends are not available.
i. All electrical connections, safety supervision is under Contractor’s scope. Illumination inside furnace is under contractor’s scope.
j. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
k. Tube OD size limits up to 76mm.

l. Mode of payment – 1 BOQ shall be paid for attending 1 welding joint up to size 76.1mm OD.
m. However for sizes above 76mm, following schedule shall be applicable :
    i. (Tube OD)X(Tube thickness)/(76.1mmX9mm)
m. In case of violation of any points mentioned above, penalty of Rs 5000/- per instance shall be applicable.

n. Tube Fin Cutting & Welding(including Insulation Pin Welding, Buckstay Cutting /Welding, anchor welding, coils pad welding, attachment and clamps welding) :

a. Ensure PTW.
b. Scope of work includes cutting of fins by gas cutting/cutting wheel. Preparations of fin plates of appropriate size as per location. Re-welding of fin plates after attending the Boiler tube repair works.
c. Welding of anchors for refractory application.
d. Welding of sacrificial pads, attachments, clamps in PSH, FHS, FRH, Screen tube coils, insulation nails.
e. Welding shall be both from inside and outside of Boiler as instructed by EIC.
f. Welding shall be carried by only IBR certified 6G welder.
g. Welding shall be SMAW or GTAW based on application by EIC.
h. Scope also includes any attachment cutting and then re-welding during Boiler tube repair required for Boiler normalization as per instructions of EIC.
i. Also necessary mobilization required for performing the activity has to be ensured by agency. Rate includes the mobilization also.
j. Agency has to ensure no damages of boiler tubes while fin cutting by gas/cutting wheel. Same may be penalized for 2 X BOQ.
k. General cleaning & housekeeping of the equipment & surrounding areas to be ensured after completion of job.
l. Any material required to be issued/returned from the main stores is under this scope.
m. Payment will be done as per the running meter of final welding. While no separate payment will be there for activities like cutting of fins/plates, insulation pin. Same included in this payment. Mode of payment as follows :
    i. For running meter welding in Fins – BOQ/meter length.
    ii. For all other pads, nails, anchor welding – 1 BOQ shall be paid for 40 nos. of such quantity.

o. Alignment of SH/RH/Economizer coils/Screen & Hanger Tubes :

a. Engage IBR class welder (certified IBR welder with TIG welding experience and having valid license for welding of carbon steel, alloy steel & Stainless steel from Chief Inspector of Factories and Boiler, Orissa.
b. This is for correction of tube sagging / bowing / misalignment/inspection in Final RH/Platen SH/Final SH/Screen tubes/LTRH/Economizer coils.

c. Cutting of male-female connectors. Cutting of male & female connectors shall be carried out by grinding machine. No gas cutting set shall be used.
d. Aligning with the help of aligning channels and tightening.
e. Re welding of male-female connectors after alignment. Male and female connectors shall be re welded at just above or below existing connectors. Only GTAW welding by certified HP Welders is permitted for welding of connectors in SH and RH and other welding works.
f. Replacement of Band Spacer, if required for alignment in Final SH.
a. Arrange adequate number of Chain pulley blocks for lifting / lowering the coils pairs
a. Understand from EIC, the extent of the coil / pair that requires to be exposed for inspection work after lifting / lowering.
h. Coils may be lowered/raised/spaced as per instructions from EIC.

1. Proper locking of the coils to be done before entry into the coils. Safety supervisor should witness the integrity of the locking.
2. Proper scaffolding plank to be used for inspection inside the coils.
3. The above activities are indicative only and agency shall carry out extra activities if required for alignment of coils.
4. Agency shall carryout all activities carefully as tubes of special materials are used in SH and RH areas. In case of puncture/ extra grinding of tubes are done by agency without permission of EIC, then same shall be restored immediately and free of cost by agency. If above defects is repeated by agency, then they shall be penalized 1 BOQ amount for 1 instance by EIC which shall be binding on agency
5. Carryout alignment for screen tubes as per procedure and instruction from *EIC.*
6. *Mode of payment* – For alignment/inspection of each coil/rectification of 1 coil – 1 BOQ shall be paid. In case of spacing or lowering/raising of coils, 2 X BOQ shall be paid.

p. Seal Trough Cleaning, Repair & Alignment :

a. Erection of scaffolding around the furnace seal trough both from inside and outside.
b. Approx scaffolding – 40mtr X 6mtr X 3mtr. While scaffolding will be paid in separate schedule.
c. Inspection of Seal trough protection meshes, drip plate and scallop plate welding. Replacement of protection meshes if found damaged. Protection mesh to be supplied by OPGC, if not available, Vendor has to fabricate at site, no extra payment shall be applicable. Raw materials to be provided by OPGC.
e. Protection mesh to be fitted with nuts and bolts, and tack welding to be done.
f. Drip plate and scallop plate welding strengthening to be done as per EIC instructions.
g. Cleaning of seal trough.
h. Inspection and restoration of Seal trough with sealing plate.
i. Any scallop plate welding with tube to be carried out only by IBR certified welder.
j. Any instance of work violation in terms of quality shall be penalized @ Rs 500/- for each instance. EIC will do the checks.

k. Payment will be done on lump sum basis per each boiler. Total length of Protection mesh and seal trough drip plate is 22032mm each for front and rear side, 6423mm each for left and right side.

17. Boiler Hydro-test :

a. Assist for hydro test after completion of the annual overhauling repair jobs and final inspection by Inspector of Factories & Boiler, Jharsuguda Zone. Necessary statutory requirement before hydro test shall be complied by the contractor.
b. Assist the operation personnel for closing and opening operation of the valve for carrying out hydro test.
c. Scope includes assistance in hydro test, vacuum test done, also includes safety valve gagging and de – gagging, boiler internal inspection for checking leakages during hydro test, vacuum test attending of defects if found during such.
d. Complete housekeeping should be done at site within 24 hours after synchronization.
e. Boiler repair permission certificate to be obtained from IBR Odisha.
f. Checking of boiler during hydro can be done at different pressures as per instructions of EIC. Provide manpower for checking of the inside of the boiler 1st and 2nd pass.
g. If any joint failure/ or any pressure parts defect found same has to be attended by the contractor and give clearance for the hydro test again in due time. While separate payment will be done as per the HP joint schedule.
h. Assistance for installing and operation of hydro test reciprocating pump.
i. Contractor has to deploy at least 3 groups of 3 manpower each for hydro test inspection.
j. Contractor has to maintain at least 6 nos. of High beam torch light for checking during hydro test.
k. Payment shall be done for all the above activities done up to the satisfaction of EIC on lump sum basis.

18. Coal burner nozzles and tips removal, inspection, replacement /repair and reassembly :

a. This scope covers replacement of all the coal burner compartment assembly along with nozzle tip. Restoration of all the systems after replacement that has been disturbed for carrying out the above activities.
b. Lock all the coal pipes at the burner end after the boiler has cooled to normal temperature.
c. Remove the coupling.
d. Remove the boiler isolation gate after removal of boiler inlet elbow.
e. Remove scanner assemblies, oil gun assemblies and igniter assemblies.
f. Remove all cooling hoses.
g. Remove the outer panel assemblies.
h. Remove the inner panel assemblies.
i. Remove coal compartment assemblies.
j. Remove oil nozzles, end air nozzles & aux. air nozzles.

k. Clean all the nozzle assemblies.
l. Replace old damaged Victaulic coupling gasket.
m. Fix the Victaulic coupling.
n. Unlock the coal pipes after reassembly.
o. Remove damaged old fasteners and fix new fasteners.
p. Put new/reconditioned coal compartment assemblies as per instruction of E-I-C.
q. Put new insulation on the outer panels.
r. Assemble the inner & outer panels.
s. Put new ceramic rope, gaskets for assembling. Cut the gasket as per the dimensions from the gasket sheet.
t. Arrange all tools & tackles, cutting / welding required for the above work.
u. Shift damaged nozzles (coal nozzle and tip) to a suitable location as per the instruction of E-I-C.
v. Clean & apply anti-seize compound on all bolt threads and bearing surfaces.
w. Assemble the repair coal nozzle with nozzle tips.
x. Assemble the gun cooling assembly, scanner assembly, igniter assembly, ensuring free and flexible movement of the hoses. Ensure free forward and retract of scanners, igniters and gun assemblies.
y. Sufficient nos. of manpower to be deployed for the above jobs to complete within 15 days after receiving PTW. Minimum 4 groups shall be deployed, one per each corner to carry out the job expeditiously. For any delay of activity beyond 15 days, Rs 50,000/- shall be penalized per day.
z. Approach from inside shall be available through cup lock scaffolding.
aa. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
bb. Any temporary scaffolding required outside boiler is under contractor's scope along with scaffolding materials.
cc. Total number of coal burners are 28, 7 per each corner.
dd. Separate payment shall be done for any welding, scaffolding job.
ee. Mode of payment – Payment shall be done per replacement of each burner subjected to that the contractor must complete all restoration jobs required for replacement of burner, including removal of locking of coal pipes.
ff. Any leakage or defect if observed after Unit in service shall be attended free of cost by the contractor and Rs 1000/- shall be deducted as penalty for each instance.
gg. Hold point –
    a. Locking of coal piping before coal pipe elbow dismantling.
    b. Before inserting coal burner assembly into wind box, clearance from OPGC EIC required.
    c. Cleaning of gasket seating surface.

19. SOFA nozzles and tips removal, inspection and replacement / repair :

a. Check all the SOFA nozzle tips for wear.
b. Cut the SOFA tip.

c. Replace new SOFA tip with locking welding of both bolt and tip face. Tack weld of tip with nut bolts must be done. If tack weld found missing after replacement, Rs 500/- per instance shall be penalized.
d. Inspection of SOFA area tube shield and rectification of shield.
e. Fabrication of shield plate. SS plate shall be provided from OPGC.
f. Sufficient nos. of manpower to be deployed for the above jobs to complete within 15 days after receiving PTW.
g. Minimum 2 groups shall be deployed, one per each corner to carry out the job expeditiously. For any delay of activity beyond 15 days, Rs 30,000/- shall be penalized per day.
h. Any temporary scaffolding required outside boiler is under contractor's scope along with scaffolding materials.
i. Total number of SOFA burners are 16, 4 per each corner.
j. Separate payment shall be done for any welding, scaffolding job.
k. Approach from inside shall be available through cup lock scaffolding.
l. Cleaning of SOFA tips deposited with ash.
m. All special welding electrodes shall be supplied from OPGC.
n. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
o. Any temporary scaffolding required outside boiler is under contractor's scope along with scaffolding materials.
p. Mode of payment – Payment shall be done per replacement/rectification of each burner subjected to that the contractor must complete all restoration jobs required for replacement of burner, including inspection and rectification of SOFA shields.

20. Coal/Air Nozzle and Tip Hard Facing :

a. Inspect all the nozzles/nozzle tips for any damage.
b. Mark all the damaged and worn out areas.
c. Cut the area where thickness has reduced considerable and weld new plate. Tips are of SS 310 plate and Nozzle compartments are Cast steel material.
d. Hard face the worn out area/new area after putting the buffer layer.
e. Welding procedure as per EIC instructions shall be followed i.e., pre-heating, locking, etc.
f. Lock properly so that distortion of the nozzle tip is avoided.
g. ITPS will supply hard facing electrode and SS310 plate.
h. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
i. Sufficient nos. of manpower to be deployed for the above jobs to complete within 15 days after receiving PTW.
j. Payment shall be welding/m2 area. Minimum number of layers as per EIC instructions to be considered for calculating area. For hard facing of nozzles, welding to be done as per thickness erosion, approximately 8mm thickness reduction of nozzles is expected. Welding for filling the same shall be done.
k. Work shall be considered completed after clearance from EIC.

l. No separate payment shall be considered for inspection, handling of burners and nozzle tips, cutting of SS plate and fit-up. Contractor has to consider all the above activities and resources required for welding.

21. Servicing of Burner Tilt Mechanism :

a. Dismantle the burner tilt mechanism in all the four corners.
b. Clean all the parts.
c. Check all the pins for any wear and tear.
d. Replace all the damaged pins.
e. Apply anti seize spray on all the contact areas.
f. Check all the drive shaft trueness.
g. Reassemble the tilt mechanism with new split pins.
h. Manually check the operation for tilt with the help of Chain pulley blocks. Minimum 3Ton chain pulley block shall be used for the same.
i. Connect all the reach rods to the tilt mechanism.
j. Carryout the zero setting after nozzles in all the elevation in all the four corners are inserted.
k. Lock all the coal compartment assembly after zero setting.
l. Clean all the scanner housings, igniter housings and oil gun housings.
m. Repair/replace damaged housings so that all the housings are in flexible condition so that it will not affect the tilt.
n. Manually check the tilt (±30 degree) by chain block and horizontal tilting also to be checked and corrected if necessary.
o. Furnace cup lock scaffolding shall be available from inside. Any scaffolding required from outside is under contractor scope. Separate schedule for welding shall be applicable. Any welding job required shall be performed. Separate payment schedule shall be applicable.
p. Connect the power cylinder to the tilt mechanism.
q. Operate power cylinder to check the tilt (±30 degree).
r. Close all the side panels after the tilt checking with gasket fitting and rectification of defect if any. Gasket shall be cut from gasket sheet provided by OPGC.
s. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
t. Sufficient nos. of manpower to be deployed for the above jobs to complete within 15 days after receiving PTW.
u. 1 BOQ comprises of 7 nos. of Coal burner tilts, 4 nos. of Oil gun tilts, 6 nos. of Aux. air tilts. Aux. air tilts checking to be done both vertically and horizontally. In other words 1 BOQ shall comprise of 1 corner tilting arrangement servicing.
v. In case of delay in work or not able to complete the job per individual corner, 0.5 BOQ shall be deducted as penalty.
w. Work shall be considered as completed only after certification of joint inspection protocol signed between OPGC representative and Contractor EIC.

22. Wind box internal inspection and SADC dampers servicing :

a. Ensure PTW.
b. Manpower has to open the door for access to dampers inside wind box and duct.
c. De-link the damper from the power cylinder.
d. Manually operate all the dampers and check for freeness of operation.
e. Remove any mechanical jamming of damper.
f. Replace the damper spare if required. Spares shall be provided from OPGC.
g. Attend any disconnection of door bar, flap and interconnection lever damage.
h. Check side clearance and overlap clearance.
   Repair any erosion and damage on the dampers flaps.
i. Open the bearing & stuffing box and clean it.
j. Put new packing rope in the doors.
k. Link the damper to the power cylinder.
l. Operate the dampers with power cylinder in presence of C&I personnel and check for smooth operation.
m. Rectify the defect if any observed.
n. Contractor has to erect any temporary scaffolding if required for the approach both outside and inside of wind box. Inside wind box duct, scaffolding can be made by welding angle to duct.
o. Separate payment shall be applicable for scaffolding and welding job.
p. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
q. All electrical connections, illuminations are under contractor's scope.
r. Sufficient manpower shall be deployed to complete the job within 15 days of receiving PTW. At least 4 group of 4 manpower each including welding and fabrication group shall be deputed. Failure to do and delay in within stipulated period shall attract penalty of 1 BOQ amount on pro rate basis.
s. Mode of payment – 1 BOQ shall be paid after complete inspection and rectification of all dampers in 1 corner. Total 17 dampers in Wind box and 4 dampers in SOFA are included per corner.
t. Work shall be considered as completed only after certification of joint inspection protocol signed between OPGC representative and Contractor EIC.

a. Removal, Inspection and assembly of coal pipe orifice/bends/elbows etc. :

a. Removal of orifice/elbow/bends as per EIC instructions.
b. Carryout necessary checks and inspection of the orifice internals/bends.
c. Carryout any repair welding/grinding /cutting job if required.
d. Adjustment of orifice plate if required.
e. Assemble the orifice/elbow/bend with new fasteners and sealing compound.
f. Any scaffolding required for approach to be erected as per EIC instructions.
g. Separate scaffolding payment schedule shall be applicable.
h. Mode of payment – 1 BOQ comprise of inspection and assembly of 1 no. of Orifice/bend/elbow.
i. Size of orifice/bend/elbow is 710mm.

j. If any defect is observed after coal piping in service, same has to be attended free of cost.
k. Deploy manpower in advance before shutdown of Unit for scaffolding erection to complete the job on time. Scaffolding shall be removed only after coal pipe charging.
l. Work shall be considered as completed only after certification of joint inspection protocol signed between OPGC representative and Contractor EIC.

24. Coal pipe victaulic coupling gasket replacement :

a. Ensure PTW.
b. Check for proper approach, if required scaffolding to be done (scaffolding price to be estimated per cubic meter).
c. Separate scaffolding payment schedule shall be applicable.
d. Deploy manpower in advance before shutdown of Unit for scaffolding erection to complete the job on time. Scaffolding shall be removed only after coal pipe charging.
e. Open the Victaulic coupling after proper coal pipe locking. Any welding job shall be paid in separate schedule.
f. Replace the damaged gaskets or damaged Victaulic coupling.
g. Scope of work includes issuing of spares if required during maintenance.
h. Proper housekeeping to be ensured after work is completed and returning of scrap material to the store.
i. Mode of payment – 1 BOQ includes replacement of gasket and box up of assembly. Any restoration work required including removal of scaffolding, locking removal shall be completed for considering job completion.
j. Pipe size of Victaulic coupling is 710mm.

25. Hangers cold value setting :

a. Record hot value readings of all the hangers while the unit is running in full load.
b. Erect scaffolding if required for approach. Separate scaffolding payment schedule shall be applicable.
c. Contractor has to deploy manpower at least 7 days in advance before Unit shutdown for erection of scaffolding required as per EIC instructions. Same is clearly explained in pre-shut down miscellaneous works.
d. Take cold value reading of all the hangers while the unit has cooled to normal temperature.
e. Detailed report of hot values and cold values shall be submitted to OPGC EIC.
f. Carry out cold value setting of constant load hangers, variable load hangers in steam & water lines.
g. All the critical pilings hangers of MS line, HRH line, CRH line, Feed water and Startup system shall be considered.
h. Mode of payment – 1 BOQ includes inspection, reporting of 1 hanger. Any rectification job/resetting shall be paid in spate payment schedule.

i. Contractor Supervisor shall closely work with OPGC representative as per instructions.
j. Hanger supports being a critical member of Piping, only Skilled and experienced manpower shall be deployed for the hanger inspection job. Same shall be interviewed before deputation on job by OPGC representative. If found unsatisfactory, contractor has to immediately deploy replacement manpower. Delay in job with regards to the mobilization shall be included in the final completion time for calculating penalty.
k. Work shall be considered as completed only after certification of joint inspection protocol signed between OPGC representative and Contractor EIC.

26. Inspection & rectification of boiler hangers & supports :

a. Clean all the hinges and bearings of all the hangers and supports.
b. Check the tightness of the fasteners, locking pins.
c. Check the hanger supports welding integrity. Carryout additional welding for strengthening as per OPGC EIC instructions.
d. Rectify the damaged hangers or replace.
e. Rectify any deformation in support beam. Cutting and welding if required to be done.
f. Based on the report submitted by Hangers inspection group, carryout cold value setting/cold loading as per OPGC EIC instructions if required.
g. Arrange chain pulley blocks, lifting accessories such as sling rope, hooks, etc. Only tested accessories are acceptable.
h. Separate payment schedule shall be applicable for welding and cutting job.
i. Arrange scaffolding for the hanger setting work.
j. Separate scaffolding payment schedule will be applicable.
k. Contractor has to mobilize manpower at site 7 days before Shutdown to complete the scaffolding approach requirements in advance to save time during AOH. Same shall be communicated to the contractor by OPGC EIC.
l. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
m. All electrical connections, illuminations are under contractor's scope.
n. Hanger supports being a critical member of Piping, only Skilled and experienced manpower shall be deployed for the hanger inspection job. Same shall be interviewed before deputation on job by OPGC representative. If found unsatisfactory, contractor has to immediately deploy replacement manpower. Delay in job with regards to the mobilization shall be included in the final completion time for calculating penalty.
o. Mode of payment – this scope includes the mobilization, hanger setting and rectification job of hanger supports. Cutting, welding and scaffolding job shall be paid on their respective payment schedule.

27. Soot blower puppet valves servicing & Burner corner trip valves servicing :

a. Ensure PTW.
b. Dismantle the valve from the soot blowers – both wall blowers and LRSB. Total 42 nos. of LRSB and 98 nos. of Wall blowers are present per Boiler.
c. Lapping of the valve disc, seat and blue match getting clearance from EIC.
d. Replace gland packing after lapping.
e. Check the puppet valve with hydro test in presence of EIC. (Hydro test kit and manual pumping arrangements to be arranged by contractor).
f. Re-fix of the valve with new flange gasket / any other sealing elements.
g. General cleaning & housekeeping of the equipment & surrounding areas to be ensured after completion of job.
h. Any material required to be issued/returned from the main stores is under this scope.
i. Lapping compound and gland packing shall be provided by OPGC free of cost.
j. If any in-situ repairing of parts required, to be performed by contractor. While workshop assistance can be availed for the same.
k. PTW will be issued from OPGC EIC. Conducting Job safety analysis and Pre-job briefing will be under the scope of Contractor supervisor.
l. All electrical connections, illuminations are under contractor's scope.
m. Work shall be considered as completed only after certification of joint inspection protocol signed between OPGC representative and Contractor EIC.
n. Hold point: All the puppet valves blue matching shall be witnessed by OPGC representative before proceeding for final box up.
o. Mode of payment – 1 BOQ shall be paid for complete box up of 1 puppet valve assembly including any in-situ repairing of valve.
p. Contractor shall deploy at least 3 groups of 3 manpower each including 1 Valve technician and supporting group to complete the job within 20 days.

28. Boiler manhole/Peephole doors ceramic rope replacement :

a. Check the operation of manhole/peephole door for freeness.
b. Do ensure proper freeness of the door, if required servicing of the door hinge joints to be done.
c. Check that the door is closing tightly so that there is no air/gas leaking through it.
d. Lubricate the hinges of the manhole door.
e. Replace the spare of the door if required.
f. Put new ceramic rope.
g. If any door erosion observed due to leakages, properly grind the surface to get a smooth sealing surface, if required welding fill up to be done.
h. Mode of payment -
    a. 1 BOQ shall be paid for man hole door rope replacement, door hinge lubrication and freeness.
    b. 0.5 BOQ shall be paid for the above activity for peephole door.
    c. If welding and fabrication job required, 1.5 BOQ shall be paid.
    d. 0.5 BOQ for rope replacement only.

29. Expansion Indicators rectification :

a. Replace the damaged/ deformed expansion tram housing, rod.

b. Fabricate new expansion tram if required. Materials for fabrication shall be provided from OPGC.

c. Re – weld the expansion tram.

d. Cold setting value to be set for each tram along with proper permanent marking by scribing or painting as per EIC instructions.

e. Erect scaffolding if required for approach. Separate scaffolding payment schedule shall be applicable.

30. Scaffolding Supply, Erection & Removal :

a. The scope of works includes supply, fabrication & erection of scaffolding inside & outside of Boiler/Duct/. to facilitate inspection & other job to be carried out by OPGC. The scaffolding should be rigid.

b. Scaffolding materials should be M.S. Pipes confirming to IS: 1161 and couplers (Right angle couplers/Cup lock couplers/ Swivel Couplers) confirming to IS: 1570. Platforms should be provided with toe guards in order to prevent falling. Earth connection points should be provided wherever electrical power is expected to pass through the scaffolding. Ladders shall be provided for proper access.

c. Scaffolding material shall be free from rust and can be rejected if integrity of material not found up to the requirements of EIC.

d. Wherever required, the contractor has to provide platform by using metallic planks, which can withstand a minimum of 4 people of about 300 kg. Load.

e. All materials such as binding wire required for executing the above job should be arranged by the contractor at his cost.

f. While erecting the scaffolding, the contractor should exercise utmost caution, so that instruments, pipelines etc. are not damaged. Scaffolding outside the pipes / equipment shall be two meters length & two meters in width.

g. The payment shall be per cubic meter of erection from the base of the scaffolding up to the top most platforms only covering a minimum base area of 4 sq. mtrs.

h. The start point for measurement at height shall be from the base of the erected scaffolding & not from the bottom of the boilers of ground as the case may be.

i. Contractor will quote the price for outside scaffolding.

j. Complete scaffolding materials is under contractor’s scope.

k. OPGC will designate a dedicated place for storing scaffolding material inside plant premises.

l. Proper housekeeping has to be maintained at all times during and after scaffolding.

m. A proper scaffold will include side railings, accessible ladder approaches, and fall arrestor if applicable and all other safety standards for scaffolding has to be

followed. Any other site specific standards related to scaffolding erection shall be strictly followed by the contractor as and when instructed by EIC.

n. Whenever instructed scaffolding material has to be shifted well in advance to the site location as per EIC instructions.
o. Only designated riggers will perform the scaffolding job.
p. Some of the areas covered in this scaffolding schedule are as follows :
    i. Various areas in PA, SA, and Flue gas duct both inside and outside for attending ATT defects.
    ii. Inside penthouse for headers inspection
    iii. Economizer inlet header above hoppers
    iv. Boiler rear arch expansion joint between first pass and 2nd pass.
    v. Water wall furnace hopper outside
    vi. Inside boiler – between screen tube and FRH (4 levels), between FSH primary and secondary (4 levels), between LTRH pendant and back pass screen tube (4levels)
    vii. Boiler seal trough hopper both inside and outside for SS mesh inspection
    viii. Scaffolding on boiler outer piping, supports, valves, any other approach if required.
q. Contractor shall ensure sufficient scaffolding materials and consumables to cater all the above needs parallel as multiple jobs have to be carried out in the limited period of Unit Overhauling.

r. If a required scaffold as specified by EIC is not erected within given time frame, a penalty of Rs. 30000/- per location shall be deducted from the amount in addition to the non-payment of scheduled rate.

s. All the jobs to be carried out with utmost importance and care being given to Safety, if any lapses observed or activity results in safety hazard, stop work will be immediately implemented. Same to be rectified and any lost time due to the above will be included in the erection time for calculating final penalty due to delay in job if any.
t. Job being critical in nature, only trained and skilled workforce should be engaged in the work, if at any time during the course of work it is found that manpower engaged are incompetent, or not giving importance to safety, they shall be replaced or mobilized for training. Time lost during above mobilization and training will be included in erection timing and agency cannot claim for the delay on the account of above.

31. Cutting Carbon Steel :

a. Job may involve cutting of duct plate/expansion plate/bellow plate/any other area as per EIC instructions.
b. Material will be carbon steel or low alloy steels.
c. Cutting shall be performed by DA gas cutting or grinding machine as per requirement.

d. Any scaffolding required to be performed. Separate scaffolding payment schedule will be applicable.
e. Activity may involve both inside and outside duct/boiler jobs. Contractor has to arrange lighting facilities accordingly.
f. Scope also involves supply and mobilization of necessary tools and tackles to the job location.
g. Mode of payment – 1 BOQ shall be paid per running meter of cutting.
h. Cutting shall be performed only as per EIC instructions, if any secondary damages observed during the cutting process; same shall be penalized per running meter of BOQ on pro rate basis. Care shall be given by the contractor only to cut the prescribed area as instructed without damaging the nearby areas.

32. Cutting Stainless Steel :

a. Job may involve cutting of expansion plate/bellow plate/Wire mesh/pipe/nozzle/any other area as per EIC instructions.
b. Material shall be Stainless steels of various grades such as SS 310, SS 316, SS 304.
c. Cutting shall be performed by plasma cutting or grinding machine as per requirement.
d. Any scaffolding required to be performed. Separate scaffolding payment schedule will be applicable.
e. Activity may involve both inside and outside duct/boiler jobs. Contractor has to arrange lighting facilities accordingly.
f. Scope also involves supply and mobilization of necessary tools and tackles to the job location.
g. Mode of payment – 1 BOQ shall be paid per running meter of cutting.
h. Cutting shall be performed only as per EIC instructions, if any secondary damages observed during the cutting process; same shall be penalized per running meter of BOQ on pro rate basis. Care shall be given by the contractor only to cut the prescribed area as instructed without damaging the nearby areas.

33. Welding- Carbon Steel :

a. Contractor has to quote per running meter of welding in areas like Duct repair activities/duct bracing welding/stiffener welding/coal burner tip repair welding/expansion plates/bellows.
b. At least 2 runs of welding required. Certified 6G welder needs to perform the job.
c. Contractor has to perform DPT as per the requirements of EIC.
d. Mobilizations like welding accessories shifting, scaffolding, and insulation removal to be done. Separate payment to be done for insulation & scaffolding activity.
e. General purpose welding electrodes (6013, 7018) shall be under the scope of contractor for the same. Special electrodes if required shall be supplied by OPGC.

f. Activity may involve both inside and outside duct/boiler jobs. Contractor has to arrange lighting facilities accordingly.
g. Any material required for the activity to be issued from stores/yard as per the EIC instructions.
h. Return of the old material to the store.
i. General cleaning & housekeeping of the equipment & surrounding areas to be ensured after completion of job.
j. Welding shall be performed only as per EIC instructions, if any secondary damages observed during the welding process; same shall be penalized Rs 1000/- per such instance. Care shall be given by the contractor only to perform welding the prescribed area as instructed without damaging the nearby areas.

34. Welding-Stainless Steel

a. Contractor has to quote per running meter of welding in areas like stiffener welding/coal burner tip repair welding/expansion plates/bellows.
b. At least 2 runs of welding required. Certified 6G welder needs to perform the job.
c. Material will be Stainless steels of various grades such as SS 310, SS 316, SS 304.
d. Mobilizations like welding accessories shifting, scaffolding, and insulation removal to be done. Separate payment to be done for insulation & scaffolding activity.
e. Special electrodes will be supplied by OPGC.
f. Activity may involve both inside and outside boiler jobs. Contractor has to arrange lighting facilities accordingly.
g. Any material required for the activity to be issued from stores/yard as per the EIC instructions.
h. Return of the old material to the store.
i. General cleaning & housekeeping of the equipment & surrounding areas to be ensured after completion of job.
j. Welding shall be performed only as per EIC instructions, if any secondary damages observed during the welding process; same shall be penalized Rs 1000/- per such instance. Care shall be given by the contractor only to perform welding the prescribed area as instructed without damaging the nearby areas.

35. Pre & Post Shutdown misc. Works :

a. Pre shutdown works :Initial mobilization, T&P testing, Welder Test, Site Set up, Submission of docs such as Labor License, ESI docs, T&P certificates, List of consumables, permission from DOB for carrying out pr part work, Test certificate of IBR welders, submission of copy of gate passes etc.
b. Post shutdown works: Post overhauling housekeeping, Post overhauling defect rectification, return of materials to store, submission of documents such as details of work executed measurement sheets, material consumption details, material return details, weld joint wise report for different zones of Boiler along with RT & PWHT report, DPT protocols, copies of wage sheet of workman etc.

c. Pre shutdown works (In detail) :

Initial Mobilization:-

a) Submit Form - IV and take form - V from OPGC.
b) Arrange Labor license, Arrange comprehensive workmen insurance, which should cover all risks encountered in such a job, including working at heights (up to 90 meters for 660 MW boilers). The policy paper shall mention the name of the work and the location (OPGC, Jharsuguda), besides the number of persons covered.
c) Agency must have the valid certificate of recognition from directorate of steam boilers for boiler repair of pressure parts of special class for any pressure.
d) Obtain the permission of the Boiler Inspectorate, Jharsuguda, for the work and for doing the work with approved HP welders.
e) Liaisoning with Asst. Director of Factory & Boiler for permission of work, radiography approval, ground inspection, Hydraulic test etc.
f) Depute Resident engineer, Site - in - charge and key supervisory and skilled personnel to interact with EIC and his representatives, for understanding the detailed resource requirements of the work (Staff, T&P, Consumables etc), to understand the anticipated quantum of work, to make PERT net work, to work out group - wise distribution of work, to work out day - wise and group - wise program of the work and to understand the quality and safety requirements. Considering the importance of the work as given at the beginning of the schedule, the indicated resources of right quality shall be mobilized prior to the actual shut down.
g) To conduct briefing sessions for the various groups to ensure that the understanding percolates to the bottom most level.
h) To arrange Photo passes for workers, staff and passes for vehicles.
i) To arrange medical check - up for the workers to ensure fitness for work.
j) To make arrangements for accommodation/ conveyance/ food refreshments etc.
k) To transport T&P, radiography sources & consumables to inside Plant premises with due entry at gate.

T&P's Testing:-

a) To arrange for testing & TPI of T&P
b) Shifting of T&P like chain pulley blocks, winches, hook chucks, slings, wire ropes etc (all T&P for which periodic testing is a must as per Factories act or is required to ensure their safe performance) to testing site
c) Shifting of loads, other items required for testing purpose to the test location & also return back the same after testing.
d) Arrange for the testing of the T&P before-hand (to be witnessed by the competent person of OPGC.
e) Submit copies of the test certificates issued by the competent person based on tests carried out as above to EIC. Failed T&P shall be sent out of plant premises.
f) Shifting of electrical equipments like welding machines, grinding machines, chop saw machines etc to electrical repair shop for checking I testing to ensure healthiness. Assist Repair shop personnel for checking I testing of

the equipments.

g) Only such T&P, Electrical equipments and Safety Gadgets, which are certified to be OK, shall be deployed during overhaul.
h) Arrangement of and payment for the competent person (as recognized by the factories act) shall be done by the agency only.
i) In case of notice of deployment of any T&P/ electrical equipment which has not been tested within plant premises, or, for which, the validity of such a test has expired, a penalty of at least RS. 1000/- shall be imposed for each such occasion in addition to penalties imposed by OPGC safety department.
j) To arrange for testing of argon gas (Purity shall be 99.99%).

Welders Test:-

To arrange for testing of skilled manpower, as given below:

a) All HP welders engaged for the .job must have valid license for HP welding, issued/endorsed by Director of Factory & Boiler, Odisha. Copy of these shall be submitted to Engineer in charge before the start of work. All HP welders shall be tested by OPGC in 6G position. (Alloy and SS). (Visual, RT)
b) All attachment welding/Fin welding shall be done by HP Welders only.
c) Only those welders, who pass the tests, shall be engaged on the job.
d) The welders shall always carry (when in job) and produce when demanded, the photo identity card issued by OPGC.
e) Gas cutters and Grinder men shall be tested by representative of EIC (Visual and verbal).

Safety at Site:-

a) Safety supervisor shall be tested verbally by EIC/safety officer of OPGC.
b) Arrange safety training to all the workers and staff at OPGC safety cell.

Site Set-up:-

a) Shift T&P, consumables, spares, scaffolding materials to specified location/platforms as per EIC instructions.
b) Chalk out the movement path of the major materials from and to the boiler.
c) Carryout pre-assembly works as instructed by EIC – weld joints, steel fabrication, etc.
d) Set up electrical connections, shift feeder pillar boards, Cables, external flood lighting etc as required/as specified by EIC.
e) Shift scaffolding pipes and metallic planks to respective llocations. Erect scaffolding as instructed by EIC before start of Unit overhaul.
f) Make site store/office ready for use.
a) Check welding and lighting supplies.
b) Set up winch for lifting / lowering of materials to work location.
c) Ensure all persons to be deployed are adequately skilled for the job.
d) Ensure all persons to be deployed are adequately trained in safety.
e) Prepare registers and formats for use during the work.
f) Arrange procurement of leak - proof ash disposal bags.
g) Cleaning of the boiler tube spool pieces by blowing compressed air as per instruction of EIC.
h) Any other work as per direction of engineer - in - charge.

d. Post shutdown works (In detail):

Post overhaul housekeeping:- Clearing of the Boiler of all debris, scrap, left – over spares, T&P, consumables etc. and dispose them as per instructions of EIC.

Post overhaul defect rectification:-

a) Deploy manpower for assisting in light up activities of boiler up to achieving in full load/or as specified by OPGC.
b) Erection and operation of sky climber if required for attending defects
c) In case of no defect up to 30 days period after 1st synchronization, payment shall be released to the contractor as a reward for the quality work.

Return of Materials:-

a) Return of OPGC material as directed. Stacking / arranging the returned items as specified.
b) Reconciling measurements and materials with EIC.
c) Servicing and return of OPGC's T&P used during the job to make ready for next work.

Submission of documents:-

Submit the following documents in report form within 07 days from synchronization of the unit after the overhaul / shutdown work is completed or before release of running bills:

d) Details of work executed.
e) Measurements against different schedules in compiled form.
f) Material issue details.
g) Material consumption details.
h) Material return detail.
i) Weld joint - wise report for different sections I zones/ areas of boiler along with RT report reference
j) Radiography reports along with repair details of defective joints.
k) DPT protocols.
a) Protocols of other hold points, Check of fit - up and weld procedure of critical welds, SR charts" etc.
b) Copies of wage sheet of workmen along with duly filled up additional format specified by EIC.

Mode of payment:

Pre-shutdown jobs – 65% of the lump sum rate to be paid on certification by EIC.
Post shutdown jobs – 35% of the lump sum rate to be paid after successful completion of jobs certified by EIC.

Penalty terms – Penalty of Rs 10000/- per day will be applicable on failure of submitting of load test documents before the schedule start of unit overhauling, Penalty of 5000/- will be applicable if return of scrap/scaffolding materials/spares are not done to the satisfaction of EIC for each instance.

36. Lighting Services :

a) Minimum 50 Halogen Lamps/Flood Light Fittings are to be set up (fixed position) and to be maintained. These are in addition to the portable hand lamps of 24 V with transformers. These are in addition to the portable hand lamps of 24V which are to be used for on - the - spot inspection works etc. In case, it is found that above number of halogen lamps are not working, then penalty of Rs.100/- per halogen per instance shall be levied on the agency and agency will be instructed to immediately replace defective halogen lamps with new halogen lamps. In case lamps are repeatedly found not working at same location for more than 24 hours, then penalty of Rs. 1500 /- per halogen per instance shall be levied on the agency.
b) Work should to be done as per the lighting plan as decided by EIC.
c) Only 24V hand lamps shall be used inside boiler for on the spot inspections and other works. The above shall be followed strictly. In case, it is found that agency is using lamps of higher voltage then penalty of Rs. 200/- per instance shall be levied on the agency.
d) Light fittings along with cable and accessories are in the scope of agency.
e) 50 nos. extension boards with 100 m. cable each is to be maintained. In case it is found that work is delayed due to non-availability of switch board or any other electrical fittings, penalty of 500/- per instance shall be levied on the agency.
f) Deploy adequate number of electricians round the clock along with suitable helper support to achieve above.
g) Any material issued from OPGC should be returned in good condition or else the cost will be recovered from agency's bill.
h) The payment of one SOQ under this schedule shall be considered only after completion of all the above mentioned activities to the satisfaction of EIC in each overhaul.

37. Additional manpower :

i. Fitter/Gas cutter/Grinder/Welder :

d. Deploy Fitter/Gas cutter/Grinder/Welder man power assistance, as specified by EIC for various works that are not of regular nature
e. Payment shall be done on the basis of man days involved. Man days shall be calculated on 8 hour basis.
f. Contractor shall deploy skilled manpower matching with the proficiencies mentioned above. However, OPGC EIC has the sole discretion to qualify/disqualify/downgrade any category of manpower deputed if found not satisfactory.

ii. Rigger :

a. Deploy Rigger man power assistance, as specified by EIC for various works that are not of regular nature
b. Payment shall be done on the basis of man days involved. Man days shall be calculated on 8 hour basis.
c. Contractor shall deploy riggers having sufficient experience in the field of lifting, scaffolding activities. OPGC EIC has the sole discretion to qualify/disqualify/downgrade any category of manpower deputed if found not satisfactory.

iii. Helper :

a. Deploy Helper man power assistance, as specified by EIC for various works that are not of regular nature
b. Payment shall be done on the basis of man days involved. Man days shall be calculated on 8 hour basis.