



ANNEXURE - 4

AMC OF Mechanical Maintenance AHP & HCSD SYSTEM

SCOPE OF WORK FOR JOB RATE CONTRACT (PART B)

1. ASH SLURRY PUMP

(a) Overhauling of pump.

- Decouple pump and motor & dismantle pump pulley.
- Removal of Suction & discharge pipes with proper arrangement.
- Loosening of casing bolts and remove suction casing with liner.
- Remove impeller with proper locking.
- Remove inner shell with motor side casing with liner.
- Remove the stuffing box.
- Remove bearing housing top cover after oil draining.
- Dismantle shaft, bearing, oil seal, "O" ring, etc.
- If required replace shaft/bearing/shaft sleeve/oil seal/o ring/compression spring etc to fit bearing housing correctly.
- After replacement of shaft, fit casings, liners, impeller, inner shell and rubber gasket with new or minor repair work.
- Check the seal water line connections to casing and if required minor repair work may be done.
- Connect the suction & discharge pipes properly.
- Replace the gland properly.
- Fit the pump and motor pulley & alignment to be done.
- Fit the V belts (new/old) with guard & oil filling in bearing housing
- Trial run the pump & adjust gland for no leakage.
- There shouldn't be any leakage from casing of pump.
- Spare parts shifting from Central store as and when required.

b) Attending casing leakage of pump

- Decouple pump and motor & dismantle pump pulley.
- Removal of Suction & discharge pipes with proper arrangement.
- Loosening of casing bolts and remove suction casing with liner.
- Remove impeller with proper locking.
- Remove inner shell with motor side casing with liner.
- Remove the stuffing box.
- Inspection and replacement of rubber gaskets/inner shell/casings/liners/impeller etc wherever necessary.
- Fitting of casings, liners, impeller, inner shell, rubber gasket with new or minor repair work.

- Check the seal water line connections to casing and if required minor repair work to be done.
- Connect the suction & discharge pipes properly.
- Replace the gland properly.
- Fit the pump and motor pulley & alignment to be done.
- Fit the V-belts (new/old) with guard & oil filling in bearing housing
- Trial run of pump & adjust gland for no leakage.
- There shouldn't any leakage from casing of pump.
- Spare parts shifting from Central store as and when required.

c) Replacement of V-Belt

- Remove the belt guard.
- Replace the old V belts with new belts.
- Alignment of motor & pump pulley.
- Check the belt tension and adjust as required.
- Fix the belt guard.
- After 48 running hours, check the belt tension and adjust if required.

d) Replacement of suction and discharge sleeve coupling

- Arrangement to be made for removal of suction / discharge pipe.
- Removal & fitting of sleeve, aligning ring & gaskets.
- Fitting of suction & discharge pipes.
- If required replace the coupling gaskets.

e) Replacement of gland packing's

- Remove the gland follower & remove old packing.
- Place new packing rings properly with lantern ring.
- Tighten the gland follower lightly.
- After trial run of pump, final adjustment of gland to be done.

f) Replacement of lubricating oil

- Open the drain plug
- Drain the old lubricant
- Flush the lubricating chamber
- Clean the oil sight glass.
- Fill the new lubricating oil.

g) Servicing/ Replacement of pump and motor pulley

- Remove the belt guard and V belts.
- Remove the taper lock bush.
- Remove the motor and pump pulley.
- Install the new pulleys and taper lock bush.

- Align motor pulley with pump pulley.
- Check for proper tension of belts
- Fix the belt guard.

2. DRAIN PUMP

a) Overhauling of drain pump

- Decouple the pump & motor and shift the motor with its base.
- Remove the coupling half if required.
- Remove & check/replace bearings, oil seals after oil draining.
- Lifting of pump assembly & checking of pump liner/casing/inner casing/impeller/shaft sleeve etc. if required Change with new one or minor repair to be done.
- Fit the pump internals & fit gland packing properly.
- Filling of oil up to mark & place motor with base in its position.
- Align motor with pump & fit belts with new or old one.
- Trial run of pump.

b) Cleaning of drain sump pit

- Lift ash water by pump/manually.
- After opening of sump cover, remove ash from pit.

c) Replacement of gland packing

- Removal of gland follower & then taken away old packing.
- Place new packing rings properly.
- Tighten the gland follower lightly.
- After trial run of pump, final adjustment of gland to be done.

d) Replacement of V-Belts

- Remove belt guard.
- Replace old v-belts with new.
- Align motor pulley with pump pulley.
- Adjust belt tension & fix the belt guard.
- After 48 running hours, check the belt tension again.

3) ASH DISPOSAL LINE AND RECYCLING WATER LINE

The agency has to arrange own vehicles for material shifting and all mobilization for the following job activities.

a) Replacement of sleeve coupling/coupling ring/ring gasket.

- Remove the coupling bolts, rubber gaskets & coupling.
- Replace the damaged part with new one.
- Proper fitting to be made with proper pipe alignment.

b) Replacement of MS/CI Pipes.

- Remove the coupling bolts, rubber gaskets & coupling.
- Remove the pipe from its position by making arrangement.
- Placement of new pipe to the position.
- Replace the damaged parts like coupling bolts, rubber gaskets & couplings with new one
- Proper fitting to be made with proper alignment to the pipes.
- If needed nearby pipes to be dismantled & fitted with taking proper care.
- Vehicle to be arranged to carry out the jobs.
- If required tripod/ special arrangement to be made for above jobs.
- Any cutting & welding of pipe is in party's scope.
- During the course of execution any civil structure/ blocks is required to be chipped is in party's scope.
- Welding of MS pipe to be done with structural welding electrode of reputed brand which is to be supplied by party with no extra cost to OPGC.
- MS / CI pipes are to be brought from central store.
- Hydra & truck are to be provided by OPGC.

c) Replacement of MS / CI Bends.

- Remove the coupling bolts, rubber gaskets & coupling.
- Remove the MS / CI bends from its position by making arrangement.
- Placement of new bend to the position.
- If required new MS bends are to be fabricated from MS pipe at site as per site requirement for which pipe is to be brought from central store / site which is in party's scope.
- Replace the damaged parts like coupling bolts, rubber gaskets & couplings with new one
- Proper fitting to be made with proper alignment to the pipes.
- If needed nearby pipes to be dismantled & fitted with taking proper care.
- Vehicle to be arranged to carry out the jobs.
- If required tripod/ special arrangement to be made for above jobs.
- During the course of execution any civil structure/ blocks is required to be chipped is in party's scope.
- Welding of MS pipe to be done with structural welding electrode of reputed brand which is to be supplied by party with no extra cost to OPGC.

d) Inspection of ash disposal & recycling line

- Any coupling leakage on the line
- Any coupling likely to develop leakage
- Prior intimation for any theft of coupling bolts, clamps etc.
- Erosion of soil from pipe support due to rain.
- Growth of wild grass & trees on the AD line.
- Corrective action for any minor problems like tightening of loose coupling bolts, pipe holding clamps & couplings etc.

e) De-choking of ash slurry pipe line from AHP to ash pond per coupling

- Opening of pipe couplings & gaskets for one pipe from the pump discharge end
- Flushing of that single pipe with water hose.
- Checking of pipe jamming for the next pipe.
- If the jamming continues then pipe dismantling /flushing/ fitting to be done one after another up to the disposal point.
- If needed any fabrication of clamp, pipes bend etc. to be made.

4.) CLINKER GRINDER.

a) Gland packing replacement / Bearing servicing.

- Isolate seal water line to the grinder.
- Dismantle the drive chain, sprockets, bearings & oil seals from the grinder with making special arrangement.
- Inspection/ Cleaning/ replacement of bearings & oil seals.
- Checking / flushing / repairing of seal water line pipings, nipples, unions & valves.
- Removal & placement of gland packing to the grinder with proper care.
- Fitting of bearings with applying grease, oil seals, sprockets & drive chain.
- Trial run & further rectification if required.

b) Alignment of Clinker Grinder, Gear Box, Fluid Coupling & Motor.

- Removal of drive chain from the grinder.
- Loosening of foundation bolts.
- Alignment to be made by dial gauge.
- Placement of drive chain to the grinder.
- Apply grease to the chain.
- Trial run & further rectification if required.

c) Adjustment / fitment of driving chain and sprockets.

- Removal of drive chain, sprocket & pinion from the grinder.
- Checking & cleaning of parts.
- Fitting of sprocket, pinion & chain to the grinder.
- Apply grease to the chain.
- Trial run & further rectification if required.

d) Greasing of chain.

- Removal of Chain guard
- Cleaning of chain & scrapping of old grease
- Apply new coat of greasing on the chain
- Fitting of chain guard.

e) Replacement of Fluid Coupling Oil.

- Opening the coupling bolts
- Remove the drain/Filling plugs
- Replace the damaged oil & fill the clean oils.

5) FEED GATE OF BOTTOM ASH HOPPER

a) Servicing of Power Cylinder.

- Dismantling of power cylinder.
- Checking/ replacement of cylinder, seal kit, "O" rings etc.
- Final fitting & placement of gland packing.

b) Gland Packing replacement for Power Cylinder.

- Removal & fitting of gland packing.

c) Removal of foreign material from Bottom Ash Hopper.

- The job will be carried out by ON LINE PTW during the plant running condition.
- Opening of manhole of feed gate with proper care.
- Foreign material to be removed from inside the hopper or above the grinder roller.
- Fitting of manhole to the feed gate.
- If needed packing rope to be placed in the manhole.

d) Dechocking of pipelines from Bottom Ash Hopper to Ash Slurry Sump.

- Opening of pipe couplings & gaskets for one pipe from the BA Hopper side.
- Flushing of that single pipe with water hose.
- Checking of pipe jamming for the next pipe.
- If the jamming continues then pipe dismantling /flushing/ fitting to be done one after another up to the slurry sump.
- If needed hydro ejector of the respective feed gate to be dismantled and Checking/cleaning / fitting of hydro ejector will be made.
- If needed any fabrication of clamp, pipe bends etc. to be made.

6.0) BOTTOM ASH HOPPER

a) Replacement of view glass

- Removal & renewal of damaged glass assy.

b) Cleaning of Seal Trough

- Flush the seal trough chamber through the bottom ash water pump.
- If the chamber is not cleaned properly than by HP water hose chambers may be cleaned externally.
- Remove the settled ash inside the chamber.

7) FLY ASH HOPPER.

a) Replacement of Ash Discharge valves

- Opening of discharge valve flange bolts.
- Replacement / repair of discharge valve.

b) Removal of foreign material from the hopper.

- Opening of discharge flange bolts.
- Removal of discharge valve from the hopper carefully.
- Removal of foreign material from the hopper.
- Final assembly and Box up.

c) Replacement of poke door and gaskets.

- Cutting of old poke door bolts.
- Welding of new bolts.
- Removal of damaged rubber gaskets.
- Placement of new gasket.

8) ASH WATER PUMP :- (BAHP, FAHP, LP water pump, HCSD water pump)

a) Overhauling of the pump.

- Decoupling of pump from motor.
- Opening of pump top cover.
- Dismantling/ checking/ cleaning/ replacement of spares like- bearing, impeller, impeller wear ring, shaft, shaft sleeve etc.
- Pump internal cleaning & painting of anticorrosive paint.
- Replacement of gland packing & casing gasket.
- Replacement of coupling bush & bolt if required.
- Final box up & alignment.
- Trial run & further rectification if required.

b) Bearing Inspection.

- Decoupling of pump from motor.
- Opening of pump top cover.
- Dismantling/ checking/ cleaning/ replacement of bearings.
- Replacement of coupling bush & bolt if required.
- Final box up & alignment.
- Trial run & further rectification if required.

c) Gland packing replacement.

- Removal of old/ damaged gland packing.
- Fitting of new gland packing.
- Trial run & further rectification if required.

d) Decouple, alignment and coupling of pump and motor.

- Removal of coupling bolts & bush.
- Loosening of foundation bolts.
- Alignment to be made for pump and motor.
- Coupling of pump & motor.

9) SEAL WATER PUMPS.

a) Overhauling of pumps.

- Decoupling of pump from motor.
- Opening of pump top cover.
- Dismantling/ checking/ cleaning/ replacement of spares like- bearing, impeller, and impeller wear ring, shaft, shaft sleeve & lock collets etc.
- Pump internal cleaning & painting of anticorrosive paint.
- Replacement of gland packing & casing gasket.
- Replacement of coupling bush & bolt if required.
- Final box up & alignment.
- Trial run & further rectification if required.

b) Bearing replacement.

- Decoupling of pump from motor.
- Opening of pump top cover.
- Dismantling/ checking/ cleaning/ replacement of bearings.
- Replacement of coupling bush & bolt if required.
- Final box up & alignment.
- Trial run & further rectification if required.

c) Gland packing replacement.

- Removal of old/ damaged gland packing.
- Fitting of new gland packing.
- Assistance during the trial run for further adjustment of gland.

d) Decouple, alignment & pump motor coupling.

- Removal of coupling bolts & bush.
- Loosening of foundation bolts.
- Alignment to be made for pump and motor.
- Coupling of pump & motor.

10) VACUUM PUMP

a) Overhauling of Pump

- Decoupling of pump & removal of motor from its base.
- Removal of all connecting pipelines & gauges.
- Removal of pump / motor pulleys.
- Complete dismantling/checking/ cleaning of pump parts.
- If necessary special arrangements to be made for removal of parts.
- Replacement of damaged parts if necessary.
- Painting of parts with anti corrosive paint if necessary.
- Reassembling of parts & fitting.
- Checking & correction of lubrication & cooling systems.
- Placement of motor to the pump, alignment & coupling.
- Trial run & further rectification if required & condition monitoring.

b) Decouple and coupling of pump.

- Decoupling of pump.
- Removal of belts & pulleys.

- Alignment to be made for pump and motor.
- If belt / pulley are damaged replacement by new ones.

c) Replacement of gland packing

- Removal of old/ damaged gland packing.
- Fitting of new gland packing.
- Trial run & further rectification if required.

11. Preventive checks of Ash Handling Equipments

a) Preventive checks of AHP pumps

- Check the oil level, oil quality, gland leakage from slurry pumps, water pumps, Clinker Grinders on weekly basis. If required tough up the oil if required.
- Grease the Water pump bearings once in every month. Report any abnormality to Engineer-in-charge.

12. FLUSHING APPARATUS

a) Servicing of Flushing Apparatus.

- Cleaning of flushing apparatus.
- Check for nozzle replacement / repair if required.
- Servicing of valves.
- Check for any abnormality.
- Trial run & further rectification if required.

b) Chocking clear work.

- Close the suction knife gate valve.
- Checking and removal of foreign material.
- Cleaning of flushing apparatus.
- Trial run & further rectification if required.

13. JET PUMP

a) Overhauling of Jet Pump

- Removal of sleeve couplings.
- Dismantling of Jet Pump.
- Replacement of damaged parts if necessary.
- Painting of parts with anti corrosive paint if necessary.
- Reassembling of parts & fitting.
- Final box up & alignment.
- Trial run & further rectification if required.

b) Choking clear work

- Removal of sleeve couplings.

- Dismantling of Jet Pump.
- Cleaning of internals.
- Replacement of damaged parts if necessary.
- Reassembling of parts & fitting.
- Final box up & alignment.
- Trial run & further rectification if required.

14. CHARGE PUMP

(a) Overhauling of pump.

- Decouple pump and motor & dismantle pump pulley.
- Removal of Suction & discharge pipes with proper arrangement.
- Loosening of casing bolts and remove suction casing with liner.
- Remove impeller with proper locking.
- Remove inner shell with motor side casing with liner.
- Remove the stuffing box.
- Remove bearing housing top cover after oil draining.
- Dismantle shaft, bearing, oil seal, "O" ring, etc.
- If required replace shaft/bearing/shaft sleeve/oil seal/o ring/compression spring etc to fit bearing housing correctly.
- After replacement of shaft, fit casings, liners, impeller, inner shell and rubber gasket with new or minor repair work.
- Check the seal water line connections to casing and if required minor repair work may be done.
- Connect the suction & discharge pipes properly.
- Replace the gland properly.
- Fit the pump and motor pulley & alignment to be done.
- Fit the V belts (new/old) with guard & oil filling in bearing housing
- Trial run the pump & adjust gland for no leakage.
- There shouldn't be any leakage from casing of pump.
- Spare parts shifting from Central store as and when required.

b) Attending casing leakage of pump

- Decouple pump and motor & dismantle pump pulley.
- Removal of Suction & discharge pipes with proper arrangement.
- Loosening of casing bolts and remove suction casing with liner.
- Remove impeller with proper locking.
- Remove inner shell with motor side casing with liner.
- Remove the stuffing box.
- Inspection and replacement of rubber gaskets/inner shell/casings/liners/impeller etc wherever necessary.
- Fitting of casings, liners, impeller, inner shell, rubber gasket with new or minor repair work.
- Check the seal water line connections to casing and if required minor repair work to be done.
- Connect the suction & discharge pipes properly.
- Replace the gland properly.
- Fit the pump and motor pulley & alignment to be done.

- Fit the V-belts (new/old) with guard & oil filling in bearing housing
- Trial run of pump & adjust gland for no leakage.
- There shouldn't any leakage from casing of pump.
- Spare parts shifting from Central store as and when required.

c) Replacement of V-Belt

- Remove the belt guard.
- Replace the old V belts with new belts.
- Alignment of motor & pump pulley.
- Check the belt tension and adjust as required
- Fix the belt guard.
- After 48 running hours, check the belt tension and adjust if required.

d) Replacement of gland packing's

- Remove the gland follower & remove old packing.
- Place new packing rings properly with lantern ring.
- Tighten the gland follower lightly.
- After trial run of pump, final adjustment of gland to be done.

e) Servicing/ Replacement of pump and motor pulley

- Remove the belt guard and V belts.
- Remove the taper lock bush.
- Remove the motor and pump pulley.
- Install the new pulleys and taper lock bush.
- Align motor pulley with pump pulley.
- Check for proper tension of belts
- Fix the belt guard.

15. Screw compressors of dry ash system & Mill reject handling system.

- Preventive, Predictive, Corrective and Breakdown Maintenance of Screw Air Compressor.
- Overhauling of Screw Compressor
- Servicing of Air Drier
- Inspection & Bearing replacement of Screw.
- Cleaning of Filter, oil replacement in every 3 months
- Inspection/repairing of Intercooler
- Belt replacement four times annually
- Servicing of Suction/Discharge Valve
- Replacement of cooling water pipe

16. Ash Conveying Vessels

- Replacement of inlet / discharge valves
- Overhauling of Ash Vessels
- Replacement Plate Valve
- Servicing / Replacement of Pneumatic Cylinder
- Arresting of Ash leakage from Ash conveying line
- Replacement of Ash conveying Pipe line
- Replacement of Ash diversion chute

17. DUST CONDITIONER

a) Overhauling of Dust Conditioner

- Remove the coupling guard.
- Check / replace pin bush coupling & coupling bush.
- Clean / replace the water nozzles of dust conditioner.
- Check / replace bearings and Plummer block if required.
- Check for wear of paddles and replace if required.
- Check / replace / repair damaged parts if any.
- Painting of parts with anti corrosive paint if necessary.
- Reassembling of parts & fitting.
- Final box up & alignment.
- Trial run & further rectification if required.

b) Gear Box Overhauling

- Remove the coupling guard.
- Removal of coupling from Gear Box, Motor and Dust Conditioner.
- Cleaning of Gear Box.
- Loosening of casing bolts.
- Check / replace Gear Box Bearings.
- Check for wear and tear of helical gear.
- Repair / replace the damaged parts if any.
- Check / replace pin bush coupling & coupling bush.
- Painting of parts with anti corrosive paint if necessary.
- Reassembling of parts & fitting.
- Final box up & alignment.
- Trial run & further rectification if required.

c) Nozzle cleaning / replacement work.

- Check / inspect the water nozzle for cleaning / replacement.
- Removal of Dust Conditioner Cover.

- Removal of defective Nozzles.
- Clean / replace the defective nozzles.
- Repair / replace the damaged parts if any.
- Reassembling of parts & fitting.
- Final box up & alignment.
- Trial run & further rectification if required.

18. FLUIDIZING BLOWERS

a) Fluidizing Blower overhauling.

- Remove the belt guard.
- Remove blower / motor pulleys.
- Removal of Suction & discharge pipes with proper arrangement.
- Check /replace defective parts if any.
- Check for the proper gap between lobes assembly.
- Alignment of motor & pump pulley.
- Check the belt tension and adjust as required.
- Fix the belt guard.
- After 48 running hours, check the belt tension and adjust if required.

b) V Belts replacement.

- Remove the belt guard.
- Replace the old V belts with new belts.
- Alignment of motor & pump pulley.
- Check the belt tension and adjust as required
- Fix the belt guard.
- After 48 running hours, check the belt tension and adjust if required.

19. BUFFER HOPPER

- Bag Filter Inspection / replacement.
- Replacement of fluidizing pads.
- Rectification of Ash Leakages.
- De choking of Buffer Hopper.

20. GEHO PUMP

- Inspection / replacement of suction and discharge pulsation dampener.
- Replacement of main pump diaphragm.
- Replacement / repair of NRVs.

- Replacement / repair of NRV Seat & inserts.
- Oil Top up / replacement in hydraulic chamber and gear box.
- Coupling replacement / repair.
- Intermediate Gear Box replacement / repair.
- Repair / replacement of damaged parts if necessary.
- Painting of parts with anti corrosive paint if necessary.
- Replacement of Oil Filter
- Repair and replacement of lubrication pump
- Repair / Cleaning of air suction strainer
- Repair / replacement of vertical suction strainer
- Nitrogen purging in pulsation dampener

19. AGITATOR RETENTION TANK

- Inspection / cleaning of ART.
- Replacement / repair of ART Gear Box.
- Replacement / repair of agitator blades.
- Repair / replacement of coupling.
- Baffle plates repair work.
- Repair / replacement of liners.
- Repair / replacement of drain valve.
- Repair / replacement of defective parts if required.

19. CLARIFLOCCULATOR

- Inspection / cleaning of clarifloculator.
- Replacement / repair of clarifloculator Gear Box.
- Replacement / repair of Agitators & agitator blades.
- Repair / replacement of traction wheel.
- V belt and pulley replacement.
- Oil Top up / replacement
- Repair / replacement of traction wheel drive.
- Servicing of doing pumps.
- Leakage arrest work for pipes and fittings.
- Replacement / repair of agitator Gear Box.

21. ROTARY VANE FEEDER

- Servicing of rotary vane feeders.
- Wear Tips replacement.
- Repair / replacement of coupling.
- Choke clear work for RVF.

22. TELESCOPIC SPOUT

- Rope replacement.
- Bellow replacement.
- Repair / replacement of gear box.
- Pulley replacement.

23. CLARIFLOCULATOR

a) Preventive Maintenance of Clarifloculator.

- Inspection of Gear Box and agitators & accessories
- Gear Boxes alignment.
- Gear Box oil top up / replacement.
- Greasing of chain.
- Rectification of defects if any.

b) Slip ring bearing replacement

- Dismantling of slip ring bearing.
- Inspection of bearing.
- Assembling / replacement of bearing.
- Bearing Lubrication.

c) Flocculator V Belt replacement

- Inspection of V Belts and pulleys.
- Removal / replacement of complete sets of V Belts.
- Inspection of pulleys and replacement if required.
- Rectification of defects if any.

d) Line leakage arresting work

- Dismantling / removal of pipes and fittings.
- Replacement of pipes and fittings.
- Assembling of pipes and fittings
- Defect rectification if any.

24. FLASH MIXER, LIME DOSING TANK, ALUM DOSING TANK & POLYELECTROLITE DOSING TANK

a) Preventive Maintenance

- Inspection of Gear Box and agitators & accessories
- Gear Boxes alignment.
- Gear Box oil top up / replacement.
- Rectification of defects if any.

b) Bearing replacement

- Dismantling of gear box bearing.
- Inspection of bearing.
- Assembling / replacement of bearing.
- Oil top up replacement.

c) Alignment

- Dismantling of agitator and gear box.
- Gear Box alignment
- Rectification of defects if any.

25.LIME DOSING PUMP, ALUM DOSING TPUMP & POLYELECTROLITE DOSING PUMP

a) Oil Top up replacement

- Inspection of Gear Box.
- Gear Box oil top up / replacement.
- Oil indicator cleaning / repair / replacement.
- Rectification of defects if any.

b) Valve / NRV & Diaphragm replacement

- Dismantling of Pump / valve / NRV & fittings
- Repair / replacement of Pump / valve / NRV & fittings
- Assembly of Pump / valve / NRV & fittings
- Defect rectification if any.

c) Leakage arresting work

- Dismantling / removal of pipes and fittings.
- Replacement of pipes and fittings.
- Assembling of pipes and fittings
- Defect rectification if any.

25.SILO

a) Bag Filter / SILO Vent Filter PM

- Inspection of Bag Filter Assy.
- Inspection and repair of purging system.
- Replacement of damaged bag filters, venturie and cages.
- Rectification of defects if any.

b) Vent Fan Bearing Replacement

- Dismantling of Vent Fan
- Inspection / replacement of bearings.

- Assembly of Vent Fan Assy.
- Defect rectification if any.

25.ASH WATER RECOVERY SYSTEM

a) Recycle Ash Water Pump, Recirculation Pump, Sludge Pump, Potable water Pump & RO Reject Transfer Pump

- Dismantling of pumps.
- Dismantling of pipes and fittings
- Internal Inspection of pumps.
- Repair / replacement of damaged parts.
- Assembly of pumps.
- Pump alignment wor.
- Rectification of defects if any.

25.MILL REJECT HANDLING SYSTEM

a) Vent Filter PM

- Inspection of Bag Filter Assy.
- Inspection and repair of purging system.
- Replacement of damaged bag filters, venturie and cages.
- Rectification of defects if any.

b) Dechoking

- Dismantling of pipes & fittings if required.
- Dechocking of system by purging, water washing or by other means.
- Asssembly of pipes & fittings.
- Defect rectification if any.

25.EOT & UNDERSLUNG CRANES OF ASH HANDLING PLANT

a) PM of EOT Cranes & Hoist.

- Equipment cleaning work.
- Inspection of EOT Cranes & Hoist.
- Ensure proper operation of EOT Cranes & Hoist.
- Oil Top up / replacement.
- Rectification of defects if any.

MISCELLANEOUS WORKS

ITEM 1(A) FABRICATION & ERECTION OF PIPING SYSTEM: -

Erection of piping shall system include withdrawal of materials from stores, loading & unloading, transportation, safe storage, cleaning by wire brushing / water flushing, cutting preheating, bending, setting, alignment, erection, welding, providing support, fitting to the required equipment / flange etc. & pressure testing etc. The assembly /erection shall include erection of valves, flanges, orifice, blanks & other instrument fittings etc. if any. If the piping length involved is less than 5 mtrs for a particular size of pipe, payment shall be made on the basis of nos. of weld joints carried out as per item no.2. No separate payment for the erection of pipe, valves, orifice, flow nozzle, other supports & fittings shall be made. Special electrodes will be supplied free of cost.

NOTE: -

For the pipe above 200 NB size but below 500 NB, the rates applicable shall be 18 % above the base rate of 200 NB pipe, for every 50 NB increase pipe size as **per formula-A as mentioned below.**

$$RT= R (1+C(D-200)/50)$$

Where RT= Rate for the pipe above 200NB size but below 500NB

R= Base rate for 200NB size pipe.

C=0.18, co-efficient for pipe above 200NB but below 500NB.

D= Size of the pipe in NB.

For pipes/tubes below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be 200 NB rate x 40/200) & so on.

The rate shall be applicable for pipe thickness up to & including 10mm.

For thickness above 12 mm, for every 1 mm increase in thickness the unit base rate shall be increased by 3 % as per **formula – C as mention below.**

$$RT= R (1+C2 (T1-12))$$

Where RT= Rate for pipes above 10mm thickness.

R= Base rate for 200NB size pipe.

C2= 0.03, co-efficient for pipes of thickness more than 10mm.

T1= Thickness of the pipes.

These rates are applicable to the rate of piping system equal to or more than 5 meters.

No separate payment shall be made scaffolding etc. or any such arrangement, necessary to be made for efficient erection of the job.

The rates include cutting leveling, fitment, preheating, welding & erection of valves, flanges, Tees, elbows. Piping fittings etc. if any in the piping system.

ITEM 1 (B): DISMANTLING OF PIPING SYSTEM: -

The job involves dismantling of piping system by gas cutting / hacksaw cutting, disconnecting of threaded & bolted joints & transportation of scraps to a suitable place as instructed by concerned engineer. Rates applicable shall be 50% of the rates against item 1(A).

ITEM 2: CUTTING & WELDING: -

The rates shall be applicable for cutting and welding of lay up of pipelines whose length is less than 5 mtr. Or making some modifications on existing pipelines or equipment / structural equipments wherever cutting, beveling and welding is involved. These rates shall also be applicable for branch joint also wherever branching is taken (i.e. no special rate shall be applicable for branch fabrication. Necessary locking of pipes for replacement will be made.

The radiography /stress relieving shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joints fail in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for the second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. No separate payment to be made for scaffolding. Rate for cutting & welding will be limited to 10 mm alloy / carbon/S.S and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4 % for every mm beyond 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

ITEM – 3: RECTIFICATION OF FLANGE LEAKAGE: -

Leakage flanged joints shall be rectified by removal of bolts & nuts, cleaning the mating surface providing new gasket & tightening the bolts. The line when commissioned or tested should be leak proof.

NOTE:-

For the flange joints above 200 NB size the rate applicable shall be 20% above the base rate of 200 NB flange joint, for every 50 NB increase in the flange size **as per formula-G as mentioned below.**

$$Rs= R (1+Cs (D-200)/50)$$

Where Rs= rate for the flange above 200NB size.

R= Base rate for 200NB flange

Cs=0.2, co-efficient for flange above 200NB.

D= Size of the flange in NB.

For flange joints below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be 200 NB rate x 40/200).

Rate shall be applicable for all types of flanges of all materials of construction & pressure ratings. The flanges may be on pipelines / equipment / heat exchangers /tanks etc.

Gaskets required are to be cut from metallic / non- metallic / oil gasket sheet including punching of holes. Gaskets & nut – bolts shall be provided by ITPS.

The scope of work includes all types of joints (except welding joints) viz, flange/screw joints union etc. Manhole joints shall also be treated as flange joints.

Odd flange joints like square / rectangular etc. are to be treated as circular flange joints by comparing the perimeter to nearest standard circular flange joint.

The flange should be leak proof after commissioning / charging the line failing which the contractor is to attend the same free of cost.

ITEM – 4: FABRICATION & ERECTION OF STRUCTURAL: -

The job involves fabrication & erection of structural, like platform& its ladders, handrails, supports, miscellaneous structural items etc. Fabrication & erection are to be carried out at different heights & various locations within factory premises. Required materials, drawings & job details will be provided by ITPS. Billing for the quantity up to 10 Tonnes will be as per cutting & welding rates of Item 2. For quantity above 10 Tonnes, billing shall be as per Tonnage.

ITEM – 4(A): FABRICATION: -

The job includes receipt of structural from ITPS stores, transportation to site / place of use, & fabrication as per drawing / sketch / instruction of the concerned engineer. Type of welding electrode to be used & thickness of weld shall be as per direction of the concerned engineer & to be arranged by the contractor. The entire structure shall be free from sharp edges, slags, & burrs. Two coats of red oxide paint are to be applied by the contractor, after the fabrication work, for which no extra charge shall be made.

ITEM –4(B): ERECTION: -

The job covers transportation of fabricated structure to site & erection / assembly etc. Assembly, bolting, welding, alignment etc. come in the scope. The contractor will do grouting. However grout material will be supplied by ITPS. ITPS shall provide as free issue materials, structural steels including angle, channels, plates, pipes, fasteners like nut – bolt etc. The contractor has to arrange other consumables like gas, electrodes, paint, clamps tools & tackles etc. No separate payment for scaffolding will be made.

ITEM –5: APPLICATION OF PAINTING: -

Protective coating may be required to be applied to pipes, equipment, structural at various locations & elevations inside the plant. The scope of work includes cleaning the surface to remove dirt oil, grease, rust, scale & other contamination etc. by blasting, chipping, scrapping, wire brushing etc., applying one coat of primer paint & two coats of finishing enamel paint .The interval of surface preparation & painting shall be minimum & in no case longer than 4 hours. The application procedure shall be in accordance with the prescribed recommendations of the paint manufacturers & IS: 1477 Part-II.

Agencies may coat the rates for this item including the cost of paint & thinner. All other materials like brush, wire brush etc., tools & tackles are to be arranged by the contractor at his own cost.

ITEM –6: ERECTION OF SCAFFOLDING: -

The scope of works includes fabrication & erection of scaffolding inside & out side of ash handling. Water treatment plants etc. to facilitate inspection & other job to be carried out by ITPS. The scaffolding should be rigid. They can be made out of Scaffolding pipes. Clamps are to be used for preparing the scaffolding. Wherever required, the contractor has to provide platform by using good metal/wooden planks, which can withstand a minimum of 4 people of about 300 kg. Load. All materials required for executing the above job should be arranged by the contractor at his cost. 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 of two meters length & two meters in width. If it is required to cover a large area, another scaffolding has to be erected by the contractor. The payment shall be per meter height of erection from the base of the scaffolding upto the top most platforms only covering a minimum base area of 4 sq. mtrs.

- i) Scaffolding shall be moved, erected and used adjacent to exposed high voltage line only in accordance with the Owner's Safety & Health Procedures and in compliance with the requirements imposed by the Engineer-in-charge. All scaffold structures shall bear the scaffold identification serial number, the safe working load of its platform, the signature of Engineer-in-charge and a clear indication of the safe access period of seven days. Incomplete scaffolds must bear a caution – "Scaffolding Incomplete" (both in Hindi & Oriya).

The Contractor shall maintain a register of all scaffolds erected, dates of erection and reports of inspection and certificate of fitness. No scaffolding new or modified shall be used by any one unless it has been inspected by Owner's Safety Officer / competent person for satisfactory condition before use and thereafter before every subsequent seven days. If scaffolding members are provided by Owner, the Engineer-in-charge must certify the members of the scaffold before use.

In case of any modification or alteration in scaffolding, the Contractor must display on the scaffolds as "DO NOT USE" sign until it has been inspected and accepted as a safe structure by Owner's Safety Officer.

None other than a skilled & experienced workman shall erect, alter, modify the scaffolding under supervision of a competent person.

Any Contractor wishing to make use of an erected scaffold must ensure that permission has been granted by the Engineer-in-charge / competent person for the purpose and that the structure is capable of taking the load required for the related work. The Contractor must also confirm to the management instructions applicable to scaffold work control.

For work at height, but for short duration, where provision of a full scaffold is not reasonably practicable, safety harness must be used as per direction of Engineer-in-charge. Walking over unguarded beam at height is strictly forbidden.

- ii) Suitable scaffoldings should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period works as can be done safely from ladders. When a ladder is used a Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footsteps and handrails shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). No metallic ladder shall be allowed for use in work place.
- iii) Scaffolding or staging on more than 3.25 meters above the ground or floor shall swing or suspend from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one meter high above the floor or platform of such scaffolding or staging and extending along with the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- iv) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or the stairway is more than 3.25 meters above ground level or floor level, they shall be closely & rigidly constructed, should have adequate width and be suitably fastened as described in (ii) above.

Every opening in the floor of a building or in working platform should be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 meter. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9.0 meter in length. The length of rung between the side rails of ladder shall in no case be less than 30 cm for ladder up to and including 3.0 meter in length. For longer ladders this length shall be increased at least 15 mm for each additional meter of length. Uniform step spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical power. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall bear the expenses of defense of every suit, action or other proceedings of law that may be brought by any person for injury sustained

owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit or action or proceedings to any such person or which may with the consent of the Contractor to compromise any claim by any such person.

ITEM – 7: REPLACEMENT OF VALVES (MOT. OPERATED/ MANUAL/ NRV: -

The work involve in taking out the valve from the position and returning the same to the stores or any other place as directed by maint. engineer. Bolts and nuts are be cleaned by applying graphite grease on the threads, which will be supplied by OPGC. Erection of repaired/new valves into position and make it leak proof at the flange joints. If necessary, the gaskets may be replaced by new gaskets. In case welded type valves, during replacement additional charges for joint welding shall be applicable as per item-2 of miscellaneous jobs. The radiography/ ultrasonic/post heating/pre heating/stress relieving if required shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Rate for cutting & welding will be limited to 10mm alloy/carbon/ss and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

NOTE: -

For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size **as per formula – F as mentioned below.**

$$R_v = R (1 + C_v (D - 200) / 50)$$

Where R_v = Rate for the valve above 200NB size

R = Base rate for 200NB flange.

$C_v = 0.25$, co-efficient of valve above 200NB

D = Size of the valve in NB.

For valves in pipelines below 200NB size, the rates applicable shall be in direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100NB pipe, it shall be 200NB rate X 100/200 and so on.).

Unit rate shall be applicable for all types of valves and all materials of construction & pressure ratings.

While erecting the valves, wherever necessary new gaskets shall be provided at no extra cost. Gasket/gasket sheet shall be provided by OPGC free of cost. Fixing of gasket, bolts, nuts and making the joint leak proof are included in the scope of job.

No separate payment will be made for erection of valves.

ITEM – 8: SERVICING OF VALVES:-

Removal of actuators (in case of mot. operated valves.)

Removal of old gland packing, diaphragm, dismantling the bonnet/spindle/disc/seat is to be done as per requirement.

Complete servicing of the above components including blue matching.

Reassembly including replacement of new gasket/gland packing/diaphragm/rubber rings etc.

Checking for freeness of valve.

In case, the rectified valves do not work properly or hold pressure, contractor has to rectify the same free of cost. In case seat leak is not rectified, no payment will be made.

Spares, gasket, gland packing etc. will be provided by OPGC.

NOTE: -

For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size **as per formula – F as mentioned below.**

$$Rv = R (1 + Cv (D - 200) / 50)$$

Where Rv= Rate for the valve above 200NB size

R= Base rate for 200NB flange.

Cv=0.25, co-efficient of valve above 200NB

D= Size of the valve in NB.

For valves in pipelines below 200NB size, the rates applicable shall be in direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100NB pipe, it shall be 200NB rate X 100/200 and so on.).

ITEM-9–: Gland replacement of valves: -

It is required to open the valve gland follower to take out the damaged packing rings, replace them by new rings & place the gland follower in position for valves of different sizes. Packing rings/packing ropes shall be provided by OPGC as free issue materials.

ITEM–10: OVERHAULING & LOAD TESTING OF HOT/CHAIN PULLEY BLOCK/ELECTRIC HOIST: -

10-(A): OVERHAULING OF EOT/HOT/CHAIN PULLEY: -

The gearboxes, brakes, all bearings, traveling wheels, wire ropes & other components are to be checked thoroughly & serviced. Change of lubricants & lubricating of wire rope are to be done wherever required & as per advice of engineer in charge. After overhauling, proper operation of the crane to be ensured. Spares required shall be supplied by OPGC free of cost. Minor repair arising out of wearing parts have to be done by the contractor & the same is considered as part of the scope of work. The waste lubricants & scraps are to be shifted to designated location.

10-(B): LOAD TESTING OF ELECTRICAL HOIST/HOT/CHAIN PULLEY :

The chain pulley blocks are to be checked for proper operation prior to load test & load tested at 1.25 times its individual capacity or as per the direction of engineer in charge.

The test load shall be supplied by OPGC free if cost. However necessary arrangements, transportation of test loads to be testing place & return to designated place are to be done by the contractor. The servicing & load testing shall be repeated, if the equipment does not give satisfactory result & to the satisfaction of the testing engineers & safety officers of OPGC.

NOTE:- After servicing / load testing of lifting machine ,the date of testing & the load for which it is tested has to be stamped on the equipment by paint clearly.

10-(C): LOAD TESTING OF ELECTRIC HOIST & PRESSURE VESSEL TESTING:

The Electric Hoist with chain blocks shall to be physically checked for operation of limit switches/lubrication of ropes etc & it is to be rectified if required. Then hoists are to be tested individually at 1.25 times of its capacity or as per instruction of competent authority .The test load shall be given by OPGC & the contractor has to make their own arrangement for transporting the test loads to different spots & returning them back again as per requirement. The test load shall be kept in lifted condition for at least 1-½ hours & the lift clearance to the ground shall be measured at the interval of 10 mins. Further, along with the test load the crane shall be operated in long & cross travels .On satisfactory results the job is said to be completed. Pressure vessels to be tested as per the guide line of EIC.

Any defects noticed while testing the hoist is to be rechecked & same procedure shall be for which no extra cost shall be payable.

NOTE: - After servicing & load testing of lifting machine, the date of testing & due date of testing should be stamped on the equipment by paint/label clearly.

ITEM – 11: Material Shifting & Scrap removal: -

1. All materials shifting from stores to site are in contractor scope.
2. Scrap removal to scrap yard after job completion are in contractor scope.

HT MOTOR REMOVAL AND BEARING REPLACEMENT

1. Ensure PTW.
2. Decouple the motor from the gearbox.
3. Check whether bearing can be dismantled at this position or else it will be shifted to maintenance bay.
4. Bearing puller/jack etc will be in the contractor's scope.
5. Install the new bearing in place of damaged one.
6. Place the motor at its location and couple with the gearbox.
7. Align it as per the limits given by E.I.C.
8. Proper housekeeping is to be ensured after completion of work.

(Note: Scope of work includes issuing of spares if required during maintenance)

PART – 3

Man power category- Superskilled, Highly skilled , Skilled ,Semi Skilled & Unskilled nature to be deployed as per the various requirement of maintenance activities. This category may be deployed to the jobs, where the job rate is not available and as per the instruction of EIC.

Scope of mechanical manpower for assisting operation:

1. Welding jobs as and when required.
2. Attending gland leakages.
3. Safety related modifications

4. To assist operation team during emergency.
5. For replacing/repairing & fixing of valves, gaskets, etc

SCOPE OF MATERIALS

LIST OF TOOLS & TACKLES, MEASURING INSTRUMENTS, CONSUMABLES TO BE ARRANGED BY THE CONTRACTOR as mentioned in the annexure.

LIST OF OWNER ISSUE MATERIALS – FREE OF COST

The following items shall be issued as consumables as required

1. Structural steel (beams, angles, channels, plates, sheets, etc.) and pipes.
2. All spare parts.
3. Lubricants
4. Gland packing's, gaskets, seal rings
5. Fasteners.
6. Paints, thinner, primer.
7. Special compounds like steel putty, anti-seize, etc.
8. Special electrodes other than that for MS applications.
9. Dye Penetrate test kit (which includes Cleaner, Dye & Penetrate).
10. Nitrogen Gas for pressure testing/ purging/ etc.