Bharat Heavy Electricals Limited
Ramachandrapuram : : Hyderabad – 502032
M&S – DIVISION
SCOPE OF WORK (ANNEXURE-I)

Tender No.: M&S/P&S/2022/68, dt. 22.12.2022
Name of Work: Operation and Basic Maintenance of Coolant Recovery System

SCOPE OF WORK:

Operation and basic maintenance of Coolant Recovery System plant (CRS) (Capacity: 100LPH) at BHEL factory premises. The scope of work covers operating the coolant recovery plant in A-shift, and on all BHEL working days.

I. Operation and Basic Maintenance (OBMC) of CRS is mainly divided into two categories

1. Operation

i. Operating the CRS equipment in such a way that availability/Up time is 90% of available time (Days when BHEL is unable to provide used coolant for processing need to be excluded)
ii. Carry out processing activities (Collection, Processing) of mineral oil based used coolant only, as the machine is capable of handling mineral oil based coolant only.
iii. Collection of the used coolant from the designated places outside machine shops within main factory complex.

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iv. Conveying in the barrels to the centralized coolant treatment plant, storing in syntex tanks or drums and processing it to make it fit for recycling.
v. Transferring the processed coolant drums to the designated places outside machine shops wherever required.
vi. The scope also includes maintenance of the coolant recovery system including periodical preventive maintenance, replacement of all spares (Spares & consumables will be supplied by BHEL), testing of raw & treated coolant.
vii. Preparing water samples, raw coolant and treated coolant for sending to outside approved agency for testing purpose. (pH, TDS,TSS,O&G,COD, BOD). Periodicity is defined by Engineer in charge of CRS.
viii. If due to any reason, CRS system is down, manually need to be processed and segregated into – water and waste oil, sludge etc.

2. Maintenance

i) Minor repairs (Eg leaking, ..etc) and other major repairs need be carried out by team (BHEL will provide spares)

ii) Maintaining measuring instruments in good condition. Need to be replaced as and when required by working with Engineer in charge.

iii) Periodical maintenance (Eg. weekly washing of tank, etc.)

II. Processing Details

i. Processing of coolant can be carried out in two methods (Refer flow chart in Annexure-1)
ii. Machine processing: Minimum of 600 lit (3 full drums) to be processed thru CRS system per day.
iii. Manual processing: Minimum of 1200 lit (6 full drums) to be processed thru offline system for 8 hr shift.
iv. Total to be processed: 6 drums (1200 lit) per day (any combination of machine processing and manual processing is OK. But total drums to be processed should be 6 full drums per day on average).
v. If BHEL is unable to provide processed coolant drums due to any reason, Contractor will not be penalised.
vi. If BHEL is unable to provide required spares due to any reason, Contractor will not be penalised and such down time is not calculated into uptime calculation.
vii. Mineral oil based coolant and synthetic oil based coolant cannot be mixed, while collecting used coolant for processing.

III. Logistics and Material Handling

i. The contractor should maintain proper logbook for the performance of the system and the log book should contain the details of the quantity of collection of the waste coolant, Point of collection, quantity treated, quantity handed over, name of work centre, etc. complete. Format to be filled will be given by BHEL.
ii. The contractor should maintain a record for quantity of consumables and spares used every month for the verification by BHEL personnel.
iii. BHEL will provide battery operated truck. Bidder need to operate this for transporting of Used / Processed coolant.
iv. The raw Coolant will be collected from designated places of shop and will be transported to CRS Plant for processing.

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v. The treated Coolant will be collected and accounted separately and handed over to machine shops on case to case basis. If shops are not willing to take, used coolant after separation need to be put into drain water properly (after ensuring no oil is present).
vi. The collected tramp oil should be handed over by the contractor to the CMM Stores of BHEL.
vii. Solid waste should be handover to scrap yard.
viii. The spent Activated Carbon shall have to be dumped in the coal yard/scrap yard by the agency.

IV. Testing

i. The tenderers are advised to visit the existing Coolant Recovery System Plant at BHEL, Hyderabad in order to assess the nature of work, man power requirement etc., before submitting their offer.
ii. Raw coolant, processed coolant and the permeate discharge should be tested for pH, Volume for every batch taken for processing and a record should be maintained and produced to BHEL for its verification.
iii. Bacteriological Analysis for TBC using Bactaslide once in a month or as and when required by BHEL on Raw and Processed coolant should be conducted at the site. The number of tests will be limited to one per month for checking the Treated Coolant and 1 (one) per month for checking the Raw waste coolant. The used Bactaslides will be burn / destroyed in the presence of Engineer - in- charge and disposed without affecting the environment.
iv. The composite sample of the permeate discharged and the raw coolant water shall have to be analysed for Total Suspended Solids (TSS) and Total dissolved solids (TDS), pH, concentration, bacterial count as directed by BHEL, in line with the laid down procedures of BIS. One sample of raw waste coolant and one sample of permeate once in a month has to be collected, analysed and the report of analysis should be submitted to BHEL for verification.
v. The Contractor should use the in-built / supplied (hand held one instrument) monitoring equipment such as pH meter, Refractometer etc. to ensure quality of treated coolant.
vi. Periodical disposal of sludge & oil to scrap yard, as and when required/ informed by BHEL personnel.

V. Manpower

i. The contractor should engage required manpower for operation & treating the waste coolant and for transporting the waste coolant from various buildings like Shop No.01, 02, 06, 51, 70 and other blocks to the centralised treatment plant, transporting the treated Coolant back to designated places near machine shops.
ii. Drums shall be transported to and fro between designated places and CRS Plant by Battery Truck supplied by BHEL.
iii. The workers should be provided with personal protective equipment such as Gloves, safety shoes etc. by the Contractor.

VI. Maintenance of Equipment

i. All the chemicals required for routine maintenance and operation shall be supplied by the BHEL.
ii. Bag filter and Cartridge filter are cleaned not less than once in a quarter by rinsing in caustic soda solution and washing it with fresh water.

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iii. The Activated Carbon Filter is washed with caustic soda solution and fresh water at the end of week's operation (Saturday) and filled with fresh water and kept for 24 hours or up to starting of next shift. The entire Activated Carbon will be replaced with fresh materials once in 45 days. The spent activated carbon shall be disposed at the coal yard of PG Plant or as directed by the Engineer-in-charge.
iv. Basket Filters, Disinfection unit and process tank are to be cleaned daily after the end of the shift.
v. Monitoring and maintaining the pressure shall be done at inlet and outlet of the Filter System.
vi. The Basket Filter unit is cleaned daily by circulating DM water for about 20 minutes and saturated with fresh water by proper closing of inlet and outlet valves.
vii. Surface Disinfection unit is to be cleaned with surf water (200gms of Aerial powder in 25 lit. water) circulated for 30 minutes and washed with fresh water. This is carried out twice in week.
viii. TDS of the treated coolant shall be corrected if it exceeds 1300 ppm, by adding fresh water and disinfected on repeated cycles.
ix. Bactaslide is used to find the bacterial content of the coolant before and after disinfection. The number of tests will be limited to not more than five per month i.e.4 (four) for checking the treated coolant and 1 (one) for checking the raw coolant once in a month.
x. The contractor should submit month wise reports like (a) Daily Tracker, Delievery Report, Trial coolant Tracker (b) Lab Test Report of the used coolant and Treated coolant, and (c) PF & ESI remittance challans to Engineer-in-Charge and any other reports as informed by BHEL.
xi. Weekly preventive maintenance should be carry-out as per format given by BHEL, Backwash cycle should be done daily at end of the shift.
xii. Drawing of coolant oil from CMM Stores and adding it to the treated coolant in right proportion to maintain 5% concentration.
xiii. Battery operated truck driver - should have 'Light Motor Vehicle' (LMV) driving license.
xiv. While operating machine, operator should follow Flow diagram given by BHEL.
xv. Drums should be cleaned before filling of Treated coolant.
xvi. All consumables will be supplied by BHEL.

VII. Others

i. As BHEL has been accorded with ISO-9001, ISO-14000. ISO 50001 and OHSAS 18001 certification, the Contractor shall carry out qualitative work to meet these standards. Necessary documentation / paper work shall also be maintained. Future standards acquired by BHEL also need to be adhered. Contractor shall arrange his own tools for removal, dismantling, assembling and re installation of hoist/motors/gearboxes, etc. However, all spares including consumables like gear oil, electrodes, grease, cotton waste, etc., and facilities like gas cutting, welding, machining facility, repair, rewinding of motors, coils etc., shall be provided.
ii. Contractor shall carry out the work at his own risk, finance, human resources and supervision.
iii. Payment of work shall be made to the contractor on the basis of work carried out on measurement basis.
iv. Contractor shall have supervision on the conduct of his employees. Any violation of safety norms and misconduct by any of his employees/contractor may result in cancellation of Gate pass of that employee/contractor.

v. Parties may visit the site for actual site conditions, and all other relevant details related to Cranes.
vi. Contractor should take feedback from supervisor on work performed, taking corrective/ preventive measures and reporting status to Engineer/ In-charge crane maintenance.

VIII. Definition of One Operation

Processing: Carrying out processing of drums (thru machine and offline) in such a way 6 drums per day (average) is maintained. Monthly data will be checked for such verification and considered as operation. 70% of PO value is allocated to Processing. There will be 12 such operations in a year.
In a week – 4 days are for processing and 1 day for – delivering empty drums to scrap yard, and 1 day for – collection of used coolant drums from respective shops.
Processing can be done by machine or manual method.

Maintenance: Carrying out Maintenance (PM and BD) in such a way that 90% uptime of machine is maintained. Monthly data will be checked for such verification and considered as operation. 30% of PO value is allocated to Maintenance. There will be 12 such operations in a year.
In case of manual operation → Loading of drums onto platform is considered.

IX.Penalty Clause

i. As this contract is Works Contract, Supplier's Performance is measured based on uptime of Processing of drums and Uptime of CRS system.

Parameter	Criteria	Penalty
Processing of Used coolant drums (thru machine) (Or)	3 drums (600lit) per day on average. Monthly reckoning is done. There will be 12 such operations in a year.	Average processed per day ≥ 3 drums – No penalty 2 drums - Rs.600/-. For every 1 drum(200Lit) decrease - Penalty will be increased in multiples of Rs.600/-. Total penalty shall not exceed 30% cost of monthly cost of processing
Processing of Used coolant drums (thru offline)	6 drums (1200lit) per day on average. Monthly reckoning is done. There will be 12 such operations in a year.	Average processed per day ≥ 6 drums – No penalty 5 drums - Rs.300/-. For every 1 drum (200Lit) decrease - Penalty will be increased in multiples of Rs.300/-. Total penalty shall not exceed 30% cost of monthly cost of processing

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Uptime of CRS system (thru machine connected) Or	90% should be available. Monthly reckoning is done. There will be 12 such operations in a year.	Uptime in a month 90% - No penalty. For every 5percent decrease, penalty of Rs.1000/- will be imposed. Total penalty shall not exceed 30% cost of monthly cost of Uptime /Maintenance cost.
Manual loading of drums onto Platform	Manpower should load 6 drums per day for all worked days and such activity for one months is considered as one operation. Monthly reckoning is done. There will be 12 such operations in a year.	Average loaded per day ≥ 6 drums – No penalty 5 drums - Rs.100/-. For every 1 drum (200Lit) decrease - Penalty will be increased in multiples of Rs.200/-. Total penalty shall not exceed 30% cost of monthly cost of processing.

ii. Breakdown time for the reason not attributable to contractor (Eg. non availability of spare) will not be included while calculating break down time for Penalty.
iii. Due to pandemics (Eg. Corona lockdown, shortage of supply of used coolant drums to CRS system due to reduced working hours, etc.), if BHEL is unable to provide used coolant drums, break can be given to contract workers/team after discussing and mutually agreeable terms and conditions.

Example of Penalty Calculations:

Contract Value	: 6.0 L
No. of months in a year	: 12
Monthly cost of OBMC of CRS	: RS 6.0L /12 = Rs 50,000/-
Monthly cost - Processing	: Rs 50,000/- x 70% = Rs35,000/-
Monthly cost - Maintenance	: Rs 50,000/- x 30% = Rs15,000/-

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