

Annexure - II				
Supply and Installation of Refractory Bricks for Producer Gas Generator				
Sl. No.	BHEL DESCRIPTION	SPECIFIED/ TO BE CONFIRMED BY VENDOR	VENDOR'S OFFER	DEVIATIONS IF ANY
1.0	Breif Description of Producer Gas(PG) Generator;			
1.1	The PG generator is used for producing 4,000 Nm3 per Hr of producer gas from crushed coal along with steam and air mixture. The generator inside temperature will vary from 600 °C. to 1400 °C. The pressure inside the PG Generator will be of minimum 100 mm of water column. The PG Generator is a continuous running equipment operated for all 24 Hrs x 365 Days.	Vendor to Note		
1.2	The PG Generator is a cylindrical vessel of diameter around 3 metres and height approx. 5.2 metres . <u>The PG Generator consists of three segments;</u> <u>(a)PG Generator Shell with water jacketed portion;</u> The bottom of the Generator Shell consists of water jacketed portion for a height of approx.2.3 metres. <u>(b)PG Generator Shell with Brick lined portion;</u> The Generator shell above the water jacket is of approx.2.8 metres and it consists of brick lining as per BHEL Drawing No.1M-20B-07-0222.Between the 6 mm thick Generator shell and brick lining,it consists of fossil flour/fossil material for min.40 mm thick(refer BHEL Drawing No.1M-20B-07-0222). <u>(c)Top Cover of the Shell with Brick lining;</u> The top of the cylindrical vessel/PG Generator shell consists of circular cover of around 3.25 metre diameter,10 mm thick Mild Steel plate which is interconnected to the vertical cylindrical shell by bolts & nuts. This portion consists of brick lining as per BHEL Drawing No.1M-20B-07-0222. The 120mm height above the top bricks (refer BHEL Drawing No.1M-20B-07-0222) consists of insulation castable and then ceramic fibre blankets.The top circular cover is placed over the ceramic fibre blankets and interconnected to the Generator shell.	Vendor to Note		
1.3	The Generator is subjected with a coal load of approx. 30 MT inside during its operation. The Generator shell portion will be subjected to an atmosphere of carbon monoxide,Hydrogen,methane and abrasive movement of coal, erosion, thermal shock with refractory lining bricks.The brick lined portion of the PG Generator will be subjected an inside temperature around 600 °C.	Vendor to Note		

2.0	Breif Description of supply/work			
2.1	The existing brick lining arrangement of the PG Generator available at BHEL,Trichy,Tamil Nadu as per BHEL Drawing No.1M-20B-07-0222 are in damaged condition. Hence the vendor shall supply complete set of new refractory bricks. On completion of total bricks supply by the vendor,the existing brick lining is to be removed and the new bricks are to be installed in the PG Generator by the vendor.	Vendor to Confirm		
3.0	Scope of Supply			
3.1	The refractory bricks for the PG Generator are to be supplied based on the Brick Lining Arrangement specified in the BHEL Drawing No. 1M-20B-07-0222. The supply of One Set of refractory bricks shall consists of the following:			
3.1.1	Shaped Bricks as per BHEL Drawing No. 4M-20B-07- 2915 of quantity 24 Nos.	Vendor to Confirm		
3.1.2	Shaped Bricks as per BHEL Drawing No. 4M-20B-07- 2914 of quantity 16 Nos.	Vendor to Confirm		
3.1.3	Shaped Bricks as per BHEL Drawing No. 4M-20B-07- 2913 of quantity 40 Nos.	Vendor to Confirm		
3.1.4	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07- 2912 of quantity 16 Nos.	Vendor to Confirm		
3.1.5	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07- 2911 of quantity 40 Nos.	Vendor to Confirm		
3.1.6	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07- 2910 of quantity 340 Nos.	Vendor to Confirm		
3.1.7	Poke Hole Block as per BHEL Drawing No. 4M-20B-07-2909 of quantity 8 Nos.	Vendor to Confirm		
3.1.8	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07- 2908 of quantity 16 Nos.	Vendor to Confirm		
3.1.9	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07- 2907 of quantity 36 Nos.	Vendor to Confirm		
3.1.10	Shaped Bricks as per BHEL Drawing No. 4-M-20B-07-06251 of quantity 50 Nos.	Vendor to Confirm		
3.2	The supply of One Set of refractory brick lining and insulation lining materials shall consists of the following;			
3.2.1	Mortar of quantity of 2000Kgs along with required liquid binder. The mortor shall consists of min. 50% Alumina and shall be suitable for service temperature of max. 1500 deg C.	Vendor to Confirm		
3.2.2	Fossil flour/Fossil material of quantity 5500 Kgs.	Vendor to Confirm		
3.2.3	Insulation castables of quantity 2500 Kgs as per below specifications; Al2O3- 45% min. , SiO2-41.6% , Fe2O3-1.2% Max , TiO2-0.9% , CaO 10% ; Max. Service Temperature - 1300 deg C.; Max grain size - 6mm.	Vendor to Confirm		
3.2.4	Ceramic fibre blankets of 1260 grade, 128Kg/m3 density of quantity 6 rolls (Size of one Roll :7300 - 7620mm(L) x 610mm(W) x 25mm(T))	Vendor to Confirm		

4	Scope of Work		
4.1	The existing refractory lining and the insulating lining present in the Top cover of the PG Generator Shell and around the circumference of the PG Generator Shell as per the BHEL Drawing No.1M-20B-07-0222 and as described in above Sl.No.1.2 are to be removed by the vendor.The jacketed portion of the PG Generator shall remain untouched. Proper care is to be taken while removal of the refractory materials such that the PG Generator shell is not affected/damaged. The removed materials are to be moved to the disposal point located within the BHEL premises by the vendor.The hand cart/vehicle required for the movement of the removed materials will be provided by BHEL.	Vendor to Confirm	
4.2	The installation of newly supplied refractory materials are to be done in the Top cover of the PG Generator Shell and around the circumference of the PG Generator Shell as per the BHEL Drawing No.1M-20B-07-0222 and as described in above Sl.No.1.2 by the vendor.	Vendor to Confirm	
4.2.1	For enabling installation of new refractory materials, the top cover will be removed and kept separately by BHEL.The same will be assembled by BHEL after completion of the refractory work by the vendor.	Vendor to Confirm	
4.2.2	The refractory work is to be carried out separately for the PG Generator Shell portion and for Top Cover portion and both are to be merged during assembly at the top with the cylindrical portion. Fixing of ceramic board or ceramic fibre blankets in place of fossil flour/fossil material around the PG Generator shell wall between shell and bricks shall not be done. No anchoring shall be done in the PG Generator shell.	Vendor to Confirm	
4.2.3	The assembled brick on the top cover after curing has to be tilted and lifted and positioned on the shell with sufficient mortar on the shell brick to enable proper bonding after the assembly of top cover with the shell.	Vendor to Confirm	
4.2.4	The fossil flour/fossil material around the circumference of the shell wall is to be minimum of 40mm as per BHEL Drawing No.1M-20B-07-0222. The 120mm height above the top bricks are to be insulated by providing insulation castable and then further with ceramic fibre blankets.This arrangement in the top should take care from falling of bricks due to self weight or thermal shock. The hot face of the refractory bricks shall be lined with minimum 25mm thickness refractory materials. After completion of the above said activities,the removed top circular cover will be placed over the ceramic fibre blankets and interconnected to the PG Generator shell by BHEL.	Vendor to Confirm	

4.3	It is in the scope of vendor to arrange the required tools and tackles and the required manpower to complete the work.	Vendor to Confirm		
4.4	The work is to be completed within 3 weeks from the date of handing over of the PG Generator by BHEL to the vendor.	Vendor to Confirm		
5	Scope of BHEL			
5.1	Welding sets with cables and welding consumables, gas cutting set with hoses and cutting gases will be provided by BHEL.	Vendor to Note		
5.2	For enabling installation of new refractory materials, the top cover will be removed and kept separately by BHEL. The same will be assembled by BHEL after completion of the refractory work by the vendor.	Vendor to Note		
5.3	The required scaffolding materials for the refractory work will be provided by BHEL. However the scaffolding shall be done by the vendor.	Vendor to Note & Confirm		
6	General Points			
6.1	Pre-despatch inspection - Complete refractory materials shall be offered for inspection at vendor's works to BHEL official before despatch.	Vendor to Confirm		
6.2	Test certificates - Material test certificates for the refractory materials are to be produced by the vendor during Pre-despatch inspection and along with final supply of materials	Vendor to Confirm		
6.3	Delivery Period - Preferable Delivery Period of the materials is to be within 12 Weeks from the date of purchase order.	Vendor to Confirm		
6.4	Guarantee - The PG Generator is of continuous operation in nature. Once new refractory bricks are lined, the PG Generator will run with gas flow for 365 days in a year without any interruption. Hence the quality of brick lining work is to be carried out with utmost care by the vendor. This execution quality is to be guaranteed for a period of one year by the vendor for the workmanship.	Vendor to Confirm		
6.5	Specific Note - Supplier should quote rate separately for supply of materials and separately for removal of existing refractory materials, installation of new refractory materials and order will be given to a SINGLE Vendor on CUMULATIVE L1 basis.	Vendor to Confirm		