FOR OFFICIAL USE ONLY
NOT FOR PUBLICATION

TENDERER'S COPY
ORIGINAL COPY

T E N D E R S P E C I F I C A T I O N

TENDER NO. BHEL: NR: SCT: MSIL: GTG: 618

FOR

MATERIAL HANDLING, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF 1 X 20 MW FR V GTG SET INCLUDING AUXILIARIES, PIPING, ASSOCIATED ELECTRICAL, C&I EQUIPMENT, ETC. AT MARUTI SUZUKI INDIA LTD., MANESAR, GURGAON, HARYANA.

PART I – TECHNICAL BID

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
Fax 091-0120-2515464 / 2515467
Email: sku@bhelpsnr.co.in / swapan@bhelpsnr.co.in

TENDER NO. BHEL: NR: SCT: MSIL: GTG: 618

IMPORTANT NOTE

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S----------

INDEX

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
Fax 091-0120-2515464 / 2515467
Email: sku@bhelpsnr.co.in / swapan@bhelpsnr.co.in

TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for the works of **"MATERIAL HANDLING, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF 1 X 20 MW FR V GTG SET INCLUDING AUXILIARIES, PIPING, ASSOCIATED ELECTRICAL, C&I EQUIPMENT, ETC. AT MARUTI SUZUKI INDIA LTD., MANESAR, GURGAON, HARYANA."**

TENDER NO. BHEL: NR: SCT: MSIL: GTG: 618

QUALIFYING REQUIREMENTS:

"Tenderers who wish to participate should fulfill following 'Qualifying Requirements";

1.1 Tenderers who wish to participate should have executed work of similar nature as covered in this tender for 20 MW Gas Turbine or higher capacity 'OR' 30 MW Steam Turbine or higher capacity in Power Projects/ Industrial Projects during last 7 years.

'AND'

1.2 Party should also have an average annual turnover of minimum of Rs. 195 lacs (Rupees One Hundred Ninety Five Lacs Only) during preceding three years (2005-06, 2006-07, 2007-08)." The bidders shall submit audited balance sheets in support of this.

NOTES:

(i) The Tender Documents comprise of following;

a. General Conditions of Contract
b. Tender Notice, Project Synopsis, Special Conditions of Contract, etc.
c. Rate Schedule

(ii) Tender Documents with complete details are hosted on BHEL's web page www.bhel.com. Bidder(s) intending to participate may download the tender document from the web site. Bidder(s) downloading the tender documents from the web site, shall remit Rs.1000/- (Rupees One thousand only) in the form of crossed demand draft (non-refundable), in favour of BHEL, NOIDA along with their offer.

(iii) Bidder(s) can also purchase hard copy of tender documents from this office. Tender documents (non transferable) will be issued on all working days between 09.30 Hrs. to

12.30 Hrs within the sale period i.e ***upto 22.04.*2008** on payment of Rs.1,000/- (non-refundable) either in cash or by crossed demand draft in favour of BHEL, NOIDA. Request for issue of tender document should clearly indicate Tender No. and work.

(iv) Tenders must be submitted to the undersigned 'OR' to Shri Kailash Arora, Sr. Asstt. 'OR' to Smt. Usha Kochhar, Sr. Astt. in Room No. 104, PSNR, NOIDA latest by **15:00 Hrs**. **on 22.04.2009**. Technical bids shall be opened at **15.30 Hrs. on 22.04.2009**. Tenders received after the due date & time shall be liable to be summarily rejected.

(v) Earnest Money Deposit (EMD): Refundable, Non-interest bearing **EMD** of Rs 2,00,000/- 'OR' **USD 4000** shall be deposited by Account Payee Pay Order 'OR' Demand Draft in favour of " Bharat Heavy Electricals Limited" payable at Delhi/NOIDA.Those bidders who have already deposited ' One Time 'EMD' of Rs. 2,00,000/- with BHEL, PSNR, NOIDA need not submit EMD with the present tender.

(vi) Tenders not accompanied with Full Earnest Money Deposit, as indicated above, will not be considered.

(vii) **All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in this web page and not in the newspaper. Bidders shall keep themselves updated with all such amendments.**

(viii) BHEL reserves the right to accept or reject any 'OR' all tenders without assigning any reason whatsoever.

(ix) BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.

(x) **BHEL reserves the right to go for a Reverse Auction instead of Opening the submitted sealed bid, which will be decided after technical evaluation. As such, the bidders should submit their best prices in the 'Sealed Price Bid'. However, bidders are required to confirm their acceptance of "General terms and conditions" governing RA specifically in their technical bid. The "General terms and conditions" governing RA are given in the SCC of the NIT. Bidders are also required to furnish following details in their techno-commercial bid, for this purpose (RA).**

Authorization of representative who will participate in the on line Reverse Auction Process;

1. Name and Designation of official
2. Postal Address (Complete)
3. Telephone Nos. (Land line & Mobile both)
4. FAX No.
5. E-mail address
6. Name of Place/State/Country, wherefrom he will participate in the RA

(xi) Unsolicited rebate/discount shall not be accepted after bid opening.

(xii) Purchase Preference will be given to Indian CPSUs as per Govt. Guidelines.

DGM/SCP

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
Fax 091-0120-2515464 / 2515467
Email: sku@bhelpsnr.co.in / swapan@bhelpsnr.co.in

DOMESTIC NOTICE INVITING TENDER

DUE DATE OF SUBMISSION *:* 22.04.2009 (15:00 Hrs.)
DATE OF OPENING *:* 22.04.2009 (15:30 Hrs.)

NIT NO. / NAME OF WORK
TENDER NO. BHEL: NR: SCT: MSIL: GTG: 618 Sealed tenders are invited from the contractors fulfilling qualifying requirements for "**MATERIAL HANDLING, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF 1 X 20 MW FR V GTG SET INCLUDING AUXILIARIES, PIPING, ASSOCIATED ELECTRICAL, C&I EQUIPMENT, ETC. AT MARUTI SUZUKI INDIA LTD., MANESAR, GURGAON, HARYANA**".

NOTES
1. Purchase Preference will be given to CPSU as per Govt. Guidelines.
2. Please visit our website at www.bhel.com for details of NIT including Qualifying Requirements.

DGM/SCP

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA

PROCEDURE FOR SUBMISSION OF SEALED TENDERS:

The tenderers must submit their tenders as required in **two parts** in separate sealed covers **prominently superscribed as Part-I Technical bid and Part-II ,Price bid** also indicating on each of the cover tender specification no., date and time as mentioned in tender notice.

TECHNICAL BID (COVER-I)

Except **Price bid Part-II**, complete set of tender document consisting of General conditions of Contract, "Technical specification & Special terms and condition" (Part-I) issued by BHEL shall be enclosed in **Part I Technical Bid only**. All schedules, data sheets and details called for in the specification shall also be submitted along with technical bid. All details / Data / Schedules including offer letter duly signed and stamped are to be **submitted in duplicate**.

PRICE BID (COVER-II)

Tenderers may please note that price bid is **to be submitted only in original copy** of Tender i.e. Price bid (Part-II) issued by BHEL and no duplicate copy of same is required.

These Two separate covers i.e. cover I & II shall together be enclosed in a **third envelope (Cover-III)** and this sealed cover shall be super scribed with tender specification No., due date, time and submitted to officer inviting tender as indicated in tender notice on or before due date as indicated.

PROJECT SYNOPSIS

M/s MSIL, (M/S Maruti Suzuki India Limited, Manesar Plant, Plot No.-1, Phase-3A , IMT Manesar, Gurgaon -122051 (Haryana) has entrusted BHEL for design, supply, erection, testing, commissioning and PG test of 1 X Fr V (20 MW) GTG unit consisting of Gas Turbine, Generator and all the associated auxiliaries.

The expansion project of M/s MSIL is already equipped with operative GTG's sets of capacity 3 X 4.3 MW, 3 X 10 MW & 1 X 3.5 MW.

The project is situated at Manesar, Gurgaon in Haryana state, located about 60 KMs from New Delhi Railway Station. It is well connected to national highway (NH-8) at Rajiv Chowk Gurgaon. IGI Airport is the nearest Airport .

SECTION III (PART-A)

SPECIAL CONDITIONS OF CONTRACT

INDEX

SECTION-III 'A'
SPECIAL CONDITIONS OF CONTRACT

(PART-A)

34.0 GENERAL

34.1 The intent of this specification is to provide services for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lump sum price shall deem to be inclusive of all such contingencies.

34.2 The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification supplied by MSIL / BHEL from time to time.

34.3 The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during execution. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be affected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.

34.4 Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices.

A Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated inspection, measuring and test equipments as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling and PG test.

B Proper out-turn as per BHEL's plan and commitment

C Completion of work as per BHEL Schedule.

D Good quality and accurate workmanship for proper performances of equipment.

E Repair and rectification

F Preservation / Re-conservation of all components during storage / erection till handing over. All assistance during PG test

34.5 Health, Safety & Environment management (HSE)

BHEL-Power Sector (NR) is ISO 9001-2000, ISO 14001-1996, OHSAS 18001-1999, ISO 27001 and SA-8000 certified company. Quality of work, to customer's satisfaction and system requirements is the essence of these certifications. The contractor in all respects will organize his work, systems, environment, process control documentation, tools, plant, inspection, measuring and testing equipments etc. as per instructions of BHEL engineer.

The contractor shall also comply with applicable legislation and regulations with regards to Health, Safety and Environmental aspects for minimizing risk arising from occupational health & safety hazards, controlling pollution and wastage. The Contractor will be responsible for Health, Safety & Environment management (HSE) at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC and elsewhere in this tender document. The contractor, who is awarded the work, shall have to sign an MOU w.r.t implementation of HSE conditions with BHEL (Safe Work Practices).

34.5.1 Besides provision with regard to SAFETY under Clause 27 of GCC, the contractor will be responsible for Health, Safety & Environment management at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC of this document. The contractor shall continuously take special care to ensure the safety and prevention of human and equipment accidents and maintain good sanitary conditions in and around the site. All the construction work and plant operation must be carried out in the safest possible manner. The Engineer reserves the right to stop any process which, in the Engineer's opinion, is being performed dangerously. In this case the contractor must immediately adhere the requisite safety precautions and any delays attributed to the work stoppage on this account shall not affect the agreed contractual finishing dates.

The contractor shall appoint dedicated full-time Qualified Safety Officers who shall have full authority to ensure that all necessary safety precautions are observed by the Contractor's employees and sub-contractors. These appointees shall have full responsibility for the safety of all personnel within the contractor's area of the works.

34.5.2 Some of the common safety rules to be followed during working are as follows**:-**

- No body is allowed to enter at construction site without Safety Shoe.
- Never enter work area without Safety helmet & chin strap in place.
- No climbing/working allowed without proper safety belt above 2 m. height.
- Do not exceed the speed limit 25 Kmph / as per guidelines of MSIL within premises.

- No debris obstacles allowed on the roads & passages.
- Do not walk on pipelines or false ceiling.
- Maintain good Housekeeping at work site.
- No photography/ Videography allowed without permission
- All Site supervisors & engineers (including subcontractors) must be imparted structured training on construction safety before start of the job & record to be maintained.
- Availability of qualified & trained Site Engineer at site during working hours and exigent hours (holidays/ night shift).
- Site Safety training to be imparted to all workers & plan to be made to cover every worker.
- Tools box by supervisor prior to commencement of any job.
- All accident / incidents(Near Miss) to be reported & investigated.(formats & procedure should be finalized)
- Daily Safety Checking by Each Site Engineer along with Safety engineer.
- Weekly co-ordination meeting of all Safety engineers with BHEL safety officer.
- Monthly safety meeting with Site In-charges.
- All Safety equipment must be ISI marked & checked by Safety officer before use.
- Tag system for erection & use of scaffoldings.
- Bamboo/wooden Scaffolding material not allowed.
- LPG cylinders not allowed for gas cutting.
- Good House keeping. Separate waste bins to be used for flammable & non flammable material.
- Safety awareness programs for workers by display of boards, posters, competitions, talks etc.
- Deployment of Safety Supervisors at work site.
- Display of List of First Aid trained persons.
- Testing certificates for lifting tools & tackle.
- Provision & maintenance of fire extinguishers at construction site & material stores.
- Display of emergency telephone numbers at various locations.
- For work in confined space use 24 V lamp fitting & use tools with air motors or electric tools with max. 24 V.
- For confined space entry Gas test must be done before & at regular intervals.
- Checking & tag of equipment like grinding machine, welding machine, gas cutting set etc. by supervisors before use.

Further, the contractor is required to provide proper Safety Net System wherever the hazard of fall from height is present as per instructions of BHEL Engineer at site. The safety net shall be fire resistant, duly tested and shall be of ISI mark and the nets shall be located as per site requirement to arrest or to reduce the consequences of a possible fall of persons working at different heights.

34.5.3 **Contractor shall ensure following:**

Contractor has to maintain contact with local hospital having ambulance facility, scanning & other ultra modern medical facilities required during emergency.

Contractor has to ensure pre employment medical check for all staff & workers.

Contractor has to ensure adequate First Aid facilities.

34.5.4 The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries. It may be noted that non-compliance to HSE requirements will result in penal action. In case of violations of safety requirements, the Contractor shall be liable for a penalty of Rs. 200/- for the first violation and Rs. 500/- for the subsequent violations. For serious lapses, as decided by BHEL Engineer, fines upto Rs. 5000/- at a time can be imposed.

The amount towards penalties as above will be deducted from running bills of the Contractor. The amount so collected above will be utilized for supporting the safety activities at site. The decision of BHEL on above will be final and binding on the Contractor.

34.5.5 **THE CONTRACTOR SHALL COMPLY WITH FOLLOWING TOWARDS SOCIAL ACCOUNTABILITY;**

a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged , the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.

b) The contractor shall not engage Forced/Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.

c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour(Regulation & Abolition) Act,1970.

d) The Contractor shall abide by UN convention w.r.t Human Rights and shall be liable for Discrimation/Corporal punishment for failure in meeting with relevant requirements.

e) The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.

f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.

g) The Contractor shall arrange potable drinking water to its employees & workers.

35.0 PRELIMINARY WORKS

35.1 The contractor shall receive, unload, handle, stack, verify, preserve etc. of all the materials; properly, in open / closed/ semi-closed as required which shall be payable as per the item rate applicable for materials handling of rate schedule.

Contractor should check the foundations as per the drawings, documents and specification such as location of foundations, their consolidation, absence of voids, levels, correctness of foundation bolt holes, pockets levels and centerlines etc. before receiving the same for erection activities. All measurements should be recorded and submitted to Engineer for approval before erection.

35.2 Contractor shall ensure that the area where erection action activity to be started is sufficiently enclosed/ guarded against ingress of dust and water, and all debris have been cleared off from the floor to a designated area as per instruction of Engineer. The contractor shall arrange to get the working area and surroundings cleaned daily to ensure a dust free atmosphere for working. Contractor shall cover all openings on operating floor and put temporary hand railings on all sides of the floor to avoid any accident to the personal working.

35.3 The contractor shall maintain a tool stores for special tools and instruments at a convenient location near to the place of working. Necessary area shall be provided to contractor by BHEL. This is to be cleared after completion of the work. If so required he will have to shift the same if required giving fronts to other agencies engaged at site.

35.4 The accuracy of all equipment / instruments and their functioning shall be established before they are permitted for use on the job. The accuracy of the precision tools is to be ensured by contractor. All the IMTE's are to be kept calibrated and maintain its validity during their utilization. The contractor shall arrange the checking / calibration of tools / equipment/ instruments at his cost.

35.5 Contractor shall set up longitudinal and axial centre lines, and two or more level bench marks accurately on GTG floor which shall be certified by BHEL. This certified GTG centre lines and datum level shall be the reference for GTG and all auxiliaries' erection and alignment work.

35.6 All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filling and blue matched, wherever necessary sealing / lubricating / antisieze compounds shall be applied as per recommendation of engineer. Machining / grinding required for fitting of keys, pins packers & dowels etc. shall be carried at his cost.

35.7 All the works shall be performed to the lines, grades and elevations indicated on the drawings. The contractor shall be responsible to locate and layout the works. The horizontal & vertical control points established by the Engineer shall be used as datum for the works under this contract. Any work done without being properly located may be removed and dismantled by the Engineer at the contractor's expenses.

36.0 CIVIL WORKS, FOUNDATIONS AND GROUTING.

36.1 MSIL shall provide all equipments foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required as incidental to the work for the erection of equipment / plants shall be carried out by the contractor.

36.2 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided if it is allowed by BHEL Engineer. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with prussian blue to get the required contact with frames.

36.3 The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to be aligned and fixed on the foundations.

36.4 **All Civil works are under the scope of MSIL** however, Minor chipping etc. to grout of structures, equipments, including anchor / foundation bolts, beneath base, base hollows etc. as may be applicable, is included in the scope of contractor. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification / work before handing over the equipments for further civil works.

After the chipping & then minor grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

36.5 NA

36.6 The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores,

couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting check up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer.

37.0 CONSUMABLES

37.1 The contractor shall provide within finally accepted rates, all consumables like, gland packing, all the type of BHEL / MSIL approved welding electrodes (including alloy steel, Aluminum, stainless steel), Aluminum filler wires , TIG wires , all inert / welding gases, soldering material, dye penetrants, other erection consumables such as tapes, jointing compound , grease, mobile oil, M-seal, Araldite, Parmali wood, petrol , CTC / other cleaning agents, petroleum jelly, insulation tape, PVC sealing compound, sleeves , cable ties, gaskets and shims, wooden, sleepers, steel required for temporary works such as supports, packing hardware items, paints, sealing compound required for completion of work except those which are specifically supplied by manufacturing unit. Tarpaulins shall be provided by contractor for covering materials during storage.

.

37.2 It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.

37.3 It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc. before procurement of welding electrodes / TIG wires. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch No. date of expiry etc. and produce test certificate for each lot / batch with correlation of batch / lot no. with respective test certificate. No electrode will be allowed to be used without valid test certificate.

37.4 BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required & records maintained.

37.5 Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

37.6 In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time (30% at present). Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the contractor.

37.7 All lubricants and chemicals required for testing, pre-commissioning, commissioning, preservation and lubricants for trial runs of the equipment shall be supplied by BHEL / BHEL's client. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. The consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked and returned to stores.

37.8 Transportation of Oil Drums from stores, centrifuging and first filling of Oil, subsequent topping / makeup till the unit is commissioned and handed over to the customer is included in the scope of this contract. The contractor shall have to return all the empty drums to BHEL / BHEL client's store at no extra cost. Any damage / loss of above drums shall be to the contractor's account.

37.9 All charges on account of Octroi, terminal or sales tax and other duties on materials obtained for the works from any source shall be borne by the contractor.

37.10 **Supply of copper tinned lugs of various types (pin, ring, fork, and snap-on) upto 4 sq.mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the awarded rates of contract.** The quality of material (dowel make) shall be got approved from BHEL engineer prior to their use on job.

Danger boards (11 KV, 415V etc.), Shock Hazard charts, sand buckets, rubber mats, GI Pipe bends – (50dia,100dia & 200dia) for cable termination up to equipment JB, GI clamps for holding cables onto Cable tray risers, Cable ferrules, Cable tags (3mm thick, 75mm long, 15mm width Al Strips) & Cable route markers, Cable Lugs Cripling Type Tinned Cu for Control & Inst. Cable as required, Cable lugs and cable glands for control and power cable as required etc. shall have to be supplied by

Contractor within quoted rates of contract as approved from BHEL Engineer.

However, if any of above material is supplied with the main supplies shall be provided to contractor free of charge for erection. Contractor shall take care of above while bidding for the work.

38.0 TOOLS AND PLANTS / IMTE's

38.1 All the T&Ps and IMTEs required for successful and timely execution of the work covered within the scope of this tender, shall be arranged by the contractor. He should ensure that these are in good in working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps and IMTEs, BHEL will be at liberty to arrange the same at the risk and cost of contractor and hire charges with overheads as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.

38.2 All distribution boards, connecting cables, wire ropes, hoses, pipes etc, including temporary air / water / electrical connections etc shall have to be arranged by the contractor at his own cost.

38.3 **NA**

38.4 The contractor shall engage trained and experienced operators for the operation of MSIL/BHEL's T&Ps,if any. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.

38.5 Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost. All necessary manpower tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost.

38.6 All supervision and labour required for maintenance and attending breakdowns shall be arranged by the contractor at his own cost.

38.7 The area and infrastructure development of the area to be carried out by the customer. However in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases consolidation of ground and arrangement of sleepers / sand bag filling etc for safe operation / movement of equipment including cranes / trailers etc

shall be the responsibility of the contractor at his cost. No compensation on this account shall be payable.

38.8 In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.

38.9 NA

38.10 Any loss / damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.

38.11 The contractor shall return BHEL T&Ps and IMTEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and IMTE, hire charges as applicable shall be levied by BHEL from time it was issued till the time of actual return. *Hire charges shall also be charged on the T&Ps and IMTEs returned in damaged / unserviceable condition to BHEL till their satisfactory repair*. T&Ps & IMTEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.

38.12 Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and IMTEs shall be recovered from the contractor's running / final bills.

38.13 Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection, Measuring and Test Equipment). The IMTEs shall have test/ calibration certificates from authorized/ Govt. approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

38.14 Retesting / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. Also if any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall i.e. repeat the readings taken by that instrument, failing which BHEL may deploy IMTEs and retake the readings at contractor's cost.

38.15 BHEL shall have lien on all T&Ps, IMTEs & other equipment of the Contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of Contract. No material brought to the site shall be removed from the site by the Contractor and/or his Sub-contractors without the prior written approval of the BHEL Engineer

38.16 The month wise T&P deployment plan to be submitted as per format (at Annexure-D to General Conditions of Contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy all the required T&Ps, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.

39.0 SUPERVISORY STAFF AND WORKMEN

39.1 The contractor shall deploy all the skilled workmen like fitters, welders, crane-operators, drivers, gas cutters, welders, riggers, sarangs, masons, carpenters, electricians, helpers and instrument technicians to carry out the works round the clock in three shifts as situation warrants as per specifications. In addition to skilled, semi-skilled and unskilled workmen required for all the works, suitable workmen required for handling and transporting of equipment from site storage to erection site, erection, testing and commissioning as contemplated under this specification shall be deployed. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary.

BHEL reserves the right to decide on the suitability of the workers and other personnel who will be deployed by the contractor. BHEL reserves the right to insist on removal of any employee / workman of the contractor at any time, if they find him unsuitable. The contractor shall remove him forthwith.

39.2 The adequate supervisory staff, including qualified Engineers, shall be deployed by the contractor to ensure proper out-turn of work and discipline on the part of the labor put on the job by the contractor and in general see that the works are carried out in a safe and proper manner and in coordination with other labor and staff deployed directly by BHEL or other contractors of BHEL or BHEL's client / other agency.

39.3 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations / activities at site. The contractor and his personnel shall

cooperate with other personnel / contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

39.4 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that assembly and workmanship conforms to the dimensions and tolerances given in the drawings / documents / instructions given by BHEL Engineer from time to time.

39.5 The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation and miscellaneous commissioning jobs till the completion of work as specified by BHEL engineer.

39.6 It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the targets set by BHEL and also during the period of commissioning and testing of unit. The contractor's finally accepted rates / prices shall include all these contingencies.

39.7 During the course of erection, if the progress is found unsatisfactory or if the target dates fixed from time to time for every mile stones are to be advanced or in the opinion of BHEL, if it is found that the skilled workmen like fitters, Electricians , operators, technicians etc. deployed are not sufficient,

39.8 BHEL after giving reasonable opportunity to the contractor, will induct on the work the required workmen in addition to contractor’s workmen to improve the progress and recover from the contractor’s bills any charges incurred for engaging the additional workmen with overheads.

39.9 If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road kerb, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wire, trees or any other property or to any part of erected components etc., the contractor shall make the same good at his own expense or in default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses (of which BHEL's decision is final) from any money due to the contractor.

.

39.10 Though every endeavor shall be made to ensure that all plant materials are supplied as per schedule. However in a job of this kind it is possible that some materials may be delayed. In order to achieve the ultimate targets, the contractor may have to augment his manpower and resources. No compensation on this account shall be admissible.

39.11 The monthwise manpower deployment plan to be submitted as per format (at Annexure-C to General Conditions of Contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required man power, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account. Separate qualified persons shall be identified at site for quality control and safety by the contractor.

40.0 MATERIAL HANDLING AND STORAGE

40.1 The materials supplied by BHELs manufacturing units, its vendors from India or abroad shall reach the plant which shall be under the scope of this contract for handling and ETC. The contractor shall receive, unload, handle, transport to store, verify, stack, preserve and issue the materials of all types, sizes and shapes including ODC's in the project stores, sheds / storage yards, site as per BHEL's instructions using his T & P, manpower and all his resources. It shall be contractor's responsibility to check the material transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. While drawing / lifting material from stores, contractor shall ensure that the balance / other materials are stacked back immediately.

It would be the responsibility of the contractor to keep in touch with the Engineer at site to find out the arrival of consignments. The GR /Lorry way bills for the consignment would be handed over to the BHEL as and when received.

40.2 The contractor has to store / stack / identify materials properly in open / close / semi closed / tarpaulins covered storage yard / shed, also it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to pre-assembly yard / erection site in time, according to schedule.

40.3 The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.

40.4 The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for GTG & ASSOCIATED AUXILIARIES works covering their scope.

40.5 All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes, slings, lifting equipment, d-shackles, dog-clamps, and eyebolts shall be used for unloading / handling. The

equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

40.6 Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor.

40.7 Approach road conditions from the stores / yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above circumstances without any extra cost to BHEL.

40.8 Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas / locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of material. As per General Conditions of contract under provisions of clause No 29 BHEL will reserve the right to recover the cost of repair / replacement, if any, to bring back the equipment in original order, in case the equipment / material is lost / damaged while in the custody of the contractor. BHEL's decision in this regard shall be final and binding on the contractor.

40.9 The contractor shall maintain an accurate and exhaustive record, detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.

40.10 All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.

40.11 If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.

40.12 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.

40.13 The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc. are returned to BHEL at a place in project area identified by the Engineer. An account will be maintained by the contractor for all such items received and returned to BHEL and duly reconciled before closing of the contract.

40.14 The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.

40.15 The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.

40.16 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores) which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage and the contractor shall comply with Engineer's decision

40.17 All Control panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energised. Exposed parts those required special protection such as bearings, slip rings, commutators shall be protected against moisture ingress and corrosion during storage and are periodically inspected. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.

40.18 If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.

40.19 The contractor shall ensure that all the packing materials and protective devices used for various equipment during transit and storage are removed before the equipment are installed.

40.20 The contractor shall thoroughly clean all the components before installation / erection.

41.0 PRESERVATION OF COMPONENTS

41.1 After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.

(a) Items stored outdoors shall be stored in such a way that item is at least six inches (6") above the ground.

(b) Motors, valves, electrical equipment, control equipment and instruments etc. shall be stored indoors in warehouse provided by contractor. Motor windings shall be kept dry by use of external heat or space heaters.

(c) Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.

41.2 It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc, cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.

41.3 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

41.4 Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

41.5 Contractor shall arrange Tarpaulins for protection of exposed equipments / components to weather on returnable basis.

42.0 WELDING AND NDT

42.1 The method of welding (**ARC, Gas, TIG, MIG** or other method) may be indicated in the detailed drawings / schedules and as per welding schedule. BHEL Engineer will have the option of changing the method of welding as per site requirements.

.

42.2 All welders including tack welder, structural and busduct welder shall be tested and approved by BHEL Engineer / Customer before they are actually engaged on work. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. All charges for testing of contractor's welders including destructive and non destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only.

42.3 Faulty welds shall be cut and re-welded at the contractor’s expenses. The procedure for the repair of defective welds shall be approved by the Engineer prior to any repair being made. Records of such repairs and defects shall be maintained by the contractor as per BHEL Engineer’s advice.

42.4 All charges for testing of contractor's welders including destructive and non destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only.

42.5 Only BHEL/MSIL approved make of electrodes will be used. All electrodes shall be baked and dried in the electric electrode baking oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. Electrodes from holding oven shall be transferred to portable ovens. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate will have co-relation with the lot No. / batch No given on electrode packets. No electrodes will be allowed to be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. Periodical calibration for the same shall also be arranged by the contractor within the finally accepted rates.

42.6 Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection of joints welded by a particular welder which, in the opinion of the Engineer will adversely affect the quality of the welding though the welder has earlier passed the tests prescribed by Engineer. The welder's passed qualification tests do not absolve the contractor of contractual obligation to continuously check the welder's performance.

42.7 The regulators used on welding machines shall be calibrated before putting these into use for work. Periodic calibration for the same shall also be arranged by the Contractor at his cost.

42.8 All welds shall be painted with anticorrosive red oxide paint. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost. Daily welding reports in the Performa suggested by BHEL should be submitted without fail.

42.9 Non-destructive testing is part of erection work and shall be carried out by the contractor in accordance with the quality plan and as per instruction of Engineer. Decision of Engineer shall be final and binding on the contractor

43.0 PROGRESS REPORTING

43.1 Contractor is required to draw mutually agreed monthly erection program in consultation with BHEL well in advance. Contractor shall ensure achievement of the program. He shall also timely arrange for additional resources considered necessary for the same at no extra cost to BHEL

43.2 Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor during discussions shall also present the program for subsequent week. The contractor shall constantly update/revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.

43.3 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report and other reports as per Performa considered necessary by the Engineer.

43.4 The progress report shall indicate the progress achieved against planned, with reasons indicating delays, if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original program and the slippage does not accumulate and affect the overall program.

43.5 The daily manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

44.0 DRAWING AND DOCUMENTS

44.1 The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.

44.2 Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.

44.3 The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings/ data/ documents and removal of obsolete ones from work place and returning to BHEL.

44.4 **The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work. The contractor has to accomplish all the work of material handling, erection, testing, commissioning, trial operation and handing over of 1 x 20 MW FR V GTG set including auxiliaries, piping, associated Electrical, C&I equipment, etc. within the awarded price of contract to fulfill the contractual obligations.**

44.5 Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of

BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.

44.6 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

45.0 TAXES & DUTIES

45.1 **TDS under Income Tax, Sales Tax, Vat etc** & surcharge, if any at prevailing rates shall be deducted on gross invoice value from the running bills unless Exemption Certificate from appropriate Income Tax Authority is furnished.

45.2 **Price quoted shall be inclusive of all taxes/duties except service tax.** The service tax, as legally leviable & payable by the contractor under the provisions of applicable law/act, shall be paid by BHEL as per contractor's bill. However, contractor shall have to submit proof of service tax deposited by them immediately after the deposit but not later than the next bill submitted after the due date of deposit. The contractor shall furnish proof of Service Tax registration with Central Excise Division covering the services covered under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project. The contractor shall obtain prior approval of BHEL before billing the service tax amount

With introduction of Cenvat credit rules 2004 which came into force w.e.f. 10.09.2004, excise duty paid on input goods including capital goods used for providing the output service and service tax paid on input service can be taken credit of against the service tax payable on output service. **As such, while offering the rates, the contractors may take into account the benefit of above provisions as the cost of input to contractors will be the cost net of excise duty and service tax and adjust their offer price accordingly to make it more competitive.**

In respect of Construction Services**,** the contractor should avail abatement of 67 % as per notification no. 15/2004-ST dated 10.09.2004 as & if applicable.

45.3 'TDS' for sales tax on Works contract at prevailing rates shall be deducted from the running bills as applicable unless Exemption Certificate from appropriate Authority is furnished. Reimbursement, if any, on account of Sales Tax on Works Contract as legally leviable and payable by the contractor shall be made on the production of requisite documents i.e. assessment order etc. of the 'Appropriate Authorities' by the contractors provided contractor has not opted for lump sum/composition scheme.

In VAT applicable States, “Tax Invoice” as required under the relevant State VAT law shall be submitted alongwith other compliances as per concerned VAT Act.

In case of non civil contracts, reimbursement, if any, on account of VAT on Works contract as legally leviable and payable by the contractor shall be made on the production of requisite documents i.e. assessment order etc. of the ‘Appropriate Authorities’ by the contractors provided contractor has not opted for lump sum/composition scheme. In case of civil contracts the rate quoted should be inclusive of VAT. However “Tax Invoice” as required under the relevant State VAT law shall be submitted along with other compliances as per concerned VAT Act. However, ‘TDS’ for VAT on works contract will be applicable as per applicable law.

45.4 Contractor shall get his organization registered with concerned Sales Tax/VAT authorities within 15 days of award of this contract. The delay on this account and delay in bringing the material shall be to contractor’s account and no extension of time shall be allowed on this account. The Sales Tax/VAT registration for this contractor shall be forwarded to BHEL within 30 days from the date of LOI. In case the contractor is already registered for Sales Tax/VAT with Govt. Authorities he must quote his registration no, while submitting their tender.

45.5 Contractor has to make his own arrangement at his cost for completing the formalities including arrangements of road Permits, if required, with Sales Tax/VAT Authorities, for bringing their materials, plants, and equipment at site for the execution of the work under this contract.

46.0 EXTRA WORK

46.1 BHEL may consider for payment of extra works on man hour basis @ Rs.30/- (Rupees thirty only) per man hour only for such of those works which:

a Require major revamping or rework and which are totally unusual to normal erection work.

b Require rectification / modification for improvement in the design during commissioning,

c Requiring fresh fabrication of components in place of rejected / replaced components

46.2 The rates indicated as above, shall include over time, if any, consumables, supervision, use of tools and tackles and other site expenses and incidentals.

46.3 The extra works, if any, shall be carried out by a separate gang, which will be identified for certification of man-hours. This gang will not be utilized for any other work during the period that they are engaged in the extra-work.

Logbook should be maintained and should be signed jointly by the contractor's representative and BHEL Engineer on day-to-day basis. However, signing of the logbook does not necessarily mean acceptance of the extra works, which would be identified by Engineer, whether work is covered in one of the above categories. Only those works and man-hours that are certified by the BHEL Engineer-in-charge will be considered for payment. The decision of BHEL in this regard shall be final and binding on the contractor.

47.0 PRICE VARIATION - Not Applicable.

48.0 RATE SCHEDULE

48.1 Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates/prices.

48.2 The tenderer shall quote the rates as per the rate schedule VIII and only, in part II price bid (Original). Conditional price bids or price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.

48.3 Contractor’s quoted price of item (AA) as per rate schedule VIII will be firm on lumpsum basis and for item (BB) shall be as per unit rate of actual handling of materials. Item (CC) shall be optional item & the applicability of this item rests with BHEL in full or in part. On execution the same shall be paid as per the terms of payments on item rate basis. The contractor undertakes to erect / commission actual quantities as per tender specifications, drawing and documents and as per the advice of BHEL Engineer within the awarded price of contract.

48.4 **Not Applicable.**

49.0 INSTRUCTIONS TO TENDERER

49.1 Offers received without data / information required to be submitted under tender clauses-11.1 to 11.11 (as per GCC_ Financial Status) are liable to be rejected. All these data / information should be duly supported by documentary evidences (Refer note below clause-11)

49.2 No deviations to the tender conditions will normally be accepted.

49.3 The tenderer is advised to actually visit the site and fully acquaint themselves with site conditions, location of stores, transportation routes, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non-familiarization of site conditions. Once the tenderer has quoted for the work, it is implied that he has ascertained various site condition and NO CLAIM whatsoever will be entertained by BHEL on any such account.

49.4 The contractor in the event of this work awarded to him, shall establish a site office at site and keep posted an authorized responsible officer who should hold a valid power of attorney for the purpose of the contract. Any order or instruction of the Engineer or his duly authorized representative shall be communicated to the contractor's representative at site office and the same will be deemed to have been communicated to the contractor at his legal address.

49.5 Offers of Tenderers with unsatisfactory past performance in any of the BHEL's Power Sector Regions will be rejected.

49.**6** **Bidders selection is subject to approval of the BHEL's Customer for this work i.e. MSIL.**

50.0 LIQUIDATED DAMAGES (LD)

For delay in completion of work attributable to the contractor, the LD shall be applicable at the rate of 0.5% of the contract value for delay of every week or part thereof limited to a ceiling of 10% of the contract value as mentioned under clause no.25.5 of the GCC of the tender.

51.0 SECURITY DEPOSIT

The contractor shall submit Security Deposit within 15 days from the date of issue of LOI as per clause no. 16.2 of the General Conditions of Contract (GCC). In case the contractor opts to furnish Bank Guarantee as a part of Security Deposit, the BG shall be issued as per the Performa enclosed as per Annexure-H of the GCC and also that the BG should be issued preferably through any of the Member Banks listed in GCC;

For BG through any other Nationalized Bank (Not covered in the list of Member Banks of GCC), the discretion of its acceptance shall lie solely with BHEL.

52.0 INSURANCE

52.1 Besides provisions under clause no. 29.0 of GCC regarding insurance, the following shall also be applicable. The contractor shall also take care of the same while submitting their offer.

52.2 Insurance for all materials pertaining to the Contractor (T&Ps, Construction Materials etc.) during transit, storage and during construction shall be in his (Contractor's) scope.

52.3 The Contractor shall provide insurance cover to all persons employed/engaged by him throughout the period of Contract, including the extended period, if any.

52.4 In addition to insurance as per Workman Compensation act. Employer's liability and also Group Personal Insurance for employees are also to be taken by contractor.

52.5 All the plant materials damages are to be covered under insurance policy. Incase of theft of material under contractor's custody, matter shall be reported to Police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL/MSIL for taking up with insurance. Contractor shall help in lodging all the insurance cases to cover the losses. The Plant properties insurance shall be the responsibility of MSIL.

53.0 OTHERS

53.1 In case of any contradiction between General Conditions of Contract (GCC) and Special Conditions of Contract (SCC), the latter shall prevail.

53.2 The tenderer shall specifically confirm he has inspected the site of work and is fully conversant with the prevailing conditions under which work is to be executed and will not raise claim of any nature due to lack of knowledge of site condition. He will also confirm that local taxation laws at the site have been clearly understood by him.

53.3 For reverse auction/ for Price Bid opening, only those bidders will be considered who will be qualified for the subject job on the basis of pre-qualification evaluation / Techno-commercial bids. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

SECTION-III (PART-B)

SPECIAL CONDITIONS OF CONTRACT

SECTION-III 'B'
SPECIAL CONDITIONS OF CONTRACT

(PART-B)

54.0 SCOPE OF WORK

54.1 BHEL has been awarded the work of– Design, Engineering, Manufacture / Fabrication, supply, Demonstration of Performance & Acceptance Testing, Transportation, Unloading, Storage at site, Erection, Testing, Commissioning of 1 X 20 MW, Fr V Dual Gas Turbine Generator Set, Balance of Plant Packages and 2 X 200 Kl HSD Storage system along with auxiliaries (special tools and tackles and spares) including tagging, Marking, Painting / Preservation prior to dispatch, Guarantees / warranty, Drawings, Data and Documentation, First Fill of Lubricating Oil and Consumables and one year of Consumables etc. for Maruti Udyog Ltd., Manesar Plant, Haryana.

54.2 The scope of work is as follows :
Unloading, Storage at site, Erection, Testing, Commissioning, Site Verification Test, PG Test of 1 X 20 MW, Frame V Dual Fuel Gas Turbine Generator Set, Balance of Plant and 2 X200 KL HSD Storage system along with all auxiliaries for Maruti Udyog Ltd., Manesar Plant, Haryana.

54.3 Scope of these specifications includes but not limited to following:

(a) Complete work of handling, Unloading of materials to Storage, Materials storage & preservation at site, Taking delivery of material from project stores/ storage yards / storage place, shifting to erection site, their preservation, safe keeping, watch & ward, cleaning, checking, dressing, minor chipping, and leveling of foundations, pre-assembly, erection, alignment, welding, radiography and other nondestructive testing wherever required, heat treatment, preservative/ touch-up & finished painting including supply of paints etc., Earthing of equipment, hydraulic testing, air leak test, card board bursting etc. and safety valve floating including erection of piping, valves, pumps, tanks etc. including other activities required for erection, testing, commissioning, post commissioning, trial operations & handing over of Frame-V Dual Gas Turbine Generator Set, Balance of Plant and 2 X200 Kl HSD Storage system along with all auxiliaries including associated Electricals, Control & Instrumentation equipments and associated items indicated in the rate schedule briefly covered within the scope of these specifications for 1x 20 MW, MSIL Manesar Plant, Gurgaon, Haryana.

The major details of major equipments to be handled, erected, tested & commissioned under these specifications are as per annexure-IX. However, the contractor has to handle, erect, test and commission the other equipments also not mentioned in Annexure IX to complete

the job of FR.5 PA of GTG and its auxiliaries within the awarded lumpsum price of contract.

(b) The quantities mentioned in the annexure IX are tentative and may vary as per the actual engineering / requirement to complete the package for work of GTG & auxiliaries. Some of the items and packages may be added or deleted which shall have to be executed by the contractor within his scope of work and shall be paid as per the lumpsum rate awarded in the contract. The contractor shall have to erect, test and commission entire material listed/ applicable to this project including its material handling in the rate schedule. The decision of BHEL in this regard shall be final and binding on the contractor.

(c) Bidders are required to execute the work on their awarded Lump sum price against Item No. (AA) of Rate Schedule for the complete work of 1 set of Gas Turbine & Generator along with all related auxiliaries & common system equipments like Electrical & C&I items, dosing skids, HSD / Naphtha / IFO forwarding skids for GT.
Indicative weights and other details of major equipments to be erected, tested & commissioned are as per item of annex. IX.
Naphtha Forwarding skid and shall also be completed within finally accepted Lump sum price against Item No. 1 of (AA) of Rate Schedule.

Total tentative tonnage to be erected under this item is 450 MT. However, changes in design may occur as is usual in any such large scale work for which no compensation will be payable and contractor shall complete the entire work as detailed in tender specifications within finally accepted rates.

(d) Major piping systems to integrate the GTG and its auxiliaries to be erected, tested and commissioned under this specification are as per actual drawings. Piping and equipment, as per requirement / drawings are to be thermally insulated with bonded / unbounded mineral wool /LRB mineral wool and to be covered with aluminum cladding.

(e) Bidders are required to execute entire work of piping & its insulation for piping systems and insulations for other equipment wherever required; as per tender specification and actual drawings; as a part of finally accepted Lumpsum price against of item No. 1 of (AA) of Rate schedule.

(f) Additional platforms and approaches wherever required by the engineer to facilitate operation are to be fabricated and installed.

54.4 The weights and other details indicated are tentative and may vary. The quantities indicated under Annexure-IX may vary as to any extent and No compensation will be payable and whatever the equipments required to complete the GTG system to be done within the quoted lumpsum price of contract.

However in case of over all variation in Contract value (as indicted in LOI), beyond (minus) 30%, the contractor will be eligible for compensation as per the following provision:

"The total executed value shall be raised by 10 % subject to the condition that the total value of work executed plus increase as above shall be limited to 70 % of the awarded contract value".

54.5 The scope of work also **covers** all **performance tests** necessary to ensure that workmanship confirms to relevant standards and that such tests are adequate to demonstrate that the installations complies with the requirements of this specification. All arrangements for conducting tests are to be made by contractor within their quoted rates and tests may have to be repeated to satisfy BHEL / MSIL Ltd.

54.6 The scope of work will also include providing free of cost services of **one qualified and experienced Diploma Engineer** (**Electrical / Instrumentation)** and **one qualified and experienced Diploma Engineer** (**Mechanical)** having experience in respective field entirely for Erection & commissioning activities and for direct supervision of various works of GTG as suggested by BHEL from placement of GT. The qualification and experience of the Engineers shall be acceptable to the Construction Manager/ BHEL, Manesar site. These qualified Engineers shall be provided for Twelve **(12) man-months** as per site conditions. These Engineers shall be reporting directly to the BHEL for the main work. They shall be deployed in all areas covered under various specifications as well as other related areas as may be deemed essential based upon work requirements, though not specified. They shall be guided by BHEL Engineers to ensure smooth work progress as and when /where required /deployed. No separate payment shall be paid for providing the services as per this clause. The contractor shall provide these free of cost services within the quoted rates.

All Supervisors/ Engineers shall have to be supported individually by all independent groups comprising of workers like electrician, technicians and helpers etc. and required T & P and IMTE's.

Note: - In case contractor fails to provide above-mentioned manpower as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man months as per above provision, fully or partly a lump sum of Rs 10,000/- (rupees ten thousands only) per man month for the un-utilized man months will be recovered from the bills of the contractor.

54.7 The contractor under this contract shall also provide free of cost services of unskilled / skilled persons for a total period of **42 Man-months** exclusively for use by BHEL. This manpower will be required for following services:

- Qualified computer operators (minimum 'O' level qualified) capable of operating the material management software package / other packages available at site or for office work for total **7 man months**,

- Unskilled workers for working in store, colony & office for a total **35 man months**.

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.

In case contractor fails to provide above-mentioned manpower as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man months as per above provision, fully or partly, recovery at the rate of the prevailing minimum wages at Manesar for the categories given plus 10% will be made from the final bill of the contractor.

54.8 **Construction Power, Area Lighting, Temp. Electrical Distribution**-The contractor has to manage the construction power available at one point and to distribute through cable, further as per use, by 1 No of Power distribution board of 500 A (Source to PDB is 250m away; 1 X 3.5C X 500 SQ mm of length approx. 250 m;) and to distribute further with MCBs, ELCBs, Illuminations (reputed make) etc. to BHEL Site Office (50A), Store shed & offices, Area Lighting, Contractor office, other Site Requirements etc.

The contractor has to bring PDB (1no, 500A consisting SFUs- a)100A -2NOs,b) 50A- 2Nos, c) 200A -1 no.), 250 M cable (3.5CX500SqMM, Al), 250M cable (3.5CX35SqMM, Al), 250M cable (2CX2.5SqMM, Cu), MCBs, switches, sockets, Welding Sockets, office illuminations for BHEL Porta cabin, Store illuminations, etc. within the quoted rate of contract on returnable basis.

Barricading of Open Store Yard (100M X 150M) - Barricading shall be done with two rows of Twin Strand Barbed wire as per standard with MS angle (40 x 40 x 5 mm) post 1meter high above ground and 0.3m grouted in cement concrete 1:3:6 pedestal of 0.25X 0.25 X0.4 m along with a coat of approved steel primer and two coats of synthetic enamel paint.

Contractor has to maintain storage and work area and keep it free from vegetation, grass and inflammable articles. Day to day upkeep of work area is to be ensured. In case the same is not done as per requirement BHEL may get the same done at the risk and cost of contractor or hold the payments till the same are complied on this account as deemed fit.

54.9 Localized barricading may be required to carry out works like welding, gas cutting, grinding etc. Localized barricading of construction area, using GI sheet, scaffolding etc. is to be arranged by the contractor for subject work at his cost. Contractor may have to take required work permit, as per existing MSIL safety procedures for carrying out works which may produce sufficient heat to ignite flammable vapor.

54.10 The MSIL may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the BHEL. Any defect in

quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.

54.11 Contractor shall erect, test, commission all the equipment, cabinets, panels, field instruments etc. as per sequence prescribed by BHEL Engineer at site. The sequence of erection / commissioning methodology will be decided by the BHEL Engineer depending upon the availability of materials / work fronts etc. No claim for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection / commissioning adopted in erection / commissioning of similar jobs elsewhere or for any reasons whatsoever.

54.12 The customer M/s MSIL may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the Engineer. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way if pointed out by the Engineer, without any cost implication to BHEL.

54.13 Contractor shall plan and transport equipment / components from storage yard sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner.

54.14 The tenderers are however, advised to acquaint themselves with the site conditions before quoting. No compensation, what so ever, shall be entertained on this account.

55.0 ERECTION

55.1 The following provisions cover the technical requirements for some of equipment installation. The brief idea about the work involved is indicated below however the work is to be carried out in accordance to the instructions of BHEL / equipment manufacturer, drawings, documents furnished to the contractor.

All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation.
Removing & reconnection of equipment will be the part of scope at no extra cost to BHEL, wherever required as per BHEL.

The Erection, installation, complete assembly and Commissioning work of mechanical, electrical and C&I equipments/items pertaining to Fr.5 Gas Turbine, Generator, Exhaust ducting, BOP and it's associated dedicated auxiliaries shall be carried out in accordance with the specifications / drawings furnished as part of the erection documentation. The major works that need to be carried out, but not limited to, are listed below : Foundation hardware Gas Turbine Skid Mounted, Gas Turbine Generators skid, Accessory system skid and Load couplings along

with their guards, GT walkways, Main Filter House, GT Vent ducting, Air processing skid, off base Compressor water wash skid, Water injection skid for Nox control, Fire protection system (including CO_2 cylinders and associated piping, nozzles etc.), Compartment ventilation fans, Inlet Air System (consisting of : Filter compartment, Support structure, Self cleaning air filter system, Air processing unit, Associated instrumentation, inlet ducting including elbows, transition piece, Inlet silencers, Inlet plenum side covers etc.), Lube oil centrifuge, Field interconnecting piping, Inlet Ducting consisting of Silencers, Expansion Joints & Support Structures, Exhaust System consisting of Ducts, Expansion Joints, Diverter Damper, Guillotine Damper, HSD Storage Tanks 2 nos. X 200 KL with Govt. License Fixed proof and floating suction, HSD Feed / Unloading / Centrifuging system, By pass Stack 30 mt., Stack support Structures, Diverter & Guillotine Panels, Seal Air Fans, Water injection Skids, GT & Off Base Enclosures, Gas Booster Pumps, GT batteries with Charger, GTMCC, Cabling, Mist Eliminator etc.

Brief description of Main Equipments:

Foundation Bolting & Embedded parts

The contractor has to inspect of civil foundation, coordinates, elevations, distances including diagonals, verticality, foundation bolt pockets of all the foundation bolts of all main equipment foundations like Accessory, Gas Turbine & Generator. Blue Matching of all the sub-sole plates, solid shim plates & L plates to at least 85% contact are to be done and then, by actual blue matching with the concerned mating part & ensure uniform thickness at all 4 corners. All the shims are to be matched such that there are no burrs, dents & bends. Lapping is required to be done for anchoring pins with the concerned matching parts with tolerances as shown in relevant drawings. All the foundation plates/sub-sole plates of main equipments required to be master leveled within 0.02 mm/meter in all directions & centered to foundation bolts. All the sub-sole plates elevations need to be maintained within 0.20mm. Pockets should be free from any left over debris during foundation casting & to be chipped–off all around the pockets for at least by 25 mm prior to assembly of concerned sub-sole plates before sub-sole plate grouting.

Gas Turbine Skid

For placement of main equipment like Gas Turbine skid, all the tools & tackles need to be arranged at site by concerned erection agency. Handling and placement of the equipments should to be done carefully at appropriate locations as shown in the applicable documents. All the inputs required for providing jack support plates below the lifting trunions of the base need to be arranged at site by the erection agency in consultation with the concerned erection engineer.

It has to be ensured that all temporary fixtures like rotor locking, transport pin etc fitted to the gas turbine as part of transport requirements are to be removed prior to carrying out checks on the equipment. Drop check & spring back checks are some of the important checks that need to be

carried out at site. Shim adjustments, contact area check under the base plates may require several iterations to arrive at an optimum level. All items which were dismantled at works for the purpose of ease of transportation need to be reassembled at site as per applicable documents/lists.

Inter skid alignment followed by spring back check, alignment of on base rotating equipment in line with applicable documents need to be carried out. Assembly of couplings shall be involving bolt stretching in line with applicable documents. Bolt stretching equipment will be provided, while it's operation and maintenance is the responsibility of the erection agency. Temporary coupling bolts (at least 20% of original nos) required for reaming (LGB Generator coupling) purpose needs to be arranged by the erection agency. Alignment fixtures required for a coupling length of more than 450 mm and below 2750 mm will be provided. All the coupling guards and its hardware will be supplied from works, this may require mockup assembly & responsibility of ensuring final fit up in line with applicable document lies with erection agency.

Inlet ducting

Inlet ducting is supplied directly from BHELs vendor works and needs to be assembled at site after ensuring proper assembly of inlet plenum. It involves assembly of inlet ducting from inlet plenum interface to the inlet air filter outlet and their associated support structure, ladders, platforms etc. The overall arrangement should comply with the general arrangement of the unit including coordinates, elevations etc. All the suitable gaskets need to be prepared at site.

Air Inlet filters

Air filters are supplied directly from BHELs vendor works and needs to be assembled at site in line with vendor documentation. It has to be ensured that air filter housing and down stream inlet ducting mating parts is perfectly joined. However if external sealing is required the same may be done to prevent air ingress from the atmosphere into the clean air side of the air filters.

Enclosures

It is required to be assembled at site in line with drawings / documents. The scope of enclosures covers mainly, but not limited to

(a) Foundation bolting arrgt, frames & support structures, panels arrgt, doors, dampers & partition from compartment to compartment

(b) Lighting of compartments, provision of the extra power points etc, hooters Including conduiting

(c) CO_2 fire fighting piping with GI piping capable of handling 55 kgs/cm^2 pressure including CO_2 nozzles, CO_2 damper actuators, impulse tubing for all Vent fan dampers etc. Mounting of DP switch & tubing.

(d) Walk ways, platforms & handrails to suit the site requirements. Rail & hoist assembly needs to be erected, where ever applicable, in line with applicable documents.

The erection of enclosures is to be done to ensure proper interfacing with adjacent equipments, like casings, heat exchangers, combustion chambers, valves, piping etc, to allow adequate space for O&M and at the same time ensure perfect sealing of the respective compartments.

Vent fans & Ducting

It is required to be assembled at site in line with drawings / documents. It involves assembly of all loose parts like fan casings, impeller, motor, outlet damper with CO_2 latch, transition piece, Gravity louvers, rain protection hood for motor, silencer, differential pressure switch / limit switch, fasteners with gaskets & matching of associated vent ducting with their associated fans in line with applicable vendor documentation. Required supporting of the fan ducting is needed to be fabricated at site as per site requirement. The CO_2 piping is to be connected to fan CO_2 damper latch.

Water washing skid

This equipment is also supplied directly from vendor works, needs to be erected at site in line with vendor documentation. The skid involves centering, leveling & grouting in line with applicable vendor documentation.

Mist Eliminator skid

It is required to be assembled at site in line with drawings / documents. All the loose parts like filters, drain pot, instrumentation, Vent pipes, NRVs etc may need to be assembled at site after centering, leveling & grouting in line with applicable vendor documentation & needs to be integrated with General arrangement of the unit.

Fire Protection System

It is required to be assembled at site in line with drawings / documents. It involves assembly of loose parts like Carbon dioxide cylinders, master valve with solenoid, NRVs, discharge hoses, actuation hoses, enclosure, pressure witches, manifolds, tubes and tube fittings, safety relief valves, manual release levers, weighing devices, limit switches etc on to the frame and subsequent centering, leveling and grouting of the frame in line with applicable vendor documentation.

Air Processing Unit with coolers
It is required to be assembled at site **in** line with drawings / documents. Loose parts like filter, drain valves, stream dip pot arrangements, SRV, Solenoid etc may need to be assembled at site after centering, leveling & grouting in line with applicable documents. Interconnecting with Cooler needs to be done at site as Air Processing Unit and Cooler are being interfaced altogether.

Diverter Damper & Guillotine Dampers
It is required to be assembled at site in line with drawings / documents. Erection of dampers involves assembly of loose parts like gear boxes, actuators, piping, valves, seal air fan skids, limit switches, sealing plates, inter connecting rods, position indicators, control panels, insulation, gaskets, fasteners, accessories for
maintenance etc after centering, leveling & grouting in line with applicable vendor documentation & needs to integrated with other equipments like By pass stack, exhaust ducting etc as per applicable documentation of the over all unit. Both the equipments are sourced from different vendors and may need close inspection of the equipment at time of receipt and involves welding of the flanges and supports after positioning.

Water injection skid
This equipment is required to be assembled at site after centering, leveling & grouting in line with applicable general arrangements drgs. Loose parts if any like filters, strainers, control & Stop Valves, solenoid valves, Control Panels, pumps, conduiting, impulse tubing etc. are to installed and commissioned on to the skid.

Mobile Centrifuge
Full unit required to be operated and maintained by the contractor.

Piping inter connection
Inter connection piping should be routed based on schematics. All the piping that needs to be fabricated and erected shall have to be tested & to under go NDT testing like DPT, radiographic examination, hydraulic testing in line with applicable standards & followed by mechanical cleaning like flushing, cardboard blasting, steam blowing as required. For fuel gas piping & CO_2 piping leak test needs to be conducted. All the vents & drain piping are required to be fabricated & erected at site with applicable standards. Valves, other pipe fittings and supports etc shall form the part of the piping systems are required to be erected as per drawings and documents and engineers instructions.

Temporary piping required for flushing of lube oil system needs to be fabricated and erected at site as per schematics within the scope of this contract.

Piping

Piping system shall involve - Gas fuel system Piping, Liquid Fuel Piping, Piping for Lubricating and control Oil Systems, ACW Piping, Service / Instrument air system, Miscellaneous piping, Piping for Instrumentation and other Misc. Piping of materials CS /AS /SS including its insulations and painting are within the scope of contract.

Contractor has to clean, install, test, pre-commission, commission all type of pipes, fittings valves and other items along with its painting and insulation within the awarded lump sum value of contract whether these are mentioned in this contract specifications, drawings and documents or not but essential for the project for fulfilling the contractual obligations. No extra cost shall be payable on this account what so ever the variation occurs.

Tentatively following piping arrangement as per schematics are required to be fabricated, welded, cleaned and painted are LO feed & drain-load, Oil vent, Fire protection, Components of diesel engine, Cooling water piping, Inter connected field, piping-lube oil and for flushing etc. Weld joints, supports etc. are to be carried out as indicated in the drawings, documents and specifications.

Following Piping are also required to be interfaced with field piping are LO feed & drain-base, control oil-internal, cooling & sealing air, fuel oil, fuel nozzle purge, false start drain, atomizing air, booster atom air, diesel exhaust, ACW diesel engine, exhaust plenum drain, air extraction, compressor washing, turbine & compressor wash, water injection etc. Weld joints, supports etc. are indicated in the drawings and to be carried accordingly.

Miscellaneous Piping-Potable water and service water piping, Potable water and service water piping, Drain and vent piping, Effluent collection and disposal piping, Valves and fittings, Insulation material for piping, Pipe supports. Dosing skid piping including dressing drains to neutralizing pit. Impulse piping is to be installed as specified in the drawings and documents.

All the above systems of piping include the erection of pipes, bends, elbows, valves, fittings, impulse piping and including root valves, sampling lines, drains, hangers and supports & other accessories so as to make the systems complete in all respect.

Above system of piping can be regrouped / renamed or any addition / deletion in the system can be made in order to make system complete as per requirement. No extra cost shall be entertained on this account.
The piping systems mentioned above are only indicative and Contractors are however required to erect commission all piping systems shown in drawings & other documents which may be necessary for erection, completion & overall commissioning of GTG and its auxiliaries. Piping systems required for commissioning of GTG have to be completed to suit BHEL requirements.

The tentative weight including hardwares, support materials are about **50T**. The contractor is required to erect / commission all piping systems shown in drawings and documents which may be necessary for overall commissioning of GTG. Pipes shall be supplied without edge preparation and for CS Piping, Mitre Bends, Tees and reducers are to be fabricated at Site from supplied pipes.

Surface cleaning/ sand blasting shall be done as per specifications.

INSULATION

Some of the piping and equipments, as per requirement/ drawings are to be thermally insulated with bonded/ unbounded mineral wool/ LRB mineral wool and to be covered with aluminum cladding. The insulation, wherever applicable, is covered in this scope of work within the awarded lumpsum price of contract. A small quantity of thermal insulation shall have to be applied for this package however the contractor has to apply all the insulation as per drawing, documents and specifications.

PLATFORMS / STRUCTURES

All maintenance platforms, ladders, H&S etc. as per drawings and site requirement are to be fabricated and installed within the scope of contract.

TEMPORARY COVERED STORAGE SHED AND AREA DEVELOPMENT

A temporary storage shed and development of open area may be required for materials storage at project site against the scope detailed in enclosed annexure. The rate for supply and installation work of the same is to be quoted against the optional item of Rate Schedule. The option for execution of this work shall rest with BHEL.

ELECTRICAL AND C&I SYSTEM

Transformer, GTMCC, Control Panels, DVR, DC System, Cabling System (includes Cable Tray installation, Cable laying, termination, dressing, ferruling, tagging etc.), Instrumentation (Panels, DCS, Mark VI panel, Instruments, Control Valves, Vibration Pick-ups, etc), Misc. Control equipments.

55.2 All works such as cleaning, checking, leveling, aligning, assembling, temporary erection for alignment, dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, straightening, blue matching, chamfering, filing, chipping, drilling, machining, surface grinding, shaping, fitting up etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily and shall be carried out by the contractor as part of the work.

55.3 Any fixtures, scaffolding materials, concrete block supports, steel structures required for temporary supporting, for pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.

55.4 Any cutting of masonry work, which is necessary shall be done by the contractor at his own cost and shall be made good to match the original work. The Contractor shall obtain prior approval before cutting any masonry / concrete work.

55.5 The contractor should note that after execution of work they will hand over marked up drawings "as erected" drawings to BHEL Engineer at site for preparation of "as built" drawings. *"As erected" drawings will bear the signature of BHEL Engineer and contractor*.

55.6 Calibration log-sheets (if require, history cards) of all the instruments, panels, drives, relay testing etc. under the scope shall be recorded and submitted on BHEL approved formats. *Proper logging will form a part of calibration / erection activity for the purpose of monthly running bills payments.*

55.7 The contractor shall use only SHEARING machine or HACKSAW for cutting angles, flats, channels and trays. No gas cutting is permitted. Drill machine shall be used for drilling holes

55.8 The equipment should be preferably in its original package and should not be unpacked until it is absolutely necessary for its installation or advised by BHEL engineer. The equipment should be best protected in its cases. It should be arranged away from walls.

The wooden pallet provided for packing itself can be retained for raised platform to protect equipment from ground damps, sinking into around and all the equipments, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site engineer.

The packing material shall be retained if the cubicle is to be repacked after inspection.

55.9 The contractor shall paint the name / put tag numbers on all the equipment / instruments / cables etc. erected by him. Materials for tagging shall be supplied by the contractor. Contractor at his cost shall also arrange the adhesive etc.

55.10 Contractor shall fabricate and erect stands / supports for Junction boxes, push button stations, fixing of push button and plugging of holes in JB's. The fabrication forms part of erection work. Conduits shall be thoroughly cleaned before pulling in the cable.

55.11 The motors, motorized valves actuators and solenoid valves will be erected & electrical commissioning, wherever required, is to be carried out within the subject scope of work.

55.12 All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR value, before they are installed and energized. Bearings and other exposed parts shall be protected against ingress of moisture and corrosion during storage and periodically inspected.

55.13 Certain instruments like pressure gauges, pressure transmitters, temperature gauges, flow-switches and indicators, etc., are received in assembled condition as integral part of equipment. Contractor shall be responsible for safe receipt, installation and custody of these instruments supplied mounted on skids / equipment.

The calibration of skid / equipment mounted instruments shall be arranged by contractor. The contractor shall arrange for removal, calibration and re-installation of the instruments. The contractor will maintain the list of all the instruments removed & reinstalled. Instruments after removal and before reinstallation shall be considered in custody of the contractor for this package.

55.14 Only BHEL/Customer approved electrodes and filler wire will be used. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number / batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode

drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.

All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his own cost.

55.15 **MISC WORKS (Electrical and C&I System)**

(A) **PANELS** –Control Panels, DAVR, GTMCC etc.

Erection at site / control room including chipping of floor, fabrication and fixing of base channel frame, leveling & alignment with spirit level, welding the base channel to the embedded plates / channels, grouting , fixing of anti-vibration pads, termination of inter panel connections, mounting / connections of loose instruments, inter panel bus bar connections, commissioning including loop checking, system checking, and putting necessary controls on automatics. Checking of internal wiring, rectification, testing and calibration of equipment mounted inside is in the scope of contractor. The contractor may have to change / replace items found faulty without any extra cost; however materials for this shall be provided by BHEL.

The cleaning of panels has to be done with electrical vacuum cleaner, besides conventional cleaning with brush etc. The drilling of holes in the gland plates for cable entry shall be part of panel erection. All blank holes / gaps in the gland plates / boxes etc. shall be properly sealed. The base frames shall be painted suitably. The contractor shall carry out the plugging and sealing of left out holes in the gland plates and other openings at the bottom of panels at his own cost by using fire retardant mortar or good quality sealing material as advised by BHEL **.**

Any minor alterations required in the bus bar arrangement, wiring in the panels/ cubicles shall also form part of the work. During testing, commissioning, some equipment / modules may need repairs / replacements. All such replacements / repairs and assistance during commissioning and running of the unit till handing over to the Customer are part of the scope as some of the test / commissioning will have to be done after the machine is running on various loads.

(B) **CABLE TRAYS, CABLE LAYING & TERMINATION**

Cable tray erection work (Ladder, prefabricated, slotted or duct type cable trays) shall include fabrication of supports to suit site requirement, fixing of support in position by welding as per requirements / engineers instruction. Fixing of cable trays and racks shall be by welding or with the fasteners.

The cutting & welding points on trays will be painted by primer & Aluminum paint by the contractor including supply of paint within the erection price.

Laying, dressing & clamping (by Nylon / PVC ties or Aluminum strips or any other method and required ferrules as specified by BHEL Engineer) of the cables in the cable trays / angles. The final dressing of cables on cable trays not erected by

contractor shall also be done with Nylon Cord / Aluminum strip. Cost of cable laying as per BOQ Cum Rate Schedule shall include the consumables such as required ferrules, Nylon / PVC ties & Aluminum strip required for dressing / clamping. The cost of required Nylon / PVC ties & Aluminum strip shall be in the scope of contractor within the awarded contract value.

The cable run number shall be provided by punching Aluminum Tag plates and tying suitably with nylon ties (at both ends and at regular intervals as advised by BHEL Engineer) which shall be arranged by contractor at his cost. Nylon / PVC ties & Aluminum strip required to be provided for cable tags within a span of 5 mtrs / as per documents and specifications shall have to be provided by the Contractor.

Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.

Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally shield wire is kept isolated at instrument/field device end and continuity is maintained through JBs and grounded at panel end only. While terminating the shield wire either in panel or JBs, PVC sleeves are to be used to avoid two-point earthing.

(C) **JUNCTION BOX, PUSH BUTTONS ETC**

Includes fabrication / fixing / painting of stands for junction boxes / push buttons / frame mounted panels etc.

(D) RIGID PIPE/CONDUITS / PLICA FLEXIBLE CONDUIT

Cutting / threading of standard lengths of conduits, laying on fabricated supports or on floor, using screwed fittings, clamping, and sealing of open ends. Laying of conduits in cable trays, end connection with instrument / J.B. / panel, using suitable connectors / unions etc. Approved Good quality sealant (required sealants to be brought by contractor, free of cost i.e. part of the contract, as per BHEL engineer's instruction) shall be used to make the joint water proof.

(E) EARTHING

Earthing installations: All instruments/panels, cable trays, JBs etc. are to be earthed as per standard Earthing procedures/practices. All equipments shall be earthed by two separate and distinct connections to the earthing terminals provided by MSIL.

Earthing work mainly involves laying and tack welding of conductors on columns / beams at every one meter interval and bolted connections with equipment at least at two points. Low hydrogen content electrodes shall be used for welding. All the galvanized items shall be given surface treatment (by thoroughly cleaning with sand paper and / or cotton cloth to make the surface clean, smooth & free from any type of spots) at the welded joints & the places where galvanizing has been

damaged. Welded joints shall be applied with two coats of cold zinc paint whereas portions with damaged galvanizing shall be applied with single coat.

Earthing work shall also include the erection / laying of earthing below ground (if required like for electronic earthing) and above ground as per drawing, documents and specifications.

(F) Instruments (Transmitters / Gauges / Switches / Temperature Sensing Elements like RTDs & Thermocouples)

For instruments supplied loose, the scope includes issue from stores, calibration, erection (including fabrication and fixing of frames / stands by welding to steel structure or by chipping & grouting with RCC columns / floor) and charging / loop checking.

For instruments supplied duly mounted on skids / racks, the scope includes dismantling from skids / racks, reinstallation after testing / calibration, restoring electrical connections, if any, pressure testing of connected piping and charging / loop checking.

Some instruments may need repeated calibration / replacement. The same will be carried out by the contractor at no extra cost to BHEL including calibration of instruments needed for replacement, which will be supplied by BHEL.

Erection of thermo elements like RTDs & Thermocouples includes erection of thermo wells, wherever required, at no extra cost to BHEL. The contractor, as directed by BHEL Engineer, will provide tags on all the instruments at no extra cost to BHEL. Tenderer may note that fabrication / fixing / painting of stands (including supply of paints) including fabrication / erection of Instrument canopy (wherever required) for instruments will be included in quoted / accepted price of respective instrument. No separate payment will be released for erection of gauge board as this will be included in item rates of instruments mounted on the gauge board. Contractor will be paid extra for fabrication / erection of stand only for the weight in excess of 25 kg per instrument and this extra weight will be paid as per applicable rates for structural steel fabrication / erection.

The loose items supplied for the main equipment falls into various categories like tools, cables, prefabricated cables, console inserts, recorders, VDU/CRT, other display units, printers, various gauges / instruments, sensors and transducers, cable glands, cable ducts, frames, racks, etc. Guidelines for handling of electronic modules to be strictly followed. All the modules shall be handled by qualified persons only. Electronic modules should only be touched when it is absolutely essential to do so. Before touching any electronic module, the operator should discharge the static electricity by earthing himself or better still, ensure constant discharge by wearing an earthed wrist strap. All modules using CMOS components are packed in antistatic bags when transported loose to avoid ESD failures. The antistatic bags must always be used to transport modules at site from one place to the other.

(G) **FIELD INSTRUMENTATION**

Various type of primary/secondary indicating/recording instrument for pressure, temperature, flow, level and analytical measurement shall be supplied either loose or mounted along with the equipment.

Scope of work under erection/calibration/testing/commissioning shall include calibration, setting, adjustment, writing instrument tag number with paint, report making, installation, servicing, minor repairs/servicing, putting instrument into service, signal checking from field upto the functional group panels and remote indicating instrument, functional checks, interlock and protection/alarm/loop checks by simulating the field devices, providing assistance for trouble shooting during pre-commissioning/post-commissioning till system is handed over to the customer.

It is the responsibility of contractor to make erection, calibration/testing protocols for various measuring equipments/devices and they should get duly certified by customer/BHEL engineer and should be submitted to BHEL engineer regularly. However, sample formats will be given by BHEL and have to be printed by contractor in adequate numbers.

Contractor shall establish calibration laboratory with adequate facilities and they should arrange standard test instruments duly calibrated from recognized agencies and calibration report of the same to be submitted prior to start of calibration of the field instruments/devices.

Installation of instrument shall also include drilling of holes and tapping for mounting of instrument and local instrument frames/panels and supply of hardware for mounting of the instrument.

Some instruments may need repeated calibration / replacement. The same will be carried out by the contractor at no extra cost to BHEL including calibration of instruments needed for replacement, which will be supplied by BHEL.

(H) **TRANSFORMER**

The checking of foundation, leveling alignment etc. will be done by erection contractor. Receipt & transportation of transformers & accessories / auxiliaries from stores to site, erection after foundation checking and carrying out minor modification wherever required.

56.0 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST-COMMISSIONING:

56.1 Site testing shall be required for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations.

56.2 Commissioning protocols are to be prepared as advised by BHEL Engineer for getting approved by customer / Consultant. During erection of various equipment, prior to commissioning and after commissioning, protocols have to be made. The proformas and formats as approved have to be printed by the contractor in adequate numbers.

56.3 During each stage of commissioning, if any part of the instrument needs repair/rectification/rework/replacement, the same shall be done expeditiously and promptly by the contractor. Contractor's claim, if any, for such repair/rectification/ rework/replacement etc. for reasons not attributable to contractor will be governed by clause on extra works of the special conditions of contract. The parts to be replaced shall however be provided by BHEL free of cost.

56.4 Testing, and pre-commissioning checks shall be as per relevant codes / practices and BHEL drawings / specifications/ approved commissioning Protocols and same shall include, but not be limited to the following:

(I) GTG and Auxiliaries - as per approved commissioning procedures.

(II) Electrical and C&I System-

A. **CONTROL & PROTECTION PANELS**

(a) Checking of complete wiring and insulation resistance.
(b) IR test and loop checking of all field wiring in the panel.
(c) Checking of all protection, metering and indicating schemes.
(d) Calibration of all indicating and measuring instruments, relays, timers.
(e) Checking of all auxiliary schemes e.g. space heating, illumination.
(f) Checking of operation of all relays, switches and other indicators.
(g) Commissioning of total scheme including relevant internal equipment.
(h) Carrying out suitable modifications as per system requirement.
(i) Carrying out primary injection, secondary injection, stability checks etc.

B**.** **MISC. INSTRUMENTS:**

- All instruments shall be checked for proper installation, supports, impulse lines, cabling etc. and corrected, wherever required.

- All instruments shall be calibrated before installation and proper calibration record shall be maintained to the satisfaction of BHEL Engineer. Instruments received in assembled condition in panels etc. shall also be dismantled, calibrated and re-assembled as per advice of BHEL Engineer.

- All impulse and pneumatic lines shall be properly cleaned (oil flushed / chemical cleaned / air blown/ steam blown/ Hydraulic tested etc.) before being charged.

- Some of the instruments may require re-calibration during commissioning. The contractor shall remove such instruments, recalibrate and install within the quoted rates.

C. **DRIVES AND CONTROLLERS**

- All drives such as power cylinders, pneumatic / motorised valves / dampers etc. and controllers shall be checked for proper installation supports etc. before commissioning.

- All transmitters shall be calibrated and limit switches shall be adjusted.
- All pneumatic and impulse lines shall be cleaned as per instructions of BHEL Engineer.
- All drives shall be operated by simulating various conditions to ensure healthiness of components of the system

D. **BATTERY, BATTERY CHARGER, UPS**

- Checking of battery charger panel.
- Calibration of all indicating and measuring instruments.
- Dummy load test of battery charger.
- Charging of battery and recharging after carrying out battery discharge test/ capability test of battery using dummy load.
- In the absence of regular power supply to battery chargers arrangements are to made for battery charging from temporary construction power supply points.

E. **TRANSFORMERS**

(a) Insulation resistance and earth resistance checks.
(b) Checking and calibration of WTI & OTI etc.
(c) Winding resistance, vector group, turns ratio test on different taps, magnetizing current, core balance check etc.
(d) Turns ratio, polarity, insulation resistance and winding resistance checks on all CT's.
(e) Oil filtration and centrifuging, BDV of oil etc.

56.5 In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc. the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the same shall be done as per Engineer's instructions including repair, rectification and replacement work by the contractor at his cost. The parts to be replaced shall be provided by BHEL.

56.6 During this period, though the BHEL/ MSIL will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision , labour , consumable, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer.

56.7 During commissioning activities and for carrying out various tests, special instruments etc, have to be temporarily erected and commissioned to suit the commissioning activities. Contractor will provide the necessary equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and to be taken back at no extra cost to BHEL.

56.8 The pre-commissioning activities will start with various trials, commissioning operations shall continue till units are handed over to customer. Simultaneous commissioning activities will be progress in various areas, checking of equipment erected, making ready for trial runs; all these works need specialised gangs including fitters, electricians, technicians in each area to render assistance to BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted.

56.9 It shall be the responsibility of the contractor to provide workmen of various categories in sufficient numbers along with Engineers/ Supervisors including necessary consumables, T&P etc. during pre-commissioning, commissioning and post commissioning period for commissioning of equipment and attending any problem in equipment erected by the contractor till handing over. The rates quoted shall include all these contingencies also.

56.10 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL commissioning Engineer and hence overtime payment by the contractor to his employees may be involved. The contractor's accepted rates shall be inclusive of all these factors also.

56.11 In case, any rework is required because of contractor's faulty erection which is noticed during commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during commissioning, the contractor will dismantle / open up the equipment / part and reassemble/redo the work without any extra claim.

56.12 During commissioning, opening and closing of valves, modifications in wiring, realigning of equipment, re-calibration of instrument, attending to leakage, minor adjustments of erected equipment may arise. The accepted rates shall include all such works.

56.13 Contractor shall arrange all inputs such as pipes, fittings, supports, tanks, pumps, electrical equipments and fixtures, test equipments etc. required for the precommissioning and commissioning activities of equipments and various systems to fulfill the contractual obligations within the awarded contract price.

57.0 FINISH PAINTING

57.1 All exposed metal parts of the equipments, structure, auxiliaries, piping, panels, transformer and other items (covered within the scope of this contract) after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant paint. However, due to storage and handling, the same may have got deteriorated or peeled off. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, and any other method as per requirement of MSIL/ BHEL. The same will be inspected and approved by the engineer before painting. These cleaned surfaces are to be touch up painted with suitable approved primer matching with shop paint approved final colour. Bare surfaces / unpainted surfaces shall be provided with two coats of suitable primer after cleaning as above.

After applying primer as above, all the structure, equipment / items and piping (covered under the scope of this contract) are to be finished painted with approved quality epoxy /synthetic enamel/other quality paints (as specified by BHEL engineer) to achieve proper finish and film thickness as per drawings / specifications. The minimum thickness of painting, if reuired, as specified has to be checked by suitable means as per advice of BHEL Engineer. Bypass stack & exhaust duct shall be painted with Heat Resistant Aluminum paint. Inlet duct is required to be painted inside also in full length using approved quality epoxy paints. All the weld joints of GI cable trays and GI structural members shall be applied with a coat of cold galvanizing zinc paint. **All the paints of approved quality shall be arranged by contractor at his cost within the awarded price.**

57.2 Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the MSIL / BHEL.

57.3 Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within the finally accepted rates. All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes. No paint whose shelf life has expired should be used for painting.

58.0 **FACILITIES TO BE PROVIDED BY BHEL/CONTRACTOR**

58.1 MSIL/ BHEL shall provide adequate **open space for office, temporary storage / fabrication, free of all costs** to contractor within the plant boundary. It is the responsibility of the contractor to construct their office sheds, arrange all utilities for their functioning; and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.

58.2 MSIL / BHEL shall **not** provide area for labour colony.

58.3 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, sanitation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

58.4 **Construction power**, for construction purposes will be **provided free** at one point near erection site from supply point. The contractor shall submit to the Engineer his electrical power requirements. Further distribution will have to be made by contractor at his cost. All wiring must comply with local regulations (as per MSIL compliance) and will be subject to Engineer's inspection and approval before connecting supply. Required calibrated energy meter for measurement of power consumed has to be arranged / installed by Contractor at his cost.

NOTE:

The contractor will be provided construction power free of charge. They, however, would have to ensure that there would be no wastage. Periodical audits will be held to ensure that these resources are being optimally used. For this the contractor has to provide an energy meter at his end.

In case any wastage is observed BHEL reserves the right to recover any charges / penalty as deemed fit.

Contractor will have to provide proper insulated cables and proper power distribution board consisting of ELCBs, MCBs etc. for power distribution and joints, if any, will be done with proper jointing kits.

MSIL shall supply free of charge water through pipe connection at suitable points (about 300 M) for construction and electricity at required voltage (415V, 500A, 3 phase) about 250M away for Office works, Store sheds, Area Lighting, Construction activities, plant start-up, pre-commissioning, commissioning activities including testing. Electricity for construction power will be provided by MSIL at one point. Contractor shall arrange further distribution for construction purposes.

58.5 Permanent lighting inside the powerhouse is to be provided by MSIL. The contractor should arrange at his cost for temporary lighting in & around the work area for execution of work. Adequate lighting facilities such as flood lights, hand lamps shall be arranged by the contractor at the site of construction, contractor's material storage area etc. within finally accepted rates.

58.6 BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.

58.7 Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.

58.8 The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.

- All electrical installations should be as per Indian Electricity rules.
- All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
- Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
- All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
- Contractor has to make their own earthing arrangement for their equipment / DB earthing.

- All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
- Contractor should use “MCCB” and “ELCB” either on incoming or outgoing connections to the DBs.
- Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.
- For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

58.9 ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.

58.10 In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.

58.11 Adequate lighting facilities such as floodlights, hand lamps and area lighting, Power requirements for BHEL office arranged by the contractor at the site of construction, contractor’s material storage area etc. within finally accepted rates.

On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc shall be dismantled and leveled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expanses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

58.12 Contractor should install a PC along with MODEM with latest software at site for exclusive use of BHEL.

58.13 The contractor shall adjust his working shift hours accordingly and deploy additional manpower if necessary so as to achieve the targets within the quoted rates of contract. In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.

58.14 Contractor shall have to provide following facilities for BHEL office within the awarded price of contract:

- Arrangement for water connection with supply of pipes and fittings and plumbing for connecting BHEL site office with water supply terminal point available at MSIL.
- Making soak pit for Toilet and its connection to BHEL office with materials.
- Temporary Electrical connection and fencing is to be done as detailed in scope of work CC no. 54.8

59.0 TIME SCHEDULE

59.1 ***The contractor is required to commence the work within 15 days from the date of issue of letter of intent unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor for material handling work and site facilities.***

59.2.1 Entire work Of Erection, testing, commissioning, trial-operation including handing over of unit, as detailed in tender specification, shall be **completed within 7 months from the scheduled date of start of work of material handling** or as per the programs / milestones indicated by BHEL from time to time.

For Material Handling, Barricading of open store yard, Electrical Power Distribution etc. Contractor has to mobilize adequate resources within 15 days from the issue of LOI.

For E&C, contractor has to mobilize the required resources by 2nd month of work of start or any other date fixed by BHEL. Contractor has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

59.2.2 In case due to reasons not attributable to the contractor, the work gets delayed and additional manpower / resources have to be mobilized so as to expedite the work to meet various milestones, same shall be done within the quoted rates, at no extra cost to BHEL. In the event the contractor fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of General Conditions of Contract.

59.3 The various milestone dates to be achieved, for GTG, as per the current status of contract is as below:

	MILESTONES	**MONTHS**
•	Start of Material Handling	within 15 days of LOI
•	Start of Erection	2nd Month
•	Mechanical Completion & Readiness of Racheting	4th Month
•	Readiness of Commissioning of GTG on FSNL	5th Month
•	Synchronisation	6th Month
•	Fuel Firing, Completion of Trial operation & handing over	7th Month

Notes:

Depending upon work front and material availability all or some of the above milestones may require to be preponed by *one month*. Contractor

shall have to mobilise additional resources to fulfill above requirements within their awarded lump sum price.

Contractor has to mobilise all required resources including manpower to achieve above schedule for which no compensation will be payable. However, in case of contractor discharges his contractual responsibility even before schedule contract period, he will be allowed to wind up his set up without any financial implications on either side.

59.4 The work under the scope of this contract is deemed to be completed in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. *The decision of BHEL on completion date shall be final and binding on the contractor.*

60.0 OVER RUN

60.1 In case due to reasons not attributable to the contractor, the work gets delayed and scheduled completion gets extended, the contractor shall **not be entitled for any over run compensation for a grace period of first one month after the contractual completion date**. In case the scheduled completion time gets extended beyond one month as stated above, the contractor shall be considered for payment of fixed over run charges @ Rs. 40,000/- (Rupees Fifty thousand only) per month on receipt of advance notice intending to claim over run & on fulfillment of following conditions:-

a) The reasons for delay in completion of work are not attributable to contractor but however subject to the provisions of clause - 31.
b) The targets fixed during the over run period are achieved by contractor.

60.2 Once the claim of over run charges is admitted no other compensation whatsoever (like for delays in receipt of materials, availability of fronts etc.) will be entertained.

60.3 The contractor shall maintain sufficient workforce and other resources required for completion of the job expeditiously, operation, maintenance, lubrication of erected equipment till the actual commissioning of the unit for the entire contractual period including total extended period.

61.0 TERMS OF PAYMENT

61.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

61.2 Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.

61.3 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder;

I PROGRESSIVE PAYMENT ON PRORATA BASIS FOR ITEM (AA) OF RATE SCHEDULE OF ANNEXURE-VIII).

IA MECHANICAL ITEMS- 84% OF LUMP SUM PRICE ON INSTALATION (ITEM NO 1 OF (AA) OF RATE SCHEDULE OF ANNEXURE-VIII).

a)	GT SYSTEM, LOAD COUPLING & ITS GUARD.	**11 %**
b)	GENERATOR SYSTEM, EXCITER, LGB.	**5 %**
c)	AIR COMPRESSOR, DIESEL ENGINE MUFFLER, SILENCER, AIR COOLER UNIT, CO_2 SYSYTEM, VENTILATION SYSTEM, OIL SYSTEM, LUBE OIL COOLOING SYSTEM, FIRE ALARM & SUPPRESSION SYSTEMS ETC.	**10 %**
d)	MISC EQUIPMENTS LIKE TRANSFER PUMPS, ON LINE COMPRESSOR / TURBINE WASHING SYSTEM, FUEL FORWRDING SKID (LIQUID FUEL SYSTEM), BATH HEATER, GAS CONDITIONING SKID, HSD UNLOADING & FEED SYSTEM ETC.	**12 %**
e)	GT ENCLOSURE, PLATFORMS, GT WALKWAY, LADDERS.	**10 %**
f)	INLET AIR SYSTEM INCLUDING INLET AIR FILTER, AIR PROCESSING SKID, SELF CLEANING SYSTEM, SEAL AIR SYSTEM ETC.	**9 %**
g)	INTEGRAL PIPING INCLUDING SUPPORTS AND FITTINGS, INSULATION FOR GTG SYTEM AND BOP.	**15%**
h)	BYPASS STACK, AVIATION LIGHT, INLET & EXHAUST DUCTING FOR GTG AND ITS AUXILIARIES, DIVERTER DAMPER, GUILLOTINE DAMPER.	**10%**
i)	OTHER MISC. AUXILIATIES INCLUDING BOP REQUD. TO INTEGRATE GTG SYSTEM (NOT LISTED ABOVE)	**2%**

IB ELECTRICAL & C&I ITEMS - 84 % of LUMP SUM PRICE ON INSTALATION (ITEM NO 2 OF (AA) OF RATE SCHEDULE OF ANNEXURE –VIII)

a)	TRANSFORMERS, BUSDUCT / GAC, ETC.	**25 %**
b)	GTMCC, (11 KV SWGR, 415V SWGR), GCB, NGT/NGR PANEL, GRP	**14 %**
c)	DC SYSTEM -UPS, UPS DB, BATTERY, INVERTER, CHARGER, DCDB ETC.	**10 %**
d)	MARK VI PANEL, DVR, DCS SYSTEM, FIELD INSTRUMENTS, ACTUATORS, VALVES ETC.	**10 %**
e)	POWER, CONTROL, INSTRUMENTATION, SIGNAL CABLE-CABLING, ITS TRAY, SUPPORTS, TERMINATION AND DRESSING; EARTHING, IMPULSE PIPING, JBs, LPBs, OTHER MISC. ELECTRICAL & C&I SYSTEMS INCLUDING BOPS TO INTEGRATE GTG SYSTEM.	**25 %**

NOTES:

1. Further percentage break up for payment against above IA and IB, if required, will be mutually discussed and finalized at site.
2. The above break up is only for payment purposes and does not cover all equipment in the scope of the subject work.

IC Milestone payments- 8 % of ITEM (AA) OF RATE SCHEDULE OF ANNEXURE-VIII:

- 1 % of CV on completion of Oil Flushing
- 1 % of CV on successful commissioning of DD / GD
- 1 % of CV on successful commissioning of Inlet air System
- 1 % of CV on Ratcheting
- 1 %of CV on FSNL
- 1 % of CV on Unit synchronization.
- 1 % of CV on synchronization with Fuel firing.
- 1 % of CV on successful completion of trial operation of GT.

NOTE: If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site In charge, at his discretion, after recording reasons for exercising such option, can split and release payment upto 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone / commissioning activities.

ID FINAL PAINTING 3.0 % of ITEM (AA) OF RATE SCHEDULE OF ANNEXURE-VIII: on successful completion of final finish painting for GTG System and its auxiliaries and Electrical, C&I items including supply of paint (BHEL Site in charge at his discretion may split above and release payment on prorata basis for supply as well as for application of paints).

IE An amount limited to 1.0 % of ITEM (AA) shall be payable in one or more installments, solely at the discretion of Construction Manager/ BHEL at different stages of the contract execution to facilitate resource augmentation or to meet any exigency of work. In case of its non-utilization 'OR' its part utilization, the entire/balance payment against this category shall be released along with full loading of unit.

II **Progressive Payment of Material Handling 96% of Item (BB) of Rate Schedule of annexure-VIII on actual basis on Item Rate Per MT**

a)	Materials Unloading	**70 %**
b)	Material Staking and Verification	**22 %**
c)	House keeping	**4 %**

III **Progressive Payment of 96% of Item (CC) of Rate Schedule of annexure-VIII on actual basis on Item Rate as mutually discussed and finalized at site**

IV **2.0% of CV** shall be payable on handing over of the unit to BHEL's customer or 3 months after the contractor has discharged his responsibilities as stipulated in this contract, whichever is earlier, provided delay in handing over of the unit is not attributable to contractor. The unit shall be deemed to be handed over on completion of trial operation.

V The balance **2.0% of CV** will be payable on completion of all pending work, rework wherever required, reconciliation of materials, clearance of site and labour colony area in all respects and on submission and passing of final bill.

NOTE:

1. Above payment against IV & V shall be released based on the contract value actual work carried out after adjustment of I , II & III as applicable.

2. Store shed & area development of Item (CC) of rate schedule on item rate basis shall be considered for arriving at L1 status of contract.

However, BHEL shall have its discretion for the applicability of this item.

Contractor should execute Item No. (CC) at the rates awarded for this contract along with other Items of contract.

ANNEXURE-I

LIST OF T&Ps AND IMTEs BEING PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS

SL No.	EQUIPMENT	QTY	Remarks
1.	NA		

.**NOTES**:

1. In addition to above any special tools and tackles, if supplied by the manufacturer will also be provided to the contractor free of hire charges as and when made available.
2. Other terms and conditions regarding above items shall be as per tender clause 38 for Tools and Plants / IMTEs).

ANNEXURE-II

INDICATIVE LIST OF T & Ps TO BE ARRANGED BY THE CONTRACTOR

Sl.No.	EQUIPMENT	QTY
1.	Power Distribution Board (500A) along with required cables	1 No
	Hydraulic Jacks (50T)	5 nos./as required
	Suitable arrangement including sleepers, jacks, winches etc. required for dragging, lifting, shifting, erecting of heavy Consignments like GT Skid, Generator Skid, Gas conditioning Skid, GAC, Transformers, Panels, etc.	1 Lot
2.	Gantry Crane (5T)	01 No. / as required
3.	Suitable capacity crane (75 T)	01 no. (for two month)
4.	15/20T Capacity trailer with pulling unit / Truck	01 no./As per requirement
5.	Mobile crane / Hydra crane 10 / 12T	01 no./As per requirement
6.	Pedestal mounted Drill Machine	As per requirement
7.	Vacuum Cleaner	1 No.
8.	Hydraulic crimping tool	1 No.
9.	Crimping tools	Adequate Nos.
10.	Blower	1 No
11.	Hydraulic pipe bending machines	As per requirement
12.	Hydraulic test Pump	As per requirement
13.	Welding Transformers / Welding generators	As per requirement
14.	Calibrated Torque wrenches of suitable capacity	As per requirement
15.	Oil Filtration Machine suitable for Transformers with oil tank	As per requirement
16.	Suitable capacity Hydraulic jacks (for handling transformers etc.	As per requirement
17.	Screw Jacks 5/10/20/50T	As per requirement
18.	Transformer Oil Testing Kit (Motor operated) 0-100 KV	As per requirement
19.	Surface Plates of suitable dimens.	As per requirement
20.	Straight Edges of suitable dimens.	As per requirement
21.	Mixing Plant (Concrete Mixer)	As per requirement
22.	Roller	As per requirement
23.	Theodolite	As per requirement
24.	Vibrator	As per requirement
25.	Tanker	As per requirement

NOTES:

a. The above list specifies only major T&P (may not be complete to be deployed by the contractor. All additional / other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate / price.

b. Other terms and conditions regarding above items please also refer clause 38 (T&Ps / IMTEs).

Annexure-III

Indicative / Tentative list of IMTEs to be arranged by the CONTRACTOR

Sl. No.	EQUIPMENT	QTY
1.	100V / 500 V / 1000V, (Hand operated) Megger	1 No.
2.	2.5/5 KV (Motor operated Megger)	1 No.
3.	Digital Multimeters with current probe 4-1/2 Digits	1 No
4.	Digital multimeters 3-1/2 Digits	1 No
5.	Tong Testers (various ranges, ac/dc) including mA Range	1 No
6.	Analog Multimeter	1 No
7.	Single phase variac, 15A	1 Each
8.	Motor checker	as required
9.	Leakage meter	1 No
10.	Variable DC regulated,0-30V,50mA, 0.2% accu. (Electronic voltage source with digital indication)	as required
11.	mA/mV source with 0-200 mA/200mV Digital display	as required
12.	Rheostat 50 & 100 Ohm, 5 A	as required
13.	High temp. instrument upto 600 deg. Calibration kit	as required
14.	Decade Resistance box upto 20K ohms	as required
15.	Continuity testers	as per requirement.
16.	Hydraulic test pump up to 250 Kg/mm2, +0.25 %accu.	as per requirement
17.	Intercom / telephone set for loop checking	as per Requirement
18.	Tachometer, 0-4000 RPM	as required
19.	Temperature recorder for 0-1000C 6/12 points with Thermocouples / rods and compensating cable	as required
20.	Master pressure gauge, 0 – 4 Kg/cm2, 0.02 acc.	as required
21.	Digital tong tester, 0-300A AC&DC	as required
22.	Micro ohmmeter, 0.05mohm to 200 ohm	1 no.
23.	Phase sequence meter	1 no.
24.	Primary injection Kit (upto 1500A)	1 no.
25.	Secondary injection Kit (upto 10A)	as required
26.	Relay test kit	1 no.
27.	High voltage test kit (0-50KV)	1 no.
28.	Dumpy level, 0-350mm, LC_0.01mm	1 no.

Tentative list For The Calibration of instruments

S.NO.	DESCRIPTION	RANGE	ACCURACY	QTY
1.	Dead Weight Tester	0-600Kg/cm2	LC-0.5Kg/cm2	01 Set
	Comparison test set (With Sub-standard Pressure gauges)	0-1 Kg/cm2	±0.25% Lc-0.02Kg/cm2	01 Set
		0-4 k g/cm2	-----do----------	
		0-6 Kg/cm2	-----do----------	
		0-10kg/cm2	-----do----------	
		0-25Kg/cm2	+0.25%Lc-0.25 Kg/cm2	
		0-60Kg/cm2	1±0.25%Lc-1.0 Kg/cm2	
		0-250Kg/cm2	±0.25%Lc-2.5 Kg/cm2	
3.	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement.	0-1000 mm	As per requirement	
4.	Oil bath with thermostat, Stirrer and sub-standard Glass Thermometers in Multiple ranges	0-300 Degree Cel.		1 set.
	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement.	0-760 mm	As per requirement	
6.	Digital Multimeter 3½ digit	Voltage 200 mV to 1000V,	±1%+1 digit	2 No.
		Current 200 mA to 10A DC,	±0.8%+1 digit	
		Current 20 mA to 20A AC,	±0.8%+1 digit	
		Resist 200 ohms to 20M ohms,	±0.5%+1 digit	

Notes:

1. The above list of testing instruments / equipment required for testing / commissioning is only for guidance to contractor and not complete. Any other / additional testing instruments / equipment required for timely and satisfactory completion of job will also be arranged by contractor at his own cost.

2. Contractor must re-ascertain /recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment of IMTE's. Calibration certificate of all the the listed IMTEs to be submitted BHEL, in advance.

3. Other terms and conditions regarding above items shall be as per clause no. 38 (Tools & plants / IMTEs).

ANNEXURE-IV

CERTIFICATE OF DECLARATION FOR CONFIRMING THE KNOWLEDGE OF SITE CONDITIONS

We,…… …… Hereby declare and confirm that we have visited the project site under the subject namely, ……and acquired full knowledge and information about the ***site conditions, wage structure, Industrial climate and total work involved***. We further confirm that the above information is true and correct and we will not raise any claim of any nature due to lack of knowledge of site condition.

Tenderers Name and Address

Place: (Signature of the Tenderer with stamp)

Date:

ANNEXURE-V

NON DISCLOSURE AGREEMENT
Memorandum of Understanding

BHEL PSNR is committed to Information Security Management System as per Information Security Policy.

M/s……, providing……..service to BHEL PSNR, Noida hereby undertake to comply with the following in line with Information Security Policy of BHEL PSNR;

To maintain confidentiality of documents & information which shall be used during the execution of the Contract.

The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PSNR.

( )	( )
M/s. BHEL, PSNR	M/s……..

ANNEXURE-VI

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

Against this enquiry for the subject item/ system with detailed scope of supply as per our tender specification, BHEL-PSNR, NOIDA may resort to "REVERSE AUCTION PROCEDURE" i.e. **ONLINE BIDDING on INTERNET.**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on Internet.
3. BHEL will inform the vendor in writing in case reverse auction, the details of service provider to enable them to contact and get trained.
4. Business rules like event date, time, start price, bid decrement, extensions, etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the compliance form in the prescribed (provided by service provider) before start of Reverse auction. Without this the vendor will not be eligible to participate in the event.
6. BHEL will provide the calculation sheet (e.g.: EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like packing & forwarding charges, Taxes and duties, Freight charges, Insurance, Service tax for services and loading factors (for non-compliance to BHEL standard Commercial terms and conditions.) for each the vendor to enable them to fill-in the price and keep it ready for keying in during the auction.
7. Reverse auction will be conducted on schedule date & time.
8. At the end of reverse auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to fax the duly signed filled-in prescribed format as provided on case-to-case basis to BHEL through service provider within 24 hours of auction without fail.
10. Any variation between the on-line bid value and signed document will be considered as sabotaging the tender process and will invite disqualification of vender to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse auction procedure for this tender enquiry, the price bids and price impacts, if any already submitted and available with BHEL shall be opened as per BHEL standard practice.

ANNEXURE-VII

NO DEVIATION CERTIFICATE

FORMAT OF UNDERTAKING

(To be submitted in the bidder's letter head)

REF: **Dt.**

Bharat Heavy Electricals Limited
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar,
NOIDA – 201 301.INDIA

Sub.: Material Handling, Erection, Testing, Commissioning, Trial Operation And Handing Over Of 1 X 20 Mw FR.V GTG set including Auxiliaries, Piping, Associated Electrical, C&I Equipment, Etc. at Maruti Suzuki India Ltd., Manesar, Gurgaon, Haryana.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited Manesar site before submission of our offer and noted the job content & site conditions etc.

We also confirm that we have not changed / modified the tender documents as appeared in the website and in case of observance at any stage, it shall be treated as null and void. We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT and confirm our acceptance to reverse auctioning process and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT. In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized Representative of the bidder)

ANNEXURE-VIII

RATE SCHEDULE

AAA)

SL.NO.	DESCRIPTION	UNIT RATE IN RUPEES	TOTAL PRICE IN RUPEES
(AA)	**E&C of GTG Works**		
1.	Lump sum price for complete scope of work for ETC as per tender specification for items indicated under Annexure-IX– All the Mechanical items of GTG (1X20 MW GTG) and its auxiliaries, Piping, Insulation etc. tentatively listed under Annexure IX and barricading of open store yard (100M X 150M) including temp. Electrical Power Distribution.	L.S	
2.	Lumpsum price for complete scope of work for ETC of Electrical and C&I equipments to complete the system of GTG and its auxiliaries tentatively listed under Annexure IX.	L.S	
	Total (AA)		
(BB)	**Materials Handling**		
1.	Entire scope of Material Handling for the materials as specified in the tender specifications for approximate weight **300MT** for Handling of equipments as listed in Annexure IX.		
2.	Lumpsum rate for GT unloading using sleeper jack method (Appx Wt. 88 MT)	L.S	
3.	Lumpsum rate for Generator unloading using sleeper jack method (Appx Wt. 62 MT)	L.S	
	Total (BB)		

(CC)	**Items (**as per scope mentioned in Annexure-XI**)**		
1	Temporary Covered storage shed (15 X 10 SQM) as per specifications, drawings / documents attached. (In accordance to BOQ rate schedule BBB-I)	Total Price -BBB-I	
2	Area development with materials (In accordance to BOQ rate schedule BBB-II)	Total Price -BBB-II	
Total (CC)			
GROSS TOTAL (AA+BB+CC)			

NOTES :

1. Accordingly taking into consideration all aspects thereof quoted above rates, further contractor confirms that he will not come with any other claim/compensation on account of any increase whatsoever during the entire period of execution including extended period if any.
2. The rate shall be entered in figures as well as in words. In case of difference in rates between words and figures, the lesser of the two will be treated as valid rate
3. Only 'Unit Rate' shall be considered for evaluation and award.
4. Evaluation shall be done considering all the items and respective quantities mentioned.
5. In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item. But the work, if awarded, will be on the lowest quoted rate obtained against that item.
6. Total price for CC-I will be taken from total price worked out as per Annexure-BBB-I.
7. Total price for CC-2 will be taken from total price worked out as per Annexure-BBB-II.

.

.

(Seal and Signature of Tenderer)

RATE SCHEDULE (Refer Annexure XI)

BBB-I)

Sl No	CODE	DESCRIPTION OF ITEM	UNIT	TOTAL QTY	UNIT RATE (Rs)	TOTAL AMOUNT (Rs)
		(A) CIVIL WORKS FOR COVERED STORE SHED (15MX10M)		**CLOSED STORE (15mx10m)**		
		EARTHWORK/SITE CLEARANCE/ROADWORK				
1	**C3**	Earth work in excavation in all types of ordinary and hard soil by mechanical means (Hydraulic excavator)/manual means including stacking the excavated soil, dressing of sides and ramming of bottom, dewatering of accumulated water from any soruce and keeping the surface dry for subsequent works such as concereting form work etc. and disposal of surplus excavated soil as directed, disposed soil to be neatly levelled and dressed lead upto 50 meters and lift upto 1.5meter complete including backfilling excavated earth and disposal if required.	Cu.M	55		
2	**C11**	Supplying the good earth from outside the site including the cost of filling the same within the site in layer not exceeding 20cm in depth & consolidating each deposited layer by ramming and watering including all leads & lifts etc. complete.	Cu.M	30.00		
		PCC				
3	**C14**	**Plain cement concrete** of mix 1:4:8 (1 cement : 4 coarse sand and 8, 40 mm down graded stone aggregate) for column footing, levelling, floors etc., including cost of all materials, lead, lift, labour charges, consolidation, shuttering, curing etc. complete.	Cu. M	20.00		
		BRICKWORK				
4	**C18**	**Brick work** with class designation 75 **in cement mortar** 1:6 (1 cement : 6 coarse sand) in foundation, plinth and super structure in thickness of 230 mm including cost of all materials, lead lifts, labour charges, mixing mortar, laying bricks, racking joints, curing etc. all complete as per drawing and specification and direction of Engineer In-charge.	Cu. M	15.00		
		RCC				

5	**C20**	**Reinforced cement concrete** of mix 1:1.5:3 (1 cement, 1.5 coarse sand and ,3 :20 mm down graded aggregate) for column footing, sunshades, shelves, lintels etc. including cost of materials, lead lift, labour charges for concreting, shuttering, curing etc. complete.	Cu. M.	10.00		
6	**C21**	**Centring and shuttering including providing all shuttering material,** strutting, propping etc. and removal of form work for : Lintels, beams, plinth beams, girders, bressumers and cantilevers.	Sq. M	45.00		
7	**C22**	Providing and placing mild steel/ tor **steel reinforcement** for RCC work including cost of all materials, labour for cutting, bending, binding and placing in position complete as per drawing and instruction of Engineer.	MT	0.30		
		ROOFING				
8	**C24**	Supply fabrication and erection of structural steel beams,channels,plates,steel tubular trusses, purlines,gates, wind ties, base plates, gusset plates, bolts, nuts etc. complete as per drawings, specifications & instructions of engineer including cost of all materials leads, lifts labour charges etc. and one coat of primer and two coats of approved enamel paint for finished products at site complete as per technical specifiction and direction of engineer.				
	a)	Trusses (medium grade pipes),Purlins side ties, bottom ties, 150 ISMB Columns including foundation bolts	MT	4.00		
9	**C26**	Providing and fixing 1mm thick M.S. sheet sliding-shutters with frame and diagonal braces of 40x40x6mm angle iron, 3mm M.S. gusset plates at the junction and corners 25mm dia pulley, 40x40x6mm angle and T-iron guide at the top and bottom respectively including applying a priming coat of approved steel primer and two coats of enamel paint.				
	a)	Mechanically Operated	Sq.M	25.00		
10	**C27**	Providing and fixing **corrugated asbestos cement sheet 6 mm thick** roofing and side cladding fixed with polymer coated J or L hooks bolts and nuts 8mm diameter with bitumen and GI limpet washer complete (upto a pitch of 60 degrees) including steel primer and 2 coats of approved paint at overlaps. as per tech. specification.	Sq.M	400.00		

11	**C29**	Providing and fixingnon-asbestos cement ridges and hips including supply and fixing J or L bolts and nuts bitumen & GI washers etc. complete as per Technical Specification including Bitumen coating at all joints .	RM	15.00		
		FINISHING				
12	**C32**	50 mm thk. Ironic Topping Cement Concrete flooring consisting(1-admixture:2-stone aggregate 6mm nominal size) by volume **with metalic hardening compound** of approved quality is mixed in the ratio(4:1) (4 cement : 1 metalic floor) hardening compound of approved quality by weight including cement slurry rounding off edges and strips etc. but excluding the cost of nose of steps etc. complete.	Sq. M	150.00		
13	**C33**	Providing and fixing glass strips in joints of terrazo / cement concrete floors 40mm wide and 4mm thick	RM	90.00		
14	**C38**	**Plastering work** with cement mortor **1:6** (1 cement : 6 fine sand) 12 mm thick after scrapping and cleaning the masoary joints including scaffolding, cost of materials, labour, mixing , leads & lifts, curing etc. complete.	Sq. M	90.00		
15	**C49**	Providing three coats of **white wash** to give a smooth and even shade including cost of materials, cleaning and preparation of surface, scaffolding etc. complete.	Sq. M	90.00		
		(B) ELECTRICAL WORKS				
16	**E1**	Providing and fixing 1 x 40 Watt Batten type **flourescent tube fitting** (Crompton / Philips / Bajaj make),fabricated from CRCA sheet steel and finished with stove enamel paint complete with Accessories like fluorescent lamp,copper wound polyster choke, starter, seat, rotor holder and terminal block duly pre-wired with copper conductor, including connections, fixing on wall, false ceiling or under roof tusties with clamps as required	Nos.	8		
17	**E5**	Providing and fixing of following sweep **exhaust fan/ceiling fan/wall mounted fan** (Khaitan / Crompton make) single phase alongwith gravity louvers, frame / tripod for holding the motor including making necessary opening in wall, supply & fixing of assembly with grouting bolts, making connections, loop earthing etc.				
		300 mm sweep	Nos.	1		

18	**E8**	Providing & fixing of 240 V, 5 / 15 Amp 6 **Pin Power socket** outlet point (with 15 A switch). Switch / socket to be fitted in suitable size 20 SWG metal type box with 3mm sunmica sheet	Nos.	1		
19	**E10**	Providing & fixing 5A piano type switch for Light / Fan Control (Anchor make)	Nos.	8		
20	**E20**	**Wiring** of the following points (including supply of Wires, conduits, clamps, boards, other misc. items) with 2.5 sq.mm colour coaded PVC insulated copper conductor wires as per IS- 650/1100 volts grade in surface PVC conduits (medium grade) including laying of 20 SWG GI wire, conduit fitting. (Fixing of piano type control switches (Anchor make) in suitable sized 20 SWG metal box with 3 mm sunmica sheet having provision for fan regulator, 5 Amp switch socket (supplied above) included in scope)				
	a)	Light point wiring including main wiring	Points	8		
	b)	Wiring for exhaust fan.	Points	1		
21	**E21**	Providing , Installation and commissioning of 18 W Lighting Panel with 18 nos 16 A MCB with 63 A SFU incomer in Sheet metal housing with double door arrangement , including all earthing and statutory requirements .	Nos.	1		
22	**E23**	Supplying and laying of following type of PVC Insulated, PVC armoured standard **aluminium conductor cable** confirming to IS:1554-1976 (part 1), glanding with single compression gland, termination of both end in DB & SFU. The cable has to be laid underground on sand cushion including backfilling, susitable clamp, clamping on surface including all materials etc. complete.(Only cable will be issued by BHEL as free issue item and all other materials are to be provided by the contractor).This includes road crossing for which suitable GI Pipe to be provided by the contractor.				
	a)	2c/3c/4c upto 16 sq.mm armoured cable	RM	20		
		GROSS TOTAL OF ALL THE ABOVE WORKS (A+B)				

BBB-II) SITE DEVELOPMENT WORKS (Refer Annexure XI)

S.NO.		DESCRIPTION OF ITEM	QTY.	UNIT	UNIT RATE	AMOUNT
		ROADS				
1		Surfact dressing of the ground including removing vegetation and in-equalities not exceeding 15 cm deep and disposal of rubbish, lead upto 50m and lift upto 1.5m in all kinds of soil.	sqm	10000		
2		**Preparation and consolidation** of site area with power road roller of 8 to 12 tonne capacity after levelling, grading, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the subgrade and disposal of surplus earh lead upto 50 Mtrs	sqm	10000		
3		**Supply and Laying water bound macadam** with specified stone aggregate stone screening and binding material including screening, sorting, spreadidng to template, watering and consolidation with power road roller of 8 to 10 tonne capacity etc. complete including supplying of all materials:				
a)		base course with 63 mm to 45 mm size including stone screening 13.2 mm size	cum	360		
4		Supply and spreading of moorum at site (1" thick) over WBM complete with rolling	cum	90		
		GROSS TOTAL OF ALL THE ABOVE WORKS				

NOTES FOR BBB-I & BBB-II:-

1. The rate shall be entered in figures as well as in words. In case of difference in rates between words and figures, the lesser of the two will be treated as valid rate.

2. Only 'Unit Rate' shall be considered for evaluation and award

3.. Evaluation shall be done considering all the items and respective quantities **m**entioned

4. In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item. But the work, if awarded, will be on the lowest quoted rate obtained against that item.

(Seal and Signature of Tenderer)

ANNEXURE-IX

TENDER NO. BHEL: NR: SCT: MSIL: GTG: 618

DETAILS OF MAJOR EQUIPMENT OF FR.V GTG AND ITS AUXILIARIES ALONG WITH TENTATIVE WTS. & DIMENSIONS:—

The quantities mentioned below are tentative and may very as per the actual engineering / requirement to complete the package for the work – Material Handling, Erection, Testing, Commissioning, Trial Operation And Handing Over Of 1 X 20 Mw FR.V GTG set including Auxiliaries, Piping, Associated Electrical, C&I Equipment, Etc. at Maruti Suzuki India Ltd., Manesar, Gurgaon, Haryana.

Some of the items may be added or deleted which shall have to be executed by the contractor within his scope of work. The decision of BHEL in this regard shall be final and binding.

(AA) GTG & ITS AUXILIERIES

SL.NO.	DESCRIPTION OF EQUIPMENTS	Length (m)	Width (m)	Height (m)	Total WT (Metric Tons)
1	Gas Turbine Package (Flange to Flange)	12	3.5	4	87.5
2	Load Coupling	1.932	Dia 0.300		0.35
3	Load Coupling Guard	1.93	Dia 0.850		0.3
4	GT Walkway + Ladders (Walkway is split into pieces)	12	1.5	2	6.5
5	Diesel Engine Muffler	2.75	0.88	0.97	0.32
6	CO2 bottle Racks-1	2.4	1	2	3.5
7	CO2 bottle Racks-2	1.8	1	2	2.5
8	Inlet Air Filter (will be shipped loose)	8.5	3.5	3.5	48
9	Tools & Tackles	-	-	-	1
10	Turbine/Acc Vent Fans (4 Nos)	2.7	2.7	2	4
11	Air Processing Skid	3	1.5	1.8	2
12	Compressor Water Washing skid	6.6	3.1	3.54	10.5
13	Lube oil Centrifuge	2.315	1.43	1.75	1.5

14	Field Inter connection piping	6	3.5	2	15
15	Foundation Bolts and Misc.Hardware	-	-	-	5
16	Water Injection Skid	6	3	2.5	5.5
17	GT Enclosure	8.5	3.5	4	70
18	**Inlet Ducting**				
19	--Inlet Duct Transition Pieces	4	1.7	3	3.2
20	--Inlet Duct Expansion Pieces	0.4	3.6	2.75	0.25
21	--Inlet Duct Elbow No.1	-	3.6	2.75	3.4
22	-- Inlet Duct Elbow No.2		3.78	2.54	3.4
23	--Silencer	2.515	3.6	2.75	6
24	--Straight Duct No.1	3.5	3.6	2.75	2.3
25	--Straight Duct No.2	3.5	3.6	2.75	2.3
26	--Support Structure	6	2	3.5	1.5
27	**Exhaust Ducting**				
28	--Expansion Joints (Total 5)	0.400	3.4	3.4	2
29	--Horizontal Transit Duct	6.5	3.4	3.4	10
30	--Silencer in stack	3	3.816	3.816	12
31	--Diverter Damper	4.2	3.4	3.4	15
32	--Guillotine Damper	0.4	3.4	12.6	9
33	--Horizontal Duct	0.8	3.4	3.4	1.2
34	--Horizontal Duct	1.2	3.4	3.4	2
35	--Stack Transit	1.8	3.8	3.8	2
36	--Stack Transit	1.5	3.8	3.8	2
37	--Cylindrical Stack (2NOS)	6.000	Dia 3.0		12
38	--Cylindrical Stack	4.4	Dia 3.0		4.4
39	Diverter Damper Local JB’s (2 No)	1.2	0.6	1.3	0.1
40	Guillotine Damper Local JB’s (2 No)	1.2	0.6	1.3	0.1
41	Stack support Structure (columns beams, angles)	-	-	-	10
42	Seal Air Fan Assy	1.8	0.8	-	0.5
43	Miscellaneous Item (Ladders ,Platform ,Bolts)	3.5	3	2	4
44	Lube Oil Mist Eliminator	4	1.47	2.02	3
45	Portable LO Drain Pump	-	-	-	0.2
46	Off Base LO Skid for fuel pump	0.92	1.22	1.675	0.8

47	BNC Monitoring System	-	-	-	0.025
48	Haz. Gas Monitoring System	-	-	-	0.005
49	GT Motor Control Center (Double Front)	12.5	1.5	2.43	10
50	GT Battery (shipped loose)	7	1.2	1.6	4
51	Battery Charger	1.8	0.62	2.03	1
52	DC Distribution Board (Single Front Draw out)	4.6	0.7	2.43	4
53	Control cable	-	-	-	9.5
54	Power Cable	-	-	-	8
55	Signal Cable	-	-	-	9.8
56	Cable Glands				0.0025
57	UPS Distribution board	3.2	0.7	2.4	2
58	GT Cabling	25000	-	-	27.3

(BB) <u>MISC. MECHANICAL ITEMS</u>

Sl. No.	ITEM DESCRIPTION	QTY	DIMENSION LxWxH in mts.	Appx. WEIGHT (IN KGS) EACH
1	HSD STORAGE TANK	2	Dia 7.5 m x H 8 m	
2	HSD FORWARDING PUMP SKID FOR GT	1	4.3X2.7X2.0	2500
3	HSD DUPLEX FINE FILTER SKID (25 micron) FOR GT	1	2.6X1.2X2.2	500
4	HSD DUPLEX FINE FILTER SKID (6 micron) FOR GT	1	2.6X1.2X2.2	500
5	HSD CENTRIFUGE	1	4 X 3 X 3	1000
6	HSD ACCUMULATOR FOR GT	1	Dia 0.5X L 2m	300
7	DRAIN TANK FOR HSD 2.0 cu.m	1	Dia 1.0 x 2 x 2.6m	1000
8	HSD UNLOADING PUMP SKID	1	1.5 M x 1.5m x 2.6m	1000
9	GAS CONDITIONING SKID WITH KOD AND Filter separator	1	6 X 3 X 3	3000
10	GAS FINE FILTER SKID	1	3 X 3 X 3	1000
11	DRAIN TANK FOR GAS CONDENSATE 2.0 cu.m	1	Dia 1.0 x 2 x 2.6m	1000
12	PIPING (INCLUDE PIPES, BENDS, TEES, FLANGES,	1 LOT		30 TONS

	GASKET, VALVES, etc.,)			
13	PIPE SUPPORTS MISCELLENEOS	1 LOT		10 TONS

(CC) GENERATOR PACKAGES

SL. NO.	DESCRIPTION OF EQUIPMENT	OVERALL DIMENSIONS (mm)			WEIGHT (MT)
		LENGTH	WIDTH	HEIGHT	
1.	GENERATOR PACKAGE (TYPE- **TARI 750-18P)**	7000	3000	3300	62.0
2.	AIR DUCT ITEMS	6000	1700	2400	2.0
3.	AIR FILTER	4000	3500	3000	3.5
4.	GENERATOR ENCLOSURE	AS PANELS			10.0
5.	FOUNDATION ITEMS	LOOSE ITEMS			7.0
6.	GENERATOR CONTROL PANEL	2000	1000	2355	1.0
7.	GENERATOR RELAY PANEL	2000	1000	2355	1.0
8.	BUS DUCT/ GAC	3000	3000	3500	8.0

(DD) ELECTRICAL ITEMS

Sl.No	Item	Qty.	Overall Dimensions / unit (approx.) (LxDxH) mtrs.	Weight/ unit (in Tonnes) (approx.)
1	Stn. Distribution Transformer 11/0.433kV 2.0MVA	1	3.3X3.5X 3.5	9
2	11kV SWGR	5 panels	5x2.5x2.5 (dim. of board)	1.25T(/panel)
3	GT MCC	1 No.	18x1.4x2.4	15
4	125V DCDB	1 No.	4x1x2.4	4

5	125V DC battery charger	1 No.	5x1x2.4	5
6	110V AC UPS	1 No.	6x1x2.4	6
7	a) UPS DB	1 No.	6x0.8x2.4	6
8	b) wall mounted DBs	5Nos	2x 2x1	0.25
9	110V (Ni -Cd) Station battery bank-1No.	40 cells	0.5x0.5x0.2(/Cell)	0.055(/Cell)
10	415V LT Bus duct	1 Nos.	15x1x1	3
11	Local Control stations	5 Nos	0.2x0.15x0.25	1
12	**Earthing & lightning protection materials**			
	(ii) 75x 10mm GI strip	500m		
	(iv) 35x6 GI strip	300m		
	(v) 8 SWG GI Wire	300m		
13	**Cable trays & Support Structurals:**			
	(i) 600mm width, 3.0m length, ladder type, GI cable trays	300 Nos.		
	(ii) 300mm width, 3.0m length, ladder type, GI cable trays	150 Nos.		
	(iii) 600mm width, 2.5m length, perforated, GI cable trays	50 Nos.		
	(iv) 300mm width, 2.5m length, perforated, GI cable trays	50 Nos.		
	(iv) 150mm width, 2.5m length, perforated, GI cable trays	100 Nos.		
	(v)50mm width perforated cable trays	300 Nos.		
	(viii)65x65x6 MS Angle for tray support	4 Tonnes		
	(ix)50x50x6 MS Angle for tray support	10 Tonnes		
	(x) ISMC 100 channel for tray support	1 Tonnes		
14	**HT/LT Power cables and Control Cables**			
	(a) HT Power Cables (hi-pot , jointing termination at site) 1Cx630 sq.mm, 11kV, cu conductor, Extruded XLPE insulated, PVC/FRLS PVC sheathed, armored Cable	200m		
	(b) LT Power Cables (1.1kV Al./ Cu. Conductor, HR PVC			

	insulated, PVC/FRLS PVC sheathed, armoured power cables)		
	(i) 1C x 6 mm2	250m	
	(ii) 4 C x 16 mm2	250m	
	(iii) 4 C x 10 mm2	250m	
	(iv) 4 C x 6 mm2	250m	
	(v) 3 ½ C x 35 mm2	250m	
	(vi) 3 ½ C x 50 mm2	250m	
	(vii) 1 C x 35 mm2	250m	
	(viii) 1 C x 25 mm2	250m	
	(ix) 3 ½ C x 185 mm2	250m	
	(x) 3 ½ C x 95 mm2	250m	
	(xi) 3 ½ C x 300 mm2	250m	
	(xii) 1 C x 150 mm2	250m	
	(xiii) 1 C x 70 mm2	250m	
	(c) Control Cables (1.1kV Cu. Conductor, PVC insulated, PVC/FRLS PVC sheathed, armored control cables)		
	(i)3 C x 2.5 mm2	250m	
	(ii) 5 C x 2.5 mm2	250m	
	(iii) 7 C x 2.5 mm2	250m	
	(iv) 10 C x 2.5 mm2	250m	
	(v) 12 C x 2.5 mm2	250m	
	(vi) 19 C x 2.5 mm2	250m	
	(vii) 24C x 2.5 mm2	250m	
	(d) Signal Cables		
	1. 1P x 1.5 mm2	250m	
	2. 6P x 0.5 mm2	250m	
	3. 12P x 0.5 mm2	250m	
	4. 1P x 16 AWG	250m	
	5. 8 Triad x 1.5 mm2	250m	
	6. 12P x 20 AWG	250m	
15	**HT Cable termination kits suitable for:**		
	(ii) 1Cx 630sq.mm, 11kV, Copper conductor Cable	35Nos.	
16	Trefoil clamps(non-magnetic)	Lot	
17	200NB G.I. hume pipes	100m	

18	Fire proof ceiling material for cable openings	Lot	

(EE) TENTATIVE DETAILS OF C&I PANELS

Sl. No.	Equipment	Qty	Dimensions	Weight per panel
	Panels / Desks/Unit		**(HxDxW) in mm**	
1	max DNA System cabinets	2 Nos.	2355 x 800 x 800	450
2	Mark-VI TMR GT Control Panel	1 Nos.	2400 x 900 x 2260	1200
3	MARK-VI HMI	02 Nos.		100
	(Each HMI consists of following)			
	CPU	01 Nos		
	Monitor	01 Nos		
	Keyboard	01 Nos		
	Optical Mouse	01 Nos		
	DMP 80 column	01 Nos		
4	Network Switches	04 Nos	44 x 223 x 440	25
5	DAVR	1 nos.	2324 x 1200 x 1200	1200

(FF) – (i) C&I MISC. ITEMS :

SL. NO.	DESCRIPTION	QTY
(A)	SIGNAL CABLES	
1	Signal cable 1 P x 0.5 mm2 Non-IS Indi & Overall Shld	7700M
2	Signal cable 6 P x 0.5 mm2 Non-IS Indi & Overall Shld	4400M
3	Signal cable 6 P x 0.5 mm2 Non-IS Overall Shld	5500M
4	Signal cable 1 T x 1.5 mm2 Overall Shld	1650M
	Control Cable 3CX2.5 mm2	6600M
(B)	Ex- proof Junction boxes	17 No
1.	Inverter package for UPS (200 Kgs)	1No
2.	Control valves(Approximately 50 Kgs)	10No

3.	Temperature safety valves(Approximate weight 100kgs each)	18No
4.	Flow meter	1No
5.	Diff. Pressure transmitter	9No
6.	Pressure transmitters	20No
7.	Temperature Elements	6No
8.	Temperature gauges	18No
9.	Pressure gauges	34No
10.	Thermowell	17No
11.	Erection material for above items	
	i) Gate valve	270 No
	ii) Globe valve	135 No
12.	Impulse pipes and tubes for impulse connection for instrument hook-up.	
	i) SS pipe 33.4x3.4 mm	100 M
	ii) Tube seamless SS 6.0 MM OD x 1.0MM THK	200 M
	iii) SS pipe(Seam less) –A312 GR TP 321-OD 21.3 x 4.78 THK	900M
	iv) Union SS316 6MM OD	100 M
	v) STRL ST(STD QLTY) Equal Angle 50 x 50 x 6	50 M
	vi) STRL ST(STD QLTY) Channel 100 x 50	50 M
	vii) STRL ST (STD QLTY) PL 6	5 M

(ii) Tentative Instruments fittings

SNO	DESCRIPTION	UNITS	QTY.
1	ELBOW	Nos	12
2	ELBOW	Nos	75
3	FLANGES	Nos	345
4	EQUAL TEE	Nos	12
5	EQUAL TEE	Nos	70
6	UNEQUAL TEE	Nos	10
7	NIPPLE	Nos	185
8	REDUCER NIPPLE	Nos	10
9	REDUCER NIPPLE	Nos	70
10	NIPPLE	Nos	225
11	NIPPLE	Nos	95
12	MALE CONNECTOR	Nos	10
13	CAP	Nos	165

14	GASKET	Nos	280
15	PIPE U CLAMP	Nos	455
16	NIPPLE	Nos	100
17	NIPPLE	Nos	10
18	COUPLING	Nos	10
19	U-BOLTS	Nos	30
20	STRAIGHT COUPLING	Nos	70
21	EQUAL TEE	Nos	40
22	AIR FILTER REG	Nos	10
23	STUD BOLTS AND NUTS	Nos	640
24	STUD BOLTS AND NUTS	Nos	50

(GG) MISC. ITEMS (Including free supply by Contractor)

SL. NO.	DESCRIPTION	QTY
1	Cable Lugs Crippling Type Tinned Cu For Control & Inst. Cable	Lot
2	Safety Materials (Danger Board, Fire bucket, Shoes Etc)	Lot
3	Double Compression Ni - Coated Brass Cable Glands	Lot
4	Markers, Tags, Ferrules Etc	Lot
5	Cable Clamps	Lot
6	Shock hazard charts (in English & Hindi) -Danger Boards (11kV), Danger Boards (415V) etc.	
7	First aid boxes	Lot
8	Sand buckets	Lot
9	Rubber mats	Lot
10	Cable tags (3mm thick, 75mm long, 15mm width Al. Strips) & Cable route markers	Lot
11	GI clamps for holding cables onto Cable tray risers	Lot
12	50dia,100dia & 200dia GI pipe bends for cable termination up to equipment JB of motor,LPB,Receptacles,Lighting poles,etc	Lot
13	Cable glands, ferrules & lugs ((Required for any shortfalls/mismatches only)	Lot
Note :	Cable glands shall be double compression type, made of brass with Nickel Chrome plating finish. Cable lugs shall be tinned copper. (Dowel Make or as approved by BHEL)	

Annexure-X

TERMINAL POINTS

Battery Limits

1) Power after synchronization at 11 KV bus of MSIL.
2) Flue Gas at suitable height as per Pollution Control Board
3) Drain at Plant Battery limits with suitable pump for sending to Effluent treatment Plant.
4) Inlet air at the plant battery Limits
5) Fuel at the unloading platform of the Fuel storage system
6) DM Water at Plant Battery limits
7) Natural Gas at 80Mtr from Plant Battery limits
8) Natural gas Vent at suitable height.

Exclusions

1. Civil Works
2. Fire Hydrant Works
3. Underground Earthing

Annexure-XI

GENERAL SCOPE OF WORK FOR STORAGE SHED (CIVIL WORKS)

A. SCOPE OF WORK

1. The Scope for construction of BHEL Closed stores at Maruti Udyog, Gurgaon covers all works for development of structural steel shed (with AC sheet roofing) for BHEL Stores complex at site. This includes

- Earth work including excavation, filling, compaction, leveling and grading
- Plain & Reinforced cement concrete and Masonry(Full and half brick work)
- Structural & reinforcement steel work, AC sheet roofing/side cladding & partition work
- Scaffolding & Formwork
- Finishing work including plastering, flooring, false ceiling, painting etc.
- Water supply and Sanitary work.
- Electrification of Building by providing Incoming cable, Main Distribution Board, Wiring for all installation Light fixtures, power sockets, Exhaust fans, Etc
- Drainage(open and covered)

The scope includes supply of all materials labour, consumables, tools & plants, transportation, storage, sample testing, etc., and any other materials to complete the work.

2. The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably implied and necessary for completion of the job as a whole all as desired and as directed by the engineer. The detail scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual construction requirements.

3. Unless otherwise specified, the work to be provided by the contractor for the items mentioned in the "Bill of Quantities", shall include but not be limited to the following:

a) Furnishing all labour, materials, supervision, construction plans, equipment supplies, transport, to and from the site, fuel, electricity, compressed air, water, transit and storage insurance and all other incidental items and temporary works

not shown on specified but reasonably implied or necessary for the proper completion, maintenance and handling over the works, except in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by the engineer during the course of works

b) Furnishing samples of all materials required by the engineers for testing / inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works.

c) Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.

d) Giving all notices, paying all fees, taxes etc. in accordance with the general conditions of contract, that are required for all works including temporary works.

e) Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.

f) Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.

4. The contractor shall be fully responsible for the proper and accuracy layout, alignment, orientation of all elements of the construction work which shall be carried out by him accurately in accordance with drawings and obtaining clarifications from BHEL/Architects if required by him, including for any discrepancy if any, before the work is executed by him. The setting out and the construction work shall be carried out by suitable precision instruments and checked from time to time and got approved. The contractor shall provide all equipment and instruments as required at the site at his own cost.

5. BHEL-Power Sector (NR) is ISO 9001-2000, ISO 14001-1996 and OHSAS 18001-1999 certified company. Quality of work, to customer's satisfaction and system requirements is the essence of these certifications. The contractor in all respects will organize his work, systems, environment, process control documentation, tools, plant, inspection, measuring and testing equipments etc. as per instructions of BHEL engineer.

THE CONTRACTOR SHALL ALSO COMPLY WITH APPLICABLE LEGISLATION AND REGULATIONS WITH REGARDS TO HEALTH, SAFETY AND ENVIRONMENTAL ASPECTS FOR MINIMIZING RISK ARISING FROM OCCUPATIONAL HEALTH, SAFETY HAZARDS, CONTROLLING POLLUTION AND WASTAGE

B. CLOSED STORE SHED (Approx 150 Sq. m)

The stores shall be developed on land given by BHEL having the built up area of Approx. 150 Sqm .

Closed Shed (15mx10m) - 1 no.

The Store area shall be cleared of all vegetation, scrap and debris.The stores shall be made of ISMB 200 columns, tubular truss, purlins, side ties, bottom ties, wind ties of minimum 25mm x 5mm over the roof sheets along the purlins, as specified(drawings attached for reference).The working/shop drgs for Steel structures, trusses, etc shall be got approved before start of work.

The columns are erected with holding down foundation bolts in the RCC 1:1.5:3 (using 20 mm size coarse aggregate) foundation of pedestal size 1200mm high 500x400 mm minimum and raft size 1500x1500x300 mm. The raft is to be provided with a reinforcement of 10mm bars @ 125mm C/C both ways and the pedestal is to be provided with 4 no.16mm & 8 no. 12 mm bar vertically with a minimum 'L' of 200mm and with 8mm stirrups @ 150 C/C. The foundation is to rest over 100 mm PCC on firm rock / ground as instructed / approved by Engineer-in-charge. Corrugated AC sheets shall be provided with polymer coated J or L hooks, 8mm nut bolts for roofing and side cladding with appropriate anchoring, fixing and drainage arrangements. Approved quality Enamel paint shall be used for painting work to MS. The wall above Finished floor level is of brick masonry of 23cm width course, to a height of 600 mm minimum in store portion, in cement mortar 1:6 and plastered with CM 1:5. Below the Finished floor level brick masonry of 23 cm width course, to a depth of 700 mm minimum, in cement mortar 1:6 is to be laid which shall rest on top of 230 x 300 mm plinth beam (5- 16 mm dia bars and stirrups 8 mm @ 200 mm c/c). The base course under plinth beam shall be PCC 100 mm thick and 400 mm wide. The top of the plinth beam shall be 300 mm below the existing ground level. The finished floor level of the stores shall be atleast 400 mm above existing ground level.The Store flooring consists of raising the Ground level by filling good earth and 100 mm PCC over which approved hardened CC flooring is to be laid, as specified. The extended outside portion is of 750 mm wide plinth protection as specified. Extended roofing shall also be provided as per the instructions of the Engr. I/C. Hinged MS sheet shutters with 0.63 mm MS sheet with anglr bracings, shutters (5.0x 5.0 mtrs)complete with all guides, anchors, etcshall be provided. The inside store plastered surface is to be white washed with two coats minimum. Outside plastered area shall be provided with cement based paint of approved shade, colour and make. Contractor to note no fixtures, specials or any material will be given for any work which are required for the completion of works. Average 300 mm deep and 300 mm wide drains shall be constructed along the plinth if directed by the Engr I/C.

Electrification of closed shed shall be as follows:

4 Nos HPSV flood light fittings with lamps of 250 W with Choke & accessories etc.each to be provided on top of each store shed with 2 mtrs. height rigid GI pole provided with adequate brackets for mounting the flood lights and tie rods duly

grouted or welded to permanent structure. Two lights should be provided with independent MCB switch.
The connection to all HPSV fittings is to be provided by 2.5 Sq. mm PVC insulated copper conductor in PVC conduit for fittings mounted on store shed.

Providing 15/5Amps Single phase socket and 20Ampts – 3 phase socket as per instructions.
Providing pedestal fan & air circulator & heavy duty exhaust fan as per instructions.

Providing common main panel to cater requirement of all total layout, laying incoming cable for the above panel from the outside nearest source, providing feeder panel, lights & sockets requirement etc., laying interconnecting panel between common main panel and feeder main panel, providing MCB distribution board to cater lights, sockets & fans requirement.

Providing earth electrode and earth conductors as per requirement.

The scope of work has to be completed in all the manner to meet the functional requirement thereby to commission the system as a whole.

All the material used to be approved by Engineer-in-charge and in case of non-availability of approved make of material; BHEL Engineer-in-charge is authorized to substitute the same.

C. APPROVED MAKE OF MATERIALS

1.	STRUCTURAL/REINF. STEEL	:	SAIL TATA RATHI
2.	CEMENT	:	ACC BIRLA JAYPEE
3.	ENAMEL PAINTS	:	JOHNSON & NICHOLSON BERGER ICI ASIAN PAINT NEROLAC
4.	GI & MS PIPES	:	SURYA, PRAKASH JINDAL-HISSAR

TATA

5. LT CABLES:

SINGLE CORE COPPER CONDUCTOR
1100 V GRADE PVC/FRLS
CABLES (STANDARD/FLEXIBLE):

a)	PVC INSULATED WIRES	:	FINOLEX/ BATRA HENLAY/ RALLISON/POLYCAB
b)	FRLS INSULATED WIRES	:	FINOLEX BATRA HENLAY/ RALLISON/POLYCAB
c)	ARMOURED LT CABLES PVCAA-IS-1554 (PART-I) XLPE-IS-7098 (PART-I)	:	NICCO/ BATRA HENLAY/ RALLISON/ POLYCAB

6. ELECTRICAL ACCESSORIES

a)	SWITCHES AND SOCKETS: (MODULAR TYPE SWITCHES)		ANCHOR, MK, LK

7. ELECTRICAL EQUIPMENT:

a)	EXHAUST FANS	:	ALSTOM / CROMTON/ GC/ NUTECH
b)	LIGHT FITTINGS	:	CROMPTON/PHILIPS /WIPRO/BAJAJ
c)	WALL MOUNTING FANS	:	ORIENT/ CROMPTON/ GC/USHA
d)	CFL & FL LAMPS	:	PHILIPS/ OSRAM/WIPRO/BAJAJ
e)	KWH METERS ETC	:	BHEL/ GE/ L&T /HAVELS
f)	MCBs & MCB DBs (10 KA)	:	MDS/ L&T-HAGGER/ HPL/ HAVELS EURO
g)	EARTH LEAKAGE CIRCUIT: BREAKER		MDS/ L&T-HAGGER/ HPL/ HAVELS EURO

Note:

1. Approval of BHEL engineer is to be obtained before procurement of materials specifies above. The make of material mention if not available in the market or is not suiting the site condition & the make of material not

mentioned in the above list, equivalent make may be used after the approval from BHEL

2. Work execution shall be done as per standard items of CPWD-DSR 2007 however the payments may be admitted with the impact of applicable esclations.

AREA DEVELOPMENT:

STORAGE YARD AND ROADS - The Storage yards and roads shall be developed on land given by BHEL having the built up area of Approx. 10000 Sqm. Storage Yard shall be of Grid structure intercepted by the road network**.**

There shall be one no. 6.0 mtr wide 1.5 mtr high entrance/exit gates of MS built up welded tubular and box sections as required . The Gates shall be complete with bottom rails, locking arrangement, etc. as per instructions of the Engineer I/C

The yard area shall be cleared of all vegetation and the rubbish shall be disposed as instructed. The entire storage yard is to be leveled first by making good the undulations , watered, compacted and rolled with road rollers to required slope (1: 300) towards the periphery so that no water logging is present. The road area, subgrade shall be prepared after dressing to camber and consolidation (8-10 passes) with 8-12 T Road rollers, over which 100mm water bound macadam is to be laid with stone aggregate 63 mm to 45 mm, stone screenings, moorum, red bajri, binding earth etc and is to be compacted and rolled with road roller. The road surface shall be atleast 100 mm above the compacted yard area and appropriate approaches shall be made to closed and open storage areas from the roads. 1” thickness consolidated morrum layer shall be provided on top of the WBM roads. The internal road of storage yard is to be connected with existing approach road. This is in the contractor’s scope. Contractor to note no machinery, tools & plants, material, manpower shall be provided by BHEL.