TENDER SPECIFICATION

No. BHE/PW/PUR/MKH-HTG/445

FOR

Name Of The Work: Loading of Materials at Customer's Stores / Stores Shed / Storage Yard, Transportation to & Unloading at Work Site, Pre-Assembly, Erection, Testing, Pre-commissioning and Assistance for Commissioning of Hydro (Francis) Turbine & Generator along with Its Associated Auxiliaries Including Governor, Main Inlet Valve, Microprocessor based control and monitoring system, lines and bus coupler, Static excitation system, Local starter panels for TG Auxiliaries, Vibration monitoring system, Control & Instrumentation, Electrical, SEE/AVR, Cooling water system, Compressed air piping, Drainage and Dewatering piping with their accessories and Final Painting of Equipments and Handing Over of 1x20 MW Unit-3

at

Madhya Pradesh Power Generation Company Ltd.

Madhikheda Hydro Electric Plant

Distt. Shivpuri (M.P.)

Part: I
(TECHNICAL BID SPECIFICATION, NOTICE INVITING TENDER and GCC)

Bharat Heavy Electricals Limited
(*A Government of India Undertaking*)
Power Sector - Western Region
345-Kingsway, Nagpur-440 001

CONTENTS

LEGEND:

$: PLACED BEFORE 'GENERAL CONDITIONS OF CONTRACT' IN BOTH HARD AND SOFT COPY DOCUMENTS.

#: ATTACHED AT THE END OF HARD COPY OF TENDER SPECS. PART-I (TECHNICAL BID) AND AS A SEPARATE FILE TITLED '**WEB_NIT_GCC** AS SOFT COPY HOSTED IN WEB PAGE.

@: ISSUED AS SEPARATE BOOKLET IN HARD COPY AS **PRICE BID (PART-II)** AND AS SEPARATE FILE TITLED 'PRICE_BID' AS SOFT COPY HOSTED IN WEB PAGE.

Bharat Heavy Electricals Limited
(A Government Of India Undertaking)
Power Sector - Western Region
Shreemohini Complex
345-Kingsway, Nagpur-440 001

TENDER SPECIFICATION NO.BHE/PW/PUR/MKH-HTG/445

Name Of The Work: Loading of Materials at Customer's Stores / Stores Shed / Storage Yard, Transportation to & Unloading at Work Site, Pre-Assembly, Erection, Testing, Pre-commissioning and Assistance for Commissioning of Hydro (Francis) Turbine & Generator along with Its Associated Auxiliaries Including Governor, Main Inlet Valve, Microprocessor based control and monitoring system, lines and bus coupler, Static excitation system, Local starter panels for TG Auxiliaries, Vibration monitoring system, Control & Instrumentation, Electrical, SEE/AVR, Cooling water system, Compressed air piping, Drainage and Dewatering piping with their accessories and Final Painting of Equipments and Handing Over of 1x20 MW Unit-3 at Madhya Pradesh Power Generating . Co. Ltd. At Madhikheda HEP, Distt. Shivpuri, (M.P.)

Earnest Money Deposit: Please refer **Section-15** of Special Conditions of Contract

Last Date and Time for Receipt of Offers: Please obtain updated information from web page **www.bhel.com** ® **Tender Notifications** ® **View Corrigendums.**

These Tender Specification Documents Containing **Part-I** Technical Bid and **Part-II** Price Bid, are issued to:

M/s……

……..

(These Tender Specification Documents **Are Not Transferable**)

For Bharat Heavy Electricals Limited

DGM (Purchase)

Place: Nagpur
Date:

PROJECT INFORMATION

SITE ADDRESS	:MADHIKHEDA HYDRO ELECTRIC POWER PROJECT
VILLAGE	:MADHIKHEDA
POST	:SHIVPURI
DIST	: SHIVPURI
NEAREST AIRPORT	:GWALIOR
NEAREST RAILHEAD	:SHIVPURI (ON GWALIOR – INDORE RAIL ROUTE, 126 KM FROM GWALIOR)
MAX TEMPRETURE	:49° C
MIN TEMPRETURE	: 5° C

THE PROJECT SITE IS LOCATED AT A DISTANCE OF ABOUT 30kM FROM SHIVPURI.

SIGNATURE OF TENDERER

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector: Western Region
345, Kingsway, Nagpur – 440 001

Procedure for Submission of Sealed Tenders & Instructions to Bidders

The bidder must submit their tenders as required in two parts in separate sealed covers prominently super scribed as part-I technical bid and part-II price bid and also indicating on each of the covers the tender specification number and due date and time as mentioned in the tender notice.

Part-I (technical bid) cover-I:

Excepting rate schedule, all other schedules, data sheets and details called for in the specification shall be enclosed in **part-I** "**Technical Bid**" only.

Part-II (price bid) cover-II:

All indications of price shall be given in this **part-II "Price Bid**". **EMD shall not be included in this cover.**

These two separate covers-I and II (part-I and part-II) shall together be enclosed in a third envelope (cover-III) along with requisite EMD as indicated earlier and this sealed cover shall be super scribed and submitted to Addl. Gen Manager (Purchase) at the above-mentioned address on or before the due date as indicated.

The qualified bidder will be intimated separately about the status of their offer.

Bidder are requested to make specific note of the following conditions:

Contractor should have adequate resources including major T&P at his disposal for this job.
Contractor should have sound financial stability.

Bidder should meet quality requirement regarding workmanship, deployment of personnel, erection tools and necessary inspection, measurement & testing instruments.

All information as called for in various appendices and clauses of tender specification, should be furnished in completeness. Please refer the checklist.

Clarification on tender specification, if any, shall be obtained by the bidder latest by seven days before Due Date for submission.

Offers must be submitted without any deviation.

Offers received with any deviation or without relevant information as described above are liable to be rejected. Price bids received in the form other than specified in part-II (price bid) are liable to be rejected.

Bidder shall note that their offer will be considered subject to the approval of BHEL's customer.

Check List (Vide Para 1.3 Of Section-I of General Conditions Of Contract)				
1	Name of the Bidder with Postal Address for Correspondence			
2	Name of Contact Person with Telephone & Fax No.	Mr./Ms Tel No. Fax No.		
3	Nature of the firm	PROPRIETARY / PARTNERSHIP / LIMITED CO.		
4	Details of EMD Please Indicate whether 1) One Time EMD or, 2) Only for this Tender	DD No. …… DD Date…… Name of Bank…….. Amount: Rs…….		
5	Validity of Offer (BHEL's Requirement: 180 days from Due Date)	Validity _____ days		
6	Mobilization Time (Please refer Section-11 of SCC)	Mobilization Time _____		
7	Whether any conditions stipulated?	**Yes** (vide Document reference:	**No**	
		Bidder to note that tender with conditions unacceptable to BHEL shall be rejected.		
8	Bidder has visited the project site and acquainted with the site conditions		Yes	No
9	Details of concurrent jobs are furnished (**Appendix-XII)**		Yes	No
10	Headquarters organization is furnished		Yes	No
11	Proposed site organization is furnished		Yes	No
12	Names and particulars of directors/partners are furnished		Yes	No
13	Financial status of the firm (**Annexure 'A' of GCC**) is furnished		Yes	No

Check List (Vide Para 1.3 Of Section-I of General Conditions Of Contract)			
14	Profit & Loss Account for preceding three years is furnished	Yes	No
15	**Latest Certificate by Bidder's Banker for Overdraft & BG Limits** is Furnished (Certificate shall not be older than six months from the Last Date for offer submission)	Yes	No
16	Latest c**opy of IT Return along with copy of PAN Card** are Furnished	Yes	No
17	Month-wise Manpower Deployment Plan for site work (**Appendix– IX**) is furnished	Yes	No
18	Month-wise Manpower Deployment Plan for Miscellaneous Services (**Appendix– XIV**) is furnished	Yes	No
19	Analysis of unit rates quoted (**Appendix-X**) is furnished	Yes	No
20	Month wise deployment plan for major T&P (**Appendix-VIII**) is furnished	Yes	No
21	Whether all the pages of the Tender Specification documents are read, understood and signed	Yes	No
22	Power of Attorney Enclosed in favour of person making Offer	Yes	No
23	Bidder has familiarized himself with all Relevant Local Laws & Local Conditions	Yes	No
24	Safety Requirement of this work in a Running plant Premises has been understood.	Yes	No
	Erection and Commissioning programme furnished	Yes	No
25	List of Jobs completed in last seven years is furnished (**Appendix-XIII**)	Yes	No
26	Whether copies of detailed Work Orders (with BOQ) and Completion Certificates in support of above furnished	Yes	No
27	Whether contractor has left any job unfinished? If so, give reasons.	Yes	No
28	Whether any client has terminated the contractor's work before completion? If so, furnish reasons for the same	Yes	No

Note: strike off yes or no, as applicable

Date: Signature of bidder

DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

I, …… HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THE TENDER SPECIFICATION No. **BHE/PW/PUR/MKH-HTG/445** ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATIONS, CONDITIONS AND STIPULATIONS IN DETAIL AND AGREE TO COMPLY WITH THE REQUIREMENTS AND INTENT OF THE SPECIFICATION. I FURTHER CERTIFY THAT I AM DULY AUTHORIZED REPRESENTATIVE OF THE UNDER-MENTIONED TENDERER AND A VALID POWER OF ATTORNEY TO THIS EFFECT IS ALSO ENCLOSED.

AUTHORISED REPRESENTATIVE'S SIGNATURE WITH
NAME AND ADDRESS

DATE:

BIDDER'S NAME AND ADDRESS

CERTIFICATE OF NO-DEVIATION

TENDER SPECIFICATION NO. BHE/PW/PUR/MKH-HTG/445

I / WE, M / s ……

HEREBY CERTIFY THAT NOTWITHSTANDING ANY CONTRARY INDICATIONS/ CONDITIONS ELSEWHERE IN OUR OFFER DOCUMENTS, I/WE HAVE NEITHER SET ANY TERMS AND CONDITIONS NOR THERE IS ANY DEVIATION TAKEN FROM THE CONDITIONS OF BHEL'S TENDER SPECIFICATIONS, EITHER TECHNICAL OR COMMERCIAL, AND I/WE AGREE TO ALL THE TERMS AND CONDITIONS MENTIONED IN BHEL'S TENDER SPECIFICATION WITH ASSOCIATED AMENDMENTS AND CLARIFICATIONS.

DATE: SIGNATURE OF THE BIDDER

Section-3

Offer of the Bidder

To,
The DGM (Purchase)
Bharat Heavy Electricals Limited
Power Sector - Western Region
Shreemohini Complex
345, Kings Way
Nagpur 440 001

Dear Sir,

I/we hereby offer to carry out the work detailed in tender specification No .BHE/PW/PUR/MKH-HTG/445 for unit # 3 issued by Bharat Heavy Electricals Limited, Power Sector-Western Region, Nagpur, in accordance with the terms and conditions thereof.

I/we have carefully perused the following documents connected with the above work and agree to abide by the same.

1) Instructions to tenderers
2) General conditions of contract
3) Special conditions of contract
4) Other sections, appendices, schedules and drawings.

I/we have deposited / forwarded herewith the earnest money deposit for a sum of Rs. 1,50,000/- (Rupees One lakh fifty thousand only) Details of EMD payment are furnished in the check list.

EMD shall be refunded should our offer not be accepted / EMD **need not be refunded and the amount may be treated as "one time EMD" for erection and commissioning tenders of BHEL-PSWR, Nagpur**. Should our offer be accepted, i/we further agree to deposit security deposit for the work as provided for in the tender specification within the stipulated time as may be indicated by BHEL, Power Sector-Western Region, Nagpur.

I/we further agree to execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

Place: Signature of Bidder:
Date : Address:

Witnesses With Their Address

	Signature	Name	Address
1.			
2.			

SECTION - 4

Special Conditions of Contract

4.0 SCOPE OF WORK

4.0.1
The work to be carried out under the scope of these specifications covers complete work of loading and transportation the BHEL equipments/materials from owner's (**MPPGCL**) site stores/ stores shed/storage yard, unloading these in the power house service bay for assembly, erection, alignment, testing, pre-commissioning and **commissioning assistance** of 1x20 MW Francis Hydro turbine, generating units along with main inlet valves with its auxiliaries and associated equipments of plant as per the technical requirement at site.

4.0.2
Complete assembly, installation, alignment, testing and **commissioning assistance** , **including the Exterior Finish Painting/ Final painting with supply of primer for touch up and Synthetic Enamel Paints for Under water path system, Generator Barrel inside and other equipments covered these specifications and handing** over of 1x20 MW hydro turbines, hydro generators, foundation parts, main inlet valves along with associated auxiliaries including governor, static excitation equipments, control panels, control & instrumentation, micro processor based control and monitoring system supplied by BHEL as per BHEL's standard and established practice. The Primer and Paints purchased will be from reputed manufactures (Berger Paints (I) Ltd., Asian Paints Ltd., Goodlass Nerolac Painst Ltd., Jenson & Nicholson Ltd, Shalimar Painst Ltd., and any other manufacturer as approved by BHEL / Customer) as per specified colour code/sheds etc.

Under water path system will be coated with one coat of Epoxide Primer Paint (Specification AA 56105) and Two Coats of High Build Black Coaltar Epoxide Paint (Specification AA 56135).

4.0.3
Contractor has to undertake the works simultaneously on many fronts/ activities as the work progresses. He shall augment his resources to meet the schedule of work as per BHEL/MPPGCL requirement. Bidders shall take account of all such necessities in their offer.

4.0.4
The terminal points decided by BHEL shall be final and binding on the contractor for deciding the scope of work.

4.1 General Details Regarding the Scope of Work

4.1.1
The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely completion of work under this specification. The contractor must deploy adequate quantity of measuring & testing instrument, tools, construction aids, and equipment etc, in

consultation with BHEL. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel to meet the work schedule.

4.1.2
The intent of specification is to provide erection services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient erection and commissioning of the plant shall not relieve the contractor of the responsibility of providing such facilities to complete the erection and commissioning without any extra compensation.

4.1.3
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with personnel of customer and their other contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

4.1.4
The entire work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working, sequence of erection etc prescribed depending upon the requirement of site shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods adopted in erection of similar power station.

4.1.5
The contractor shall perform services & tests etc that may not be specified but nevertheless required for the completion of the work within the quoted rates.

4.1.6
All necessary certificates, licenses, and clearances, from concerned appropriate authorities including statutory authorities if any, required to carry out this work are to be arranged by the contractor expeditiously.

4.1.7
The work shall conform to dimensions and tolerances specified in the various drawings and documents that will be provided during the erection. If any portion of the work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, to the satisfaction of BHEL.

4.1.8
During the course of erection, testing and commissioning of equipments, etc, certain rework/ modification/ rectification/repairs/ fabrication etc will be necessary on account of feedback from various power stations or units already commissioned and/or units under erection and commissioning and also on account of design discrepancies, manufacturing defects and site operation & maintenance requirements. Contractor shall carry out such rework/ modification/ rectification/ fabrication/ repairs etc, promptly and expeditiously. Daily log sheets indicating the details of work carried out, man hours, consumables used etc shall be maintained

by the contractor and got signed from BHEL engineer every day. Claims of contractor, if any, for such work will be governed by the provisions of section-13.

4.1.9
Contractor shall collect all scrap, surplus, and packing materials etc periodically from various areas of the work site and return to BHEL / MPPGCL stores.

4.1.10
Use of permanent plant materials like angles, channels, etc, are prohibited from use in temporary arrangements like scaffoldings etc the contractor shall provide materials for such arrangements.

4.1.11
In respect of materials supplied by BHEL**/MPPGCL**, the contractor has to render accounts for consumption and return the surplus in good condition to MPPGCL.

4.1.12
Without prejudice to the right of enforcement of the penal provisions available in the general condition of contract, BHEL at its absolute discretion may withdraw the work (partly or the balance or in full) entrusted to the contractor and entrust the same to other agencies or execute the work departmentally. Any compensation on this account shall be worked out as per mutual agreement.

4.1.13
Erection of DT liner and DT Cone works has been already carried out by other agency. Contractor under this contract shall carry out the removal of temporary supports/bracings, fixing and welding of concrete pouring plugs and finish grinding of DT Liner and DT cone as part of scope of work of tender specification.

4.1.14
Contractor shall have to carry out the erection of left over pressure and metering pipes as part of scope of work in DT cones that are already erected.

4. 2 PREPARATION OF FOUNDATION

4.2.1
Foundation and other necessary civil works for supporting structures, equipments etc, will be provided by the MPPGCL. It shall be the contractor's responsibility to check the various equipment foundations for their correctness with respect to benchmarks of level, orientation, co-ordinates, etc these dimensions shall be measured, logged and submitted to BHEL for approval prior to erection of equipments. Minor chipping or dressing of concrete foundations up to 25mm for obtaining proper level and alignment for packer plates/shims, enlarging of the pockets in foundation etc, as may be required for the erection of the equipments/ plants will have to be carried out by contractor without extra cost. A joint log sheet before taking over the foundations shall be prepared by contractor.

4.2.2
Any fixtures, minor foundations, anchors, concrete block supports, steel structures, required as temporary supports/platforms during pre-assembly or any other similar

requirements during all stages of this work shall be arranged by the contractor using his own materials etc, as per the approval of BHEL.

4.2.3
Cleaning of foundation surfaces, pocket holes, de-watering and making them free of oil, grease and sand and other foreign materials by water washing, compressed air and other approved methods are within the scope of work.

4.2.4
Grouting of equipments and supply of grout materials is excluded from the scope of work.

4.3 MATERIAL HANDLING AND TRANSPORTATION

4.3.1
The scope of work shall include the work of taking delivery of materials from the stores/shed/store yards of customer situated at a distance of approximately 2-3 km. Also wherever required materials may have to be got issued from BHEL stores/shed/yard.

4.3.2
Contractor shall prepare necessary indent/requisition voucher, as may be prescribed, well in time and obtain necessary approvals of BHEL/MPPGCL engineers for issuance of materials.

4.3.3
After obtaining the delivery of materials, contractor shall transport the same to the site of work. Contractor shall provide all the required manpower, tools and plants, tackles, trucks/trailers etc these shall be of adequate capacity and safe in operation.

4.3.4
Materials once issued to the contractor shall be in his custody and he shall be responsible for proper stacking at site, preservation of the same, even in erected condition, as per prescriptions/instructions of BHEL in this regard. Safety and security of these either loose, pre-assembled or in erected condition shall be the responsibility of the contractor.

4.3.5
Resources required for above e.g. Sleepers, tarpaulins, preservatives, watch and ward staff etc, should be arranged by the contractor.

4.3.6
Stacking of material should not lead to the congestion of work site for the contractor as well as other agencies work there. Shifting, re-stacking if required shall be done by the contractor expeditiously as part of work.

4.3.7
All equipments shall be handled very carefully to prevent any damage or loss.

4.3.8

Generator Stator segments have been transported to service bay in TG hall from customer's store by other agency. Contractor under this contract shall take the further works of assembly of stator segments, winding etc. as part of scope of work.

4.4 ERECTION

The scope of work of pre-assembly, erection, though not limited to, will in general be as follows:

4.4.1

The list of equipments to be erected under this contract is generally as per the Appendix-III the list of equipments and their weight & dimension indicated as per Appendix- II are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. These shall be overridden by the pertinent documents/information supplied by the manufacturing unit/sub-vendor of BHEL during the course of erection, commissioning etc.

4.4.2

All works, such as cleaning, conditioning, checking, leveling, blue matching, aligning, assembling, temporary erection for alignment, dismantling of certain equipment for checking/cleaning, surface preparation, fabrication of tubes and pipes as per general engineering practice at site, cutting, grinding, straightening, chamfering, filing, chipping, drilling, reaming dowelling, oblonging of holes, scrapping, shaping, fitting, up as may be applicable in such erection work and necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work.

4.4.3

The contractor shall carry out the work to ensure compliance with the pertinent field quality assurance plans. All necessary checks, stage inspections shall be done to ensure correctness of installation of equipments covered in the scope of work.

4.4.4

Pipes will be issued as received from manufacturing units. These are to be cut to required length to suit layout as given in the erection drawing and edge prepared at site. Attachments etc, may be supplied as loose items, which will have to be welded to the main pipes at site as per erection drawings. Contractor as a part of work, if required, shall do necessary drilling of holes on main pipe, at site. Fittings like bends, tees, elbows, meter bends, reducers, flanges etc, may have to be fabricated out of straight pipes.

4.4.5

The work of piping systems will include laying, edge preparation, fixing and welding of the elbows/ fittings,/valves etc, welded on the lines, fixing and adjustment of /hangers & supports and carrying out all other activities to complete the erection as per BHEL instructions, approved drawings and documents.

4.4.6
Alignment, matching and welding/bolting of piping to the terminal points shall also form part of scope of this specification. Further, where the piping connections to the terminal points involves flanged joints, mounting and welding of flanges on piping, matching of flanges, fixing of gaskets, bolting and tightening as per BHEL's instructions is in the scope of work.

4.4.7
The contractor to suit the final layout, as part of work without additional cost, shall do certain adjustment by way of removal or addition of extra length to the piping supplied as readymade from the manufacturing unit. Also minor adjustment like opening/closing of the fabricated pipe bends by hot correction or any other specified procedure shall be done by the contractor as part of work.

4.4.8
Prior to erection all equipments particularly the piping shall be cleaned of dust, dirt, etc using wire brush, compressed air as the case may warrant.

4.4.9
All drains, vents, relief/exhaust piping to various tanks/sewage/drain canal/sump/ atmosphere etc, from various equipments and piping are part of scope of work.

4.4.10
Taking delivery, loading, transport, unloading, erection, testing, and commissioning of cables, panels, static excitation equipments, controls & instrumentation, auto sequencer, ups/battery charger/battery bank, Calibration of instruments supplied by BHEL manufacturing unit is in the scope of work. Cable termination is also part of work.

4.4.11
In case any class of work, which is not specifically stated/detailed herein but is essential for the satisfactory completion of the work tendered through these specifications shall be carried out as part of work within the quoted rates.

4.4.12
Generator coil bars, winding and complete assembled Generator and Generator Rotor assembled shall require heating during erection, pre and post commissioning to carry out dry out before carrying out HV test at various stages. Contractor shall arrange required capacity DC heating sources with temperature measurement and adequate quantity of asbestos cloth covering materials as part of scope of work.

4.4.13 Welding, Heat Treatment and Non-Destructive Testing:

4.4.13.1
Method of welding viz. arc, TIG or other methods as indicated in the detail drawing/welding schedule shall be followed. BHEL engineer shall have the option to alter the same to suit site conditions. No claim for change in method of welding will be entertained.

4.4.13.2
All welders shall be tested and approved by BHEL engineer before they are actually engaged on the work, though they may possess the requisite certificate. BHEL reserve right to reject any welder without assigning any reasons.

4.4.13.3
All charges for testing of contractor's welders including destructive and non-destructive test conducted by BHEL at site shall have to be borne by the contractor.

4.4.13.4
BHEL is entitled to stop any welder from his work, if his work is found unsatisfactory for any technical reasons or if there is a high percentage of rejection of joints welded by him which in the opinion of BHEL engineer will adversely affect the quality of welding. This despite the welder is having passed the qualifying test earlier.

4.4.13.5
Basic coated welding electrodes shall be dried in the electrode-drying oven to the temperature and period as specified by BHEL before they are used in the erection work. Each welder using such welding electrodes should be provided with a portable electrodes drying oven at the work spot by the contractor.

4.4.13.6
Wherever specified, weld joints shall be surface finished to the required level.

4.4.13.7
Complete welding, post weld heat treatment, all NDT and other prescribed checks, tests, and inspections as per field quality plans/ other documents of BHEL shall be part of scope of work. Necessary scaffolding and approach for conducting these shall be in the scope of contractor.

4.4.13.8
All welding electrodes other than DT Knee & Spiral Casing shall be in contractor's scope. Welding generator/welding transformer, gas cutting set and any other equipments required for successful completion of the job except those specified as BHEL's scope, shall be under the scope of contractor.

4.4.13.9
Oil, lubricants, flushing oils etc required for initial/subsequent filling shall be drawn from the stores/shed/yard. Empty containers, balance part quantity etc shall be returned to MPPGCL stores.

4.4.13.10
Oil & air pipes up to 3" shall have their welded joints, root run TIG welded and DP tested, subsequently arc welding to be carried out. Oil pipelines shall be acid cleaned, neutralised and hydraulically tested as per technical requirement.

4.5 Hydrostatic Testing & Other Tests

4.5.1
The contractor shall carry out the specified tests on the equipments and the pipelines and rectify all defects. There is likelihood of certain equipments which require dismantling/blanking/isolation for conduct of hydraulic test and restoration afterwards. It shall be carried out by contractor as per requirement and as part of work within quoted rates.

4.5.2
Contractor shall lay all necessary temporary piping, install pumps, valves, pressure gauges, electric cables and switches etc required for the hydraulic test and other tests. After the test is over, all the temporary piping, pumps etc shall be removed.

4.5.3
Hydraulic testing of piping, individual systems and equipment either under hydrostatic pressure or under static water head or both as per BHEL's instruction is in the scope of work. Test pump required for hydraulic testing will have to be arranged by contractor.

4.5.4
All the above tests should be repeated till all the equipments satisfies the requirement/obligations of BHEL to their customer. All repairs during testing due to failures attributable to the erection shall be made good by the contractor at his cost. For the manufacturing defects revealed during the hydro test, the contractor's labour used in rectification of the defect shall be governed by section-13. However, no extra payment will be considered for repeating the tests on account of manufacturing defects.

4.5.5
Hydro test of piping may have to be repeated several times in consonance with technical/statutory requirement during the stage of erection and commissioning.

4.5.6
Contractor shall carry out any other tests as desired by BHEL on erected equipment covered under the scope of work to demonstrate the completion of any part or whole of the work performed by the contractor.

4.5.7
Flushing of oil pipelines should be carried out by contractor to the satisfaction of BHEL engineer. For this flushing plant consists of tank, motor/pump, heating arrangement etc shall be arranged by contractor. Flushing oil will be supplied by BHEL.

4.5.7a Embedded Pipes In First Stage :
Drain pipes of penstocks and draft tubes, air inlet pipes to top cover, pivot ring, siphon drain pipes, pressure balancing pipes if any to draft tube / and any pipes and fixtures in the drainage and dewatering bays.

4.5.7b Embedded Pipes in Second Stage Foundation:

Pipes such as drainage, dewatering, air breather pipe cooling water inlet/discharge pipes of turbine and generator, air intake pipes for air valve, top cover drain pipes, siphon drain pipes and embedded pipes in turbine & generator barrel such as piezometric pipes, cooling water pipes to shaft gland and pressure balancing pipes, air intake pipes to air valve, flow meter pipes etc inline with the relevant drawings embedment of anchor hooks etc wherever called for as per relevant drawings shall also be carried out by the contractor.

4.5.8 Spiral Casing

Spiral casing along with inlet pipe shall be hydraulically tested as per technical requirement. Test cylinder and test cone are supplied by BHEL. After completion of hydraulic test cylinder and test cone is to be removed and edges are to be finished by grinding. Supports are to be placed and welded inside spiral casing prior to release of spiral casing for concreting. Contractor shall take care of all technical requirements while installation of spiral casing and inlet pipe as per drawings.

The contractor shall plan the welding of stay ring, spiral casing, cone and inlet pipes etc in such away so that NDT of weld joints can be done progressively. All necessary equipments, consumable, qualified personnel required for NDT of welds joints shall be contractor scope. The technical requirements for welding & non destructive testing shall be as per instruction given in the drawing & welding quality plan and shall be binding on contractor.

4.5.9

Control & instrumentation system comprising of field instruments, control panel for turbine/ generator auxiliaries & associated equipment, MMI & its peripherals, common control panels, auto sequencer & relay panels, metering & protection panels, SEE/AVR (excitation equipments, inter panel cabling, cabling between field devices/instruments to marshalling boxes/ junction boxes etc cabling scope includes laying, glanding, dressing, clamping, termination. Contractor shall arrange cable lugs up to 2.5 sq mm (Cu) size and dressing/ clamping materials within the quoted rate.

4.6 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING

On completion of erection of major equipments, the same shall be thoroughly inspected for correctness and readiness for trials/ pre-commissioning tests. All tests, pre-commissioning, commissioning and post commissioning activities shall be performed in accordance with the standards / procedures / methods / documents / instructions etc, of BHEL. Some of these, though not limited to these, are stated hereunder:

4.6.1

(A) Foundation Parts

1. Centering, leveling alignment of stay ring, spiral casing and inlet pipes with respect to unit axis & benchmark level.

2. Measurement of diameter of stay ring and foundation ring and carry out all necessary correction as per instruction of BHEL Engineer at site in discrepancies noticed in diameter/ ovality of above equipments .

3. Measure the dimensions of DT Cone (installed by other party) and carry out minor corrections to ensure matching with Stay Ring and Spiral Casing components.

(B) Hydro Turbine

1. Measurement of clearance between shaft and guide bearing and runner and top cover/ pivot ring
2. Measurement of guide vane top/bottom clearance
3. Relation between servomotor stroke and guide van opening.
4. Check of shaft alignment.
5. Running for bearing run
6. Determination of guide vane opening for starting and no load run.
7. Guide vane bedding.

(C) Main Inlet Valve (BF Valve)

Assembly, hydro test and erection of main inlet valve along with inlet outlet pipes their welding NDT and erection associated auxiliaries**.**

(D) Pre-Commissioning/Commissioning Tests

1. Load rejection test.
2. Emergency stop test.
3. Quick stop test.
4. No load and no excitation run test.
5. Over speed test.
6. Continuous operation test.

(E) Electro-Hydro Governor

1. Speed governor adjustment.
2. Pressure test of oil pumping system.

(F) Hydro Generator

1. Leveling & alignment
2. Stator winding, dry out, HV test
3. Rotor pole to pole connection, dry out, HV test
4. Measurement of air gap length.
5. Mechanical run (checking balance, bearing temperature, automatic braking etc)
6. OCC &SCC
7. Interlock & protection checks
8. AVR (excitation system) commissioning checks & adjustment.

(G) Controls & Instrumentation

1. Functional checks /tests of all the auxiliaries and control equipments.
2. Calibration / testing / adjustment of all field devices/ instruments.

3. Checking of auto sequencer.
4. Commissioning of all drives.

4.6.2
Pre-commissioning/commissioning will involve calibration, tests/trial runs of all the equipments/field devices/instruments individually and in integrated manner.

4.6.3
Checks/tests etc, as above, will have to be repeated as part of work till satisfactory results are obtained. Defects/re-work noticed during such trials/tests etc shall be attended to expeditiously. Certain rectification, modification may be called for as a result of these tests. Contractor's claim, if any, toward such re-works, rectifications, modifications will be dealt with according to provisions of section-13 depending upon the fact whether the same is attributable to the contractor or not.

4.6.4
After trials etc, the bearings of sets may have to be opened for inspection, re-work/re-adjustments if any, and closure of the bearings shall be done as part of work without any extra compensation.

4.6.5
It is to be noted that during such trials/pre-commissioning and commissioning activities work may have to be carried out on round the clock basis. Contractor shall earmark separate skilled manpower for various commissioning activities which shall not be disturbed or diverted for other work. Such contingencies shall be taken account of in the offer by the bidders.
If at any time the contractor fails to arrange requisite manpower, consumables, T&P or any other resource, BHEL will make alternative arrangements and necessary recoveries with overhead cost will be made from the bill of the contractor.

4.6.6 Type Test and Acceptance Test
As part of work contractor shall provide all assistance by way of manpower including supervision, consumables, tool, tackles, routine measuring instruments, etc for conduct of type test and acceptance test. Any special instruments if required shall be arranged by BHEL.

4.7 LOSS/DAMAGE TO EQUIPMENTS AND VERIFICATION

4.7.1
While taking delivery of material the same shall be inspected for its correctness and for any apparent damage/deterioration/loss during transit/storage. Such instances should forthwith be brought to the notice of BHEL/**MPPGCL** for further instructions.

4.7.2
BHEL reserves the right to recover from the contractor any losses arising out of undue delay/discrepancy /shortage/damage or any other causes due to contractors lapses, during any stage of this work.

4.7.3

Contractor shall provide exclusive watch & ward (security) services at Erection site/stores (open/closed) and BHEL office within the quoted rates. Contractor shall make separate arrangements for security and safety of the components/equipments issued to them by Customer including such arrangement at the site of work. No separate payments shall be made for any of these watch and ward services under the scope of this tender specification.

4.8.0 FINAL PAINTING & UNDER WATER PAINTING

4.8.1

All exposed metal surfaces shall be painted with Synthetic Enamel finish paints conforming to IS:2932. Corresponding matching primer shall be conforming to IS:2074. The contractor shall provide all the primer finish paint and other consumables like brush, cleaning agents etc. All T&P, manpower, supervision is in contractor's scope. Colour coding & Colour bands (as approved by BHEL/Customer) bands, name of equipments/lines, flow direction arrow, inscription etc.) for identification and specification of various equipments & pipelines shall be as decided by BHEL/ Customer at site.

4.8.2

All exposed metal parts of the equipment including main equipments under the scope of this tender specification, piping, supports, structures, railing, tanks/vessels etc, as applicable shall be painted after thoroughly cleaning the surface from dust, rust, grease, oils, scales, etc, by wire brush, scrapping, etc as required. The above parts shall then be painted with two coats of synthetic enamel paint over the existing shop primer/paint. Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by suitable method to obtain clean metal surface and coated with two coats of Primer and two coats of Finish Paint. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned and painted as specified above. The dry film thickness after final coat should be as per specification. The colour shade etc. shall be as instructed by the BHEL engineer in charge. Primer and Finish Paints shall be sourced only from the BHEL-approved manufacturers. Prior approval of BHEL shall be taken by the Contractor before procurement of the paints and primers. Tentative list of BHEL–approved manufacturers is as under:

1) Berger Paints (I) Ltd.
2) Asian Paints Ltd.
3) Goodlass Nerolac Paint Ltd.
4) Jenson & Nicholson Ltd.
5) Shalimar Paints Ltd.
6) Any other manufacturer approved by BHEL.

In order to have consistency in painting system, it is preferable that all the supplies are sourced from one single manufacturer.

The primer shall be compatible with the final paint schedule.

Manufacturer's test certificate for each batch of primer/ paint shall be submitted prior to use. Non-compliance to this requirement will lead to the prohibition from use and rejection of that particular batch of supplies.

4.8.3

Under water parts like spiral casing, foundation ring and inlet pipes shall be painted with one coat of Epoxide Primer Paint (Specification AA 56105) and Two Coats of High Build Black Coaltar Epoxide Paint (Specification AA 56135). The spiral and inlet pipe segments are generally supplied final painted leaving 100mm wide band from edges, after welding the joints, the exposed area to be painted with coat of primer and then final paint coat. The painted area damaged during the course of handling/ erection shall be cleaned and painted as per the instruction of BHEL engineer. Contractor shall arrange equipment required for surface preparation and all consumables, paints, thinners, primer as per requirement for finish paints at his cost as part of scope of work.

4.9 OTHER VARIOUS SERVICES

4.9.1

The Contractor under this contract shall provide following three categories of services towards proper Record keeping, Secretarial Services and Messenger Services under Erection and Commissioning scope of work.

(A) Record Keeping:- 1 Service point at site office.

Contractor shall prepare, maintain and update various erection material records, associated with Materials receipt at project site. Two systems of record keeping/capturing information & data at various stages are in vogue viz.

- Manual Ledgers & Records.
- Computerized Database Application: BHEL has developed a software application named Site Operations Management System (SOMS) that captures all the data in the entire chain of transactions starting with master list of project materials, records of dispatch, receipt, inspection, issue, return, consumption etc.

Some of these records are Master shipping/packing list/Box Number list, LR/RR register, daybook register, stock register, records of issues to & return of materials in respect of various erection subcontractors, Insurance Claim records, periodical status reports in various formats covering desired aspects and output information as per BHEL/Client's requirement.

BHEL will provide necessary hardware, software & stationary etc. for the above. Contractor shall take utmost care of ensure that these properties and records are protected from any damage or loss. BHEL will recover the cost of such property /

expenses of restoration from the contractor with 30% overhead charges in case of any loss/damage attributable to negligence/failure on contractor's part.

(B) Secretarial & Other Misc. Services

These services shall include secretarial services at BHEL Office and Stores, services of office boy, messenger/peon and services as per following requirement:

1. Secretarial services :- 1 Service Point at BHEL Office
2. Messenger Services : 1Service Point at BHEL Office
3. Messenger Services : 1Service Point at site Office

4.9.2 Parameters and Quantification of Services, Periodic Monitoring

For the purpose of delivery of the aforesaid Services & progressive monthly billing by the Contractor and release of payment thereof by BHEL, there shall be jointly agreed plan and review by BHEL and Contractor for services rendered/to be rendered. This plan and review shall be at the beginning of each month convenient number of months as per actual project need. The plan shall detail the following aspects.

- Plan period (number of months planned).
- List of activities/targets to be carried out/achieved by the Contractor under the scope of these services in the defined plan period.
- Identification of necessary resources to be deployed by the Contractor for delivery of the planned activities/targets in the defined plan period.
- Deciding on the break up of the assigned amount towards Services in the plan period towards each of its **four** components (Record Keeping, Secretarial Services and Messenger services - 2 Service points) for the purpose of monthly billing by contractor.

4.9.3 Price and Stage Payment

Contractor shall include the price for rendering complete Record Keeping Services, Secretarial Services and Messenger Services (generally described as in the preceding clauses, including providing all necessary resources excepting those indicated specifically as BHEL scope) as part of lumpsum Scope of Erection & Commissioning work as appearing in the Rate Schedule of Price Bid. **Contractor shall not quote any separate item rate/price for these Services in the Rate Schedule** .

For further details of progressive payment and final payable amounts, please refer clause no. 12.1.5 of Sectioon-12 (SCC).

4.9.4 Deficient/Unsatisfactory Services & Not Rendering Services

4.9.4.1
Contractor shall render the described Services as per the jointly agreed plan and parameters thereof as described in **"Parameters and Quantification of** Services". In case the contractor fails in delivering/rendering these services partly or totally, either qualitatively or quantitatively in the concerned Plan Period, BHEL will take the following recourse.

- **Deficient/Unsatisfactory Services**:

In case the level/quality of services is found not in compliance with the plan (either in terms of deficiency in quality or quantity or both, with regard to the mutually agreed/identified resources), BHEL will communicate the same to the Contractor on record. Contractor shall immediately take corrective action to eradicate the complaint. BHEL will not make any payments for such period / number of days when services are found deficient/ unsatisfactory. Payment will be made for the period /number of days of satisfactory services on pro-rata basis as per the following formula.

$P = P_a \times D_s / D_m$, where

P = Amount Payable for rendering a particular service satisfactorily in a billing month.

P_a = Amount **assigned** towards the particular service for the concerned month as per agreed plan.

D_s = Number of equivalent days including Sundays and BHEL Holidays of **satisfactory** services in the particular billing month.

D_m = Total Number of days including Sundays and BHEL Holidays in the particular **billing month**.

In addition to no payment for the unsatisfactory/deficient services period, a penalty @ 5% applied on the pro-rata amount of the deficient period i.e. 5% of (P_a – P) will be levied on the contractor. This penalty will be recovered from the Running Account Bill of the same month.

4.9.4.2 Not Rendering the Services at all

In the event, the contractor fails to render a particular service during the month (either part of the month or full) BHEL will not make any payment towards that service for such period. Additionally, a penalty @ 15% will be levied as follows.

For no services in the entire month:	15% of the total monthly assigned amount.
For no services during part of the month:	15% of the pro-rata amount for the defaulting period as per formula given earlier here.

4.9.4.3 Irrevocable Penalty and Disallowed Amount

It shall be specifically noted that the payment disallowed for deficient or nil service in a particular month and/or Penalties levied on similar ground, shall not be considered for release in any subsequent month even if the contractor takes corrective action in the later stage.

4.10

BHEL shall carry out testing of site-brazed joints of generator stator coils, however contractor shall provide all necessary assistance while carrying out the testing. However defects, if any, found during testing shall be repaired by contractor as part of scope of work.

SECTION-5

SPECIAL CONDITIONS OF CONTRACT

5.0 Obligations of the Contractor

5.1 ACCOMMODATION, DRINKING WATER & LOCAL TRSNPORTATION FOR LABOUR AND OTHER EMPLOYEES:

BHEL/Customer will not provide any open land for labour colony. Contractor shall have to make his own arrangements for accommodation of labour and other staff members including the lighting, water, sanitation etc. with hygiene and comply with all requirements. has to make their own arrangements for accommodation of their staff at site. Also contractor has to make his own arrangement for transportation of his workmen and other employees. BHEL/ Client shall any provide any facilities in this regard.

However Customer will provide covered storage space inside the Powerhouse for storage of contractor's T&P and open storage area out side the Power house, but within the project for storage of contractor's heavier T&P/Equipments etc.

5.2 Tools and Tackles

5.2.1

All T & P's as required for satisfactory completion of work under the tender specification shall be provided by the contractor during the contract period and also the extended period, if any, though such extension may not be attributable to the contractor.

BHEL/**MPPGCL** will provide only those special T&P for assembly and erection work which are supplied from manufacturing unit as part of maintenance tools under regular packages in various product groups. Contractor shall return them after the completion of the specific work for which the tools were spared, in good working order.

All other Tools and Plants, tackles, transport, handling equipments, hand tools, calibrated measuring testing & instruments etc., whether specifically stated in these specifications or not, but required for satisfactory completion of this work shall be in the contractor's scope.

5.2.2
Where required, tools and tackles to be used for the work shall have the prior approval of BHEL engineer with regard to quality and specification.

5.2.3
The tenderers are requested to note that the tools and tackles and equipments which will be made available by BHEL/MPPGCL free of hire charges on loan basis are detailed elsewhere in these specifications. It is the responsibility of the contractor to keep these equipments always in working condition and ensure their

safe return in working condition to BHEL stores after completion of the job subject to normal wear and tear.

5.2.4
The contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc., during pre-assembly, erection, testing and commissioning of the hydro sets.

5.2.5
Contractor should be able to augment the T&P at short notice to match the planned programmes and to achieve the milestone events.

5.2.6
Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternate arrangements expeditiously so that the progress of work is not hampered.

5.2.7
In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material and non-availability of the same owing to breakdown, BHEL shall have right to make alternate arrangement at the contractor's risk and cost.

5.2.8
The T&P to be arranged by the contractor shall be in proper working condition. The operation shall not lead to unsafe conditions. The movements of cranes and other equipment should be such that no damage/breakage occurs to foundation, equipment, material and men.

5.2.9
Holders, welding cables, connecting cables to equipments and other welding accessories including temporary electrical connection from construction power point to individual equipment like winches, hoisting equipment, welding generators, transformers, heat treatment equipment and other construction equipment shall be arranged by the contractor.

5.2.10
The contractor at his cost will carry out periodical testing of lifting equipments and calibration of measuring instruments and certificates produced for the same to BHEL. Periodicity shall be as per BHEL's requirement.

5.2.11
Contractor shall provide T&P and tackles for loading of materials at MPPGCL/BHEL stores/shed/yard and transport for shifting the materials to site. However customer's EOT crane will be provided to the contractor for erection, assembly and related activities in TG hall.

5.2.12
Wooden sleepers etc required for stacking/ shifting of materials at site shall be arranged by the contractor.

5.3 Consumables

5.3.1
The contractor shall provide all consumables required for carrying out the work covered under this scope of work excepting those which are specifically indicated as BHEL supply.

5.3.2
Contractor shall arrange all chemicals and other consumable required for acid cleaning and neutralization of pipes at his own cost.

5.3.3
Wherever required consumables to be used for the work shall have prior approval of BHEL engineer in regard to quality specifications.

5.4 WELDING ELECTRODES AND GASES

5.4.1
All the required welding electrodes as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement of the electrodes, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL details regarding type of electrodes, batch number and date of expiry etc. Copy of manufacturer's test certificate shall be furnished to BHEL.

BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to submit weekly/fortnightly/monthly statement/report regarding consumption of electrodes of all types for cost analysis purpose.

5.4.2
All the required gases like Argon, Oxygen, Acetylene, gas etc. will be provided by the contractor at his cost.

5.4.3
If at any time during the execution of work, it is noticed that the work is suffering on account of shortage/non-availability of consumables from the contractor's side like electrodes, gases and other consumables, then, BHEL will make alternate arrangements and the necessary costs with overheads at 30% will be recovered from the running bills of the contractor.

5.5 FIELD OFFICE AND STORES

5.5.1
The contractor shall make his own arrangements for field office with necessary equipments, tools room, clerical staff, storekeeper etc., for the execution of the work. Only open space will be provided by BHEL's customer free of charges within the project boundary on temporary basis.

5.5.2
On completion of work, all the temporary buildings, structures, pipelines, 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 same will be arranged by BHEL at the cost and risk of contractor.

5.6 Construction Power, Lighting and Water

5.6.1 Construction Power

5.6.1.1
Construction power (three phase, 415v / 440v 3 Ph.) will be provided at one point near the site approximately 500 Meters from erection site free of charge. However all taxes, duties, levies, charges etc, as applicable, shall also be born by the contractor. Contractor shall have to make his own arrangement by providing the required energy meter, all cables, fuses, distribution boards, switches, switchboards, bus bars, earthing arrangements, protection devices e.g. ELCB, if any, and any other installation as specified by Statutory Authority, Client in this regard, for drawl of Construction Power. Obtaining approvals, payment of necessary fees, duties etc towards the clearance of such installations, if any, prior to these being put to use or as may be specified, shall be the responsibility of the contractor.

5.6.1.2
It shall be the responsibility of the contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with the appropriate statutory requirements. The installation and maintenance of this shall be done by licensed and experienced Electrician.

5.6.1.3
The contractor shall install necessary Capacitor Bank etc. with appropriate control mechanism to maintain the Power Factor as per the guidelines in vogue from time to time in this regard. Any levy imposed by the customer / authority for any deviation in power factor shall be passed on to the contractor.

5.6.1.4
Contractor shall be equipped with back-up power supply arrangement like DG set and diesel operated welding machine etc. to tackle situations arising due to failure of customer supplied power, so as to ensure continuity and completion of critical process that are underway at the time of power failure or important activities planned in immediate future.

5.6.2 Lighting

5.6.2.1
Customer will provide general area lighting of the powerhouse. However, the contractor, at his cost should arrange for temporary lighting and local lighting arrangement, that may be required for the execution of the work. Contractor shall arrange adequate floodlights, hand lamps (with 24 Volt supply arrangement) and area lighting.

5.6.2.2
All temporary wiring & installations for construction power & lighting must comply with local regulations and will be subjected to engineer's inspection and approval before connecting to supply point.

5.6.2.3
It shall be the responsibility of the contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site.

5.7 Water and Compressed Air

The customer at a single point inside the powerhouse will provide water and compressed air for construction purpose. Further distribution thereon for his use will be the contractor's responsibility. However contractor has to make his own arrangement for air compressor for the work in scope of this tender specification.

5.8 Responsibilities of the Contractor in Respect of the Local Law and Employment of Workers etc.

5.8.1
Contractor shall adhere to the responsibilities stated vide clause no. 2.8 of general conditions of contract.

5.8.2 Statutory Inspections/ Approvals
Contractor shall be responsible for the necessary period testing and inspection during erection and commissioning of the equipments and shall carry out the work to meet the specific requirement of the relevant statutory authority. However, all fees, charges etc., payable to the statutory authorities shall be borne by the owner. However, contractor shall be responsible for paying all fees, making arrangements for their visit etc., towards qualification of his workmen, on account of their carrying out this work.

5.9 TAXES, DUTIES, LEVIES

5.9.1

Refer to Clause 2.8.4 of General Conditions of Contract. Notwithstanding anything contained therein, the following provisions shall be applicable for this contract.

5.9.2

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

5.9.3 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be **exclusive** of Service Tax and Cess on Output Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and deposit the same with the concerned tax authorities, such applicable amount will be paid by BHEL. Contractor shall submit to BHEL documentary evidence of Service Tax registration and remittance record of such tax immediately after depositing the tax with concerned authorities. Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.

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 and Service Tax paid on Input Services that are used for providing the output services can be taken credit of against the Service Tax payable on output services. However BHEL may opt for availing the abatement provision in which case cenvat credit may not be available on input duty.

5.9.4 VAT/WCT

As regards Sales Tax on transfer of property in goods involved in Works Contract applicable as per local laws, the price quoted by the contractor shall be **exclusive** of the same. Where such taxes are required to be paid by the contractor, this will be reimbursed on production of proof of payment made to the authorities by the Contractor. In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. The contractor has to take all necessary steps to **minimize tax on input goods** by purchasing the materials from any registered dealer of the concerned state only. In case contractor opts for composition, it will be with the prior express consent of BHEL. Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

5.9.5 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.

5.9.6 New Taxes/Levies

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**.

Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on input goods/services/work shall be made. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

5.9 SUBMISSION OF PERIODICAL REPORTS

Contractor shall submit periodical reports in respect of following aspects of operation:

1) Consumption of consumables like welding electrodes, gases and paints
2) Consumption of construction power
3) Availability and utilization of BHEL's Tools & Plants
4) Availability and utilization of contractor's Tools & Plants
5) Daily manpower reports
6) Daily progress reports of activities & incidents
7) Calibration reports
8) Records of wages payment
9) Any other report/record as may be specified by BHEL/client.

BHEL at site will suggest formats for these reports.

5.11
It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

SECTION-6

SPECIAL CONDITIONS OF CONTRACT

6.0

Contractor's obligation in regard to employment of engineers, supervisory staff and workmen

6.1 SUPERVISORY STAFF AND LABOUR

6.1.1

The contractor shall supply all the skilled labour and high pressure welders, carbon and alloy steel welders, gas cutters, riggers, sarangs, erectors, instrument fitters electricians, instrument technicians, instrument calibrators, etc. in addition to other skilled, semiskilled and unskilled labour required for all the work of handling and transporting from site, storage at erection site, calibration, erection, testing and Assistance for commissioning and all other works envisaged in this tender. 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 employed by the contractor. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him. Contractor should furnish the list of personnel proposed to be deployed for this job along with their qualification, experience

In similar type of job. The actual deployment will be so as to satisfy the erection and commissioning targets set by BHEL. The contractor shall give an organisation chart indicating the staffing pattern for the work. Supervisors shall adequately support each area. This is only for guidance. During execution of work if any area needs extra attention, contractor shall post engineers/supervisors/ skilled/semiskilled/ unskilled workers as per the advise of BHEL engineer. Contractor hall submit his manpower deployment plan as per appendix-IX

6.1.2

Any sort of subcontracting/subletting of the work awarded, by the contractor is strictly prohibited.

6.1.3

If at any time, it is found that the contractor is not in a position to deploy the required workmen due to any reason, BHEL shall have the option to deploy their workmen or make alternate arrangements at the contractor's risk and cost. The expenditure incurred with overhead on this account will be recovered from the contractor's bills.

6.1.4

It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the target set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. The decision of BHEL in regard to setting the erection targets will be final and binding on the contractor.

6.1.5

Contractor shall employ only qualified and experienced engineers/supervisors for this job. They shall have professional approach in executing the work having adequate knowledge and experience in the fields of erection, erection methodology, calibration, testing and Assistance commissioning, quality control

and quality assurance procedures, planning, safety etc. required to undertake the type of work as per this tender.

6.2 SAFETY ASPECTS AT SITE

6.2.1

The safety engineer/supervisor of contractor shall coordinate all aspects connected with this work. He shall be aware of the safety procedures, use of safety equipment, safe rigging and also in a position to enforce strict safety at site. He shall coordinate with the various contractors' engineers, supervisors working gangs to enforce safe working procedures, he shall also coordinate the timely arrangement of work permits required for hot works and cold works. He should be trained and qualified to give proper guidance and direction to other supervisors and workers. He shall also submit weekly accident report in the format required by BHEL.

6.3 INDUSTRIAL RELATIONS AND LABOUR LAWS

6.3.1

An industrial relations supervisor shall coordinate for the implementation of local labour laws, maintenance of records as required by contract labour (regulation and abolition) act and also coordinate with the local labour authorities.

6.3.2

In case at any time the contractor is not in a position to deploy the required engineer/supervisors due to any reason, BHEL shall have the option to deploy their engineers/supervisors. The expenditure incurred with overheads on this account will be recovered from the contractor's bills.

6.3.3

The contractor’s supervisory staff shall execute the work in the most substantial and workmanlike manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/ instructions given by BHEL engineer from time to time.

6.3.4

The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor and in general, see that the works are carried out in a safe and proper manner in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.

6.4 Watches and Ward

Contractor has to arrange and provide watch and ward round the clock. Any theft or damage of component due to negligence of the contractor will have to be replaced/repaired by the contractor. The areas are unit control room, field and any other place where equipments are kept (stored or installed) by the contractor.

6.5 Proposed site organisation chart for erection/commng.

Contractor to provide necessary engineers and supervisors for the work and they shall have adequate experience in similar type of work. Contractor in the following areas shall provide adequate staffing: -

- Overall co-ordination & execution
- C&I erection / commissioning assistance
- Hydro generator and aux. C&I erection / commissioning assistance
- Station C&I
- Instrument calibration
- Quality control
- Safety
- Planning, review, monitoring & reporting
- Industrial relations
- Material management, material identification, transport, storage & supervision.

Contractor shall deploy separate in charge for erection & commissioning assistance for the above-mentioned areas. Contractor shall give an organization chart indicating the staffing pattern for the above purpose. The engineer in each area shall have adequately supported by supervisors.
The above areas are indicated for guidance. During erection of work if any area needs extra attention, contractor shall post engineers/supervisors accordingly.

6.5.1
Contractor shall provide along with the offer, names and details of the engineers/supervisors supposed to be deployed

6.5.2
Contractor should provide a team of engineers with proven experience in microprocessor based DDC systems with regards to the software as well as hardware. They should be in a position to undertake specific assignments during the start up / post start up situation of above system as per the instruction of BHEL engineer. Contractor has to provide names of the engineers with their bio data for the scrutiny of BHEL.

6.5.3
Planning - Contractor shall have his own planning cell headed by planning engineer. He shall work out the physical erection target area wise for his engineers and also plan the achievements for milestone events. He shall also monitor the input like T&P, materials, manpower, deployment position of the various working gangs. He shall furnish all the details required by BHEL as per the relevant contract clauses.

Section-7

Special Conditions of Contract

Obligations of BHEL

Facilities Provided By BHEL

7.1 SPACE FOR SITE OFFICE / STORES

Refer Section-5 in this regard

7.1.2 CONSTRUCTION POWER & WATER

Refer Section-5 in this regard

7.1.3 OTHER MATERIALS AND CONSUMABLES:

BHEL / Customer will only First fill of lubricants for Turbine & Generator, and Grouting material for Secondary grouting for the works under these tender specification. The all other materials and consumables as required for satisfactory completion of work shall be provided by Contractor as scope of work.

7.3 ELECTRODES AND TEST PLATES

7.3.1
Sufficient quantity of test plates and pipe pieces as considered adequate for testing contractor's welders will be supplied by BHEL free of cost. **BHEL will provide welding Electrodes for welding works of DT Knee and Spiral Casing. For rest of works contractor shall have to arrange required quantity of Welding Electrodes**/filler wires etc. or any other special electrodes of approved quality / brand as required for completion of work under this tender specification.

7.4 Equipment – Tools

7.4.1
BHEL will provide only those special T&P for assembly and erection work which are supplied from manufacturing unit as part of maintenance tools under regular packages in various product groups. Contractor shall return them after the completion of the specific work for which the tools were spared, in good working order.

7.4.2
The contractor must not use these equipments for purposes other than the scope of work given in this tender. Misuse, if any, will result in penalty.

7.4.3
BHEL engineer will inspect all the above equipments issued to contractor periodically. In case contractor fails to make good the damages caused, BHEL will do the same at contractor's cost.

7.4.4
All temporary piping including valves, fittings, for conducting hydro test will be provided by BHEL free of cost.

Section-8

Special Conditions of Contract

8.0 Inspection / Quality Assurance / Quality Control / Statutory Inspection

8.1

Various inspection/quality control/quality assurance procedures / methods at various stages of erection and commissioning assistance will be as per BHEL/ customer quality control procedure / codes and other statutory provisions and as per BHEL engineer's instructions.

8.2

Preparation of quality assurance log sheets and protocols with customer's engineers, welding logs and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work/specification.

The protocols between contractor and customer/BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer/BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.

8.3

A daily logbook should be maintained by every supervisor/engineer of contractor on the job in duplicate (one for BHEL and one for contractor) for detailing and incorporating alignment/clearance/ centering/leveling readings and inspection details of various equipments, structures, piping, and others.

All the important measurements like pre-assembly records, foundation levels, equipment alignment, etc. Shall be recorded in the daily logbook with sketches based on BHEL drawings indicating readings/ measurements taken and signed by BHEL/customer/ contractor representatives.

Welding details like serial number of weld joints, welders name, date of welding, details of repair, heat treatment etc. Shall be documented in welding log as per BHEL engineer's instructions.

8.4

All the electrical/mechanical measuring and testing instruments/ gauges, feeler gauges, height gauges, dial gauges, micrometers, levels, spirit levels, surface plates, straight edges, vernier calipers and all other measuring instruments shall be provided by the contractor for checking, leveling, alignment, centering etc Of erected equipments at various stages.

The instruments/gauges/tools etc. Provided should be of brand, quality and accuracy, specified by BHEL engineer and should have necessary calibration and other certificates as per the requirements of BHEL engineer.

8.5

In the course of erection, it may be necessary to re-check or counter check or finally check the work with instruments recently calibrated, recalibrated or of inspection grade gauge/tools or special measuring instruments. Such instruments whenever necessary will be provided by BHEL on specific authorization by BHEL engineer.

8.6

The instruments mentioned in clause 8.5 shall be drawn by the contractor from BHEL stores on the specific authorization and use the same on the specific job for the purpose of inspection/ rechecking/counter checking/ finally checking of the work and shall be returned to BHEL stores immediately on completion of the inspection.

8.7

Total quality is the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide for the services of quality assurance engineer.

8.8

The welder's performance will be reviewed from time to time as per the BHEL standards and any welder not performing to the standards set by BHEL will be removed from working. Contractor shall arrange for the alternate welders immediately.

8.9

All the welders shall carry identity cards as per the pro-forma prescribed by BHEL only welders duly authorised by BHEL/ customer/consultant shall be engaged on the work.

8.10

Contractor shall ensure speedy alignment and welding of all equipments erected by him soon after placement. Also all alignments, welding, NDT tests required for stage inspection shall be completed as per the quality assurance procedures.

8.11 Stage Inspection By FES/QA Engineers

Apart from day-to-day inspection by BHEL engineers and customer engineers, stage inspection of equipments at various stages of erection and commissioning assistance by teams of engineers from field engineering services /field quality assurance groups of BHEL's manufacturing units and commissioning engineers from technical services of BHEL may also be conducted. Contractor shall arrange all labour, tools and tackles etc., for such stage inspections within their quoted rate.

8.11.1

Any modifications suggested by FES / FQA engineers team shall be carried out. Claims of contractor, if any, shall be dealt as per clause 13.1 to 13.8.

8.11.2

Any minor rectification or minor repairs of defective work found at during stage inspection shall be rectified free of cost, by the contractor.

8.11.3

Any major rectification or major repair/major rework of defective work, found out during stage inspection as per clause 8.11, but not attributable to contractor shall also be carried out. Claims of contractor, if any, shall be governed as per clause 13.1 to 13.8.

8.12 Statutory Inspection

8.12.1

During the statutory inspection, contractor shall provide all the manpower assistance as per the requirement within their quoted rate. However, all other arrangements for visiting of statutory authorities at site including fee etc. Shall be done by customer.

8.13.0

BHEL, power sector- western region (PSWR) has already been accredited with ISO 9002 certification and as such this work is subject to various audits to meet ISO 9002 requirements. One particular aspect that needs special mention is about arrangement of calibration of instruments by the contractor. Contractor shall ensure deployment of reliable and calibrated MMD (Measuring and monitoring devises). The MMD shall have test/calibration certificates from authorized/government approved/accredited agencies traceable to national/international standards. Retesting/recalibration 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 MMD so that work does not suffer when the particular equipment/ instrument is sent for re-calibration. Also if any MMD 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 MMD and retake the readings at contractor's cost.

SECTION-9

SPECIAL CONDITIONS OF CONTRACT

Safety, Occupational Health and Environmental Management

SPECIAL CONDITIONS OF CONTRACT

SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENTAL MANAGEMENT

INTRODUCTION:-

BHEL PSWR has been certified for Environmental Management under ISO 14001:1996 standard and Occupational Health & Safety under OHSAS 18001 by DNV. In order to comply with the above standards, it shall be the endeavour of BHEL and all its subcontractors to meet and implement the requirements by following the guidelines issued under Environmental, Occupational Health and Safety Management (EHS) manual a copy of which will be available with the BHEL site-in-charge.

Contractor shall also enter into a "Memorandum of Understanding" as given in clause 9.9 in case of award of contract.

Responsibility Of The Contractor In Respect Of Safety Of Men, Equipment, Material And Environment.

The Contractor Shall

Abide by the Safety Regulations applicable for the Site/Project and in particular as mentioned in the booklet "Safe Work Practices" issued by BHEL. Contractors are also to ensure that their employees and workmen use safety equipments as stipulated in the Factories Act (Latest Revision) during the execution of the work. Failure to use safety equipment as required by BHEL Engineer will be a sufficient reason for issuance of memo, which shall become part of Safety evaluation of the contractor at the end of the Project. Also all site work may be suspended if it is found that the workmen are employing unsafe working practice and all the costs/losses incurred due to suspension of work shall be borne by contractor. A comprehensive list of National Standards from which the contractor can draw references for complying with various requirements under this section is given under 9.10

Hold BHEL harmless and indemnified from and against all claims, cost and charges under Workmen's Compensation Act 1923 and 1933 and any amendment thereof and the contractor shall be solely responsible for the same.

9.1.3 Abide by the Procedure governing entry/exit of the contractor's personnel within the Customer/Client premises. All the contractors' employees shall be permitted to enter only on displaying of authorized Photo passes or any other documents as authorized by the Customer/Client

9.1.4 Be fully responsible for the identity, conduct and integrity of the personnel/workers engaged by them for carrying out the contract work and ensure that none of them are ever engaged in any anti national activity

9.1.5 Prepare a sign board giving the following information and display it near the work site:
Name of Contractor
Name of Contractor Site-in-charge & Telephone number
Job Description in short
Date of start of job
Date of expected completion
Name of BHEL Site-in-charge.

9.1.6 Abide by the rules and regulations existing during the contract period as applicable for the contractors at the Project premises.

9.1.7 Observe the timings of work as advised by BHEL Engineer-in-charge for carrying out the contract work.

SPECIAL CONDITIONS
SAFETY
SAFETY PLAN

Before commencing the work, contractor shall submit a "safety plan" to the authorised BHEL official. The safety plan shall indicate in detail the measures that would be taken by the contractor to ensure safety to men, equipment, material and environment during execution of the work. The plan shall take care to satisfy all requirements specified hereunder.

The contractor shall submit "safety plan" before start of work. During negotiations, before placing of work order and during execution of the contract, BHEL shall have right to review and suggest modifications in the safety plan. Contractor shall abide by BHEL's decision in this respect.

The contractor shall take all necessary safety precautions and arrange for appropriate appliances and/or as per direction of BHEL or it's authorised person to prevent loss of human lives, injuries to men engaged and damage to property and environment.

The contractor shall provide to his work force and also ensure the use of Personnel Protection Equipment (PPE) as found necessary and/or as directed and advised by BHEL officials without which permission is liable to be denied.

Safety helmets conforming to IS 2925/1984 (1990)
Safety belts conforming to IS 3521/1989
Safety shoes conforming to IS 1989 part-II /1986(1992)
Eye and face protection devices conforming to IS 2573/1986(1991), IS 6994 (1973), part-I (1991), IS 8807/1978 (1991), IS 8519/1977(1991).
Other job specific PPEs of standard ISI make as may be prescribed

All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, cages, safety nets, ladders, equipment, etc used by the contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained before putting them to use and from time to time as instructed by authorised BHEL official who shall have the right to ban the use of any item found to be unsafe

All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carryout all types of electrical works. All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

The contractor shall not use any hand lamp energised by electric power with supply voltage of more than 24 volts. For work in confined spaces, lighting shall be arranged with power source of not more than 24 volts.

The contractor shall adopt all fire safety measures as per relevant Indian Standards

Where it becomes necessary to provide and/or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such provisions and/or storage in accordance with the rules and regulations laid down by the relevant government acts, such as petroleum act, explosives act, petroleum and carbides of calcium manual of the chief controller of explosives, Government of India etc. The contractor in all such matters shall also take prior approval of the authorised BHEL official at the site.

Proper means of access must be used e.g. ladders, scaffolds, platforms etc. No makeshift access such as oil drums or pallets shall be used. Design of these will be in accordance with relevant standards and certified by competent persons before use.

Temporary arrangements made at Site for lifting, platforms, approach, access etc should be properly designed and approved before being put to use.

All excavations and openings must be securely and adequately fenced/barricaded and warning signs erected when considered necessary as per relevant code of practice.

No persons shall remove guardrails, covers or protective devices unless authorised by a responsible supervisor and alternative precautions have been taken.

Access ways, means of escape and fire exits shall be clearly marked, kept clear and unobstructed at all times

Only authorised persons holding relevant license will drive and operate site plant and equipments e.g. cranes, dumpers, excavators, transport vehicles etc.

Only authorised personnel are allowed to repair, commission electrical equipments.

Gas cylinders shall be handled and stored as per Gas Cylinder Rules and relevant safe working practices

All wastes generated at Site shall be segregated and collected in a designated place so as to prevent spillage/contamination/scattering at Site, until the waste is lifted for disposal to designated disposal area as advised by BHEL official.

The contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working when natural day light is not adequate for clear visibility.

The contractor shall train adequate number of workers/supervisors for administering “FIRST AID”. List of competent first aid administers should be prominently displayed.

The contractor shall display at strategic places and in adequate numbers the following in fluorescent markings

Emergency telephone numbers
Exit, Walkways
Safe working load charts for wire ropes, slings, D shackles etc
Warning signs

The contractor shall be held responsible for any violation of statutory regulations (local, state or central) and BHEL instructions that may endanger safety of men, equipment, material and environment in his scope of work or other contractors or agencies. Cost of damage, if any, to life and property arising out of such violation of statutory regulations and BHEL instructions shall be borne by the contractor.

In case of a fatal or disabling injury/accident to any person at construction sites due to lapses by the contractor, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial penalty on the contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.

In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover cost of such damages from payments due to the contractor after holding an appropriate enquiry.

In case of any delay in the completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay from payments due to the contractor after notifying the contractor suitably and giving him opportunity to present his case.

If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued

by the authorised BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

EMERGENCY RESPONSE

BHEL will have an Emergency Response Plan for each Project Site in consultation with the Owner as the case may be, detailing the procedure for mobilization of personnel and equipment, and defining the responsibilities of the personnel indicated, in order to prepare for any emergency that may arise in order to ensure the priorities of
Safeguard of life
Protect assets under construction or neighbouring
Protect environment
Resumption of normal operations as soon as the emergency condition is called off

All Contractors shall also be part of the Emergency response Plan and the personnel so nominated shall be aware of their duties and responsibilities in an emergency response situation.

At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aid personnel shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organised by BHEL.

OCCUPATIONAL HEALTH

Specific occupational health hazards will be identified through the hazard evaluation processes in consultation with BHEL engineers and the necessary prevention/reduction/elimination methods implemented.

All personnel working in an activity with a potential risk to health shall be made aware of all those risks and the actions they must take to reduce/control/eliminate the risk

Safety coordinator shall conduct periodic checks to ensure that every group of workers engaged in similar activities are aware of potential risks to health and the actions required to be taken to mitigate the risk

In order to protect personnel from associated health hazards, the following main areas will be focussed
Issue of approved Personnel Protective Equipment
Verification that the PPEs are adequate/maintained and worn by all staff involved in operations that are potentially hazardous to their health
Ensure that the personnel deployed are physically fit for the operation/work concerned
Provide hygienic and sanitary working conditions

Contractor workers employees engaged in noise risk areas shall be issued with hearing protection aids and the use of the same will be enforced. Further, these workers will be educated on the hazards of noise

Contractor workers engaged in dust environment shall be issued with necessary dust protection aids and the use of the same shall be enforced

Workers engaged in exposure to bright light/rays as in welding or radiation shall be issued with eye protection devices and the use of the same shall be enforced

Adequate arrangements shall be made to provide safe drinking water

Health monitoring records on at least sample basis for contractor employees & workmen shall be maintained for persons engaged in specified categories of work. These shall include

Noise induced hearing loss
Lung Function test
Ergonomic Test
Eye Test for Welders, Grinders, Drivers etc

HYGIENE and HOUSEKEEPING

Good house keeping and proper hygiene is one of the key requirements of Occupational Health Safety and Environment management. Towards this the contractor shall encourage his workers and supervisors to maintain cleanliness in their area of work.

The Contractor shall arrange to place waste bins/chutes at convenient locations for the collection of scrap and other wastes. The bins shall be clearly marked and segregated for metal, non-metal, hazardous and non hazardous wastes.

BHEL may take up appropriate remedial measures at the cost of the contractors if the contractor fails in good house keeping and if there is an imminent risk of pollution

ENVIRONMENT MANAGEMENT

BHEL has a sound environmental management system, which is to be maintained and implemented by all the contractors. The system allows for project specific objectives to be set and developed sensitive to client requirements, applicable environmental legislation and BHEL's own objectives and policy. BHEL engineers will assess and monitor the environmental impact of their work and lay out objectives for their minimisation. The contractors shall implement the objectives for continual improvement of environmental performance. BHEL shall regularly audit environmental impacts and their improvements.

WASTE MANAGEMENT

The objective of waste management is to ensure the safe and responsible disposal of waste, ensuring that it is correctly disposed of and being able to audit the process to ensure compliance.

Chemical wastes if any shall be collected separately and disposed of to BHEL designated refuse yard as per BHEL advise

No dangerous chemicals, noxious waste products or materials will be disposed off on or off site without approval obtained through BHEL.

All disposal of wastes generated during construction shall be in accordance with all relevant legislation.

Acid and alkali cleaning wastes shall be neutralized to acceptable norms before disposal to the designated area.

All necessary measures shall be taken to ensure safe collection and disposal of waste oils. In particular to ensure the prevention of their discharge into surface waters, ground waters, coastal waters or drainages

SUPERVISION

Contractor must provide at least one full time on site safety coordinator when the manpower engaged is in excess of 50 for the contract activities in the premises. If the manpower is less than 50, the on site safety coordination responsibilities shall be assumed by any one of the contractor's other supervisory staff; however in both the cases, the contractor must specify in writing the name of such persons to the BHEL Engineer in Charge .

Contractor's safety coordinator or his supervisor responsible for safety as the case may be shall conduct at his work site, and document formal safety inspection and audits at least once in a week. Such documents are to be submitted to BHEL Engineer in Charge for his review and record

.

Contractor, supervisor must attend all schedule safety meetings as would be intimated to him by the BHEL Engineer in Charge.

Before starting work under any contract, the contractor must ensure that a job specific safety procedures/field practices as required over and above the safety permit conditions are prepared and followed .He should also ensure that all supervisors and workers involved understand and follow this procedures /field practices.

Contractor must ensure that in his work site appropriate display boards are put displaying signs for site safety, potential hazards and precautions required

TRAINING & AWARENESS

Contractor shall deploy experienced supervisors and other manpower that are well conversant with the safety and environment regulations of the Project. The electricians to be deployed on the job should have wireman license.

All Supervisors & Workmen of the Contractor shall undergo Fire safety training/demonstration whenever arranged by BHEL with the help of either Customer's Fire and Safety department or outside faculty so as to acquire

knowledge of fire prevention and also to be able to make use of appropriate fire extinguishers.

Contractor must familiarize himself from BHEL Engineer in Charge about all known potential fire, explosion or toxic release hazards related to the contract. He in turn will ensure that same information has been passed to the supervisors and workmen

Contractor must ensure that all his supervisors are properly trained and each employee has received and understood from his supervisor necessary training and briefing about the safety requirement. Necessary document as a means to verify that employees have understood the training is to be maintained.

The contractor supervisors shall also give a small safety briefing to all the workmen under his charge before undertaking any new work and specially understand the safety requirements that are mandatory

REPORTING

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorised BHEL official immediately after such occurrence but in any case not later than twelve hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL and also to meet statutory requirement.

Any injury sustained by any of the contractor's employees within the Project premises must be reported to BHEL supervisor and FIRST AID should be immediately administered. The Contractor shall be responsible for keeping and maintaining proper records of Accidents to his personnel.

Contractor must arrange to immediately investigate, properly document and report any injury, accident or near miss involving any of his employees and take appropriate follow up action. He must furnish within 12 hours of the incident a written report to BHEL Engineer in charge and the Safety Section.

According to the Factory Act and the Employees state Insurance Act & regulation, any person sustaining any injury within the project premises and absenting himself from work for more than 46 hours, his accident report has to be sent to the respective Government Authorities. Therefore contractor shall inform the owner's representative such matter immediately for their needful action.

In addition, contractor shall submit periodic reports on safety to the authorised BHEL official from time to time as prescribed.

Before commencing the work, the contractor shall appoint/nominate a responsible officer to supervise implementation of all safety measures and liaison with his counterpart of BHEL.

AUDIT REVIEW AND INSPECTION

BHEL shall conduct audit on the contractor performance and compliance with the project specific requirements of the Environment and Occupational Health & Safety

Management systems. The programme of audit shall cover all activities under the contract but will focus particularly on high-risk activities. The Construction Manager shall decide the schedule of audit. The audit findings shall be communicated to the contractors and necessary remedial action as advised by BHEL Engineers shall be under taken within the stipulated time.

Inspections shall be carried out regularly by the contractors and by BHEL engineers on activities, facilities, equipment, and documentation to cover the following aspects.
Compliance with procedures and systems
Availability, condition and use of PPEs
Condition of maintenance tools, equipments, facilities
Availability of fire fighting equipments and its condition
Use of fire fighting equipments and first aid kit
Awareness of occupational health hazard
Awareness of safe working practices
Presence of quality supervision
Housekeeping

The Safety Co-ordinator shall visit and inspect work sites daily. All unsafe acts, unsafe conditions that have imminent potential for causing harm/injury/damage will be immediately corrected. He shall maintain a daily logbook giving details of unsafe acts or conditions observed and the corrective action taken and recommendations for preventing recurrence. Adequacy of corrective actions will be verified

The contractor shall take remedial measures as per the findings of each inspection.
Besides the above, the contractor shall be required to carry out the following inspections.

Sl no	Equipment	Scope of inspection	Inspection by	Schedule
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify unsafe/defective tool	User	Daily
3	Fire Extinguishers	To check pressure and any defect	User Safety Coordinator	Daily Every month
4	Lifting equipment/ tackles	To check for defects and efficacy of brakes	User Third party	Daily Every Year
5	PPE	To check for defects	User	Daily

NON COMPLIANCE:-
NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND THE BHEL HAS RIGHT TO IMPOSE FINES ON THE CONTRACTOR AS UNDER for every instance of violation noticed:

SN	Instance of Safety Violation	Fine (in Rs)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13	Improper Earthing Of Electrical T&Ps	500/-
14	Accident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
15	Fatal Accident/Accidents Resulting in total loss in Earning Capacity	1,00,000/- per victim

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the contractor. The amount collected above will be utilised for giving award to the employees who could avoid accident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.

9.8 CITATION:-If safety record of the contractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognise the safety performance of the contractor may be considered by BHEL after completion of the job

9.9 Memorandum of Understanding

After Award Of Work, Contractors Are Required To Enter Into A Memorandum Of Understanding As Given Below:

Memorandum of Understanding

BHEL, PSWR is committed to Health, Safety and Environment Policy (EHS Policy) as given in the booklet titled " Safe Working Practices" issued to all contractors.

M/s _____ do hereby also commit to the same EHS Policy while executing the Contract Number _____

M/s _____ shall ensure that safe work practices not limited to the above booklet are followed by all construction workers and supervisors. Spirit and content therein shall be reached to all workers and supervisors for compliance.
BHEL will be carrying out EHS audits twice a year and M/s _____ shall ensure to close any non-conformity observed/reported within fifteen days.

Signed by authorised representative of M/s----------

Name:

Place & Date:

Comprehensive list of National Standards for reference and use wherever applicable in the execution of Civil, Erection and Commissioning Contracts

IS No.	YEAR	Amd. upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER RRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING

IS No.	YEAR	Amd. upto	DESCRIPTION
			PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS- DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS - FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK- CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION

IS No.	YEAR	Amd. upto	DESCRIPTION
			OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY

IS No.	YEAR	Amd. upto	DESCRIPTION
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

Section-10
Special Conditions of Contract

10.0 Drawings and Documents

10.1

The detailed drawings, specifications available with BHEL engineers will also form part of this tender specification. Revision of drawings/documents may take place due to various considerations, as is normal in such large project. Work will have to be carried out as per revised drawings/ documents. These documents will be made available to the contractor during execution of work at site.

10.2

One set of necessary drawings/documents to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL after completion of the work. Contractor's personnel shall take care of these documents given to them.

AS-BUILT DRAWING:

Once the system is commissioned successfully, contractor shall submit one set of drawing duly incorporate all corrections, modifications adjustments carried out during erection, commissioning/post commissioning period. BHEL and contractor shall jointly sign these documents. As-built drawing shall be prepared by BHEL on the basis of above document.

10.3

The data furnished in various sections and appendices in this tender specification describe the equipment to be installed, tested and commissioned under this specification briefly. However, work shall be carried out as per the drawings furnished at site. The changes in the design and in the quantity may be expected to occur, as is usual in any such large scale of works.

10.4

If any error or ambiguity is discovered in the specification/ information contained in the documents/drawings and tender, the contractor shall forthwith bring the same to the notice of BHEL before commencement of the work. BHEL's interpretation in such cases will be final and binding on the contractor.

10.5

In case of any conflict between general instructions to tenderers and general conditions of contract contained in sections 1 & 2 respectively and other special conditions of contract contained in sections 4 to 15 and appendices, provisions contained in sections 4 to 15 shall prevail.

10.6

In case of discrepancy between quoted item rate and corresponding amount, the **quoted item rate shall be reckoned as correct and amount recalculated**. Quoted item rates shall also prevail for arriving at the total price quoted and evaluation of offer will be done on the basis of total price.

10.7

Bank Guarantees for Security Deposit, Advance Payment and Performance Guarantee shall have a claim period of six months beyond the period of their contractually stipulated validity.

SECTION-11

SPECIAL CONDITIONS OF CONTRACT

11.0 Time Schedule, Mobilization, Progress and Monitoring, Completion, Overrun, Price Variation etc.

11.1 Contract Period & Grace Period

11.1.1 Mobilization Period and Milestones

All activities for the mechanical erection, testing, pre-commissioning and commissioning of the hydro turbine generator, foundation parts and associated auxiliaries shall be completed progressively within overall **period of 9 (Nine) months** from the start of work. Contractor shall mobilize his resources within **two weeks time** to undertake the erection works from date of issue of telegraphic letter of intent. The schedule of milestones for each unit will be as under:

Sl. no.	**Activity**	Time of completion from the date of starting of work
01	Erection foundation parts (spiral casing, runner chamber etc)	2.5 Months
02	Completion of combined alignment of Turbine & Generator shafts	5 Months
03	Mechanical completion of hydro turbine, generator and associated auxiliaries	7 Months
04	Testing, pre-commissioning and commissioning of hydro turbine, generator and associated auxiliaries	9 Months

11.1.2 Contract Period

The Contract Period shall **be 9 (Nine) months** for this contract. Erection of the first equipment / sub-assembly / major component on its permanent location / foundation shall be reckoned as the start of Contract Period. Smaller components like packer plate etc. will not be considered for this purpose.

11.1.3 Grace Period

Grace Period of two (2) months beyond Contract Period will be applicable with the discretion of BHEL.

11.2 Progress and Monitoring of Work

11.2.1

The contractor should reach site and establish his site office and mobilize to commence the work as per directions of BHEL engineer. The date of commencement for the purpose of clauses 11.1 & 11.2 will be the date on which erection activity is taken up.

11.2.2
An overall completion programme shall be drawn jointly with BHEL to meet the completion schedules as specified in this section.

11.2.3
Based on the above and latest site conditions monthly plan shall be drawn jointly with BHEL. The monthly plan shall take into consideration the availability of material and other inputs at the beginning of the month and also any material likely to be received during the month.

11.2.4
It is the responsibility of the contractor to provide all the relevant periodical information on a regular basis regarding progress against the plan, manpower availability, equipment/instruments deployment, consumption of electrodes, gases, down time of major equipment etc the report shall be submitted as prescribed by BHEL.

11.2.5
The contractor shall submit tentative erection & commissioning assistance plan and proposed man-month plan along-with offer.

11.3
The work under the scope of contractor shall be deemed to be complete in all respects, only when all the activities completed satisfactorily and so certified by BHEL engineer. The decision of BHEL in this regard shall be final and binding on the contractor.

11.4 OVERRUN CHARGES

11.4.1
If the execution of the work gets delayed beyond the Contract Period plus Grace Period, and such delays are not attributable to the contractor or to force majeure conditions, the contractor will be compensated by payment of overrun charges as prescribed hereunder:

Overrun Charges: at the rate of **Rs. 35,000/-** (Rupees thirty five thousand only) per month of overrun if the work is delayed beyond the normal completion time of 10 months and grace period of 2 months.

11.4.2
Ascertaining and establishing that the contractors are not responsible for any delay in executing the work.

As the onus probandi that the causes leading to extending the contract period is not due to any reasons attributable to the contractor is on him, the contractor shall prepare and submit by 15th of a month to the BHEL engineer in-charge a programme for doing the work for the period from 25th of that month to 24th of the succeeding month indicating the work, the % output planned etc discussions will be held by the contractor with engineer in-charge and the programme will be finalized and jointly signed by the engineer in-charge and contractor within a week of such submission of the programme (i.e. By 22nd, the agreed programme should be available). A review of the performance will be made and considering the availability of components to be erected and other constraints over which the contractor has no control, the

performance will be ascertained and the assessment will be recorded by both the parties. The programmed erection will be reviewed area wise and the following facts will be recorded in case of shortfall at the end of every month:

01. Erection/commissioning programme not achieved owing to non-availability of fronts.
02. Erection/commissioning programme not achieved owing to non-availability of materials.

03. Erection/commissioning programme not achieved owing to non-availability of tools and plants, manpower and consumables by the contractor or any other reason attributable to the contractor.

11.4.3
The contractor will forfeit his claim for overrun charges if the monthly programmes as mentioned in clause 11.4.2 are not made by him and jointly reviewed.

11.4.4
BHEL at its discretion may extend the contract beyond the end of grace period for further period depending upon the quantum of work left out at the end of grace period.

11.4.5
Overrun beyond the grace period shall be apportioned between contractor and BHEL in the proportion of shortfall attributable to the contractor and BHEL as per the provisions of clause no.11.4.2 above. Time extension on account of delay attributable to the contractor shall be exhausted first.

11.4.6
During the overrun period, contractor shall deploy necessary and adequate resources like engineers, supervisors, labours, T&P and consumables to complete the agreed programme in each month.

11.4.7
Over-run compensation will be paid proportionate to the progress made during the corresponding month. Evaluation of progress of the achievements vis-à-vis programme drawn for respective month shall be recorded as per the clause 11.4.2.

11.4.8
The conditions stipulated vide clauses 2.8.3 and 2.8.4 of general conditions of contract include within their purview all taxes and duties including variation as well as variation in wages/salaries /benefits for any reason whatsoever which are all to be borne by the contractor.

11.5 INTEREST BEARING RECOVERABLE ADVANCE

Interest bearing (@ 12% per annum interest on monthly reducing balance basis) recoverable advance limited to 5% of the contract value may be paid by BHEL at its discretion depending on the merit of the case against receipt & acceptance of bank guarantee from the contractor for the amount sought. This Bank Guarantee

(BG) shall be valid at least for one year or the recovery duration, whichever is less. In case recovery of dues does not get completed within the aforesaid BG validity period, the Contractor must renew the validity of BG or submit fresh BG for the outstanding amount and remaining recovery period. BHEL is entitled to make recovery of the entire outstanding amount in case the Contractor fails to comply with the BG requirement as above.

Recovery of dues will be made minimum @ 10% of the admitted gross running bill amount from the first applicable running bill onwards till entire due (principal plus interest) is recovered. In the event sufficient time duration is not left for recovery @10%, the rate of recovery shall be suitably enhanced so that entire due is recovered within the contract period (including extensions granted or foreclosure if any).

11.6 Price Variation

Agreed price/rate shall remain firm through out the contract period including grace period and extensions thereof .No price variation/adjustment shall be applicable for this contract and dause No.2.16 of General Condition of Contract shall not be applicable.

11.7 FORECLOSING OF CONTRACT

11.7.1

BHEL, at its discretion may foreclose the contract at any time after the completion of contract period from the date of starting the work at site.

11.7.2

In case it is decided to withdraw any portion of work or foreclose the contract, the percentage value of the work withdrawn / left over shall be determined mutually. BHEL engineer's decision in regard to status of an item shall be final and binding on the contractor.

11.7.3

The date of completion of work for the purpose of guarantee vide clause 2.13 of general conditions will be the date on which the contract is foreclosed.

11.8 Definition of Work Completion

The contractor’s scope of work under these specifications will deem to have been completed in all respect, only when all the activities are completed satisfactorily and so certified by BHEL site in charge. The decision of BHEL in this regard shall be final and binding on the contractor.

Section-12

Special Conditions of Contract

12.0 Terms of Payment

12.0 TERMS OF PAYMENT

12.0.1
The contractor should submit his monthly on account bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas from the 25 of previous calendar month to 24th of the current month.

12.0.2
Clause 2.6 of general conditions of contract shall be referred to as regards mode of payment, and measurement of the work completed.

12.0.3
Release of payment in each running bill will be restricted to 95% of the value of work admitted, as per the percentage break-up for the stage of work completion stipulated vide clauses hereinafter.

The 5% thus remaining shall be on account of workmanship guarantee of work executed. The same will be released after completion of the guarantee period of 12 months from the date of completion of entire work as certified by BHEL engineer. However, this amount may be released earlier on receipt and acceptance of bank guarantee (BG) of equal amount in BHEL's prescribed format. The BG shall be valid at least for one-year period and renewed if necessary to cover the entire Defect Liability period and an additional six months of claim period.

12.0.4
The payment for running bills will normally be released within 30 days of submission of running bill. Contractor shall make his own arrangement for making payment of impending labour wages and other dues in the meanwhile.

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

The progressive pro-rata payment will be released based on accepted price/item rates in following manner:

(A) Progressive payment for erection, testing and commission assistance (95% of the total contract value as per the break up given hereinafter under the clause 12.1.1)

(B) Progressive payment for providing **Other Various Services- as per clause 4.9 of Section-4** (5% of the total contract value as per the details given hereinafter under the clause 12.1.2)

12.1.1 **Embedded Parts, Foundation Parts, Hydro Turbine , Main Inlet Valve, Hydro Generator, Erection/Pre-commissioning of Common System, Commissioning of HTG set with Aux. and Final Painting (as per Sl. No.01 of Rate Schedule) - {SL.No. (A) above}**

Monthly running bill payment for various items/activities of work under these specifications will be released, based on certified completion by BHEL Engineer, as pro-rata progressive payment as per the stage break up given hereafter:

A. Embedded Parts –1.0%

SN	Description Of Activities	Percentage
01	Removal of temporary supports of Draft tube & DT Cone and grind finishing.	0.5
02	Welding and finish grinding of concrete grouting plugs and completion of finishing jobs DT Liner & DT Cone.	0.5
	Total of (A)	**1.0**

B. Foundation Parts (14%)

SN	Description Of Activities	Percentage
01	Installation of speed ring	1.5
02	Pre assy. And welding of spiral segments	1.5
03	Matching of spiral segments with speed ring	1.0
04	Welding of spiral segment	2.5
05	Assy. Matching and welding of inlet pipe with spiral casing	1.0
06	NDE of welded joints as per requirement	2.0
07	Assy. And welding of test cylinder & test cone	1.5
08	Hydro test of spiral casing and removal of test cone/ cylinder etc	1.5
09	Erection and welding of foundation ring with DT cone	0.5
10	Miscellaneous work, pit liner, second stage embedded pipe etc	0.5
11	Installation of felt covering, welding of supports inside spiral and handing over for concreting	0.5
	Total of (B)	**14.0**

C. Hydro Turbine (20.0%)

SN	Description Of Activities	Percentage
01	Turbine Guide Bearing Pad Scrapping	0.5
02	Assy. Of Runner And Shaft	1.0
03	Trial Assy. Of Guide Apparatus	1.5
04	Lowering And Installation Of Runner /Shaft And Alignment	1.0
05	Final Assy. Of Guide Apparatus	1.5
06	Erection Of Guide Vane Servo Motors	0.5
07	Erection Of Oil Pumping Unit/ Pressure Vessel And Oil Leakage Unit And Other Equipments & Piping	2.0
08	Erection Governor Mechanical & Electrical Cabinets	0.5
09	Erection of Governor Oil Pipe Line	1.0
10	Erection of Compressed Air Piping	1.0
11	Erection of Water Pipe Line Inside Pit	0.5
12	Erection of Cooling Water Piping & Pumps Sets	1.0
13	Erection of Dewatering Piping & DT drain valve	1.0
14	Installation of Top Cover Drain Pump & Ejector System etc.	0.5
15	Coupling of Turbine Generator Shaft	1.0
16	Final Assy. of Turbine Guide Bearing	1.0
17	Assy. of Turbine Shaft Sealing	0.75
18	Erection of Feed Back Mechanism	1.0
19	Oil Filling and Centrifuging In Guide Bearing	0.5
20	Completion of misc. Items Like Platform, Handrail etc.	0.5
21	Pressure Testing of GV Oil Pipe Line	0.5
22	Installation of Mono rail	0.25
23	Installation of Shear Pin Contact, Cabling, Discharge Measuring Device, Pressure Testing of Gov. Oil Piping	1.0
	Total of (C)	**20.0**

D. Main Inlet Valve-7.0%

SN	Description of Activities	Percentage
1	Assy. of BF Valve	1.0
2	Erection of BF Valve Including Base Plate	1.0
3	Installation & Welding of Inlet Pipe with Penstock Including NDT	1.0
4	Assy, Matching Welding of Outlet Pipe With Dismantling Joint and Spiral Inlet Including NDT	1.5
5	Overhauling and Testing of Servomotor	0.5
6	Installation of Servomotor, Air Valves & Bypass Valve, Bf Valve Control Mechanism With Piping etc.	1.0
6	Laying And Welding of Oil Pipe Line	0.5
7	Assembly Of Dismantling Joint With Seal	0.5
	Total of (D)	**7.0**

E. Hydro Generator (24%)

SN	Description of Activities	Percentage
01	Matching Of Stator Sole Plates With Stator Frame	0.5
02	Matching Of Lower Bracket Sole Plate With Lower Bracket	0.5
03	Erection Of Stator Sole Plate	0.5
04	Erection Of Lower Bracket Sole Plate	0.5
05	Scrapping Of Generator Guide Bearing Pads	0.5
06	Assembly Of Stator Segments	1.0
07	Laying Of Coils	1.0
08	Preparing Stator Coil Joints Brazing And Testing	1.0
09	Capping And Insulating Coil Joints/ Fixing Bus Rings	0.5
10	Dry Out And HV Test Of Stator	.75
11	Lower And Installation Of Stator In Pit	1.0
12	Assy. And Installation Of Rotor Spider In Erection Bay	0.5
13	Cleaning And De-Burring Of Rim Punching- 1st Stage	0.5
14	Rim Building And 1 st Stage Pressing	0.5
15	Cleaning And De-Burring Of Rim Punching- 2nd Stage	0.5
16	Rim Building And 2 nd Stage / Final Pressing And Locking Of Nuts.	0.5
17	Mounting Of Rotor Poles And Key Driving	1.0
18	Pole To Pole Connection	0.25
19	Rotor Dry Out And HV Test	1.0
20	Assy. Of Upper And Lower Fans And Current Carrying Leads	0.5
21	Preparation Of Thrust Bearing Pads For Assy.	0.5
22	Erection And Alignment Of Lower Bracket	0.5
23	Over Hauling And Assy. Of Brake Jacks And Piping On Lower Bracket.	0.5
24	Assy Of Thrust Bearing Pads And Hp Lubrication System.	0.5
25	Installation Of Generator Shaft.	0.5
26	Lowering And Assy. Of Rotor With Generator Shaft And Alignment Checking	0.5
27	Checking And Correction Of Combined Alignment	1.0
28	Erection Of Balance Brake Jacks Piping And Bra king System	0.5
29	Installation Of Air Piping And Receiver Package For Generator Brake System	0.5
30	Erection Of Cooling Water Pipes	0.5
31	Hydraulic Test Of Stator Air Coolers	0.25
32	Mounting Of Stator Air Coolers	0.25
33	Hydraulic Test Of Guide Bearing Coolers	0.25
34	Assy. Of Oil Cooler (Guide Bearing)	0.25
35	Erection Of CO2 System with Piping, fittings etc. including inter connection	0.5
36	Assy. of Upper Bracket And Erection	0.5
37	Assy. of Upper And Lower Air Guides Bracket	0.75
38	Assy. of Slip Ring/ Brush Gear	0.5
39	Boxing of Thrust & Guide Bearing	0.5

SN	Description of Activities	Percentage
40	Installation of Anti Condensation Heaters	0.25
41	Oil Filling and Centrifuging	0.5
42	Miscellaneous Works Like Generator Flooring Cabin/Lighting Generator, Access Doors Installation	0.5
43	Dowelling of Top &Bottom Brackets and Stator	0.5
	Total of (E)	**24.0**

F. Erection, Pre-commissioning, Cabling, Testing and Commissioning assistance of common system Equipments with Auxiliaries (20%)

SN	Description of Activities	Percentage
01	Commissioning of CO2 system	1.0
02	Erection of all panels of generator & turbine auxiliaries/valves	3.0
03	Pre-commissioning of MIV & other valve	1.0
04	Cable laying, glanding, dressing/clamping & termination of BHEL supplied cables including inter panel cable termination	0.5
05	Calibration & installation of field devices/ instruments	1.0
06	Pre-commissioning checks/tests of governing system	3.0
07	Pre-commissioning checks of, AVR/SEE	2.0
08	Pre-commissioning checks of control and protection and auto sequence system	1.0
09	Pre-commissioning checks/tests of auxiliaries system panel for generator & turbine	1.0
10	Pre-commissioning checks/tests of alarm annunciation system & common control panels.	1.0
11	Trial run of all auxiliaries drives	1.0
12	Pre-commissioning checks/tests of microprocessor based auto sequencer panels and relay panels.	1.0
13	Pre-commissioning checks/tests of generator control & metering, instrument panel, synchronizing trolley & generator protection panel	1.0
14	Pre-commissioning checks/ tests of pc based MMI & micro processor based diagnostic station	1.0
15	Pre-commissioning checks of compressed air, de-watering, drainage & CO_2 fire fighting and cooling water system & drive	1.5
	Total of (F)	**20.0**

G. Commissioning of HTG Sets with Associated Auxiliaries (5%)

SN	Description of Activities	Percentage
01	Spinning	2.0
02	Completion of bearing run &balancing	0.5
03	Electrical & protection check on turbine /generator system, OCC/SCC on generator load throw test	0.5
04	Synchronizing and stabilization	1.0
05	Trial run & handing over	1.0
	Total of (G)	**5.0**

H. Final Painting Of Equipment (4.0%)

SN	Description of Activities	Percentage
01	Final painting of equipments including foundation parts as covered in this tender specification with supply of primer, paints, thinner as per BHEL specification, other consumable, labour, and all other arrangement necessary for application of paint, surface cleaning and preparation prior to application of paints, making of legends, direction of flow etc. all complete.	2.0
02	Final painting of foundation parts as covered in this tender specification with supply of Synthetic Enamel based primer, thinner & paints as per BHEL specification, other consumable, labour and all other arrangement necessary for application of paint, surface cleaning and preparation prior to application of paints, making of legends, direction of flow etc. all complete.	2.0
	Total of (H)	**4.0**

12.1.2 STAGE-WISE BREAK UP FOR PRO-RATA PROGRESSIVE PAYMENT FOR OTHER VARIOUS SERVICES – {SL.NO. (B) ABOVE}

For the purpose of payments to the contractor, 5% of the contract value shall be assigned as the amount payable towards installation supervision services.

For the purpose of release of progressive payments, month-wise break up for each of the above services will be jointly worked out by BHEL and the contractor at site at the time of start of work. This will be regularly reviewed every month mutually agreed periodicity and based on requirement & keeping in view relevant aspects. On all the issues as above, BHEL engineer's decision shall be final & binding.

These services are to be rendered even during extended period (the contract extension may be due to any reason) without any additional payment/ compensation. The periodical review of monthly billing/payment break up shall take this aspect in consideration. Progressive payment for the service rendered will be made on certification of BHEL accordingly.

SECTION-13

SPECIAL CONDITIONS OF CONTRACT

13.0 EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION

13.1
If extra works (requiring less than 100 man hours) for modification, rework, revamping, in brief, any work done to change the state existing to a stage desired and also fabrication, all or any, are needed due to any change in or deviation from the drawings and design of equipment, operation/ maintenance requirements, mismatching, transit damages and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, are done, no extra charges will be paid. The tenderers are requested to take this aspect into account and the quoted rate should include all such contingencies.

13.2
It may also be noted that if any such said extra works arise on account of the contractor's fault it will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

13.3
However, BHEL may consider for payment as extra, for such of those works detailed in clause 13.1 which require more than 100 man hours and such payment will be regulated by the terms, conditions and stipulations contained in the clauses 13.4 and or 14.2.1 to 14.2.10. It may be specifically noted that the decision of BHEL as to whether such payment is due shall be final and binding on the contractor.

13.4
BHEL may, at their absolute discretion, consider for payment as extra on man day basis as found by them as justifiable for such of those works specified in clause 13.1 which require major modification, major repair, major reworks, major rectification etc. It may also be noted that only those works which are identified as major and warrant extra payment and certified as such by the project manager and accepted by the designers and/or competent authority of BHEL, will be considered for extra payment.

13.5
Such extra works arising out of transit, storage and erection damages, payment, if found due, will be regulated by clauses 14.2.1 to 14.2.10.

13.6
All the extra work carried out should be done by a separate gang that would be identified for ascertaining the man-days. No diversion of regular gang for such extra works will be permissible and no delay or slow progress should be caused due to executing extra works. Hence, the question of granting extension of time for this reason should not arise.

Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. Daily log sheets. It may, however, be noted that signing of log sheets by BHEL engineer does not mean the acceptance of such works as extra works eligible for payment or the acceptance of number of man days needed for the work. Contractor shall submit the extra work bills within 30 days after completion of extra work.

13.7

BHEL retains the right to award or not to award any of the major repair/major rework/major modification/major rectification/major fabrication works under clauses 13.1 to 13.6 to the contractor, at their discretion without assigning any reason for the same.

13.8

After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

Extra charges

Single average man day rate of 8 hours, including overtime if any, and other site expenses and incidentals, including consumables, tools and tackles, for carrying out any major rework/repairs/rectification/modification/ fabrication as may arise during the course of contract execution.(refer clauses 13.1 to 13.8 and 14.2.1 to 14.2.10) **Rs. 320/- (Rs. three hundred twenty only) per Man-day of 8 hours.** No payment will be made if an item of work lasts less than 100 man-hours.

SECTION-14

SPECIAL CONDITIONS OF CONTRACT

14.0 INSURANCE

14.1

MPPGCL shall arrange Plant Insurance for transit, storage, erection, testing and commissioning of Equipment. However contractor shall have to arrange the Insurance of their worker/staff, T&P and third party liability or any other liabilities for all the workmen employed, T&P & assets deployed at site for against any accident and injuries etc. while at work as required by the relevant rules and it shall be the responsibility of contractor to pay the compensation, if any to such workmen as per workmen's compensation act or any other acts and any such statutory requirement or modifications and all unforeseen associated liabilities in this respect and also in respect of any damages or compensation payable in consequence of any accident and injury sustained by the workmen or other person whether in the employment of contractor or not, if caused by the action of/or negligence on the part of contractor.

14.2

The contractor should satisfy BHEL that an accident insurance policy of their employees and T&P and assets is taken before starting of the works and the policy is kept in force till the work is completed. If required, recoveries will be made from the contractor's bill for any liabilities for the accident and refund of the same shall be considered later after the claim is fully settled by insurance authorities.

Contractor shall adhere to and comply with the relevant ESIS act as applicable to the site of work.

14.3 REPORTING DAMAGES AND CARRYING OUT REPAIRS

14.3.1
Checking all components/equipments at siding/site and will report & provide all assistance in processing the insurance claims covered by the said comprehensive insurance policy that is taken by customer.

14.3.2
Contractor shall render all services to BHEL/Customer in inspection including handling, re-stacking etc, assessing and preparing estimates for repairs of components damaged during transit, storage and erection, commissioning and preparing estimates for fabrication of materials lost/damaged during transit, storage and erection. Contractor shall help BHEL to furnish all the data required by railways, insurance company or their surveyors.

14.3.3
Contractor shall report to BHEL in writing any damages to equipments/ components on receipt, storing, and during drawl of the materials from stores, in transit to site and unloading at place of work and during erection and commissioning. The above report shall be as prescribed by BHEL site management. Any consequential loss arising out of non-compliance of this stipulation will be borne by contractor.

14.3.4
Contractor shall carry out fabrication of any material lost/damaged as per instructions from BHEL engineer.

14.3.5
BHEL, however, retains the right to award or not to award to the contractor any of the rectification/rework/repairs of damages and also fabrication of components.

14.3.6
All the repairs/rectification/rework of damages and fabrication of materials lost, if any, shall be carried out by a separately identifiable gang for certification of man-hours. Daily log sheets should be maintained for each work separately and should be signed by contractor's representative and BHEL engineer. Signing of log sheets does not necessarily mean the acceptance of these as extra works.

14.3.7
All rectification, repairs, rework and fabrication of components lost, which are minor and incidental to erection work (consuming not more than 100 man-hours on each occasion) shall be treated as part of work without any extra cost.

14.3.8
Insurance cover under this policy will generally be as per clauses 2.10.1 to 2.10.4 of General Conditions of Contract unless and otherwise specified differently in the Special Conditions.

14.3.9
In case the loss/damage is not attributable to the contractor, Payments of all extra works on account of repair / rectification / reworks of damages and fabrication of materials lost will be as per provisions of Section-13.

14.3.10
n case the repairs/rectification/rework and fabrication of materials lost, the work has been done by more than one agency including the contractor, the payment towards extra charges will be on pro-rata basis and the decision of BHEL in this regard is final and binding on the contractor.

14.3.11
In case of theft / damage / loss of materials due to negligence or failure attributable to the Contractor, the expenses incurred on account of repair/replacement of such components including BHEL's overhead expenses as applicable (presently @ 30%) in excess of the amount realized from the underwriters shall be recovered from the contractor. Recovery will be limited to Normal Deductible Franchise (DF) / Excess as per applicable Insurance (TAC) tariff guidelines. However, in case such

insurance claim is summarily rejected by the underwriters due to wilful damage/loss on the part of the contractor, the total cost of repair/replacement shall be recovered from the contractor. In case a claim is treated as Non-Standard by the underwriters for reasons attributable to the Contractor and settled for a lesser value, the differential amount will be recovered from Contractor.

14.4 INSURANCE BY THE CONTRACTOR AND INDEMNIFICATION OF BHEL

BHEL have taken a third party liability insurance, indicating in the proposal for such insurance that sub-contractors will be taking part in the erection work detailed in this tender. However, the tenderer has to bear any expenses /consequences over and above the amount that may be reimbursed to BHEL by such coverage of third party liability insurance taken by BHEL.

Such additional liability will be to cover and indemnify BHEL and its customer of all liabilities which may come up and cause harm/damage to other contractors/ customer/BHEL properties/personnel or all or anybody rendering service to BHEL/customer or is connected with BHEL/customer's work in any manner whatsoever. The tenderer's specific attention is also invited to clause 2.10 of General conditions of contract.

Contractor shall obtain and operate suitable insurance policies to cover the risk pertaining to the assets/properties and personnel belonging to or deployed by him.

SECTION-15

SPECIAL CONDITION OF CONTRACT

15.0 EARNEST MONEY DEPOSIT & SECURITY DEPOSIT

15.1 EARNEST MONEY DEPOSIT:

EMD for this tender is **Rs. 1,50,000/-** (Rupes one lakhs fifty thousand only). Bidders who have already deposited One Time EMD of **Rs. 2.00 lakh** will be exempted from submission of any EMD now for this tender.

EMD shall be deposited in cash (as permissible under income tax act), pay order or demand draft (payable at Nagpur in favour of 'Bharat Heavy Electricals Limited') only. **No other form of EMD remittance shall be acceptable to BHEL.**

EMD by the tenderer will be forfeited as per tender documents if

i) After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates.

ii) The tenderer does not commence the work within the period as per LOI contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

EMD shall not carry any interest.

15.2 Security Deposit

15.2.1 Security Deposit should be remitted by the successful tenderer. The rate of security deposit will be as below:

Sn	Contract value	Security deposit amount
1	Up to Rs. 10 lakhs	10% of contract value
2	Above Rs. 10 lakhs upto Rs. 50 lakhs	1 lakh + 7.5% of the contract value exceeding Rs.. 10 lakhs.
3	Above Rs. 50 lakhs	Rs 4 lakhs + 5% of the contract value exceeding Rs. 50 lakhs.

The Security Deposit shall be remitted <u>before start of the work</u> by the contractor in the manner specified as follows.

Security Deposit may be furnished in any one of the following forms

i) Cash (as permissible under the income tax act)

ii) Pay order, demand draft in favour of BHEL.

Iii) Local cheques of scheduled banks, subject to realization.

Iv) Securities available from Post Offic es such as National Savings Certificates, Kisan Vikas Patras etc.

(Certificates should be held in the name of contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

v) Bank Guarantee from scheduled banks / public financial institutions as defined in the companies act subject to a **maximum of 50%** of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The bank guarantee format should have the approval of BHEL.

vi) Fixed deposit receipt issued by scheduled banks / public financial institutions as defined in the companies act. The FDR should be in the name of the contractor, a/c BHEL, duly discharged on the back.

vii) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the security deposit should be remitted (either by cash/DD or BG **for maximum 50%** of total SD) before start of the work and the balance 50% may be recovered from the running bills.

viii) EMD of the successful tenderer, excepting One Time EMD, shall be converted and adjusted against the security deposit or specific request by the contractor.

ix) The Security Deposit shall not carry any interest.

Note: acceptance of security deposit against sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

15.3
Security deposit shall not be refunded to the contractor except in accordance with the terms of the contract.

Appendix – I

General Technical Description of Hydro Turbine, Generator and Auxiliaries

1.1 Turbine and Governor

1.1.1 Runner

The runner shall be integrally cast stainless steel (13% chromium and 4% nickel). A fabricated steel cone shall be bolted to it. Integral labyrinth rings, at upper rim and lower rim shall be provided .the runner shall be matched all over and accurately ground in the water passage homologous with corresponding model runner.

The runner shall be coupled with the turbine shaft by means of machined spigotted flange and coupling bolts and nuts. Pressure relief holes shall be provided at the runner crown to release water pressure from the above crown and bellow the turbine top cover. The runner shall be suitably balanced at works. The runner shall be interchangeable.

1.1.2 Turbine Shaft

Turbine shaft shall be of forged carbon steel and machined all over. Shaft shall be integral flange at both the ends, one bolting to the runner and other to the generator set. Integrally forced collar shall be provided forming the guide-bearing journal. The collars shall be polished to a firm finish.

The turbine shaft shall be connected to the generator shaft by spigotted coupling and fitted bolts. The coupling bolts and nuts for connecting turbine and generator shaft are covered under generator scope of supply. The shaft shall be inspected for full length to ascertain soundness and machine trueness. A polished corrosion resistance removable and renew able sleeve shall be fitted to the shaft where it passes through shaft gland .the runner and shaft shall be designed to with stand the max. Runaway speed attained at maximum net head with the guide vane s fully opened.

1.1.3 Guide Bearing

Shall be of submerged and self-oil lubricating, pivoted pad type, with external cooler. The bearing shall be situated above the shaft gland as close to the turbine/runner as possible. The bearing shall permit sufficient vertical movement of runner and shaft to allow for adjustment of the generator thrust bearing.

1.1.4 Shaft Gland

To prevent leakage of water through the gap between the shaft and turbine cover. A turbine sealing shall be provided below the guide bearing. Two-rubber ring as the sealing elements shall be used against the stainless steel sleeve mounted on the shaft.

1.1.5 Set of Guide Apparatus and Servo Motors

1.1.5.1 Top Cover

The top cover guides the water axially into the runner and serves as a support for guide bearing, shaft glands and guide vane operating mechanism.

Tops cover shall be of welded structure stress relieved and machined at works. The cover shall be of rigid construction with adequate stiffing ribs. The cover shall be fitted with fixed stainless steel wearing plates above the guide vanes. The top cover shall be machined for bolting to the stay ring and bored for the upper guide vane stems nearing housing.

1.1.5.2 Pivot Ring

The pivot ring shall be fabricated from the steel plates. The rings shall be bolted to runner chamber/ stay ring and bronze bearing bushes shall be housed in it for the lower stem of guide vanes. Fixed type stainless steel wearing plates shall be welded to it below the guide vanes.

1.1.5.3 Set of Guide Vanes

These shall regulate the flow of water with change of load, guide vane shall be of cast stainless steel / fabricated construction with integral stem. The guide vanes shall be designed to maintain closing tendency under the normal operating condition

1.1.7.4 Guide Vane Stem Sealing: -

Each guide vane shall be provided with upper seal of molded synthetic rubber located in recesses machined on guide vane housing. A rubber seal shall also be provided for the lower bearing of the guide vane.

1.1.7.5 Guide Vane Regulating Gear Assembly

The guide vane shall be coupled to the regulating rings by means of levers and linkages capable of withstanding normal operating forces without distortion.

1.1.7.6 Regulating Ring

Shall be electrically welded stress relieved steel, provided with renewable bronze bearing strips and will be supported on top cover. Two steel pins shall be provided for connection to the guide vanes servomotors. The ring shall be bored and bronze bushes shall be inserted for the guide vane link pins.

1.1.7.7 Guide Vane Servo Motors

Guide vane shall be operated by double acting oil operating servomotors. The servomotors shall be fabricated from steel plates. Cylinder shall be accurately bored and machined for mounting on the corresponding machined surface of the

spiral casing. The servomotor shall be complete with piston, piston rings, stuffing boxes, connecting rods, pins etc.

1.1.9 Compressed Air System

The system comprises of the following: -

The work includes laying of piping from existing available source, welding and testing along with valves and control equipment from terminal point to equipments /, instruments, system under these specifications and drawing requirement

1.1.10 De-Watering and Drainage System

The work includes laying of piping from existing available system, welding and testing along with valves and control equipment. from terminal point to equipments/, instruments, system under these specifications and drawing requirement

1.1.11 Cooling Water System

The system shall be complete with booster pumps motor sets, duplex strainers, motorised valves, isolating valves, non-return valves, field instruments, piping & fitting etc. for supplying cooling water to each unit.

1.1.12 Synchronous Condenser Operation

Pipeline for this system shall be laid along with control valves, solenoid valves, servo-operated valves, level controller & its piping. The system should be tested as per BHEL requirement after final welding and assembly.

1.1.13 Foundation Part

1.1.13.1 Stay Ring

Stay Ring being supplied is fabricated from welded steel plate of cast steel and have set of streamed lined stay vanes and stress relieved prior to matching. Two properly shaped strong guide ring shall guide the water to the guide apparatus. The top ring shall be designed to carry the top cover and the pit liner and lower ring to carry the pivot ring. The two rings shall rigidly tied together by strong stream lined stay vanes. The whole assembly shall be built up at works in number of segments. The section shall have machined flanges for bolting together at site. Suitable member of jacking pads, holding down bolts and jacks shall be used for erection purpose. Tapped grout holes shall be provided in lower contour plate of stay ring, these holes shall be plugged after the concreting.

1.1.13.2 Spiral Casing

The spiral casing shall be logarithmic form and substantially circular cross-section to maintain a constant velocity through out its length, substantial part shall be

fabricated from steel plate. It shall be designed to withstand maximum operating pressure including water hammer. It shall be dummy stay ring. Each section shall match be matched marked before dismantling for shipment. The spiral casing shall be pressure tested at site.

The inlet pipes shall be fabricated from steel plate with one end connected to penstock and other end shall be welded to spiral casing. The inlet pipe shall be of constant diameter.

Note: - 100% weld length of stay ring, spiral casing, inlet pipes, joints, tee joints and longitudinal joints shall be radiographically & ultrasonically tested.

1.1.12 Hydraulic Pressure Testing Equipment

This shall consist of a bulkhead cover and a test cylinder with a flange for blanking off the inlet section of spiral casing and inner annuls of the stay ring during hydraulic pressure test at site. The bulkhead and cylinder shall be of welded steel structure and shall be provided with drain hole, air release cock etc.

1.1.13.3 Foundation Ring – Assembly, Erection Of Foundation Ring

1.1.13.4 Pit Liner

It shall be fabricated from steel plate in section for welding together and stay ring at site. It shall be sufficiently ribbed to prevent defomation. Necessary brackets, anchors, pockets for pipes and fittings etc. The pit liner shall extent to bottom of generator barrel. It shall be welded on to stay ring/ spiral casing.

2.1 Generator

2.1.1 General

The generator is vertical shaft type having salient poles with closed air circuit ventilation and suitable for coupling to a turbine. It will have static excitation system energising field coils. The slip rings, toothed wheel and over speed device will be located on shaft. The generator shall have a combined thrust and guide bearing below the rotor.

General descriptions of various parts of generator are given below: -

2.1.2 Stator Frame

The stator frame will be built- up of wieldable steel plates and will have adequate depth to prevent distortion during transport or any operating conditions. The joints between the segments of the frame will be heavily flanged internally and coupled by number of short bolts.

2.1.3 Stator Core

The stator core will be built-up of varnish-insulated stampings of high grade, non-aging cold rolled silicon alloy steel. The segments will be secured to the frame by dovetail notches engaging with corresponding dovetail bars welded into the frame. The core will be clamped between segmental steel and plates through non – magnetic radial fingers welded to them. It will also have ventilation duct at interval along the stator core.

2.1.4 Stator Winding

The stator winding will be two turn layer diamond pulled coil wound in open slots. Each coil consists of a number of glass covered polyesteermide varnish bounded rectangular copper conductors to minimise eddy current losses.

The coil will be insulated with resiflex insulation system. Each turn will be insulated with resin rich epoxy bonded glass cloth backed mica paper tape. The end winding position of the coils will be insulated with flexible isopthalata mica flake tape. The stator will is dispatched to site in a number of segments to suit the transport limitations. The coils at the joints of the stator segments will be assembled at site.

2.1.5 Anti-Condensation Heaters

Tubular or box type heaters shall be provided the windings inside protection caps to prevent condensation.

2.1.6 Rotor

The entire rotor will be designed to safely withstand all mechanical stresses imposed by maximum runway speed. The static and dynamic balancing of the rotor will be carried out as a part of pre-commissioning tests and values of rotor vibration will be kept within allowable limits according to IS/BS standards.

2.1.7 Rotor Spider

The rotor spider will be fabricated structure having upper and lower discs, vertical radial ribs and central bush forging. Thrust collar and lower guide bearing journal will be integral part of central bush forging. Heavy steel bars will be welded on the outer periphery of the spider to support the rotor rim, which will be secured to the spider by rectangular keys.

2.1.8 Shaft

The shaft will be forged from high quality carbon steel. An integrally forged half coupling will be provided at the bottom of the shaft for connecting to the turbine flange.

2.1.9 Rotor Rim

The rotor rim assembled around rotor spider will be built up from thin sheet lamination each covering two poles pitches and successive layers of laminations overlapped to give adequate strength to the rim and lamination will be clamped between heavy steel plates. 'T' shaped slots in the outer periphery of the rim will receive similar shaped projection on the poles.

2.1.10 Slip gear and Brush gear

The collector ring will be of mild steel and mounted on the top of generator tube shaft. The brush gear for collector will be mounted on insulated stud supported on the top bracket and will be arranged to permit convenient access for maintenance and inspection. The insulation for slip ring and their connection will be non hygroscopic and oil resistant. The leads from the collector to the generator field pole will be taken along the shaft.

2.1.11 Bearings

(A) Thrust bearing will be of the spring-supported type in which the stationary part consist of set of white metal segmental pads supported on mattress of helical springs. Each pad will rest on a number of springs, which will be furnished to a standard overall length. The bearing will be self-lubricated and emerged in oil bath in which water-cooled oil coolers are also placed.

(B) The guide bearing will be of pivoted pad type consisting of a row of white metal pads arranged in supported ring to bear on general surface. A pivot bar will be bolted to the back of each guide pad to enable the pad to rock slightly to take up suitable position and facilitate formation of oil film when running. A seal will be fitted to prevent the escape of oil into the generator air circuit.

I. Hydrostatic Lubrication System

The high-pressure oil system will be provided on the thrust bearing in order to create a positive oil film over the pad at low speed during starting and stopping of the generator. The component consists of a positive displacement pump with motor, filter and valves etc. that are mounted on steel base.

J. Oil Coolers

The oil of combined thrust and guide-bearing housing will be cooled by number of coolers and associated pipes, fittings, valves, instruments etc. will be supplied loose.

2.1.14 Ventilation

The generator will have a close circuit system of ventilation. Numbers of air coolers will be fixed on outer periphery of stator frame and the cooled air shall be discharged into the angular space surrounding the stator.

2.1.15 Axial Fans

The fans consists of large number of specially shaped welded steel blades, welded to the segmental fabricated structure, which in turn are bolted to the plate on the rotor rim.

2.1.16 Air coolers

A number of air coolers will be fixed to the stator frame for dissipating the losses in the generator stator. Each air cooler unit will consist of a rectangular nest of tubes between two water chambers, arrange for air to flow over water through the tubes. Each cooler shall be consisting of drain and vent valves, pipes, flow indicator etc. as required.

2.1.17 Top Bracket

The bracket will be of fabricated steel structure. It will also support the weights of the stationary parts of brush gear and over speed device.

2.1.18 Bottom Bracket

The bottom bracket will also be of a fabricated steel structure. It is designed to support the hydraulic thrust from the turbine in addition to the weight of rotating parts of the generator and turbine. Brake and jack unit will be mounted on the bracket for rotor braking and lifting.

2.1.19 Brakes and Jacks

The generator brakes will consist of a number of fertodo lined shoes, mounted on a vertical piston moving in a cylinder and will operate against a polished circular s teel brake track located on underside of the spider. It will be pneumatically operated.

2.1.20 Hydraulic Power Pack

A hydraulic power pack shall be supplied for jacking the rotor during maintenance. The unit will be portable type and consist of pump-motor, shut of valve, starter. Pressure gauges etc.

2.1.21 Overspeed Device

The over speed device shall be located on the shaft of generator and shall consist of spring operated latched switch mounted on a bracket.

2.1.22 Oil Purifier

A portable type of oil purifier suitable for the use both for turbine and generator bearing oil will be provided. The unit will be of centrifuge type and flexible rubber hoses will be supplied along with purifier.

2.1.23 Major Instrument & Devices

The following devices/ instruments shall also be provided for monitoring of various parameters

1. Temperature scanner/recorder
2. Rotor temperature indicator
3. Vibration monitor
4. Moisture detector
5. Shaft current monitor

2.1.24 Fire Extinguishing Equipment

It will be of the carbon-di-oxide type initiated by heat detectors or operation of generator differential relay. CO_2 banks consisting of an adequate number of cylinders will be provided. Bank will be complete with mounting racks, pipe manifolds with pressure relief valve, electrical release trips and associated control etc.

2.1.25 Poles with Field Winding

The poles will be laminated construction consisting of sheet steel pole punching. The field coil will be of square ended being fabricated from copper steel, dovetailed and braced at the end.

2.1.26 Static Excitation System

The static excitation equipment consists of regulation cubicle, thyristor cubicle, field breaker cubicle, field flashing cubicle, transformer cubicle and associated cabling.

Appendix – II

Tentative Weight and Dimensions of Major Equipments in Scope

A) Turbine

SN	Item	Weight in MT
01	2nd Stage Embedded Pipes	4.0
02	Runner	8.5
03	Shaft	5.0
04	Stay Ring In Two Halves	13.0
05	Spiral Case	22.0
06	Servo-motors	1.5
07	Pit Liner	5.7
08	Spiral Inlet Pipes	6.3
09	Bulk Head Cover In Two Halves	8.6
10	Test Cylinder In Two Halves	12
11	Guide Bearing	2.7
12	Shaft Seal	0.35
13	Top Cover	6.0
14	Pivot Ring	3.5
15	Guide Vane 20 Nos.	4.4
16	Misc. Valves, Piping & Other Small Components	10
17	Auxiliaries	50
18	Governor	9.0
19	MIV	23
	Total Approximate Weight	225 MT

B) Generator

SN	Item	Weight In MT
01	Wound Stator Segments - 3 Nos.	30 MT Each=90 MT
02	Stator Coils	2.0
03	Stator Sole Plate	1.4
04	Air Cooler	3.0
05	Spider	9.0
06	Rim Punching	48.0
07	Wound Poles	24
08	Field Coil	1.8
09	Shaft	16
10	Thrust Brg. Pads	0.5
11	H.S. Oil Unit	2.1
12	Top Air Guide	3.0
13	Oil Purifier	0.8
14	Power Pack	0.8
15	Marshalling Box	1.5
16	Large Package	7.5
17	Bottom Sole Plate	1.4
18	CO_2 Equipments	4.5
19	Miscellaneous	32
	Approximate Total Weight	250 MT

Appendix – II

Tentative Weight and Dimensions of Major Equipments in Scope

C) Heaviest Package to be Handled

Sl.No.	Item	Weight In MT
01	Runner+ Shaft+ Top Cover	40 Ton
02	Wound Stator & Rotor	60 Ton

Appendix – III

Tentative List of Major Equipment/System in Scope of Contract

A) Turbine & Electro Hydraulic Governor

Vertical Shaft Francis Type Hydro Turbine Complete With Associated Equipment And Each Shall Be Comprise Of The Following

1) Embedded Parts

SN	Description	Quantity
01	2nd Stage Embedments & Pipes	1 Set

2) Foundation Parts

SN	Description	Quantity
01	Stay Ring shall be of fabricated construction with Flange, Bolts, Jacks etc.	1 Set
02	Spiral Casing- 9 Segments, Thickness 12 to 20 mm shall be fabricated from steel plate	1 Set
03	Inlet Pipes (Six Halves / Dia. 3 Mtrsx2.5 Mtrs Long X 25 mm Thick	1 Set
04	Pit Liner (Two Halves)	1 Set
05	Foundation Ring (Quadrant)	1 Set
06	Set of Chequered Plate, Stair Case and Hand Rail for Turbine Pit	1 Set

3) Turbine

SN	Description	Quantity
01	Runner Francis	1 Set
02	Turbine Shaft- Shall Be Forged Steel Having Guide Bearing Journal And Integral Flanges Complete With Coupling Bolts and Nuts and Stainless Steel Sleeve	1 Set
03	Turbine Guide Bearing- Shall Be Of Self-Oil Lubricated, Pivoted Pad Type Complete With Instruments, Devices And Cooling Arrangement.	1 Set
04	Turbine Shaft Gland- Shall Be Of Water Lubricated Rubber Type Completes With Connection For Cooling Water Supply And Protected Devices.	1 Set

Appendix – III

SN	Description	Quantity
05	Set Of Guide Apparatus And Servomotors	1 Set.
	Top Cover (Outer In Two Halves & Inner In Single)- Shall Be Fabricated From Steel Plate And Consist Of Vacuum Breaking Valve, Piping, Two Pump Motor Sets And One Ejector With Necessary Controls	1 Set.
	Pivot Ring (Four Quadrants) –Shall Be Fabricated Construction	1 Set.
	Set Of Guide Vanes (24 Nos.) And Bearing Housing-Guide Vanes Shall Be Supplied Complete With Bearing Housing, Fittings And Grease Connections.	1 Set.
	Set Of Guide Vane Regulating Gear Assembly- Shall Consist Of Levers, Links, Shear Pins And Regulating Ring.	1 Set.
	Set Of Guide Vane Servomotor (2nos)- Shall Consist Of Two Double Acting Oil Operated Servomotors With Piston, Piston Rings, Piston Rod Etc	1 Set.
06	Electro Hydraulic Governor And OPU System	1 Set.
07	Set Of Piping And Valves Pipes And Valves For Drainage Of Water From Top Cover. -Pipes And Valve For Shaft Gland Cooling Water System. -Pipes and Valves for Interconnecting Oil Pumping Units, Pressure Receiver And Servomotors Of Guide Vane Apparatus And Runner. -Pipes With Tappings On Spiral Casing And Draft Tube For Connecting Pressure/ Vacuum Gauges.	1 Set
08	Leakage Oil Unit Consist Of Oil Tank, Pump Motor Set With Control Panel, Valves & Piping	1 Set
09	Compressed Air System Consists Of necessary pipes with fittings & supports, Drain Traps and Instrument & Control Panels from terminal point to equipments/instruments & Auxiliaries etc. under this specifications.	1 Sets
10	Set Of De-Watering System consists of Piping and one number of valves with fittings, Support etc. from terminal point to drain point etc. under this specifications.	1 Set
11	Drainage System piping with valves, fittings, supports etc. for equipments / system under this tender specification to from terminal point	1 Set
12	Cooling Water System Shall Have Tap Off From Penstock and System consists of one No. Booster Pumps with motor sets, Duplex Strainers, Motorized valves, Isolating valves, Piping and fittings, instruments, supports etc.	1 Set Each
13	Top cover drain system consisting of pumps, motor and Ejectors.	1 set

Appendix – III

4) Valves, Servomotor etc.

SN	Description	Quantity
1	Main Inlet Valve	1no.
2	Servomotors, Valves, Piping, Panels etc.	1set

5) Generator –1 Nos.

22850 KW, Rated Out Put 20770kw 11.0 KV, 0.9 P.F., 250rpm, 50 Hz. 3 Phase, Vertical Shaft A.C Generator, Umbrella Type, With Close Air Circuit Ventilation, Consisting Of: -

SN	Description	Quantity
01	Wound Stator In Three Sectors Complete With Stator Frame "Core And Star – Connected Epoxy Insulated Winding With Main And Neutral Terminals	1 Set
02	Rotor Assembly Complete With Spider, Rims, Fans, Brake Track, Complete Pole Assembly With Pole Pieces And Field Winding With Epoxy Insulation, Damper Winding And Suitable Connector Up to The Brush Gear,	1 Set
03	Main Shaft With Integral Thrust Block And Integral Shaft Coupling To Suit Shaft Half Coupling	1 Set
04	Studs, Nuts And Coupling Guard For Turbine Generator Shaft Coupling	1 Set
05	Combined Thrust And Guide Bearing Complete With Bearing Bracket, Thrust And Guide Pads With Fixing Details, Oil vapour Seals, Located Below The Rotor Etc	1 Set
06	Self Contained Lubricating System For Thrust And Guide Bearing With Plug In Type Oil Coolers, Water Piping, Control Valve And Indicators	1 Set
07	Hydrostatic Lubricating System For Thrust Bearing Complete With Pump Motor, Pipes, Filters, Valves, Flexible Hoses Etc	1 Set
08	Air Cooler With Valves, Piping, Control Valve And Indicator Etc	1 Set
09	Sole Plates, Holding Down Bolts, Foundation Bolts, Dowels, Shims Etc For Stator	1 Set
10	Sole Plates, Holding Down Bolts, Foundation Bolts, Dowels, Shims Etc For Bottom Bracket	1 Set
11	Turbine Pit Air Seal	1 Set
12	Top Floor Plate Along with Support Structure	1 Set
13	Air Operated Brake With Piping Valve And Accessories	1 Set
14	Brush Gear System With Collector Rings, Brush Plate, Brush Boxes, Brushes And Connecting D.C. Connections	1 Set
15	Extension Of Main And Neutral Terminal From The Stator Frame To Generator Barrel	1 Set
16	Anti-Condensation Heater Located In Generator Pit	1 Set
17	Casing To Enclose Collector, Toothed Wheel And Over speed Device	1 Set
18	Pit Access Door, Staircase And Handrails For Generator Barrel	1 Set
19	Generator Barrel Lighting Arrangement And Outlet Sockets	1 Set
20	Brake Dust Collection System	1 Set
21	Oil Required For First Oil Filling Of Bearing Oil Reservoir	1 Set
22	Generator Marshalling Box With Terminal Block And Cables For Connections Between Various Instruments And Devices And Marshalling Box	1 Set

Appendix – III

6) Miscellaneous

SN	Description	Quantity
01	Portable Oil Purifier Unit	1 Set
02	Portable Motor Operated Hydraulic Power Pack	1 Set
03	Carbon Di Oxide Fire Extinguishing System Complete With Cylinder, Valve Manifold, Instruments, Control Panel, Piping, Fitting, Valves etc	1 Set

7) Control & Instrumentation

SN	Description	Dimensions In Mm			Wt In Kg	Quantity
		W	D	H		
01	**Excitation Equipments**					
A	Transformer Cubicle	2350	1450	2300	2500	1 No
B	Transformer				800	1 No
C	See- Regulation Cubicle	1150	1200	2295	1500	1 No
D	Field Flashing &Field Breaker Cubicle	2100	1200	2295	2000	1 Set
E	Thyristor Cubicle Set Of 2 Cubicle & Fans Supplied Loose	2240	1200	2295	3200	1set
F	Cables Refer Scope Of See In Drg. 3-653-00-10777					
02	Auto Sequencer Panel, Relay Panel, &Control, Metering, Transducer, Synchronizing Panel	2902	800	2320	2500	1 Set
03	Unit Alarm Annunciation Panel	1000	800	2320	900	1 No
04	Gauge Panel	1000	800	2320	900	1 No
05	Intra-Plant- Bus Cable For Above(2,3.4) & Common System Panels(Single Core Co-Axial Cable)					
06	Motor Control Panel Wall/ Floor Mounted For 1.Gov. Oil Pump 2.Top Cover Drainage Pump 3. C.W.Pump 4. HP Lub Oil Pump 5. Oil Leakage Pump 6. Brake 7. Heater Control 8. Drainage &De-Watering Pump	 1200 600 -Do- 600 -Do- -Do- 600 -Do-	 300 -Do- -Do- -Do- 300 -Do- -Do- 300	 1000 -Do- -Do- -Do- 1000 -Do- -Do- 1000	 300 -Do- -Do- -Do- 300- -Do- -Do- 150	 1 No 1 No 1 No 1 No 1 No 1 No 1 No 1 No

Appendix – III

8) Other Common System

Sl. No.	Description	Dimensions In Mm			Wt In Kg/ Unit	Quantity
		W	D	H		
01	Suit of Panel Consisting of Relay/Electronic/ Control, Metering, Monitoring, Common Auxiliaries, Transducers, Alarm Annunciator Panels	2850	800	2320	1500	1 No (Overall Dimensions furnished)
02	P.C. Based MMI including Monitor, Peripheral Cable, Diagnostic Station, Printers / Printer Table & Accessories Etc	--	--	--	--	2 Sets
03	Inter Connecting Links, Cables Etc	---	----	---	---	1 Sets

9) Cabling

Supply and installation of Control & Power Cable is customer's scope of work. However this tender specification covers the work of laying/landing/ferruling/ dressing/clamping/termination of cables that are specifically supplied by BHEL as part of equipments or mentioned in drawings.

Note: The above description is general nature. The actual equipment will be as designed for the project.

Appendix-I V

Site Test on Turbine and Generator

Tentative list of Test to be carried out Under the Supervision of BHEL

A. Turbine

SN	Description
01	Inspection Of Welding Of Spiral Casing & Inlet Pipe (In case Welded At Site)
02	Pressure Testing Of Spiral Casing & Inlet Pipe. (Incase Welded At Site)
03	Measurement Of Clearance Between Shaft And Guide Bearing And Runner And Turbine Top Cover
04	Measurement Of Guide Vane Gaps
05	Relation Between Servomotor Stroke And Guide Vane Opening
06	Check Of Shaft Alignment
07	Running Test On Bearing
08	Determination Of Guide Vane Opening For Starting And No Load Run
09	Acceptance Test • Load Rejection Test • Emergency Stop Test • Quick stop Test • No-Load And No-Excitation Run Test • Over Speed Test • Continuous Operation Test • Turbine Out Put Test • Turbine Efficiency Test • Index Test
10	Speed Governor Adjustment
11	Pressure Test Of Oil Pumping System

B. Main Inlet Valve

SN	Description
1	Hydro test Of Main Inlet Valve
2	Hydro Test Of Piping And Valves

C. Generator

SN	Description
01	Measurement Of Air Gap Length
02	Mechanical Run (Checking Balance, Bearing Temperature, Automatic Braking Etc)
03	Insulation Resistance And Winding Resistance Measurement Of Stator And Rotor Winding
04	High Voltage Dielectric Tests On Stator And Rotor As Per Iec-34
05	Alignment Of Generator Rotor And Turbine Runner And Shaft System
06	Dry out Of Stator Winding
07	Braking Tests For Verifying Stopping Time
08	Measurement Of Shaft Voltage

Appendix- IV

SN	Description
09	Phase Sequence Test
10	Open Circuit And Short Circuit Characteristic Curve
11	Balancing Of Rotor
12	Runway Speed Test
13	Line Charging Capacity Test
14	Synchronization Test
15	Quick And Emergency Stop Test
16	Oil Lift Operation Test
17	Potential Drop And Polarity Test For Field Coils
18	Load Throw Off At 25%,50%,75%,100%, Rated Output And Measurement Of Speed Rise And Pressure Rise
19	Hydrostatic Pressure Test On Each Air Cooler And Each Bearing Cooler
20	Record Of Thrust Bearing And Upper Bracket Deflection At Dead Load And Operating Load
21	Checking And Commissioning Of Various Other Auxiliary Equipment
22	Determination Of Field Currents Under Different Condition
23	Acceptance Test • Temperature Rise Test And Output • Vibration Test • Efficiency Test

Appendix- V

Erection, Testing, Commissioning Procedure and Activities

1.1 Foundation Parts

1.1.1 Turbine Speed Ring and Spiral Casing Assembly

A. Cleaning, assembly, leveling, fabrication of support, alignment And locking of speed ring

B. Matching and welding of spiral segments, matching of spiral ferrule with speed ring as well as with other spiral ferrule including cutting, edge preparation and re welding as may be necessary for building of complete spiral assembly, welding, gouging and grinding of weld joints of speed ring and spiral casing.

C. Assembly, matching and welding of inlet pipe with spiral casing cone with spiral casing and penstock.

D. Preparation of welded joints for x- ray testing, ultrasonic testing, MPI

E. X-ray / ultrasonic testing/MPI of welded joints as per technical requirement.

F. Preparation for hydraulic testing of spiral casing including speed ring & speed ring, repair of leakages appeared during testing and releasing for concreting.

G. Cleaning, assembly and welding,(as case may be) on runner chamber with staying and matching, welding of compensating cone with upper cone & grinding.

1.1.2 Pit Liner

Assembly and welding of pit liner.

2.0 Turbine

2.1 Assembly Of Guide Apparatus

Cleaning, re-tapping, trial assembly, dowelling, adjustment of clearances, dismantling and final assembly and erection of guide apparatus consist of outer top cover, pivot ring, set of guide vanes, guide vane bearing and stem seal, guide vane regulating gear assembly etc..

Servomotor For Guide Apparatus

Dismantling, cleaning, assembly, testing and erection of guide apparatus servomotors.

2.2 Runner and Shaft Assembly

Cleaning, overhauling, reassembly and hydraulic testing of runner and shaft assembly in service bay and its alignment in pit.

2.3 Guide Bearing Assembly

Cleaning, scrapping and matching with turbine shaft journal surface of guide bearing pads. Cleaning of other parts, removal of paints from housing, re-painting if necessary, testing and positioning of coolers cover and housing assembly, setting of clearances, level gauges, level relays, interconnecting pipes and dowelling of guide bearing housing etc

2.4 Shaft Seal Assembly

Dismantling, positioning, adjustment, assembly and dowelling of shaft seal assembly.

2.5 Set Of Pipes And Valves

Cleaning, cutting, edge preparation, welding, erection, testing of following pipes and valves for: -

A) Drainage of water from top cover/ejector pipe
B) Flow relay and pressure gauges and other fitting or shaft gland cooling water system
C) Flow relay pressure gauge and other fitting for turbine guide bearing cooling water system
D) Interconnecting oil piping unit pressure receiver, oil leakage unit etc(acid cleaning)
E) Pressure and discharge measurement of spiral casing, top cover and draft tube etc
F) Flow meter piping and pipe in turbine pit

2.6 Discharge Measuring Device

Erection, commissioning of discharge measuring device

2.7 Governing System

- Cleaning, dismantling, assembly installation and testing of
- Emergency slide valve
- Pressure accumulator
- Pressure pumping set
- Governor
- Governor oil pipe lines laying, welding, acid cleaning,
- Feed back mechanism
- Oil leakage unit

2.9 Drainage And Dewatering System

Laying, welding and testing of pipes as per the layout drawings

2.10 Compressed Air System

Cleaning, assembly and erection of necessary pipelines with valves, high pressure compressor receiver along with necessary pipelines and valves and pipeline for generator air brake system.

2.11 Cooling Water System

Cleaning, erection and testing of strainer, valves, flow switches, instruments, laying/welding/testing of pipes and their connection with penstock tapping and other equipments including installation of booster pump motor sets.

2.12 Miscellaneous

A General cleaning of work spot including powerhouse building, removal of un-used materials from the work place and return to stores.

B Temporary blanking flanges and testing flanges will be fabricated by the contractor at his own cost. The steel required for fabrication of these flanges will also be arranged by the contractor at his own cost.

C Preparation, opening and closing of draft tube main hole door as needed

D Monorail, chequered plate inside turbine pit supporting steel structure and all other pipeline which is required including plugging required necessary for successful commissioning of the plant.

E Dismantling, cleaning and re-assembling of draft tube drain, pipelines etc whenever necessary and fixing of gate valve and spindles with new stock.

F Penstock drain valve assembly

G Level relay in top cover

2.0 Main Inlet Valve Dia-3200 mm-Weight-23 MT Approx

Cleaning, assembly of MIV supplied in dismantled condition hydraulic testing, erection, alignment, welding & assembly of inlet and outlet pipes with expansion joint, assembly of servomotor s, associated air, water, oil piping valves etc. main inlet valve shall be butterfly type with complete operating mechanism and associated equipment and each comprises of body, door, main seal, lever, servomotor, dismantling joint inlet pipe, air valve, by-pass valve, set of control gears and sundry items.

Appendix- V

3.0 Generator

3.1 Stator

A. Leveling and dressing of the stator pedestal to technical requirement
B. Matching of sole plate with stator, reaming of hole, dowelling
C. Positioning of sole plates on the pedestal including of foundation tubes.
D. Lowering, leveling and alignment of wound stator in the pit.
E. Necessary platform, stool etc will also be arranged by the contractor to suit the site requirement.
F. Stator winding may be done either inside the generator barrel or in service bay suiting to the site condition and erection schedule.
G. Contractor will have to make necessary arrangement for stator covering with asbestos cloth during dry out of winding as per site requirement.
H. Cleaning & painting of stator
I. Testing of stator winding site brazed joints.

3.2 Rotor

The rotor consist of spider and rim punching (to be build up at site)

A. Cleaning, deburring, weighing and segregation of rim segments.
B. Assy. And positioning of spider in erection bay /rotor pit area and its leveling, key matching.
C. Positioning brake track segment and building of rim segments, clamping of rim segment by means of fine clearance studs, checking of rotor rim form and grinding as may be required.
D. Cleaning, dismantling, assembling, testing of poles and bedding of keys.
E. Mounting of poles, inter pole connection.
F. Dry out & HV. testing.
G. Mounting of slip ring, fan segment.
H. Cleaning & painting.

3.3 Generator shaft

Cleaning, de-burring of generator shaft and thrust bearing and assy. of shaft and rotor & tubular shaft.

3.4 Alignment

Erections of the following equipments are to be carried out before starting the alignment.

A. Bottom bracket and its sole plates
B. H.S. lubrication system.
C. Erection of brake and jack system.
D. Erection of rotor.
E. Erection of top bracket.
F. Assy. Of guide bearing, thrust bearing, scraping of G.B. & T.B. pads.
G. Assy. Of tubular shaft & rotor leads & slip ring
H. Pit air seal cover.

3.5 Generator alignment

After generator shaft alignment and Turbine shaft is coupled to generator shaft. Thereafter combined rotation check of both the shaft is to be carried out. The run out reading is to be recorded at guide bearing, generator coupling and turbine guide bearing journal. The turbine run out is to corrected by placing the SS shims in coupling or scraping the flange, if throw circle diameter exceeds the permissible limits as given in the generator erection manual. The stainless Steel shims of finer thickness as required to provide between the generator and turbine coupling to achieve the turbine run-out within satisfactory acceptable limits shall be arranged by contractor as part of scope of work.

3.6 Combined alignment

After generator shaft alignment and turbine shaft is coupled to generator shaft, thereafter-combined rotation checks of both the shafts are to be carried out. The run out reading are to be recorded at guide bearing, generator coupling and turbine guide bearing journal. The turbine run-out to be corrected by placing the stainless steel shims in coupling or by scrapping the flange. If the throw-circle diameter exceeds the permissible limits as given in erection manual.

3.7 Boxing of machine

After combined alignment and leveling, shaft is to be centered and rotor, stator form to be checked. After centering and locking of shaft with respect to turbine runner centering of stator & bracket is checked and corrected locking, the setting of guide pads, clearance in turbine and generator is carried out as per drawings. Final dowelling of stator, bottom bracket is to carried out.

3.8 Generator Auxiliaries

Cleaning, dismantling if necessary, assembly, erection and commissioning of following equipments/ system shall be carried out.

1. Cooling water system
2. Oil vapour seal aasy and air & oil vapour seal and packing.
3. D.C. connection.
4. Generator flooring.
1. Barrel and brush gear lighting.
2. Brush gear assy.
3. Assy of top & bottom air guide and baffles.
4. Brake jack, piping and conduit.
5. Calibration and mounting of instruments in generator gauge panel.
6. Oil level switch
7. Over speed device
8. Instrumentation cabling laying, dressing, clamping, termination as supplied by BHEL.
9. Heaters installation & cabling

10. Oil pipe of generator
11. Oil and air coolers and water piping of coolers.
12. Generator access doors, stare case, trench covers etc
13. Hydro static lubrication system, piping etc
14. Co2 fire extinguisher system.
15. Shaft current monitor.
16. External terminals and connection with bus duct.
17. Power pack.

4.0 Control Equipments

Cleaning, dismantling, assembly, erection, testing, calibration, commissioning of the following equipment.

1. Hydro mechanical/ electrical cabinet of governor
2. Unit control board
3. Unit control desk
4. Unit relay panel
5. Alarm & annunciation panel
6. Temperature gauge panel
7. Static excitation equipment
8. Local starter panels for auxiliaries
9. Electrical equipment governor panel
10. Auto sequencer panels
11. MMI & accessories
12. Inter panel cables
13. Common control panels
14. Microprocessor based control and monitoring system for units, lines and bus coupler
15. Vibration monitoring system

5.0 Spinning

On completion of pre-commissioning tests the unit will be jointly inspected by customer and BHEL engineers, and cleared for spinning. The machine will be run to rated speed and smooth running of the machine is established.

6.0 Bearing Run

After successful spinning the machine will be put on bearing run till the bearing temperature stabilizes. The balancing 0f the machine will be carried out if necessary.

After dry out the protection checks on the machine will be carried out and machine will be synchronized for trial run. The trial run will be continued for 72 hours. During trial run, various parameters of the machine are to be observed & recorded. Machine thereafter will be handed over to customer.

Appendix-VI

List of T&P to be provided by BHEL free of Hire Charges

01. BHEL will provide only those special T&P for assembly and erection work which are supplied from manufacturing unit as part of maintenance tools under regular packages in various product groups. Contractor shall return them after the completion of the specific work, for which the tools were spared, in good working order.

02. BHEL will make available the oil centrifuge for purifying and filling of lube oil in to the permanent plant and system.

03. 100 MT Capacity EOT crane along with Operator will be provided on free of charge by MPPGCL for erection of equipments within the TG hall.

Appendix-VII

The following consumables shall be provided by BHEL free of charge.

1) Cable glands

2) Cable lugs (4mm sq. and above) for power cable termination only

3) Consumables like insulating materials for assembly of stator/rotor etc, as supplied by BHEL manufacturing unit shall be made available to the contractor free of charge.

4) For permanent plant use, oil / lubricants / grease including flushing oil for the initial and subsequent filling shall be provided free of charge.

5) Electrode for welding of DT Knee and Spiral Casing shall be provided by BHEL free of charge.

Appendix-VIII

Format for deployment plan for Major Tools and Plants of Contractor

SN	Description & Capacity of T&P	Min. Qty	Month -wise Deployment Quantity										
			1	2	3	4	5	6	7	8	9	10	11
01.	Mobile Crane of adequate capacity	As reqd.											
02.	Trailer with Tractor of adequate capacity	As reqd.											
03.	TIG welding sets	As reqd.											
04.	Pipe bending m/c electro-hydraulic	As reqd.											
05.	Heating torch and cutting sets with hoses	As reqd.											
06.	Stress relieving equipment with temperature recorders	As reqd											
07.	Radiography source & other arrangement	1set											
08.	Electric distribution board with energy meter	1set											
09.	Welding Generators/rectifiers	As reqd.											
10.	AC ark welding transformers	As reqd.											
11.	Portable Electric oven with temperature gauge	As reqd.											
12.	Hydraulic test pump cap.150 Kg/cm2	1 Set											
13.	A.C. H.V. Test kit, 0-35 kV. A.C. with 7.0 Amps capacity and frequency 50 Hz.	1 set											
14.	D.C. Rectiformer for dry out capacity 0 - 2000 Amps.	As reqd.											
15.	1/2/3/4/5 KV Motorised Meggar suitable for measuring IR/PI value	As reqd.											
16.	500 V motorized meggar	As reqd.											

Appendix-VIII

SN	Description & Capacity of T&P	Min. Qty	Month -wise Deployment Quantity										
			1	2	3	4	5	6	7	8	9	10	11
17.	250 V megger	As reqd.											
18.	Phase sequence indicator	As reqd.											
19.	Function Generator	As reqd.											
20.	Micro-Ohmeter (Digital/Analog) 0-100 Ohm.	As reqd.											
21.	Calibrator mA & mV	As reqd.											
22.	Digital Multimeter (3 ½ and 4 ½ digits)	As reqd.											
23.	Analog Multimeter	As reqd.											
24.	As reqd.	As reqd.											
25.	Primary & Secondary Current Injection kit	As reqd.											
26.	Single phase Variable Volt Auto Transformer 0-230 V., 150 Amps. For measurement of Impedance	As reqd.											
27.	Single phase Variable Volt Auto Transformer 0-230 V., 28 Amps	As regd.											
28.	3 Phase Variac 415 V, 30 Amps.	As reqd.											
29.	Oscilloscope	As reqd.											
30.	Oil temperature Bath with standard temperature gauge	As reqd.											
31.	0-30 V DC Variable source	As reqd.											
32.	Tan Delta test kit	As reqd.											
33.	Non-contact type Tachometer	As reqd.											
34.	Contact type Tachometer	As reqd.											

Appendix-VIII

SN	Description & Capacity of T&P	Min. Qty	Month -wise Deployment Quantity										
			1	2	3	4	5	6	7	8	9	10	11
35.	Clamp Meter /Clamp Tester (AC/DC)	As reqd.											
36.	Decade Resistance Box.	As reqd.											
37.	Rheostat capacity 5 Amps/10 Amps	As reqd.											
38.	Any other major T&P planned by the contractor	As required											
39.	Hand held scope	As reqd.											

(*) NOTE:

1. This list is neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P and measuring/testing equipments/instruments as required to meet the schedules & as prescribed by BHEL.

2. No claim whatsoever will be entertained on this account.

signature of the bidder

Date:

Appendix-IX

Format for Month-wise Manpower Deployment Plan (category-wise numbers to be indicated for each month)

SN	Category	Months										
		1	2	3	4	5	6	7	8	9	10	11
01 02	Resident engineer Erection engineers											
03	Erection supervisors											
04	Quality assurance engineer											
05	Safety engineer											
06	Materials management supervisors											
07	High pressure welders											
08	Structural & other welders											
09	Fitters											
10	Millwright fitters											
11	Crane operator											
12	Truck/trailer drivers											
13	Store keepers											
14	Electricians											
15	Semiskilled/ unskilled workers											
	Month wise total											

NOTE:

1. NAME, QULAIFICATION AND EXPERIENCE OF ENGINEERS/SUPERVISORS PROPOSED TO BE DEPLOYED MAY BE INDICATED IN ORGANISATION CHART.
2. THE DEPLOYMENT PLAN SHALL BE FINALIZED WITH BHEL SITE AT THE TIME OF MOBILIZATION.

SIGNATURE OF TENDERER WITH SEAL

Appendix-X

ANALYSIS OF UNIT RATE QUOTED

SN	DESCRIPTION	% OF UNIT RATE QUOTED	REMARKS
01	SITE FACILITIES AND OTHER INFRASTRUCTURE		
02	SALARY AND WAGES		
03	CONSUMABLES		
04	DEPRECIATION AND MAINTENANCE FOR T&P AND OTHER ITEMS		
05	ESTABILISHMENT AND ADMINISTRATIVE EXPENSES OF SITE		
06	RETRENCHMENT BENEFIT		
07 08	EXTRA WORK INCIDENTAL TO ERECTION OVERHRAD		
09	PROFIT		
TOTAL			100%

SIGNATURE OF THE TENDERER WITH SEAL

Appendix-XI

Planned workers man-days in various areas

Sl. No.	Description of work	Man-days Planned	Remarks
1.	Hydro Turbine & Aux.		
2.	Hydro Generator & Aux.		
3.	Rotating Aux.		
4.	Piping		
5.	Electrical		
6.	Control & Instrumentation		
7.	Materials Management		

SIGNATURE OF BIDDER WITH SEAL

DATE

Appendix-XII

Details of Concurrent Commitments

SN	Full postal address of client and name of officer in-charge	Description of the work	Value of the contract	Commenc-ement date	Scheduled completion	% completed as on date	Anticipa-ted compln. Date	Remarks

Signature of the bidder

Date:

APPENDIX–XIII

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEVEN YEARS

SN	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	DESCRIP-TION OF WORK	VALUE OF CONTRACT	DATE OF AWARD OF WORK	DATE OF COMMENCEMENT OF WORK	ACTUAL COMPLETION TIME (MONTHS)	DATE OF ACTUAL COMPLETION OF WORK	REMARKS
1								
2								
3								
4								
5								

BIDDERS SHALL ENCLOSE COPIES OF DETAILED WORK ORDER (GIVING BILL OF QUANTITIES AND SCOPE OF WORK) AND COMPLETION CERTIFICATE IN SUPPORT OF THIS STATEMENT.

DATE

SIGNATURE OF TENDERER WITH SEAL

APPENDIX-XIV

FORMAT FOR MONTH-WISE MANPOWER DEPLOYMENT PLAN FOR OTHER VARIOUS SERVICES FOR EACH MONTH)

***USE ADDITIONAL SHEETS TO COVER THE TOTAL CONTRACT PERIOD**

SN	CATEGORY	MONTHS									
		1	2	3	4	5	6	7	8	9	SO ON*
01	Record Keeping										
02	Secretarial Services										
03	Messenger Services										
	MONTH WISE TOTAL										

DATE

SIGNATURE & SEAL OF BIDDER