

CONTRACT AGREEMENT

FOR

220/33KV GIS SUBSTATION AT PHOJAL

BETWEEN

HP POWER TRANSMISSION CORPORATION LIMITED

AND

LARSEN & TOUBRO LIMITED

VOLUME – 1C (BOOK- 3 OF 5)

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LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SECTION – I

LARSEN & TOUBRO LIMITED
Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

CORRESPONDENCES

LARSEN & TOUBRO LIMITED
Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters . Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089. INDIA
Tel. +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345
Web : www.lntecc.com
www.larsentoubro.com

16th March, 2010

LTCD/EIC/HPPTCL/NJ/PALCHAN/1603

To
M/s. HP Power Transmission Corporation Limited,
Barowallas House,
Khalini,
Shimla - 171 002.

Kind Attn: Dy. General Manager (Contracts)

Dear Sirs,

Sub.. Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – HP

Ref Letter No: HPPTCL/PALCHAN/2009/4048

With reference to the above mentioned tender, we have received the above referred letter seeking clarifications on our offer. Since we had received the letter at the closing hours of 12.03.2010 and the points were forwarded to the corresponding vendors , who require some more time to provide the clarifications, we kindly request you to extend the last date of submission of replies from 20.03.2010 to 01.04.2010.

Thanking you and assuring you of our best services at all times.

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

(K.RAJARAM)
Head - Business Development & Contracts
EI&C Sector

Regd. Office: L&T House, Ballard Estate, P.O Box 278, Mumbai 400 001. Tel.:022- 65525656 Fax: +022-65525858
Website : www.larsentoubro.com

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www.larsentoubro.com

LTCD/EIC/HPPTCL/PALCHAN/NJ/BID04 — 14th April, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002,

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Replies to your queries for Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

Mail Ref No :HPPTCL /PALCHAN /2009-4048 DATED 08 /04 /10

With reference to our above mentioned ref no, please find enclosed our point wise replies & confirmations. We hope that our replies are inline with your requirement. Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

(K.RAJARAM)
Head – Business Development & Contracts
EI&C Sector

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SUBJECT: TENDER. FOR CONSTRUCTION OF 220 /33 kV GIS SUB STATION AT PALCHAN ON TURNKEY BASIS
REFERENCE: OUR OFFER NO.: LTCD / El&C / HPPTCL - PALCHAN / NJ / BID/02 DATED 08.12.2009

Sl.No.	Description	L&T's Replies to Queries
1.	Certificate as requested by this office vide letter dated 04.03.2010 (Point No.: 2) has not been enclosed. The same to be submitted now.	As per the specification for the given scope of work **"It is certified that if during execution of the Work, it is felt that certain Equipments / Materials/ Items for which No Rates have been quoted are required for Construction, Erection and successful Commissioning of the Sub Station, nothing EXTRA shall be charged for such Equipments / Materials /Items from the Purchaser."**
2.	Detail of Sub Station Design Infra Structure available has not been enclosed which be submitted now.	Enclosed
3	You have not conveyed acceptance to the entire Commercial Terms and Conditions of the Tender Document in TOTO.	Confirmed
4	The Current Transformer Ratio that is required for 25 / 31.5 MVA Power Transformers is 65 / 83 Amperes. Accordingly, the C. T. Ratio works out to be 90 – 180 Amperes and not 150 – 300 Amperes. Clarify / confirm.	Proposed current ratio is 150-300A as against 90-180A. The relays at the C&R panels can be set to meet the current rating of the CT
5	The Secondary ratio of Potential Transformer required is 110 / √3 – 110 / √3 – 110 Volts 3. Confirm.	Noted & confirmed
6	It is not clear why the Client should bear for the damage Equipment covered under Guarantee / Warranty and during One Year of O & M of the Sub Station to be carried - out by the Contractor for the Equipment / Material supplied by him. Clarify and submit revised Schedule of Maintenance of Sub Station.	Confirmed

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Sr.No.	CONFIRMATION REQUIRED	BIDDERS REPLY
1	In line with Clause No. 1 of 220 kV GIS Specification, Bidder must confirm that all parts of offered GIS including Bus Bar are **Single Phase Design**	Noted & Confirmed
2	In line with clause No. 1 of 220 kV GIS (Special Requirement of GIS), Bidder must confirm that offered 220 kV GIS must have **Aluminium enclosures** for all part of GIS	Noted & Confirmed
3	In line with Bill of Material, Bidder must confirm that the offered 220 kV GIS Continuous Current Rating of Bus Bar and Bus Coupler Bays should be **4000 A**, for Transformer Bay **1600 A** & for Feeder Bay **2000 A** and Short Circuit Current should be **50 kA** for 3.0 sec. Kindly confirm.	Noted & Confirmed
4	In line with the Clause No. 21 of clarification / amendment after Pre-Bid Meeting , the Bidder has to submit the Type Test Report of offer GIS within last five years	Confirned during detail engineering
5	Bidder must confirm that offered GIS enclosures thickness shall be such that it will withstand an **Internal flashover** without burn through for a period of 500 ms. Bidder must submit documentary evidence to establish the same.	We confirm as per IEC. Enclosed the relevant copy from IEC 62271-203
6	Please confirm compliance to Clause No. 2 of 220 kV GIS Bid Specification and Bidder also must confirm following: 1. Offered GIS enclosures flanges should not connect via external bonding or strips. 2. Please confirm that offered GIS Insulator Cones shall be embedded in full return current carrying metal fixing rings to impart full conductivity across the flange connections. 3. To prove this Bidder must submit offered GIS pictures clearly demonstrating above points.	1. Noted & Confirmed 2. Noted & Confirmed 3. Photo Enclosed
7	In line with the Clause No. 4.12 of GIS Bid Specification, the Bidder must confirm that, in offered GIS, the internal components of the GIS shall be Maintenance Free for atleast 10 Years Bidders shall also confirm that the routine replacement of insulating gas should not be required in intervals of less than 10 Years.	Noted & Confirmed
8	In line with Clause No. 21.25 of Technical Specification of 220 kV GIS, Bidder must confirm that gas loss of the Switchgear shall be in no case higher than 0.5 % per year.	Noted & Confirmed
9	In line with Clause No 4.14 of Bid Specification, Bidder must confirm following: 1. 220 kV GIS CB and 220 kV CT are in separately gas monitored compartment. 2. Offered 220 kV GIS Bus Bar must have Bay viz gas segregation.	1 For CB: Confirmed, For CT: CT will be part of the line disconnector compartment. 2 confirmed
10	In line with the Clause No. 9 of Special requirement of GIS in Bid Specification, Bidder must confirm that, in offered GIS, the Breaker shall be Self Blast / Puffer Type Principle and the arrangement of the Breaker shall be HORIZONTAL	Noted & Confirmed
11	Bidder must confirm that offered 220 kV GIS CB must have rated break time as 60 ms in line with Clause No 10.7.3) of 220 kV GIS Technical Specification.	Noted & Confirmed

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12	In line with the Clause No. 15 B) of GIS Bid Specification, the Bidder must confirm that, at the altitude of 2500 meter above sea level, all the Bushing shall have impulse and Power Frequency Withstand level should be greater than or equal to the level specified for GIS. i.e a) One-Minute Power Frequency Dry and Wet Withstand Voltage should be greater than or equal to 460 kV rms. b) 1.2 / 50 Microseconds Full Wave Impulse Withstand Voltage for all Equipment should be greater than or equal to ± 1050 kVp and for Lighting Arrestor ± 900 kVP	Noted & Confirmed
13	Please confirm compliance to Clause No. 4.20, 4.38 & Clause No. 4.39 of 220 kV GIS Bid Specification. Bidder need to confirm following:- 1. It Must be possible to remove Circuit Breaker with both Bus Bar must remain available 2. It must be possible to remove Bus Bar Disconnector with one Bus Bar must remain available. 3. In case of any internal fault in Bus Bar or Bus Bar Disconnector, Circuit Breaker, repair work must be possible with one Bus bar remain in service.	We have noted your requirement and In line with our engineering practices being carried out at Project engineering stage, allocating for the stringent condition we confirm to comply & request you to note the following: 1.Noted & Confirmed 2.Not confirmed. Removal of busbar disconnector will entail outage of both busbars3.Confirmed for CB and back portion after CB. Removal of busbar disconnector will entail outage of both busbars.
14	In line with the Clause No. 13.8 of GIS Bid Specification, the Bidder must confirm that, In offered GIS High Speed Grounding Switches shall be electrically interlocked with their associated Circuit Breakers and Disconnectors.	Noted & Confirmed
15	Please confirm compliance to Clause No. 10.5 of 220 kV GIS Technical Specification. Bidder must confirm that offered 220 kV GIS CB is with either Spring operated or either Electro - Hydraulic Spring operated mechanism or combination of these.	We have offered spring type operated CB
16	In line with clause No. 11 of 220 kV GIS (Special Requirement of GIS) Technical Specification; Bidder must confirms that the number of operations before maintenance should not be less than the mentioned in the Clause.	Proposed equipment complies with the mechanical endurance of 10000 operations except for the high speed earthing switch which has a mechanical endurance of 2000 operations.The proposed CB is complied with 10 interruptions at rated short circuit breaking current(50kA).

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LARSEN & TOUBRO LIMITED Construction Chennai

Accepted

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DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009



SUPPORTIVE DOCUMENTS

LARSEN & TOUBRO LIMITED Construction Chennai

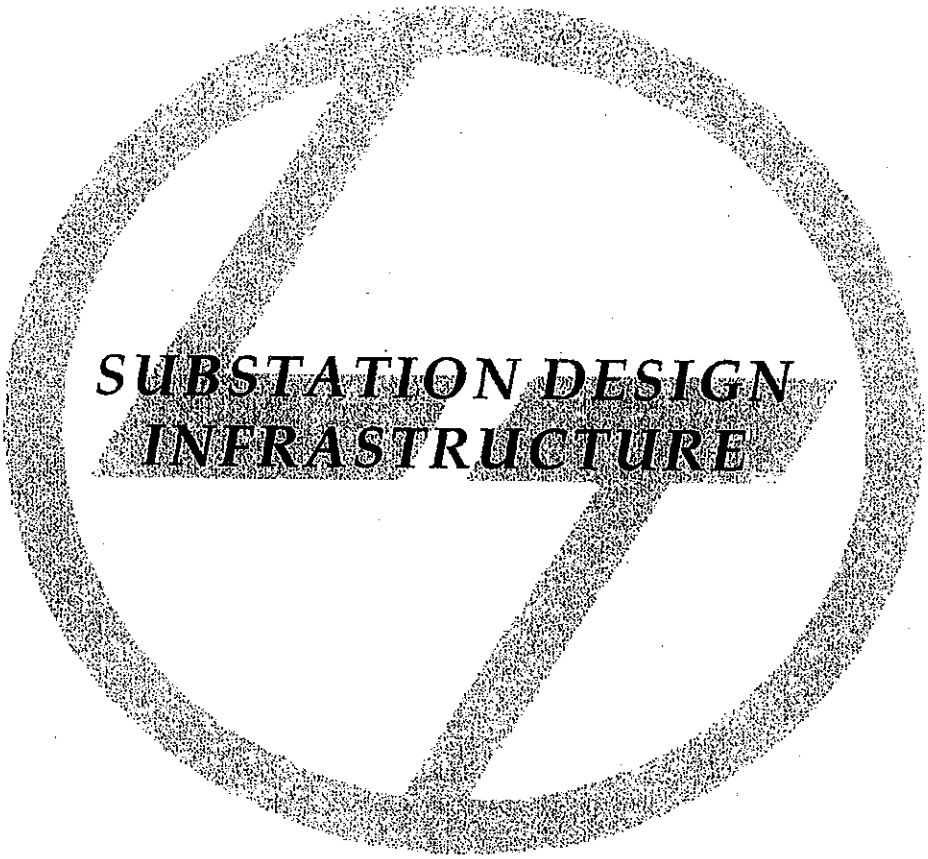
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BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

007

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

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LARSEN & TOUBRO LIMITED Construction Chennai

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BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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GENERAL CAPACITY OF THE FIRM

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LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

LARSEN & TOUBRO LIMITED, ECC DIVISION – EDRC

ABOUT OURSELVES:

We, EDRC - **Engineering Design and Research Centre,** are the consultancy wing of Larsen & Toubro Limited – ECC Division.

Larsen & Toubro Limited (L&T) is the one of the top ranking Engineering and Construction conglomerate with established reputation in India and abroad for quality, service and timeliness.

L&T has diversified business portfolios ranging from multi-products, equipment and cement manufacturing; mega projects Engineering, construction & management; to Information Technology.

L&T – ECC Division is the premier and largest construction company in India. ECC undertakes comprehensive and diversified construction activities on turnkey / EPC basis in India and abroad.

EDRC offers comprehensive engineering consultancy services in Civil, Structural, Mechanical, Electrical & Instrumentation fields. Elegant Engineering coupled with ingenuity and quality, is the hallmark of EDRC's success. The ability to provide alternative solutions for complex projects entailing comprehensive engineering services has made EDRC one of the most reliable consultancy organizations.

EDRC has multi-disciplinary skills – Electrical design, Transmission line towers, architectural, Civil, Structural, Building services, Mechanical, Construction methods and Planning, Geotechnical, Engineering software and Research and Development. With more than 350 experienced engineers, architects and 100 draughtpersons, EDRC is one of the best-equipped design house in the Indian construction industry.

EDRC's unique strength is its Larger Knowledge Database Acquired by Virtue of ...

- **Our exposure to variety of consultants in India & abroad and acquiring their engineering & quality systems.**
- **Our business with lead equipment & system vendors in India & abroad and understanding salient features of their products.**
- **Our six decades of construction experience in all fields of industries.**
- **Synergy of engineering with construction experience gained through commissioning and operation of plants.**

LARSEN & TOUBRO LIMITED Construction Complex

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

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On account of this unique strength we provide cost effective, optimal and constructible design.

Unlike majority consultants, our engineers have all-round experience – Design, Installation ,Testing and Commissioning. hence we provide commercial solution. Our core strength in exhaustive detailed engineering to facilitate quick and quality construction.

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LARSEN & TOUBRO LIMITED CHENNAI 600 002 ECC DIVISION

EDRC (E I & C) CAPABILITIES

Dy. General Manager (Contracts)
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LARSEN & TOUBRO LIMITED CHENNAI 600 089 E.C.C. DIVISION

EDRC – E I & C Capabilities

Electrical, Instrumentation & Communication

EDRC (EI&C) servicing to Electrical Projects & Gulf Operating Company of L&T has a team of more than hundred engineers and drafts person with diversified experience in Engineering Design & Detailing, Project Execution, Erection, Testing & Commissioning and Project Management.

Field of experience cover:

- EHV substation and switchyards up to 765 kV
- Gas Insulated substation up to 400 kV
- Industrial Electrification (Process plants, factories etc.,)
  - Cement Plants / Steel Plants
  - Paper plants
  - Refinery plants
  - Power plant
  - Petrochemical
- Industrial Instrumentation
- Mega Building projects
  - International Airports
  - Soft ware parks / Hotels / Hospitals – Right from (power system & LV system) concept to detailing
  - Residential complex / Commercial Centers / Sports Complex, Stadiums etc.,
- Expertise in Substation Automation System using latest IEC 61850 Protocol.
- APDRP (Accelerated Power Distribution Reforms Project) & Distribution Networks.

Engineering Design & Research Center (EDRC) is one of the best-equipped design houses in the Indian Construction Industry

Unlike majority Consultants our engineers have All-round experience in Design, Installation, Testing & Commissioning.

For EHV sub-station, intelligent building and industrial project electrification works, EDRC provides conceptual / base design to detailed engineering covering, basic power distribution and electrical layout philosophy, equipment selection and specification, related engineering calculation and analysis.

Our expertise spans over decades covering almost all lead clients & consultants in India & prestigious client/consultant abroad. By virtue of our long association & lead position in construction, we have definite edge over other engineering office, as we integrate best of the systems, provide comprehensive, cost effective, optimal constructible design.

LARSEN & TOUBRO LIMITED ECC DIVISION CHENNAI 600 089

LARSEN & TOUBRO LIMITED Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
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The Strength of Electrical & Instrumentation (including related civil & structural) design wing comprises of :

➢ Engineers	:	100 persons
➢ Draughtsman	:	24 persons
➢ Computers	:	130 numbers
➢ Plotters(Ink jet)	:	2 numbers
➢ Printer (Xerox N32)	:	2 numbers

All the computers (with windows XP / Vista) are connected through an ethernet network with a common server. All the drafting purpose computers are loaded with ACAD 2009).

Training

- In-house programmes are conducted to hone-up our skills in the latest / modern techniques in Electrical field. We have the latest, state of the art simulator imported from Siemens, Germany for interconnecting Numerical relays compatible with IEC 61850 of leading manufacturers viz., Siemens, ABB & AREVA which is first of its kind in India.
- Periodical up-gradation of Engineering skills and knowledge dissemination by conducting and participating in Training Programmes sponsored by CPRI, IE, CH, IEMA & Programmes of Lead Business houses in addition to In-house Programmes.
- Interaction with Lead Educational Institutions and Research Organisations

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QUALITY MANAGEMENT SYSTEM IN EDRC

LARSEN & TOUBRO LIMITED Construction Chennai

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ISO CERTIFICATE

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Engineering Design & Research Centre, ECC Division
Larsen & Toubro Ltd.,
Chennai Tamil Nadu, India

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

BS EN ISO 9001:2000

The Quality Management System is applicable to:

Engineering, Design and Associated activities for turnkey and non-turnkey type of projects by the company's operating business group of "Electrical Projects and Gulf Operations "comprising of following Business units:

1. **Electrical, Instrumentation & Communication**
2. **Buildings & Urban Infrastructure Projects. (Gulf Operations)**

This certificate is valid only in association with the Certificate No.MUM0060723

Approval
Certificate No: MUM0060723/C

Original Approval: 9 May 2002

Current Certificate: 9 May 2008

Certificate Expiry: 8 May 2011

Issued by: Lloyd's Register Quality Assurance Limited

UKAS QUALITY MANAGEMENT 001

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

This document is subject to the provision on the reverse
71 Fenchurch Street, London EC3M 4BS United Kingdom. Registration number 18793.
This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
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QUALITY POLICY

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

QUALITY POLICY

Larsen & Toubro Limited - ECC Division is committed to achieve and sustain Business Excellence by integrating sound quality management principles into all its activities and at all levels of the organization.

We would be focused in our work and operate with clearly articulated and aligned objectives and strategies embracing

- Customer Value: Drive actions from a desire to serve the customer and deliver superior value.
- Process: Manage work as a process with focus on results: improving efficiency, delivering enhanced value to customers and shareholders.
- Improvement: Install Plan-Do-Check-Act checks at every stage of work to achieve both continual and breakthrough improvements in cost, cycle time, quality and safety.
- Leadership: Develop leaders who set high expectations, serve customers, achieve Business Excellence and include sense of entrepreneurship and team spirit in the organization: work together, take prudent risk, learn and continually improve performance.
- Motivation: Train, encourage and motivate people throughout the organization to establish and meet both short-term and long-term commitments to all key stakeholders including the society.
- Partnership: Build long-term relationship with the customer and strategic suppliers based on shared objectives.

We would adopt a value-driven professional approach and ensure that the Quality Management System as per ISO 9001: 2008 is effectively implemented and continually improved towards achieving Excellence.

K.V. RANGASWAMI
Member of the Board &
President (Construction)

December 01, 2008

LARSEN & TOUBRO LIMITED
Engineering Construction & Contracts Division

LARSEN & TOUBRO LIMITED CHENNAI ECC DIVISION

LARSEN & TOUBRO LIMITED

Dy. General Manager (Contracts)
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SAMPLE QSD DOCUMENT

Dy. General Manager (Contracts)
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QUALITY MANAGEMENT SYSTEM (Sample Document)

1.0 EDRC has developed & implemented the Quality Management System (QMS) to help our organization to consistently provide consultancy , design & total engineering services that meet customer & applicable regulatory requirements & operate with increased effectiveness & efficiency with the overall aim of enhancing customer satisfaction. We provide complete engineering services like Architecture , Civil & Structural , Geotechnical , Electrical , Mechanical system & Equipments , HVAC , Fire fighting , Plumbing & Sanitary services , Instrumentation , Piping , Mechanical utilities & Construction methods.

All the documents of Quality Management Systems are divided into 4levels.
Level 1 document : It is our Quality manual - 4
Level 2 document : Standard Operating procedure / process (SOP)
Level 3 document : Work Instruction – L3
Level 4 document : Formats – L4

L1 – Quality Manual addresses the Organisation work practices against the clauses of ISO 9001 : 2008. It provides cross references of various standard operating Procedures / processes.
L2 – Standard Operating Procedures / Processes for various functional activities of Organisation consistent with the requirements of ISO & stated Quality Policy.
L3 – Guidelines / Work instructions describing how the individual activity is to be Performed to meet the requirements.
L4 – Formats & records generated through activating quality system. This forms the Evidence of commitment.

2.0 Document control

We have method for numbering our document & drawings. All project specific documents / drawings are approved for adequacy before issue. All the customer supplied data which form the design input are enlisted. All unintended use of obsolute documents are prevented from usage by properly identifying the documents with stamping on the same.

All important data are preserved after project completion for future use. We have an system of maintaining all the important project related information and data bank in soft form in EIP VIDHYA.

3.0 Design & Development of Product

The enquiry received from the customer are properly documented. Organizational & technical interfaces are made among the various sections & customer. For multidisciplinary jobs i.e. where other disciplines are involved like HVAC, Fire fighting, Civil & Structural etc an Engineering co-ordinator is identified.

For these type of Jobs the identified Engineering Co-ordinator (ECD) co-ordinates with all the disciplines involved & he ensures that the inputs are received in time & the deliverables are submitted as per schedule.

The Design & development review is done at suitable stages and all the designs &

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drawings undergo three levels of checking before release. The designs / drawings are

prepared by the Design engineer, the same is checked by the Engineer incharge and

then it goes to the next level of getting the approval / Validating the deliverables by

the Design Manager/Design Division Head(DDH).

For multi-disciplinary job all the applicable drawings are checked by relevant disciplines involved. We have the title block which carries the signature block to be signed by the various disciplines involved in the project before release of drawing(refer sample title block enclosed for inter discipline check).

During various design review stage the deliverables are reviewed and we have our Sectional Design manual wherein guidelines / work instructions are covered mentioning how the individual activity is to be performed to meet the design requirements.

The planning of the various activities of a project & assigning the responsibilities for the same & interdependency of various activities are shown by means of a barchart. The activities are monitored by drawing the barchart for the actual progress. Standard formats are available for monitoring the same. For multidisciplinary Job, ECD plans the activities of the project & he makes the central plan & the same is given to all concerned section head & Engineer in-charge for consistency & in order to comply with customer's requirement.

We also have an format Document Control Index(DCI) which helps in detailed planning & monitoring the submission of design deliverables (drgs including Vendor drawings) to customer. In this format for multidisciplinary jobs the Engineering co-ordinator (ECD) identifies the drawings which require multidisciplinary checking & approval by suitably marking in the DCI. This format is also prepared by the Design engineer , checked by the Engineer in-charge/ ECD (for multi-disciplinary jobs), so that it meets the scheduled deliverable dates. The revision of the drawings/documents are also identified in this format.

In the document top sheet & drawing title block we have the revision column & the revision history of the drawings & documents are clearly mentioned. In the Drawing/ Document relevant changes are highlighted by clouding/marking. Also, we prepare a detailed compliance report for the comments/observations made by Clients/Consultants, as applicable.

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4.0 Design verification / Validation

Each & every drawing / document goes through Design verification / validation

4.1 Design Verification

Checking authority(Engineer in charge) verifies all concerned design outputs of the

project to determine if the design output meets the design input requirements.

4.2 Design Validation

The Design Manager approves all the design outputs of their respective area prior to release. During this approval, Design Manager reviews & ensures that the resulting product is capable of meeting the requirements for the specified application or the intended use. In some specific areas this activity is carried out by Design Division Head (DDH).

5.0 Audit

We have a procedure for audit, once in 6 months surveillance audit is carried out by the certifying body. We have the presidential audit conducted by the Design group head and the design division head to bring out the technical improvement & check the effectiveness & efficiency of various processes once in six months by each head. Internal audits are also conducted once in three months approximately. These audits are conducted by cross discipline / cross sectional trained internal auditors within the divisions.

The nonconformity & the improvement points given by the auditor during the audits are entered in the on line NCR (Non conformity report) and the improvement points in the on line CPA System (Corrective Preventive Action).

6.0 CPA System : (Corrective Preventive Action)

There is a system which is being followed for continuously improving & maintaining the effectiveness of our Quality Management system. Any complaint received from customer approving authority etc are entered in this system.

- Investigating & eliminating the root cause of these failures is a critical part of our continual improvement process.
- Preventive action is considered as a pro-active action in our organization

7.0 Competence awareness & Training

In order to determine the competency needs including employee training & awareness needs, the training needs for the employees are identified and the effectiveness of the training undergone is evaluated. There is an employee skill set

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format available which is used for representing the existing skill set of employees assessing / identifying the areas which an individual needs to be trained, monitoring the schedule adherence of training recommended / provided & for monitoring the improvement in the skill set of the employees. This format is updated once in six months.

Also, we have knowledge sharing session for our design department as and when required to disseminate the experiences and knowledge gained through various projects.

8.0 Vendor Engineering

We are involved in the vendor engineering during the pre-order and post order stage. The offers received during pre-order stage are evaluated technically & our technical recommendations are given to business unit. While placing the order on vendor, we give a check list to the Business Unit / Manufacturer which indicates the schedule of deliverables for subject equipment in prioritize way, so that concurrent engineering such as Civil Engineering (Building size),Air conditioning Engineering (A/C capacity) etc.can be carried out(Sample checklist enclosed). Once the order is placed on the vendors then the next stage of post order evaluation/review is done wherein we review the drawings/documents and give necessary feedback to the manufacturer and final reviewed documents are submitted to clients.

9.0 Roles :

9.1 Design Division Head

He is the overall in-charge for review & monitoring of the project and will ensure that the project schedules are met by providing adequate infrastructure(manpower, hardware , software resources etc.)

9.2 Design Manager:

Final review & approval of the designs/ drawings for the project. Design related co-ordination with external(client, consultant,vendors) / internal agencies involved in the project.

9.3 Engineering Co-ordinator

The Electrical Design Manager for the job will be the Engineering Coordinator and will be the focal point between all external & internal agencies involved in the project.

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9.4 Engineer In-Charge

Review / Checking of the designs all in house generated drawings/ document & external vendor drawings / document at various stages .Design related co-ordination with external (vendors only) / internal agencies involved in the project.

9.5 Design Engineer

Design of the system according to the specification with relevant codes, standards & practices. Review of the external vendor drawings / document at various stages. Maintaining the project related correspondences.

9.6 Draftsman

Preparation of drawings in AutoCad & maintaining of project related drawings & documents.

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DESIGN SERVICES OFFERED

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Design Services offered In the Field of EHV & Distribution Substations

I Basic Engineering

- Generation of Feasibility Report for Substations
- Insulation Coordination Studies
- System Studies such as Load Flow, Short Circuit & Transient Stability
- Harmonic Studies
- Assessing Condition of Soil & related soil improvement methodology
- Tender document preparation and Tender evaluation
- Generation of Specification / Data Sheets for Electrical equipments & Systems Supply, Installation, Testing & Commissioning Including Quality Plans

II Design & Detailed Engineering

❖ Electrical Services

- Complete Engineering starting from Conceptualisation, pre-tender Engineering and Estimation of Quantities
- Sizing & Selection of Equipments
- Schematic and Line diagrams
- Indoor and Outdoor equipment layout – Plan and section
- Phase pull & Critical Spacer Span Calculation for Strung Bus
- Maximum Span Length Assessment for Rigid Bus
- Cantilever Strength Calculations for Bus Post Insulators & Equipment Support Insulators
- Rigid / Tubular Conductor sizing
- Sag-Tension Calculations
- Cable Routing Layout & Tray Engineering
- Lightning Protection
- Earth Mat Design for Switchyard
- Erection Key Diagram
- Illumination Scheme (Outdoor / Indoor)
- Control & Interlocking Logic Diagrams
- Cable Selection – HV / LV
- Cable Schedule
- Termination Schedule
- Relay Co-ordination
- Reactive Power Compensation – Group / Individual
- Interfacing Site Generated Captive Power With the Grid of The Utilities
- Battery Bank & charger Selection (DC / UPS Power Needs)
- Auxiliary Transformer Sizing & LV AC Panels
- Generation of Specification / Data Sheets for Electrical equipment & Systems Supply, Installation, Testing & Commissioning Including Quality Plans
- Protection Interfacing / Communication through PLCC, FOTS, Microwave Communication Systems
- Substation Automation SCADA, LDC / Substation Monitoring Systems, LDFOTE / SDH systems
- Review of the Vendor Drawings & Documents
- Inspection of the Vendor Equipments

❖ Civil & Structural Design Services

- Towers & Gantries Design & detailing
- Equipment Supporting Structures Design & detailing

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028

- Structural Loading Diagram
- Foundations for Towers, Equipment Supporting Structures Design & detailing
- Foundations for Transformers & Circuit Breakers Design & detailing
- Cable Trenches, Duct Banks, Road Crossing Culverts, Oil Soak pit
- Roads & Drains
- Fence & Gates
- Control Room / Electrical Switchgear / FFDG Building
- Generation of Architectural Layout for Buildings
- Numeration & RC Details for Buildings Columns, Beams & Floors & Related detailing

❖ Mechanical Services

- Heating & Ventilation System
- Air Conditioning System
- Fire Alarm Systems
- Fire Fighting Systems for Cable Cellar & Transformers
- EOT Crane Requirements in GIS s/s

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VERSATALITY IN ENGINEERING PROJECTS

Project Classification

- Industrial Electrification
- Switchyard And Substations
- Intelligent Buildings

Types of Industries

- Cement
- Coal handling
- Refinery & Petrochemical
- Metallurgical & Steel
- Sugar
- Water & Effluent Treatment Plants
- Automobile Industries
- Factory / Workshop Complexes
- Research Centres / Launch Pads

Types of Switchyards & Substations

- EHV Multibus Switchyards Upto 765 kV
  - –Single Bus
  - –Main and Transfer bus
  - –Double Main bus
  - –Double Main and Transfer bus
  - –Ring main system
- GIS Substations upto 400kV
- Indoor MV&HV Substations
- Power Plant & Plant Auxiliaries
- Captive DG Plants
- Cogeneration Plant

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Types of Buildings

- Software Parks
- Star Hotels
- Hospitals
- Airports
- Townships
- Socio-cultural Buildings
- Shopping / Office complexes
- School / Temple Complex Buildings
- Intelligent Buildings

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SOFTWARE RESOURCES

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SOFTWARE RESOURCES

SOFTWARES PROCURED:

- **ETAP- Electrical Transient Analyzer Program,** provides extensive support in performing the critical analysis involving system studies for the switchyard, substations, process plants etc. The software package covers the following modules.

Sl. No	Modules
1	Load flow analysis
2	Short Circuit analysis
3	Motor starting
4	Transient stability
5	Relay Co-ordination
6	Cable Ampacity Derating
7	Harmonic analysis
8	Ground Grid Design

Each of this modules is provided with relevant customized & extensive data bank.

- **PDMS- Plant Design Management system-** Total quality management through Design, Fabrication and maintenance by the way of
  - Design Consistency Checks.
  - Interference Checks.
  - Automatic updation of Drawings on modification in Models.
  - Planning of Plant maintenance procedures, design alterations and safety routes.

  This software is extensively modeled for Chemical, Oil, Gas, Nuclear, Power & Pharmaceutical Industries with a multi-disciplinary design package. It has its application in 2D & 3D modeling of various Electrical layout drawings like equipment layout, lighting layout, cable tray layout etc, quantity estimation/ preparation of BOQ for indoor as well as outdoor substations.

- **OTHER SOFTWARES-(Vendor Based)**
  - CG LUX- For indoor & Outdoor Lighting.
  - BAJAJ- For indoor & outdoor Lighting.
  - CCTV- System Design for Security Purpose.

  OTHER SOFTWARES
  - **STAADPRO 2003**
  - **PSCAD**
  - **VPSTUDIO**

INHOUSE DEVELOPED SOFTWARES :

- We are having about 30 nos. of in-house built softwares for various applications.

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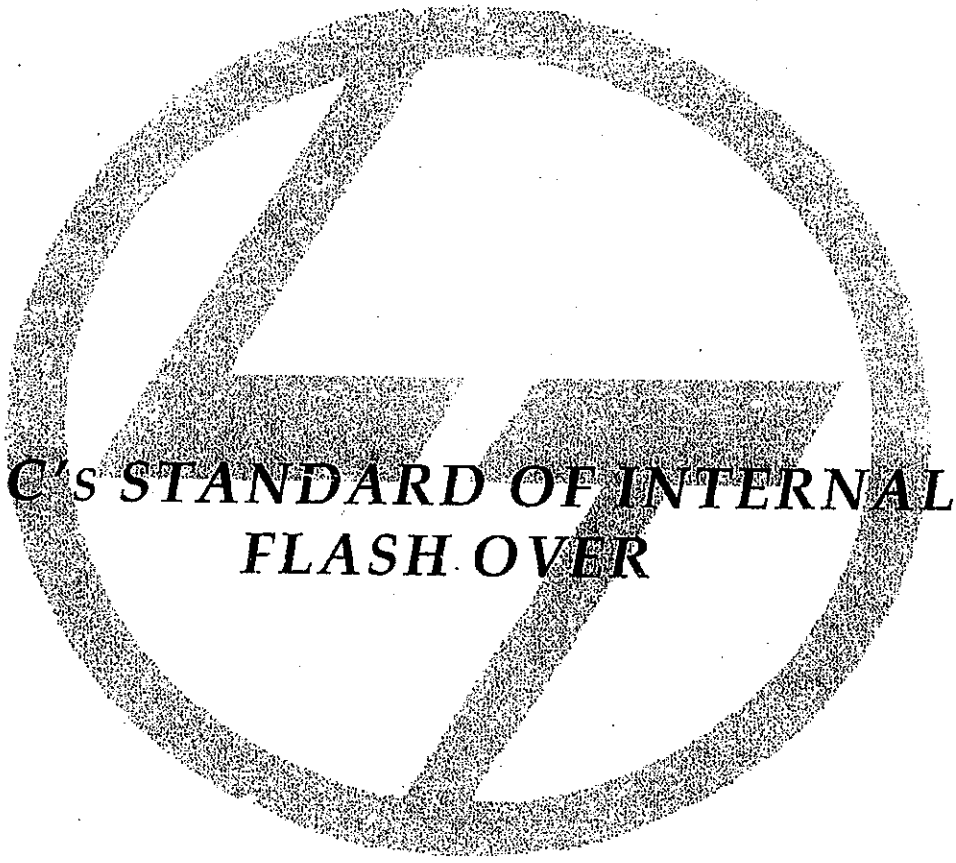
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033

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009



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H.P. Power Transmission Corpn, Ltd.
Barowalia House, Khalini, Shimla-3

BIDDER:
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ECC DIVISION, EI&C SECTOR,
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Table 104 – Performance criteria

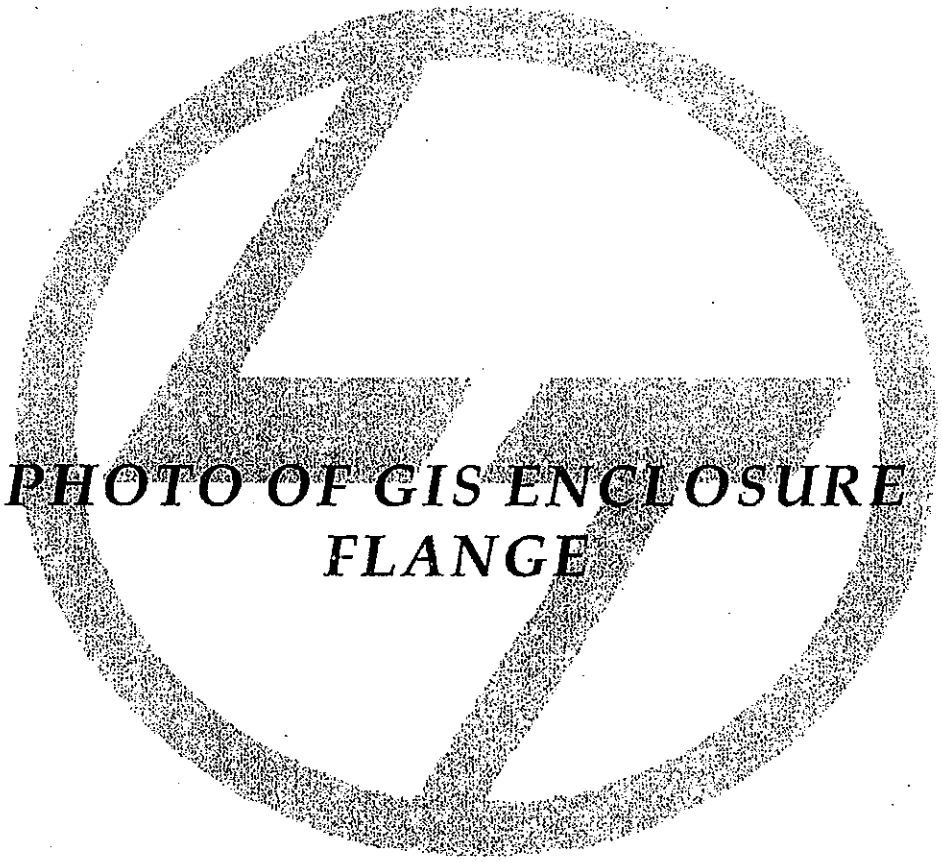
Rated short-circuit current	Protection stage	Duration of current	Performance criteria
<40 kA r.m.s.	1	0,2 s	No external effect other than the operation of suitable pressure relief devices
	2	≤0,5 s	No fragmentation (burn-through is acceptable)
≥40 kA r.m.s.	1	0,1 s	No external effect other than the operation of suitable pressure relief devices
	2	≤0,3 s	No fragmentation (burn-through is acceptable)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

035

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009



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Construction Chennai

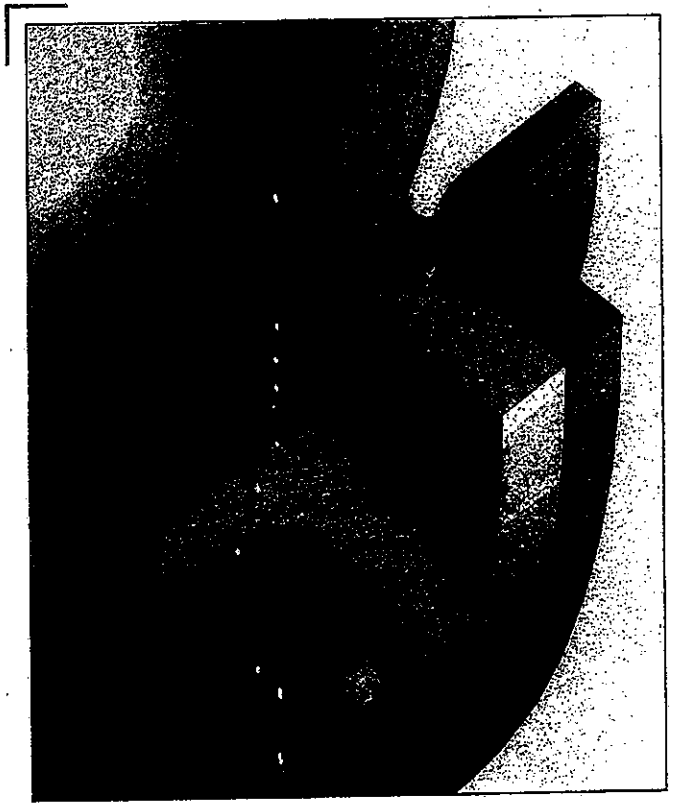
Dy. General Manager (Contracts)
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BIDDER:
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GIS B105
SF6 Tightness

High tightness level guaranteed during the life of B105 by the use of special lip seal



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L&T, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
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LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division
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LTCD/EIC/HPPTCL/PALCHAN/NJ/BID05

12th July, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002,

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Replies to your queries for Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

With reference to the telephonic discussion our Mr. S Kirupa Shankar – Sr.DGM (Contracts) had with you today, please note that we have not taken any deviations from tender documents in our bid. The offered equipments are already type tested as per Clause No. 9.1 of GTR and the type test certificates shall be submitted for approval. In case if there is any discrepancy in the Test reports i.e. any Test Report not acceptable due to any Defect / Manufacturing Changes or due to non-compliance with the requirement stipulated in the Technical specification and / or IEC / IS or any Additional Type tests not carried out, the same shall be carried out without any additional cost implication to the owner as per Clause No. 9.2 of GTR.

We also confirm our quoted price is inclusive of all taxes & duties including Service tax without any additional implication to you.

Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

(K.Rajaram)
Head Business Development & Contracts
EI&C Sector

Managing Director
1440
20/7/10
Shimla

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Dy. General Manager (Contracts) 036
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LTCD/EIC/HPPTCL/PALCHAN/NJ

29th July, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002,

Kind Attn: Dy. General Manager (Contracts)

Dear Sirs,

Sub.: Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

With reference to your discussion with Mr.Kirupasankar, we are forwarding herewith the guaranteed technical particulars pertaining to 250kVA LT Transformer.
We hope that this is inline with your requirement

Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

(K.RAJARAM)
Head – Business Development & Contracts
EI&C Sector

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn, Ltd.
Barowalia House, Khalini, Shimla-2

SL. NO.	DESCRIPTION		UNIT	TECHNICAL PARTICULARS	
*18.0	**EFFICIENCY**				
	Efficiency at 75 Deg. C.			UPF	0.8 P.F.
18.1	100% full Load		%	98.41	98.02
18.2	75% full load		%	98.67	98.35
18.3	50% full load		%	98.67	98.60
18.4	Max. efficiency		%	98.90	
18.5	Load at which max. efficiency occurs kVA		kVA	99.40	
*** SUBJECT TO IS : 2026 TOLERANCE**					
19.0	Terminal Arrangement				
19.1	Location		[1]	Outdoor	
19.2		HV	[1]	Parebushings	
19.3		LV	[1]	Cable Box	
20.0	Atmospheric Condition		[1]	Normal	
21.0	**Weights (Approx.)**				
21.1	Core & Windings with Clamps (Untanking Weight)		Kg.	870	
21.2	Tank & fittings		Kg.	280	
21.3	Oil		Ltrs./ Kg.	400 (340 Kgs)	
21.4	Total Weight		Kg.	1250	
22.0	Dimensions of transformer	Length	mm	1350	
		Breadth	mm	750	
		Height	mm	1150	
23.0	Flux Density at principle voltage and normal frequency		Tesla	1.7 (Max.)	
24.0	Current Density				
		HV	A/mm^2	3.0 to 3.5	
		LV	A/mm^2	3.0 to 3.5	
25.0	Bushing				
		HV	[1]	As	
		LV	[1]	As	
26.0	Painting :				
26.1	Surface Preparation		[1]	Shot Blasting	
26.2	Finish		[1]	Enamel light grey Shade No. 631 - IS : 5	

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TECHNICAL SPECIFICATION

SL. NO.	DESCRIPTION		UNIT	TECHNICAL PARTICULARS
1.0	Reference Standard	Transformer		IS : 2026 - 1977
		Oil		IS : 335 : 1993
2.0	Rating	HV	kVA	250
		LV	kVA	250
	Type			Core Type Oil Immersed
3.0	No. of Phases	HV	[1]	3
		LV	[1]	3
4.0	Frequency		Hz	50
5.0	No load Voltage (Line to Line)	HV	kV	33
		LV	kV	0.433
6.0	Connection	HV	[1]	Delta
		LV	[1]	Star
7.0	Vector Group		[1]	Dyn 11
8.0	Insulation Level	HV	kV/Kvp	70 / 170
		LV	kV/Kvp	3 / ----
9.0	Tap Switch		[1]	Off Circuit Tap Changer
10.0	Tapping			
	Provided on			HV
	Range			+3% to -9% in steps of 3%
	No. of switch positions			5
11.0	Rated current (Line current)	HV	A	4.37
		LV	A	333.34
12.0	Temperature Rise			
	Top oil		deg. C.	35
	Winding		deg. C.	45
13.0	Ambient Temperature		^{0}C.	50
14.0	Type of Cooling			ONAN
*15.0	Losses			
		No Load	W	530
		Load	W	2500
*16.0	Impedance	HV - LV	%	5.0
*17.0	No Load Current (% of Rated Current)		%	Less than 1.5%

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

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LTCD/EIC/HPPTCL/PALCHAN/NJ/BID06 17th August, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002.

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

With reference to the discussion our Mr. N Jaganathan had with you in your office on 12th August, please note that there is no list for Mandatory spares available in tender documents, all other SEB's / Power Utilities in India provides the list to have common offer from Vendors, since the list is not available we haven't quoted for the same.

As advised by you now, we are enclosing the list of mandatory spares as per Technical specification of Karian tender quoted by us to HPPTCL. The rates for the items is also indicated by us now. These prices are to be added to our quoted bid price to arrive at "Prices including Mandatory Spares".

Further as requested by you, we are enclosing the GTP's of the following items

1. Control & Relay Panel
2. SCADA
3. 33kV HT Cable
4. LT Power & Control Cable
5. LT Transformer
6. PLCC Equipments & Wave Trap
7. EOT Crane
8. FOTE
9. Battery & Battery Charger
10. Structural Steel
11. CVT
12. Outdoor Surge Arrestor

Also please note that the Outdoor LA shall be of any one of the following makes CGL / OBLUM / LAMCO

And the GIS LA should be of Toshiba / Equivalent make.

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Hope the above is in line with the requirements.

Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

(K.Rajaram)
Head Business Development & Contracts
EI&C Sector

LARSEN & TOUBRO LIMITED Construction Chennai

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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PRICES IN INR

Sr. No.	Decription of Material	Unit	Quantity	Unit						Total FOR
				Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
				-		-	-	-	-	-
	MANDATORY SPARES			-		-	-	-	-	-
	Mandatory Spares as per the List enclosed			-		-	-	-	-	-
a)	245kV Circuit Breaker (GIS)	LS	1	1,16,16,255	Included		2,99,800	1,06,306	1,20,22,361	1,20,22,361
b)	220 kV Current Transformer	LS	1	INCLUDED IN SL.No. a						-
c)	245kV CVT	LS	1	4,05,079	Included		4,647	4,394	4,14,120	4,14,120
d)	245kV Potential Transformer	LS	1	INCLUDED IN SL.No. a						-
e)	198kV Surge Arrester	LS	1	88,016	Included		874	826	89,716	89,716
f)	245kV Isolators & Earth Switch	LS	1	INCLUDED IN SL.No. a						-
g)	36kV Circuit Breaker (GIS)	LS	1	19,44,101	Included		18,235	17,242	19,79,578	19,79,578
h)	36 kV Current Transformer	LS	1	INCLUDED IN SL.No. g						-
i)	36 kV Potential Transformer	LS	1							-
j)	36kV Isolators & Earth Switch	LS	1							-
k)	30kV Surge Arrester	LS	1	25,102	Included		243	230	25,575	25,575
l)	Illumination System	LS	1	2,25,853	Included		2,186	2,067	2,30,106	2,30,106
m)	Battery	LS	1	3,67,252	Included		3,554	3,361	3,74,167	3,74,167
n)	Battery Charger	LS	1	1,81,065	Included		1,752	1,657	1,84,474	1,84,474
o)	Relay & Protection Panels	LS	1	8,92,218	Included		8,635	8,165	9,09,018	9,09,018
p)	Sub Station Automation	LS	1	2,69,542	Included		2,609	2,467	2,74,618	2,74,618
q)	LT Switchgear	LS	1	2,97,246	Included		2,877	2,720	3,02,843	3,02,843
r)	DG Set	LS	1	84,338	Included		816	772	85,926	85,926
s)	Optic Fibre Cable	LS	1	84,232	Included		815	771	85,818	85,818
				-			-	-	-	-
	TOTAL						-			1,69,78,320

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Engineering House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED ECC DIVISION CHENNAI 600 089

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

TENDER SPECIFICATION No. : DGMC / PALCHAN SUB STATION / 2 / 2009

NAME OF WORK : 220 / 33kV Substation at Palchan, District Kullu - H.P.

Sl. No.	Description of Material	Unit	Quantity
	MANDATORY SPARES		
A	**220 KV GIS Circuit Breaker**		
I(a)	245 KV, Three Phase, Circuit Breaker interrupting chamber complete with all necessary apparatus. ***(1 no. of each rating)***	No.	1
II	Rubber gasket, 'O' rings and seal	Set	1
III	Trip Coils with Resistor	Nos.	3
IV	Closing Coils with resistor	Nos.	3
V	Molecular Filter	Set	3
VI	Density/ pressure monitoring system	No.	1
VII	Relays, Power Contactors, push Buttons, timers & MCB etc.	Set	1
VIII	Closing assembly/ valve	No.	1
IX	Trip assembly/ valve	No.	1
X	Pressure Switches	Set	1
XI	Auxiliary Switch Assembly	No.	1
XII	Operation Counter	No.	1
XIII	Rupture disc/ diaphram	No.	1
XIV	Windoscope/ Observing window	No.	1
XV(a)	245 KV, Three Phase, Circuit Breaker operating mechanism, complete with all necessary connecting apparatus. ***(Each rating)***	No.	1
XVI	All Type of Coupling for SF6 gas ***(1 No. of each type)***	Set	1
B	**245 KV CURRENT TRANSFORMER**		
1	Multi ratio Single Phase Current Transformers of each rating ***(3 Nos. of each rating)***	Set	1
C	**245 KV POTENTIAL TRANSFORMER**		
1	Single Pahse VT complete with all Gaskets and Mounting Hardware.	Set	1
D	**198 KV SURGE ARRESTER**		
1	Complete L.A. ***(For 1 Phase)*** : GIS Type	Nos.	1
2	Surge Counter/ Monitor	Nos.	1
E	**245 KV Isolators & ES**		
I	245 kV, Single ph., Disconnecting Switch internal parts, complete with all necessary gaskets, mounting hardware, etc.	Set	1
II	245 kV, Single ph., Grounding Switch Internal parts, complete with all necessary gaskets, mounting hardware etc.	Set	1
III	245 kV, single phase high speed fault making grounding switch, internal parts complete with all necessary gaskets mounting hardware etc.	Set	1
F	**36 KV Circuit Breaker**		
I(a)	36 KV, Three Phase, Circuit Breaker interrupting chamber complete with all necessary apparatus. ***(1 no. of each rating)***	No.	1
II	Rubber gasket, 'O' rings and seal	Set	1
III	Trip Coils	Nos.	3
IV	Closing Coils	Nos.	3
V	Molecular Filter	Set	3
VI	Density/ pressure monitoring system	No.	1
VII	Relays, Power Contactors, push Buttons, timers & MCB etc.	Set	1
VIII	Closing assembly/ valve	No.	1
IX	Trip assembly/ valve	No.	1

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sl. No.	Description of Material	Unit	Quantity
X	Pressure Switches	Set	1
XI	Auxillary Switch Assembly *(For CB)*	No.	1
XII	Operation Counter *(For CB)*	No.	1
XIII	Rupture disc/ diaphram	No.	1
XIV	Windoscope/ Observing window *(If Applicable)*	No.	1
XV(a)	36 KV, Three Phase, Circuit Breaker operating mechanism, complete with all necessary connecting apparatus. *(Each rating)*	No.	1
XVI	All Type of Coupling for SF6 gas *(1 No. of each type) (If Applicable)*	Set	1
G	**36 KV CURRENT TRANSFORMER**		
1	Multi ratio Single Phase Current Transformers of each rating *(3 Nos. of each rating)*	Set	1
H	**36 KV POTENTIAL TRANSFORMER**		
1	Single Pahse VT complete with all Gaskets and Mounting Hardware	Set	1
I	**36 KV SURGE ARRESTER**		
I	Complete L.A. including insulating base with Surge Counter & accessories. : **AIS Type**	Nos.	1
II	Surge Counter/ Monitor	Nos.	1
J	**36 KV Isolators & ES**		
I	36 kV, Three ph., 1250A Disconnecting Switch operating mechanism, complete with all necessary connecting apparatus.	Set	1
II	36 kV, Three ph., 1250A Grounding Switch operating mechanism, complete with all necessary connecting apparatus.	Set	1
III	36 kV, 2500A, three phase high speed fault making grounding switch operating mechanism complete with all necessary gaskets connecting apparatus	Set	1
K	**LIGHTING**		
I	Single Pole MCB *(2% of Total Population of Each Type)*	Set	1
II	Triple pole MCB *(2% of Total Population of Each Type)*	Set	1
III	Fluorescent tube & Starter *(10% of Total Population)*	Set	1
	a) Choke *(2% of Total Population of Each Type)*	Set	1
	b) Bottom Strips *(1% of Total Population of Each Type)*	Set	1
	c) Top covers & reflector	Set	1
	d) Holders *(2% of Total Population of Each Type)*	Set	1
	e) Complete fittings	Nos.	10
IV	**Sodium vapour/Mercury vapour Lamps**		
	a) Lamp *(10% of Total Population of Each Type)*	Set	1
	b) Ballast *(5% of Total Population of Each Type)*	Set	1
	c) Condenser/ Igniter *(5% of Total Population of Each Type)*	Set	1
	d) Lamp holder *(5% of Total Population of Each Type)*	Set	1
	e) Lamp holder*(5% of Total Population of Each Type)*	Set	1
	f) Complete fittings **(5 Nos. of Each type)**	Set	1
V	**Incandescent lamp**		
	a) Bulbs *(20% of Total Population of Each Type)*	Set	1
	b) Holders *(5% of Total Population of Each Type)*	Set	1
	c) Complete fittings	No.	10
VI	Switches and sockets *(5% of Each Type)*	Set	1
VII	Junction box *(2% of Each Type)*	Set	1
L	**BATTERY**		
	220V/ 48V Batteries		
a	Spare battery cell without electrolyte	Nos.	10
b	Terminal connectors with bolts & Nuts (each type)	Nos.	10
c	Float level indicators *(each type)*	Nos.	10
d	Vent Plugs *(each type)*	Nos.	10
M	**BATTERY CHARGER**		
	220V/ 48V Battery Chargers		
a	Set of Control Cards *(of each type)*	Set	1

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Sl. No.	Description of Material	Unit	Quantity
b	Set of relays	Set	1
c	Set of contactor	Set	1
d	Micro-switches	Set	1
e	Filter Capacitors	Set	1
f	Thyristor/ Diode	Set	1
g	Set of switches	Set	1
h	Set of wound resistors	Set	1
i	Potentiometers	Set	1
j	Fuses of Thyristor with indicators	Set	6
N	**RELAY & PROTECTION PANELS**		
I	**Breaker Relay Panel Spares**		
a	Breaker failure relay (numerical type)	Nos.	1
b	Trip circuit supervision relay	Nos.	2
c	Self reset trip relay ***(Each rating)***	Nos.	1
d	Hand reset trip relay	Nos.	1
e	Timer relay ***(Each rating)***	Nos.	1
f	DC supervision relays	Nos.	1
g	Flag relays ***(Each rating)***	Nos.	1
h	Auxiliary relays ***(Each rating)***	Nos.	1
II	**Line Protection panel equipment spares**		
a	Main 1 numerical distance relay (excluding external trip relays with s	Nos.	1
b	Main 2 numerical distance relay (excluding external trip relays)	Nos.	1
III	**Common Spares**		
a	Power supply module for Bus Bar protection.	set	1
b	Metrosil(Non-linear resistor) each type	set	1
c	Inter-posing CT & PTs each type	set	1
O	**SUBSTATION AUTOMATION**		
1	Cartridge for Printer ***(2 set of of each type)***	set	1
P	**LT SWITCHGEAR**		
1	Relays (aux.)	Set	1
2	CTs AND PTs	Set	1
3	Switches/Push buttons and Meters	Set	1
4	TPN Switches/MCB	Set	1
5	L.T. Breaker spares		
	a) Spring charging motor	No.	1
	b) Aux. Contact sets	Set	2
	c) Busbar Seal off insulators	Nos.	5
	d) Arc-chutes	Set	2
	e) Moving contacts	Set	1
	f) Arcing contacts (Fixed/Moving)	Set	1
	g) Springs (Closing/Opening)	No.	1
	h) Closing coil	No.	1
	i) Tripping coil	No.	1
	j) Aux. finger contact	Set	1
	k) Limit switches	Set	1
	l) Jaw contacts	Set	1
6	Busbar		
	a) Busbar insulators	No.	5
	b) Interphase barrier	No.	2
	c) Busbar strip 1mm (Aluminium)	meter	5
Q	**DG Set**		
I	Set of filters 1 set (Lubeoil/fuel/Air ckt)	Set	1
II	Solenoid coil assembly	No.	1
III	Self starter assembly	No.	1
IV	Lub-oil pressure safety control	No	1
V	High water temp. safety control	No.	1
VI	Diode	Nos.	2
R	**Optical Fibe Cable**	Mtrs	500
S	**220 KV CVT**	Nos.	1

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

047

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

TECHNICAL DATA SHEETS

1. *CONTROL & RELAY PANEL*
2. *SCADA*
3. *33KV HT CABLE*
4. *LT POWER & CONTROL CABLE*
5. *250KVA 11 TRANSFORMER*
6. *PLCC EQUIPMENT & WAVE TRAP*
7. *EOT CRANE*
8. *FOTP*
9. *LEAD ACID TUBULAR BATTERY & BATTERY CHARGER*
10. *STRUCTURAL STEEL*
11. *245KV CVT*
12. *198KV OUTDOOR SURGE ARRESTOR*

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

048

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

CONTROL & RELAY PANEL

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

049

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA -171002
NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN, KULLU DISTRICT
DATA REQUIREMENT SHEET
PROTECTION PANEL

Sr. No	Perameter	Unit	To be filled by the bidder
1	**GENERAL**		
1.1	Make		As per our list of proposed makes
1.2	Type		Control & Relay panel
1.3	Reference Standard		IS standard
1.4	Construction		Simplex
a)	Degree of Protection		IP5x
b)	Sheet Metal Thickness	mm	3 mm for load bearing members, 2 mm for non-load bearing members
c)	Floor Channel Sills, Vibration Damping Pads and Kick Plate furnished ?		yes
1.5	**EQUIPMENT MOUNTING**		
a)	All Relays and Switches are flush mounted ?		yes
b)	Relays furnished in Drawout Cases with built - in Test Facilities ?		yes
1.6	**NAME PLATE**		
a)	Material		Anodised aluminium
b)	Thickness		1.5 mm
c)	Size for		
i.	Equipment		12.5 * 65 mm
ii.	Panels		25 & 25 mm
1.7	**INTERNAL ILLUMINATION**		
a)	Volt		240v
b)	Watt		40/ 60 W
c)	Door Switch Controlled		yes
1.8	**SPACE HEATER**		
a)	Volt		240v
b)	Watt		60/80 watts
c)	Thermostat Controlled ?		yes
1.9	**PLUG SOCKET**		
a)	Type		Three pin type
b)	Rating		5A
1.10	Panel Illumination, Space Heater & Plug Socket Circuits provided with Individual Switch Fuse Units?		yes
1.11	A. C./D.C. SUPPLY Type & Rating of Isolating Switch Fuse Units for		
a)	Incoming A. C. Supply		As per scheme requirement
b)	Incoming D. C. Supply		As per scheme requirement
1.12	**INTERNAL WIRING**		
a)	Wire Type		copper conductors with PVC insulation
b)	Voltage Grade		Voltage 660/1100V
c)	Conductor Material		copper
d)	Conductor Size for		
i)	Current Control Circuit		2.5 sq mm stranded copper wire
ii)	Voltage Circuit		2.5 sq mm stranded copper wire
e)	wire identified at both ends with Ferrules ?		yes
1.13	Terminal Block		
a)	Make		Shall be as per our list of proposed makes
b)	Type and Catalogue Number		disconnecting/stud type
c)	20 % Spare Terminals furnished ?		yes
1.14	**GROUND BUS**		
a)	Materials		copper
b)	Size	mm	25 x 6 mm
1.15	**PAINTING**		
a)	Type of Finish		Powder coat method
b)	Colour Shade - Inside / Outside		As per scheme requirement
c)	Details of Painting Procedure furnished ?		As per scheme requirement
2	**PUSH BUTTON**		Not applicable
2.1	Make		
2.2	Type		
2.3	Reference Standard		
2.4	Contact Rating		
a)	Make & Continuous	Ampere	
b)	Break (Inductive)	Ampere	

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

PROTECTION PANEL

2.5	Number and Type of Contacts provided per Button		
3	**LAMPS**		Not applicable
3.1	Make		
3.2	Type		
3.3	Reference Standard		
3.4	Rating		
a)	Volt		
b)	Watt		
c)	Series Resistance		
3.5	10 % Extra Lamps furnished ?		
3.6	Size of Lens		
4.0	**RELAYS**		
	Make, Type and Catalogue of Relays to be furnished		During detailed engineering
4.1.1	**220 kV SIDE AUTO TRANSFORMERS RELAY**		
a)	Local Breaker Back up (LBB) Protection Relay		In built in Busbar protection relays
b)	Directional O / C IDMT Relay		As per our list of proposed makes
c)	Directional E / F IDMT Relays		
d)	Transformer Differential Relay		As per our list of proposed makes
e)	Transformer Over fluxing Relay		In built in transformer differential relay
f)	IDMT O / C Relay (Connected to neutral side CT)		In built in OC &EF protection relay
g)	Restricted Earth Fault Relay		As per our list of proposed makes
h)	Auxiliary Relays for Transformer Protection (viz, Buchholz, Winding / Oil Temperature, Oil Level, Fire Protection Relay, etc.)		As per our list of proposed makes
4.1.2	**33 kV SIDE AUTO TRANSFORMERS RELAY**		
a)	Local Breaker Back up (LBB) Protection Relay		In built in Main protection relays
b)	Directional O / C IDMT Relay		As per our list of proposed makes
c)	Directional E / F IDMT Relays		
d)	Transformer Differential Relay		In built in transformer differential relay
e)	Transformer Over fluxing Relay		
g)	Restricted Earth Fault Relay		
f)	IDMT O / C Relay (Connected to neutral side CT)		In built in overcurrent & earthfault protection relays
h)	Auxiliary Relays for Transformer Protection (viz, Buchholz, Winding / Oil Temperature, Oil Level, Fire Protection Relay, etc.)		Included in 220KV Panel
4.2.1	**220 kV LINE PROTECTION RELAY PANEL**		
a)	Main -1 Protection Scheme (composite Numerical Distance Protection Relay with Auto Re - Closing and Check Synchronizing Facility)		As per our list of proposed makes
b)	Main - II Protection Scheme (composite Numerical Distance Protection Relay or Phase Comparison Relay with Auto Re - Closing and Check Synchronizing Facility)		As per our list of proposed makes
c)	Composite Numerical Directional Over Current (Instantaneous/ IDMT) and Earth Fault Relay		As per our list of proposed makes
d)	Over Voltage / Under Voltage Protection Relay		Inbuilt in distance protection relays
e)	Disturbance Recorder (if not available in the Distance Protection or Main Protection Module)		
f)	Distance - to - Fault Locator for Phase and Earth Faults (if not available in Distance Protection or Main Protection)		
g)	CVT Selecting Relays or Switches (depending on Switching Scheme)		As per scheme requirement
h)	Auxiliary Relays for Carrier Supervision of Main -1 and Main - II Protection Relays (depend on its Application)		Yes Provided
i)	Carrier Receive Lock Out Relay (depending on its Application)		Yes Provided
j)	Breaker Failure Protection Relay		Inbuilt in busbar protection relay
k)	Trip Circuit Pre and Post Supervision Relays for Trip Coil-I and Coil-II		As per our list of proposed makes
l)	Flag Relays for Circuit Breaker Troubleshooting		As per our list of proposed makes
m)	Over - Fluxing Relay		Not applicable
n)	OverFrequency/ Under Frequency Relay		As per our list of proposed makes
o)	df/dt Relay		
	dv/dt Relay		Not applicable
4.2.2	**33 kV LINE PROTECTION RELAY PANEL**		

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PROTECTION PANEL

a)	Main -1 Protection Scheme (composite Numerical Distance Protection Relay with Auto Re - Closing and Check Synchronizing Facility)		Not applicable
b)	Main - II Protection Scheme (composite Numerical Distance Protection Relay or Phase Comparison Relay with Auto Re - Closing and Check Synchronizing Facility)		Not applicable
c)	Composite Numerical Directional Over Current (Instantaneous/ IDMT) and Earth Fault Relay		As per our list of proposed makes
d)	Over Voltage / Under Voltage Protection Relay		Inbuilt in overcurrent protection relay
e)	Disturbance Recorder (if not available in the Distance Protection or Main Protection Module)		Not applicable
f)	Distance - to - Fault Locator for Phase and Earth Faults (if not available in Distance Protection or Main Protection)		
g)	CVT Selecting Relays or Switches (depending on Switching Scheme)		
h)	Auxiliary Relays for Carrier Supervision of Main -1 and Main - II Protection Relays (depend on its Application)		
i)	Carrier Receive Lock Out Relay (depending on its Application)		
j)	Breaker Failure Protection Relay		
k)	Trip Circuit Pre and Post Supervision Relays for Trip Coil-I and Coil-II		
l)	Flag Relays for Circuit Breaker Troubleshooting		
m)	Over - Fluxing Relay		
n)	OverFrequency/ Under Frequency Relay		
o)	df/dt and dv/dt Relay		
4.3	**220 kV BUSBAR PROTECTION PANEL**		
a)	Busbar Differential Protection for Bus -I		Shall be as per our list of proposed makes
b)	Busbar Differential Protection for Bus -II		
4.4	**220 kV BUS COUPLER PROTECTION PANEL**		
a)	Composite Numerical Non - Directional O / C and E / F Protection Relay		Shall be as per our list of proposed makes
b)	Breaker Failure Protection Relay		Inbuilt in busbar protection relay

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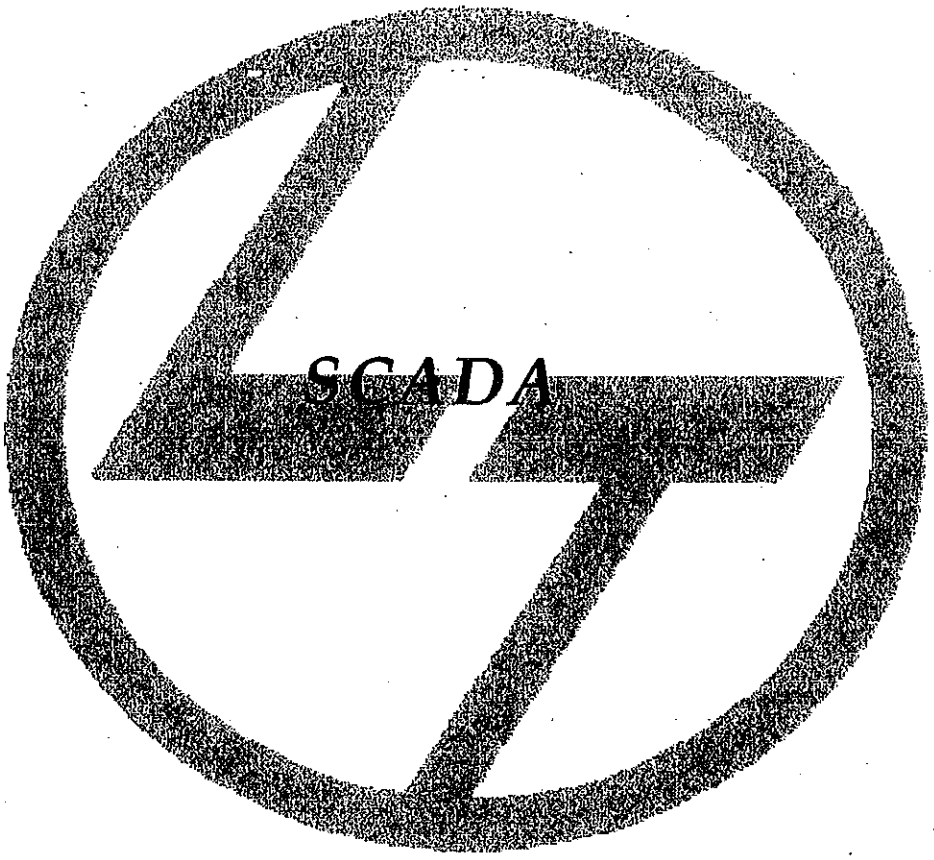
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By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

052

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009



LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

053

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN, KULLU DISTRICT

DATA REQUIREMENT SHEET		
SUBSTATION AUTOMATION SYSTEM (SAS)		
Sr. No	**Parameter**	**To be filled by the bidder**
1	**ANALOG INPUT MODULES**	
1.1	Number of Inputs / Module	2 (5 Channels * 2)
1.2	Types of Input (Linear)	Linear
1.3	Accuracy	0.20%
1.4	A / D Converter	>=14bit
1.5	Temperature Effect	0.003% of full scale/°C.
1.6	CMRR	>=80 dB
1.7	NMRR	>=90 db min
1.8	Stability	>=±50 ppm/°C
1.9	Diagnostics	yes
2	**BINARY INPUT MODULE**	
2.1	Number of Inputs / Module	4 modules (24 Input per Card) Total 96 SPI
2.2	Types of Input	Digital
2.1	Input Current	5A
2.2	Maximum Switching Frequency	Contact debounce timer are user configurable
2.3	Diagnostics	Yes
3	**PULSE INPUT MODULE**	NA
3.1	Number of Inputs/Module	
3.2	Types of Input	
3.3	Input Current	
3.4	Maximum Switching Frequency	
3.5	Diagnostics	
4	**ANALOG OUTPUT MODULES**	NA
4.1	Number of Points/Module	
4.2	Types of Output (Linear)	
4.3	Accuracy	
4.4	Load	
4.5	Diagnostic	
5	**BINARY OUTPUT MODULES**	
5.1	Number of Points / Module	28 output
5.2	Type of Output	Digital
5.3	Contact Rating	Work Capacity: 1250VA/150W transient impulse Break Capacity: AC250V, DC30V Work Capacity: 62.5VA/30W transient impulse Break Capacity: AC250V, DC30V
5.4	Contact Voltage Rating	AC250V, DC30V
5.5	Switching Frequency	Contact Pulse timer are user configurable
5.6	Contact Life	> 100,000 electrical switching operations
6	**SERIAL DEVICE INTERFACE MODULE**	
6.1	Support Protocol	IEC 60870-5-101,IEC 60870-5-104,IEC 61850 Client
6.2	Type of Configuration	IP based configuration
6.3	Nominal Capacity of	10 CPU system

LARSEN & TOUBRO LIMITED Construction Group

Dy. General Manager (Contracts) 054
H.P. Power Transmission Corpn. Ltd.
Vidyut Bhawalia House, Khalini, Shimla-2

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN, KULLU DISTRICT

DATA REQUIREMENT SHEET		
SUBSTATION AUTOMATION SYSTEM (SAS)		
Sr. No	**Parameter**	**To be filled by the bidder**
6.4	Seamless Integration of Data	Yes
6.5	Physical Medium of Communication	Ethernet for IEC 61850 and IEC 60870-5-104,Serial for IEC 60870-5-101
7	**CONTROLLER**	
7.1	Type	CSI 200EA
7.2	Number of Loops	NA
7.3	Word Length	32 bit
7.4	Register add Cycle Time	100ns
7.5	Instruction Cycle Time	165nS
7.6'	I/O Address Capability	16 x 16
7.7	Memory	32M SDRAM
7.8	Redundancy Supported	NA
7.9	Whether Fall Back Transparent	NA
7.10	Power Supply	Yes
7.11	Mounting	Rack mounting
7.12	Configuration	Yes
7.13	Diagnostics	Yes
7.14	Indication	Indication on LCD display
8	**OPERATOR'S & ENGINEERING STATION The Operator's Station shall either be Personal Computer based or Workstation based with suitable Networking Capability interface with the Real - Time Data Bus as well as the MIS Bus. Engineering Station shall be PC based.**	
a)	**OPERATOR'S STATION / ENGINEERING STATION (PC BASED)**	Advantech/Eqvt
	1 Processor	Speed 7200rpm
	2 Configuration	
	3 Internal clock	
	4 Architecture	
	5 Video Card	
	6 System Memory	2 GB RAM
	7 Hard drive	160GB-Type-SATA
	8 Cache	
	9 Floppy drive	
	10 CD Drive	16X DVD-ROM (Combo)
	11 DAT Drive	
	12 Audio controller	
	13 Monitor support	
	14 Operating system	Windows XP Professional
	15 Video RAM	

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

055

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN, KULLU DISTRICT

DATA REQUIREMENT SHEET		
SUBSTATION AUTOMATION SYSTEM (SAS)		
Sr. No	**Parameter**	**To be filled by the bidder**
b)	**MONITOR**	
	1 Type	HP/Eqv make
	2 Sync.	-
	3 Screen Diagonal	24
	4 Display	Wide-aspect active matrix TFT
	5 Array (60 Hz)	Frequency Range Horizontal: 30 to 94 kHz, Vertical: 48 to 85 Hz
	5 Colors	Bezel color Carbonite/Silver
	6 Dot Pinch	Resolution 1920 x 1200 @ 60 Hz
	7 Degree of Protection	-
	8 Screen	Wide-aspect active matrix TFT
	9 Glare Filter	-
	10 External Controls	Brightness, contrast, positioning, color temperature (6500k, 9300k, custom), individual color control, serial number, display, clock, clock phase, monitor management, factory reset
	11 Power Supply	Typical: < 75 watts (without speaker/with 50% USB); Maximum: < 120 watts; Power-saving; < 2 watts standby; <1 watt off
	12 Ambient Temperature	Operating: 41° to 95° F (5° to 35° C); Non-operating: 29° to 140° F (-20° to 60° C)
	13 Humidity	-
	14 Version	-
c)	**KEY BOARD**	
	1 Type	HP/Eqv make
	2 Different keys	Yes
	3 Key lock	Yes
	4 Life Expectancy	
	5 Version	
d)	**LASER PRINTER**	
	1 Type	HP Color LaserJet CM2320nf/Eqv make
	2 Printer Memory	Memory, standard-160 MB, Memory, maximum-416MB
	3 Speed	Up to 21 ppm
	4 Resolution	Colour- Up to 600 x 600 dpi
	5 Number of Color (Basic)	Print technology Laser
	6 Duty Cycle	Monthly duty cycle-Up to 40000 pages
	7 Power Supply	Input voltage: 110 to 127 VAC (+/- 10%), 60 Hz (+/- 2 Hz); 220 to 240 VAC (+/- 10%), 50 Hz (+/- 2 Hz)
	8 Ambient Temperature	Operating temperature range 59 to 80.6° F
	9 Humidity	

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Vidyut Bhawan, Khalini, Shimla-2

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN, KULLU DISTRICT

DATA REQUIREMENT SHEET		
SUBSTATION AUTOMATION SYSTEM (SAS)		
Sr. No	**Parameter**	**To be filled by the bidder**
	10 Size of Paper	Media sizes, standard Letter, legal, executive, envelopes (No. 10, Monarch),Media sizes, custom Tray 1: 3 x 5 to 8.5 x 14 in; Tray 2, optional Tray 3: 3.94 x 5.83 to 8.5 x 14 in
	11 Print Media	Media types Paper (bond, brochure, colored, glossy, letterhead, photo, plain, preprinted, prepunched, recycled, rough), transparencies, labels, envelopes
	12 Accessories	Multitasking printer

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Construction Channel

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Barowalia House, Khalini, Shimla-2

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DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

33 KV HT CABLE

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002			
AME OF WORK : CONSTRUCTION OF 220 / 33kV GIS SUB STATION AT PALCHAN IN KULLU DISTRICT			
DATA REQUIREMENT SHEET			
BIDDER'S NAME AND ADDRESS:		LARSEN & TOUBRO LTD- ECC DIVISION	
POWER CABLES & CONTROL CABLE			
r. No.	PARAMETER		POWER CABLE
			TO BE FILLED IN BY THE BIDDER
			1C X 630
1	Make		As per our list of proposed makes
2	Cable Type		A2XWaY
3	Applicable Standard		IS:7098 Pt(2)/1985
4	Voltage Grade	Kv	19/33
5	Suitable for System with		
a)	Service Voltage		19/33
b)	Neutral Earthing		36
6	Maximum Conductor Temperature		
a)	Continuous	°C	90
b)	Short time	°C	250
7	Conductor		
a)	Material & Conforming Standard		H2/H4 Grade Aluminium to IS: 8130/1984
b)	Grade		H2/H4 Grade
c)	Size	mm^2	630
d)	Number & Diameter of Wire in each Conductor	No. / mm	57x3.75
8	Shielding On Conductor		
a)	Material		Extruded Semi-conducting Compound
b)	Type / Applicable Standard		Extruded as per IS:7098 Pt(2)/1985
c)	Nominal thickness (mm)	mm	0.3
9	Insulation		
a)	Material		Cross Linked Polyethylene
b)	Type / Applicable Standard		Cross Linked Polyethylene as per IS:7098 Pt(2)/1985
c)	Nominal thickness (mm)	mm	8.8
d)	Negative Tolerance of Thickness	mm	0.98
e)	Approx Diameter of Core over Insulation	mm	49.8
10	Shielding On Insulation		
a)	Material		Extruded Semi-conducting Compound followed by Copper Tape
b)	Type / Applicable Standard		Extruded as per IS:7098 Pt(2)/1985
c)	Nominal thickness (mm)		
	Nominal thickness of Semi-conducting compound (mm)	mm	0.3
	Nominal thickness of Copper Tape (mm)	mm	0.045
d)	Approximate Diameter of Cable over Shielding	mm	51.3
11	Inner Sheath		
a)	Material		Extruded PVC Type ST2 to IS:5831/84
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84
c)	Minimum Thickness	mm	0.6
d)	Extruded ?	Yes / No	Yes
e)	Approximate Outside Diameter over Sheath	mm	52.9
12	Armouring		
a)	Material		Aluminium
b)	Type / Applicable Standard		Round Wire as per IS 3975
c)	Calculated Diameter over Inner Sheath (under Armour)	mm	50.1
d)	Nominal size of armour		2.5
e)	D. C. Resistance at 20 °C	ohm / km	0.112
f)	Short Circuit Current Carrying Capacity	kAmps	23.76
13	Overall Sheath		
a)	Material		Extruded FRLS PVC Type ST2 to IS:5831/84
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84

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	d) Minimum Thickness		2.36 (Min.)
	e) Color		Black
	f) Tolerance of Thickness	mm	Minimum is mandatory
14	Approximate Overall Diameter	mm	64.0
15	Standard Drum Length with Tolerance	metres	500 mtrs
16	Net Weight of Cable Approx.	kg / km	4,920
16.1	Approximate Weight of Empty Drum	kg	As per IS 10418
17	Continuous Current Rating for Standard IS Condition laid Direct		
	a) In Ground at 30°C		550
	b) In Duct at 30°C		470
	c) In Air at 40°C		840
17.1	Is the Cable guaranteed to safely Withstand Continuous Current for		
	Temperature of 90 ° / 85 ° / 70 °C (as the case may be) and also withstand		Confirm
	Temperature of 130 °C for a duration of 100 hrs. per year		Confirm
18	Short Circuit Current for 1 second	kA	59.54
19	Electrical Parameters at Maximum Operating Temperature :		
	a) i) D. C. Resistance at 20 °C	ohm / km	0.0469
	ii) A. C. Resistance at 90 °C	ohm / km	0.0627
	b) Reactance at 50 Hz	ohm / km	0.106
	c) Impedance	ohm / km	0.12339
	d) Capacitance per Phase	microf / km	0.29
	e) Volume Resistivity at Rated Operating Temperature	ohm cm	1×10^{12} (Min.)
	f) Loss Tangent		0.008
	g) Partial Discharge Value at	kV	shall not exceed 20 pC
	h) Charging Current at Normal Operating Voltage	mA / km	1.731
20	Recommended Minimum Bending Radius		20 times Overall diameter
21	Derating Factor for following Ambient Temperature in Air / Ground		
	a) at 30 °C		As per Annexure attached
	b) at 35 °C		As per Annexure attached
	c) at 45 °C		As per Annexure attached
	d) at 50 °C		As per Annexure attached
22	Group Factor for following Number of Cables laid Touching / 2 x Diameter		
	center to center apart :		
	a) Single Core Cable (In Trefoil)		
	i) 2 Number		As per Annexure attached
	ii) 3 Number		As per Annexure attached
	iii) 4 Number		As per Annexure attached
	b) Multi - Core Cable		
	i) 3 Number		Not Applicable
	ii) 4 Number		Not Applicable
	iii) 5 Number		Not Applicable
	iv) 6 Number		Not Applicable
23	The Cables shall be Tested as specified in Specification		As per relevant IS
	(Add Sheets, if necessary)		

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Rating Factors for Variation in Ground and Air Temperatures

Ambient Temperature °C	15	20	25	30	35	40	45	50	55	60
Cables Laid in Ground	1.12	1.08	1.03	1.00	0.96	0.91	0.87	0.82	0.76	0.71
Cables Laid in Air	1.22	1.18	1.14	1.10	1.04	1.00	0.95	0.90	0.84	0.77

Rating Factors for Depth of Laying for Direct Buried Cables

Voltage Grade of Cables	Depth of Laying (cm)				
	90	105	120	150	180 and above
3.3 kV, 6.6 kV & 11 kV	1.00	0.99	0.98	0.96	0.95
22 kV & 33 kV	-	1.00	0.99	0.97	0.96

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
25	1.12	1.08	1.00	0.91	0.84	0.78
35	1.13	1.08	1.00	0.91	0.83	0.78
50	1.14	1.08	1.00	0.91	0.83	0.77
70	1.14	1.08	1.00	0.90	0.83	0.77
95	1.14	1.08	1.00	0.90	0.83	0.77
120	1.14	1.08	1.00	0.90	0.83	0.77
150	1.15	1.09	1.00	0.90	0.83	0.77
185	1.15	1.09	1.00	0.90	0.83	0.77
240	1.15	1.09	1.00	0.90	0.83	0.77
300	1.15	1.09	1.00	0.90	0.82	0.77
400	1.15	1.09	1.00	0.90	0.83	0.76

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
25	1.16	1.10	1.00	0.89	0.81	0.75
35	1.16	1.10	1.00	0.89	0.81	0.75
50	1.16	1.10	1.00	0.89	0.81	0.74
70	1.17	1.10	1.00	0.89	0.81	0.74
95	1.18	1.11	1.00	0.89	0.81	0.74
120	1.18	1.11	1.00	0.89	0.80	0.74
150	1.18	1.11	1.00	0.89	0.80	0.74
185	1.18	1.11	1.00	0.89	0.80	0.74
240	1.18	1.11	1.00	0.88	0.80	0.73
300	1.19	1.11	1.00	0.88	0.80	0.73
400	1.19	1.11	1.00	0.88	0.79	0.73
500	1.19	1.11	1.00	0.89	0.79	0.73
630	1.19	1.11	1.00	0.88	0.79	0.73
800	1.19	1.11	1.00	0.88	0.79	0.73
1000	1.19	1.11	1.00	0.88	0.79	0.73

Correction factors for groups of three-core cables in horizontal formation laid direct in the ground

Number of cables in group	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.80	0.86	0.90	0.92	0.94
3	0.69	0.77	0.82	0.86	0.89
4	0.62	0.72	0.79	0.83	0.87
5	0.57	0.68	0.76	0.81	0.85
6	0.54	0.65	0.74	0.80	0.84
7	0.51	0.63	0.72	0.78	0.83
8	0.49	0.61	0.71	0.78	-
9	0.47	0.60	0.70	0.77	-
10	0.46	0.59	0.69	-	-
11	0.45	0.57	0.69	-	-
12	0.43	0.56	0.68	-	-

Correction factors for groups of three-phase circuits of single-core cables laid direct in the ground

Number of circuits in group	Spacing between group centres (mm)				
	Touching	200	400	600	800
2	0.73	0.83	0.88	0.90	0.92
3	0.60	0.73	0.79	0.83	0.86
4	0.54	0.68	0.75	0.80	0.84
5	0.49	0.63	0.72	0.78	0.82
6	0.46	0.61	0.70	0.76	0.81
7	0.43	0.58	0.68	0.75	0.80
8	0.41	0.57	0.67	0.74	-
9	0.39	0.55	0.66	0.73	-
10	0.37	0.54	0.65	-	-
11	0.36	0.53	0.64	-	-
12	0.35	0.52	0.64	-	-

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H.P. Power Transmission Corpn. Ltd.
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RATING FACTORS FOR DEPTH OF LAYING (CABLES LAID DIRECT IN THE GROUND)

Depth of Laying cm	Cable Size		
	Upto 25 mm²	Above 25 mm² Upto 300 mm²	Above 300 mm²
75	1.00	1.00	1.00
90	0.99	0.98	0.97
105	0.98	0.97	0.96
120	0.97	0.96	0.95
150	0.96	0.94	0.92
180 or more	0.95	0.93	0.91

RATING FACTORS FOR VARIATION IN GROUND TEMPERATURE (FOR CABLES LAID DIRECT IN THE GROUND)

Ground Temperature °C	15	20	25	30	35	40	45	50
Rating Factor	1.12	1.08	1.03	1.00	0.96	0.91	0.87	0.82

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL (TWIN AND MULTI-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.00	0.92	0.86	0.81
2.5	1.10	1.05	1.00	0.92	0.86	0.81
4	1.10	1.05	1.00	0.92	0.86	0.81
6	1.10	1.05	1.00	0.92	0.86	0.81
10	1.10	1.06	1.00	0.92	0.85	0.80
16	1.12	1.06	1.00	0.91	0.84	0.79
25	1.14	1.08	1.00	0.91	0.84	0.78
35	1.15	1.08	1.00	0.91	0.84	0.77
50	1.15	1.08	1.00	0.91	0.84	0.77
70	1.15	1.08	1.00	0.90	0.83	0.76
95	1.15	1.08	1.00	0.90	0.83	0.76
120	1.17	1.09	1.00	0.90	0.82	0.76
150	1.17	1.09	1.00	0.90	0.82	0.76
185	1.18	1.09	1.00	0.89	0.81	0.75
240	1.18	1.09	1.00	0.89	0.81	0.75
300	1.18	1.09	1.00	0.89	0.81	0.75
400	1.19	1.10	1.00	0.89	0.81	0.75

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL (THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.00	0.90	0.82	0.76
2.5	1.18	1.09	1.00	0.90	0.82	0.76
4	1.18	1.09	1.00	0.90	0.82	0.76
6	1.18	1.09	1.00	0.90	0.82	0.76
10	1.18	1.09	1.00	0.89	0.81	0.75
16	1.19	1.09	1.00	0.89	0.81	0.74
25	1.19	1.09	1.00	0.88	0.80	0.74
35	1.20	1.09	1.00	0.88	0.80	0.74
50	1.20	1.09	1.00	0.88	0.80	0.74
70	1.21	1.10	1.00	0.88	0.80	0.74
95	1.22	1.10	1.00	0.88	0.80	0.74
120	1.22	1.10	1.00	0.88	0.79	0.74
150	1.22	1.10	1.00	0.88	0.79	0.73
185	1.22	1.10	1.00	0.88	0.79	0.73
240	1.22	1.10	1.00	0.88	0.79	0.73
300	1.22	1.10	1.00	0.88	0.79	0.72
400	1.24	1.11	1.00	0.88	0.79	0.72
500	1.24	1.11	1.00	0.88	0.79	0.72
630	1.24	1.11	1.00	0.88	0.79	0.72
800	1.24	1.11	1.00	0.88	0.79	0.72

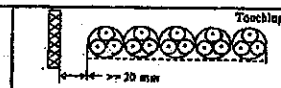
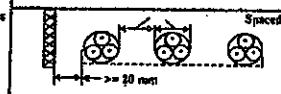
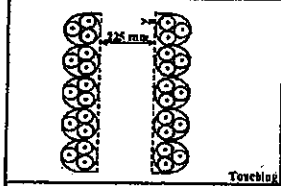
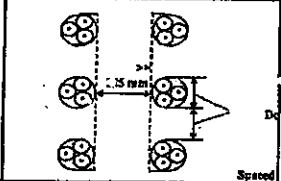
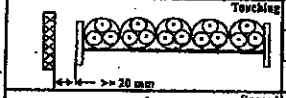
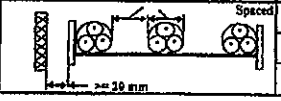
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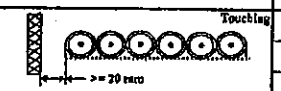
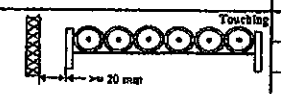
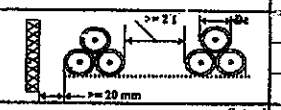
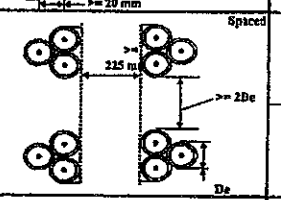
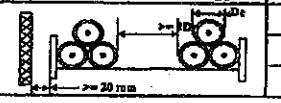
Dy. General Manager (Contracts)
[illegible] Power Transmission Corpn. Ltd.
[illegible] House, Khalini, Shimla-2

Reduction factors for groups of more than one multi-core cable in air - To be applied to the current-carrying capacity for one multi-core cable in free air

Method of installation		Number of trays	Number of Cables					
			1	2	3	4	6	9
Cables on perforated trays		1	1.00	0.88	0.82	0.79	0.76	0.73
		2	1.00	0.87	0.80	0.77	0.73	0.68
		3	1.00	0.86	0.79	0.76	0.71	0.66
		1	1.00	1.00	0.98	0.95	0.91	-
		2	1.00	0.99	0.96	0.92	0.87	-
		3	1.00	0.98	0.95	0.91	0.85	-
Cables on vertical perforated trays		1	1.00	0.88	0.82	0.78	0.73	0.72
		2	1.00	0.88	0.81	0.76	0.71	0.70
		1	1.00	0.91	0.89	0.88	0.87	-
		2	1.00	0.91	0.88	0.87	0.85	-
Cables on ladder supports, cleats, etc.		1	1.00	0.87	0.82	0.80	0.79	0.78
		2	1.00	0.86	0.80	0.78	0.76	0.73
		3	1.00	0.85	0.79	0.76	0.73	0.70
		1	1.00	1.00	1.00	1.00	1.00	-
		2	1.00	0.99	0.98	0.97	0.96	-
		3	1.00	0.98	0.97	0.96	0.93	-

NOTE: 1 Factors apply to single layer groups of cables as shown above
NOTE: 2 Factors are given for vertical spacings between trays of 300 mm and at least 20 mm between trays and wall.
NOTE: 3 Factors are given for horizontal spacings between trays of 225 mm with trays mounted back to back.

Reduction factors for groups of more than one circuit of single-core cables in air - To be applied to the current-carrying capacity for one circuit of single-core cables in free air

Method of installation		Number of trays	Number of three-phase circuits		
			1	2	3
Perforated trays		1	0.98	0.91	0.87
		2	0.96	0.87	0.81
		3	0.93	0.85	0.78
Ladder supports, cleats, etc.		1	1.00	0.97	0.96
		2	0.98	0.93	0.89
		3	0.97	0.90	0.86
Perforated trays		1	1.00	0.98	0.96
		2	0.97	0.93	0.89
		3	0.96	0.92	0.86
Vertical Perforated Trays		1	1.00	0.91	0.89
		2	1.00	0.90	0.86
Ladder supports, cleats, etc.		1	1.00	1.00	1.00
		2	0.97	0.95	0.93
		3	0.96	0.94	0.90

NOTE: 1 Factors are given for single layers of cables (or trefoil groups) as shown above
NOTE: 2 Factors are given for vertical spacings between trays of 300 mm and at least 20 mm between trays and wall.
NOTE: 3 Factors are given for horizontal spacings between trays of 225 mm with trays mounted back to back.
NOTE: 4 For circuits having more than one cable in parallel per phase, each three phase set of conductors should be considered as a circuit for the purpose of this table..

ABB ASEA BROWN BOVERI LIMITED CHENNAI 600 099

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ABB ASEA & TOUBRO LIMITED

Deelayfeet

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

1000	1.24	1.11	1.00	0.88	0.79	0.72

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Cables	Spacing of cables (Centre to Centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.80	0.84	0.87	0.90	0.91
3	0.68	0.74	0.79	0.83	0.86
4	0.62	0.69	0.75	0.80	0.83
5	0.58	0.65	0.72	0.77	0.80
6	0.55	0.61	0.69	0.75	0.78
7	0.52	0.59	0.67	0.73	0.77
8	0.50	0.57	0.66	0.72	0.75
9	0.48	0.55	0.65	0.71	0.75
10	0.46	0.54	0.64	0.70	0.74
11	0.45	0.53	0.63	0.70	0.74
12	0.44	0.52	0.62	0.69	0.73

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN TIER FORMATION, LAID DIRECT IN THE GROUND

No of Cables	No of Tiers	Spacing of cables (Centre to Centre)				
		Touching	15 cm	30 cm	45 cm	60 cm
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.60	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.40	0.45	0.49	0.53	0.54

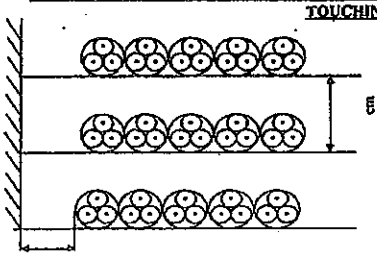
GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL AND TOUCHING, HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Circuits	Spacing of trefoil groups of three cables (centre to centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.77	0.81	0.86	0.88	0.89
3	0.67	0.71	0.78	0.81	0.83
4	0.61	0.64	0.72	0.76	0.80
5	0.57	0.60	0.69	0.74	0.77
6	0.53	0.57	0.66	0.72	0.75
7	0.51	0.55	0.64	0.70	0.74
8	0.49	0.53	0.63	0.69	0.73
9	0.47	0.52	0.62	0.68	0.73
10	0.45	0.51	0.61	0.67	0.72
11	0.44	0.50	0.60	0.66	0.72
12	0.43	0.49	0.59	0.65	0.71

RATING FACTORS FOR VARIATION IN AMBIENT AIR TEMPERATURE

Air Temperature ° C	25	30	35	40	45	50
Rating Factor	1.14	1.10	1.04	1.00	0.95	0.90

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH CABLE TOUCHING



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RATING FACTORS FOR DEPTH OF LAYING
(CABLES LAID DIRECT IN THE GROUND)

Depth of Laying cm	Cable Size		
	Upto 25 mm²	Above 25 mm² Upto 300 mm²	Above 300 mm²
75	1.00	1.00	1.00
90	0.99	0.98	0.97
105	0.98	0.97	0.96
120	0.97	0.96	0.95
150	0.96	0.94	0.92
180 or more	0.95	0.93	0.91

RATING FACTORS FOR VARIATION IN GROUND TEMPERATURE
(FOR CABLES LAID DIRECT IN THE GROUND)

Ground Temperature °C	15	20	25	30	35	40	45	50
Rating Factor For 70 °C PVC	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
Rating Factor For 85 °C PVC	1.13	1.09	1.04	1.00	0.95	0.90	0.85	0.89

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(TWIN AND MULTI-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.00	0.92	0.86	0.81
2.5	1.10	1.05	1.00	0.92	0.86	0.81
4	1.10	1.05	1.00	0.92	0.86	0.81
6	1.10	1.05	1.00	0.92	0.86	0.81
10	1.10	1.06	1.00	0.92	0.85	0.80
16	1.12	1.06	1.00	0.91	0.84	0.79
25	1.14	1.08	1.00	0.91	0.84	0.78
35	1.15	1.08	1.00	0.91	0.84	0.77
50	1.15	1.08	1.00	0.91	0.84	0.77
70	1.15	1.08	1.00	0.90	0.83	0.76
95	1.15	1.08	1.00	0.90	0.83	0.76
120	1.17	1.09	1.00	0.90	0.82	0.76
150	1.17	1.09	1.00	0.90	0.82	0.76
185	1.18	1.09	1.00	0.89	0.81	0.75
240	1.18	1.09	1.00	0.89	0.81	0.75
300	1.18	1.09	1.00	0.89	0.81	0.75
400	1.19	1.10	1.00	0.89	0.81	0.75

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.00	0.90	0.82	0.76
2.5	1.18	1.09	1.00	0.90	0.82	0.76
4	1.18	1.09	1.00	0.90	0.82	0.76
6	1.18	1.09	1.00	0.90	0.82	0.76
10	1.18	1.09	1.00	0.89	0.81	0.75
16	1.19	1.09	1.00	0.89	0.81	0.74
25	1.19	1.09	1.00	0.88	0.80	0.74
35	1.20	1.09	1.00	0.88	0.80	0.74
50	1.20	1.09	1.00	0.88	0.80	0.74
70	1.21	1.10	1.00	0.88	0.80	0.74
95	1.22	1.10	1.00	0.88	0.80	0.74
120	1.22	1.10	1.00	0.88	0.79	0.74
150	1.22	1.10	1.00	0.88	0.79	0.73
185	1.22	1.10	1.00	0.88	0.79	0.73
240	1.22	1.10	1.00	0.88	0.79	0.73
300	1.22	1.10	1.00	0.88	0.79	0.72
400	1.24	1.11	1.00	0.88	0.79	0.72
500	1.24	1.11	1.00	0.88	0.79	0.72
630	1.24	1.11	1.00	0.88	0.79	0.72
800	1.24	1.11	1.00	0.88	0.79	0.72
1000	1.24	1.11	1.00	0.88	0.79	0.72

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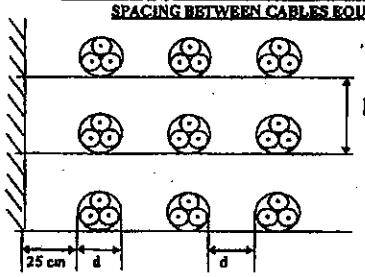
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25 cm

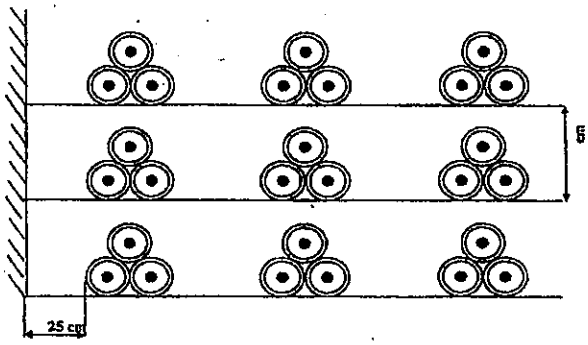
No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.84	0.80	0.75	0.73
2	1.00	0.80	0.76	0.71	0.69
3	1.00	0.78	0.74	0.70	0.68
6	1.00	0.76	0.72	0.68	0.66

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH SPACING BETWEEN CABLES EQUAL TO DIAMETER OF CABLE



No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92
2	1.00	0.95	0.93	0.90	0.89
3	1.00	0.94	0.92	0.89	0.88
6	1.00	0.93	0.90	0.87	0.86

RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL ON RACKS IN AIR WITH SPACING BETWEEN CIRCUITS - EQUAL TO TWICE THE CABLE DIAMETER



No of Racks	Number of Circuits		
	1	2	3
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
6	1.00	0.93	0.90

CHENNAI 600 089

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GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Cables	Spacing of cables (Centre to Centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.80	0.84	0.87	0.90	0.91
3	0.68	0.74	0.79	0.83	0.86
4	0.62	0.69	0.75	0.80	0.83
5	0.58	0.65	0.72	0.77	0.80
6	0.55	0.62	0.69	0.75	0.78
7	0.52	0.59	0.67	0.73	0.77
8	0.50	0.57	0.66	0.72	0.75
9	0.48	0.55	0.65	0.71	0.75
10	0.46	0.54	0.64	0.70	0.74
11	0.45	0.53	0.63	0.70	0.74
12	0.44	0.52	0.62	0.69	0.73

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN TIER FORMATION, LAID DIRECT IN THE GROUND

No of Cables	No of Tiers	Spacing of cables (Centre to Centre)				
		Touching	15 cm	30 cm	45 cm	60 cm
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.65	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.60	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.40	0.45	0.49	0.53	0.54

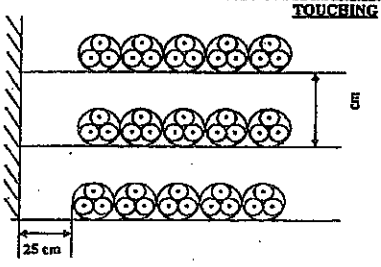
GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL AND TOUCHING, HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Circuits	Spacing of trefoil groups of three cables (centre to centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.77	0.81	0.86	0.88	0.89
3	0.67	0.71	0.78	0.81	0.83
4	0.61	0.64	0.72	0.76	0.80
5	0.57	0.60	0.69	0.74	0.77
6	0.53	0.57	0.66	0.72	0.75
7	0.51	0.55	0.64	0.70	0.74
8	0.49	0.53	0.63	0.69	0.73
9	0.47	0.52	0.62	0.68	0.73
10	0.45	0.51	0.61	0.67	0.72
11	0.44	0.50	0.60	0.66	0.72
12	0.43	0.49	0.59	0.65	0.71

RATING FACTORS FOR VARIATION IN AMBIENT AIR TEMPERATURE

Air Temperature ° C	25	30	35	40	45	50
Rating Factor For 70 °C PVC	1.25	1.16	1.09	1.00	0.90	0.81
Rating Factor For 85 °C PVC	1.15	1.11	1.05	1.00	0.94	0.88

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH CABLE TOUCHING



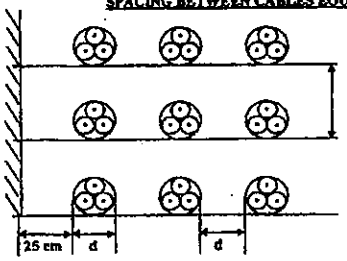
No of Racks	Number of cables per rack

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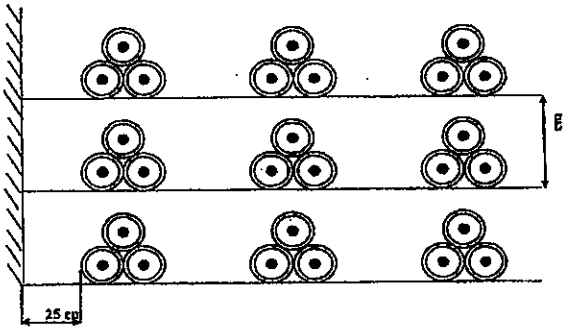
No of Racks	1	2	3	6	9
1	1.00	0.84	0.80	0.75	0.73
2	1.00	0.80	0.76	0.71	0.69
3	1.00	0.78	0.74	0.70	0.68
6	1.00	0.76	0.72	0.68	0.66

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH SPACING BETWEEN CABLES EQUAL TO DIAMETER OF CABLE



No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92
2	1.00	0.95	0.93	0.90	0.89
3	1.00	0.94	0.92	0.89	0.88
6	1.00	0.93	0.90	0.87	0.86

RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL ON RACKS IN AIR WITH SPACING BETWEEN CIRCUITS - EQUAL TO TWICE THE CABLE DIAMETER



No of Racks	Number of Circuits		
	1	2	3
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
6	1.00	0.93	0.90

LARSEN & TOUBRO LIMITED CHENNAI 600 089 HEAVY ENGG. DIVISION

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009





Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002
NAME OF WORK : CONSTRUCTION OF 220 / 33kV GIS SUB STATION AT PALCHAN IN KULLU DISTRICT
DATA REQUIREMENT SHEET

BIDDER'S NAME AND ADDRESS:

POWER CABLES & CONTROL CABLE

Sr. No.	PARAMETER		POWER CABLE				
			TO BE FILLED IN BY THE BIDDER				
			3.5C X 95	3.5C X 70	3.5C X 35	4C X 16	4C X 4
1	Make		As per our list of proposed makes				
2	Cable Type		AYFY	AYFY	AYFY	AYFY	AYWY
3	Applicable Standard		IS:1554 Pt(1)/1988				
4	Voltage Grade	V	1100				
5	Suitable for System with						
a)	Service Voltage		1.1 kV.				
b)	Neutral Earthing		1.2 kV.				
6	Maximum Conductor Temperature						
a)	Continuous	°C	85				
b)	Short time	°C	160				
7	Conductor						
a)	Material & Conforming Standard		H2/H4 Grade Aluminium to IS: 8130/1984				
b)	Grade		H2/H4 Grade				
c)	Size	mm^2	95	70	35	16	4
d)	Number & Diameter of Wire in each Conductor	No. / mm	18x2.67 & 7x3.05	12x2.80 & 7x2.67	7x2.67 & 7x1.76	7x1.76	7x0.87
8	Shielding On Conductor						
a)	Material		Not Applicable				
b)	Type / Applicable Standard		Not Applicable				
c)	Nominal thickness (mm)	mm	Not Applicable				
9	Insulation						
a)	Material		HR 'PVC Type 'C'				
b)	Type / Applicable Standard		HR 'PVC Type 'C' as per IS:5831/84				
c)	Nominal thickness (mm)	mm	1.6 & 1.4	1.4 & 1.2	1.2 & 1.0	1.0	1.0
d)	Negative Tolerance of Thickness	mm	0.26 & 0.24	0.24 & 0.22	0.22 & 0.20	0.20	0.20
e)	Calculated Diameter of Core over Insulation	mm	14.2 & 10.8	12.2 & 9.1	9.1 & 6.5	6.50	4.30
10	Shielding On Insulation						
a)	Material		Not Applicable				
b)	Type / Applicable Standard		Not Applicable				
c)	Nominal thickness (mm)		Not Applicable				
d)	Approximate Diameter of Cable over Shielding	mm	Not Applicable				
11	Inner Sheath						
a)	Material		Extruded PVC Type ST2 to IS:5831/84				
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84				
c)	Minimum Thickness	mm	0.4	0.4	0.3	0.3	0.3
d)	Extruded ?	Yes / No	Yes				
e)	Approximate Outside Diameter over Sheath	mm	32.0	27.6	20.6	16.2	12.2
12	Armouring						
a)	Material		Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel
b)	Type / Applicable Standard		Flat Strip as per IS 3975	Flat Strip as per IS 3975	Flat Strip as per IS 3975	Flat Strip as per IS 3975	Round Wire as per IS 3975
c)	Calculated Diameter over Inner Sheath (under Armour)	mm	33.1	28.4	21.0	16.3	11.0
d)	Nominal size of armour		4.0 x 0.8	4.0 x 0.8	4.0 x 0.8	4.0 x 0.8	1.4
e)	D. C. Resistance at 20 °C	ohm / km	2.39	2.57	3.38	3.99	4.14
f)	Short Circuit Current Carrying Capacity	kAmps	2.88	2.47	1.92	1.51	1.79
13	Overall Sheath						
a)	Material		Extruded PVC Type ST2 to IS:5831/84				
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84				
c)	Calculated Diameter under Sheath (over Armour)	mm	34.7	30.0	22.6	17.9	13.8
d)	Minimum Thickness		1.56 (Min.)	1.56 (Min.)	1.40 (Min.)	1.40 (Min.)	1.24 (Min.)
e)	Color		Black				
f)	Tolerance of Thickness	mm	Minimum is mandatory				
14	Approximate Overall Diameter	mm	37.5	33.0	25.5	21.0	18.0
15	Standard Drum Length with Tolerance	metres	500 mtrs	500 mtrs	500 mtrs	1000 mtrs	1000 mtrs
16	Net Weight of Cable Approx.	kg / km	2200	1730	1090	750	630
16.1	Approximate Weight of Empty Drum	kg	As per IS 10418				
17	Continuous Current Rating for Standard IS Condition laid Direct						
a)	In Ground at 30°C		188	154	105	68	32
b)	In Duct at 30°C		160	131	88	57	26
c)	In Air at 40°C		186	156	103	61	28
17.1	Is the Cable guaranteed to safely Withstand Continuous Current for						

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070

	Temperature of 90 ° / 85 ° / 70 °C (as the case may be) and also withstand		Confirm				
	Temperature of 130 °C for a duration of 100 hrs. per year		Confirm				
18	Short Circuit Current for 1 second	kA	6.52	4.80	2.40	1.10	0.27
19	Electrical Parameters at Maximum Operating Temperature :						
a)	i) D. C. Resistance at 20 °C	ohm / km	0.320 & 0.641	0.443 & 0.868	0.868& 1.91	1.91	7.41
	ii) A. C. Resistance at 85 °C	ohm / km	0.404	0.559	1.10	2.41	9.35
b)	Reactance at 50 Hz	ohm / km	0.0767	0.0771	0.0827	0.0862	0.101
c)	Impedance	ohm / km	0.412	0.565	1.10	2.41	9.35
d)	Capacitance per Phase	microf / km	1.16	1.12	0.96	0.80	0.49
e)	Volume Resistivity at Rated Operating Temperature	ohm cm	1×10^{10} (Min.)				
f)	Loss-Tangent		0.1				
g)	Partial Discharge Value at	kV	Not Applicable				
h)	Charging Current at Normal Operating Voltage	mA / km	0.151	0.146	0.125	0.104	0.064
20	Recommended Minimum Bending Radius		12 times Overall diameter				
21	Derating Factor for following Ambient Temperature in Air / Ground						
a)	at 30 °C		As per Annexure attached				
b)	at 35 °C		As per Annexure attached				
c)	at 45 °C		As per Annexure attached				
d)	at 50 °C		As per Annexure attached				
22	Group Factor for following Number of Cables laid Touching / 2 x Diameter						
	center to center apart :						
a)	Single Core Cable (in Trefoil)						
	i) 2 Number		Not Applicable				
	ii) 3 Number		Not Applicable				
	iii) 4 Number		Not Applicable				
b)	Multi - Core Cable						
	i) 3 Number		As per Annexure attached				
	ii) 4 Number		As per Annexure attached				
	iii) 5 Number		As per Annexure attached				
	iv) 6 Number		As per Annexure attached				
23	The Cables shall be Tested as specified in Specification		As per relevant IS				
	(Add Sheets, if necessary)						

LARSEN & TOUBRO LIMITED ECC DIVISION CHENNAI 600 089

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002			
NAME OF WORK : CONSTRUCTION OF 220 / 33kV GIS SUB STATION AT PALCHAN IN KULLU DISTRICT			
DATA REQUIREMENT SHEET			
BIDDER'S NAME AND ADDRESS:			LARSEN & TOUBRO LTD- ECC DIVISION
POWER CABLES & CONTROL CABLE			
Sr. No.	PARAMETER		POWER CABLE
			TO BE FILLED IN BY THE BIDDER
			3.5C X 300
1	Make		As per our list of proposed makes
2	Cable Type		A2XFY
3	Applicable Standard		IS:7098 Pt(1)/1988
4	Voltage Grade	V	1100
5	Suitable for System with		
a)	Service Voltage		1.1 kV.
b)	Neutral Earthing		1.2 kV.
6	Maximum Conductor Temperature		
a)	Continuous	°C	90
b)	Short time	°C	250
7	Conductor		
a)	Material & Conforming Standard		H2/H4 Grade Aluminium to IS: 8130/1984
b)	Grade		H2/H4 Grade
c)	Size	mm^2	300 & 150
d)	Number & Diameter of Wire in each Conductor	No. / mm	35x3.4 & 18x3.4
8	Shielding On Conductor		
a)	Material		Not Applicable
b)	Type / Applicable Standard		Not Applicable
c)	Nominal thickness (mm)	mm	Not Applicable
9	Insulation		
a)	Material		Cross Linked Polyethylene
b)	Type / Applicable Standard		Cross Linked Polyethylene as per IS:7098 Pt(1)/19884
c)	Nominal thickness (mm)	mm	1.8 & 1.4
d)	Negative Tolerance of Thickness	mm	0.28 & 0.24
e)	Calculated Diameter of Core over Insulation	mm	23.1 & 16.6
10	Shielding On Insulation		
a)	Material		Not Applicable
b)	Type / Applicable Standard		Not Applicable
c)	Nominal thickness (mm)		Not Applicable
d)	Approximate Diameter of Cable over Shielding	mm	Not Applicable
11	Inner Sheath		
a)	Material		Extruded PVC Type ST2 to IS:5831/84
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84
c)	Minimum Thickness	mm	0.6
d)	Extruded ?	Yes / No	Yes
e)	Approximate Outside Diameter over Sheath	mm	52.0
12	Armouring		
a)	Material		Gal.Steel
b)	Type / Applicable Standard		Flat Strip as per IS 3975
c)	Calculated Diameter over Inner Sheath (under Armour)	mm	53.2
d)	Nominal size of armour		4.0 x 0.8
e)	D. C. Resistance at 20 °C	ohm / km	1.52
f)	Short Circuit Current Carrying Capacity	kAmps	4.56

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Barowalia House, Khalini, Shimla-2

13	Overall Sheath		
a)	Material		Extruded PVC Type ST2 to IS:5831/84
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84
c)	Calculated Diameter under Sheath (over Armour)	mm	54.8
d)	Minimum Thickness		2.20 (Min.)
e)	Color		Black
f)	Tolerance of Thickness	mm	Minimum is mandatory
14	Approximate Overall Diameter	mm	58.5
15	Standard Drum Length with Tolerance	metres	500 mtrs
16	Net Weight of Cable Approx.	kg / km	4960
16.1	Approximate Weight of Empty Drum	kg	As per IS 10418
17	Continuous Current Rating for Standard IS Condition laid Direct		
a)	In Ground at 30°C		367
b)	In Duct at 30°C		349
c)	In Air at 40°C		455
17.1	Is the Cable guaranteed to safely Withstand Continuous Current for		
	Temperature of 90 ° / 85 ° / 70 °C (as the case may be) and also withstand		Confirm
	Temperature of 130 °C for a duration of 100 hrs. per year		Confirm
18	Short Circuit Current for 1 second	kA	28.35
19	Electrical Parameters at Maximum Operating Temperature :		
a)	i) D. C. Resistance at 20 °C	ohm / km	0.100 & '0.206
	ii) A. C. Resistance at 90 °C	ohm / km	0.130
b)	Reactance at 50 Hz	ohm / km	0.0703
c)	Impedance	ohm / km	0.148
d)	Capacitance per Phase	microf / km	0.71
e)	Volume Resistivity at Rated Operating Temperature	ohm cm	1×10^{12} (Min.)
f)	Loss Tangent		0.008
g)	Partial Discharge Value at	kV	Not Applicable
h)	Charging Current at Normal Operating Voltage	mA / km	0.093
20	Recommended Minimum Bending Radius		12 times Overall diameter
21	Derating Factor for following Ambient Temperature in Air / Ground		
a)	at 30 °C		As per Annexure attached
b)	at 35 °C		As per Annexure attached
c)	at 45 °C		As per Annexure attached
d)	at 50 °C		As per Annexure attached
22	Group Factor for following Number of Cables laid Touching / 2 x Diameter		
	center to center apart :		
a)	Single Core Cable (in Trefoil)		
	i) 2 Number		Not Applicable
	ii) 3 Number		Not Applicable
	iii) 4 Number		Not Applicable

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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b)	Multi - Core Cable			
	i) 3 Number		As per Annexure attached	
	ii) 4 Number		As per Annexure attached	
	iii) 5 Number		As per Annexure attached	
	iv) 6 Number		As per Annexure attached	
23	The Cables shall be Tested as specified in Specification		As per relevant IS	
	(Add Sheets, if necessary)			





Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED

BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

NAME OF WORK : CONSTRUCTION OF 220 / 33kV GIS SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET

BIDDER'S NAME AND ADDRESS:

POWER CABLES & CONTROL CABLE

Sr. No.	PARAMETER		CONTROL CABLE									
			TO BE FILLED IN BY THE BIDDER									
			2C X 2.5	4C X 2.5	7C X 2.5	10C X 2.5	12C X 2.5	16C X 2.5	19C X 2.5	2C X 4	4C X 4	7C X 4
1	Make		As per our list of proposed makes									
2	Cable Type		YWY	YWY	YWY	YFY	YFY	YFY	YFY	YWY	YWY	YFY
3	Applicable Standard		IS:1554 Pt(1)/1988									
4	Voltage Grade	V	1100									
5	Suitable for System with											
a)	Service Voltage		1.1 kV.									
b)	Neutral Earthing		1.2 kV.									
6	Maximum Conductor Temperature											
a)	Continuous	°C	85									
b)	Short time	°C	160									
7	Conductor											
a)	Material & Conforming Standard		Plain annealed Copper to IS:8130/1984									
b)	Grade		EC Grade									
c)	Size	mm^2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4
d)	Number & Diameter of Wire in each Conductor	No. / mm	7x0.655	7x0.655	7x0.655	7x0.655	7x0.655	7x0.655	7x0.655	7x0.84	7x0.84	7x0.84
8	Shielding On Conductor											
a)	Material		Not Applicable									
b)	Type / Applicable Standard		Not Applicable									
c)	Nominal thickness (mm)	mm	Not Applicable									
9	Insulation											
a)	Material		HR 'PVC Type 'C'									
b)	Type / Applicable Standard		HR 'PVC Type 'C' as per IS:5831/84									
c)	Nominal thickness (mm)	mm	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1	1	1
d)	Negative Tolerance of Thickness	mm	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.2	0.2	0.2
e)	Calculated Diameter of Core over Insulation	mm	3.6	3.6	3.6	3.6	3.6	3.6	3.6	4.3	4.3	4.3
10	Shielding On Insulation											
a)	Material		Not Applicable									
b)	Type / Applicable Standard		Not Applicable									
c)	Nominal thickness (mm)		Not Applicable									
d)	Approximate Diameter of Cable over Shielding	mm	Not Applicable									
11	Inner Sheath											
a)	Material		Extruded PVC Type ST2 to IS:5831/84									
b)	Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84									
c)	Minimum Thickness	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
d)	Extruded ?	Yes / No	Yes									
e)	Approximate Outside Diameter over Sheath	mm	8.6	10.3	12.6	16.5	17.1	19.2	20.4	10.1	12.1	14.8
12	Armouring											
a)	Material		Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel	Gal.Steel
b)	Type / Applicable Standard		Round Wire as per IS 3975	Round Wire as per IS 3975	Round Wire as per IS 3975	Flat Strip as per IS 3975	Flat Strip as per IS 3975	Flat Strip as per IS 3975	Flat Strip as per IS 3975	Round Wire as per IS 3975	Round Wire as per IS 3975	Flat Strip as per IS 3975

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	d) Nominal size of armour		1.4	1.4	1.4	4.0 x 0.8	4.0 x 0.8	4.0 x 0.8	4.0 x 0.8	1.4	1.4	4.0 x 0.8
	e) D. C. Resistance at 20 °C	ohm / km	5.54	4.77	4.15	4.90	4.49	4.15	3.85	4.83	4.14	5.39
	f) Short Circuit Current Carrying Capacity	kAmps	1.29	1.50	1.79	1.51	1.65	1.79	1.92	1.50	1.79	1.37
13	Overall Sheath											
	a) Material		Extruded PVC Type ST2 to IS:5831/84									
	b) Type / Applicable Standard		Extruded PVC Type ST2 to IS:5831/84									
	c) Calculated Diameter under Sheath (over Armour)	mm	10.6	12.1	14.2	16.6	17.2	19.1	20.2	12.0	13.8	15.1
	d) Minimum Thickness		1.24 (Min.)	1.24 (Min.)	1.24 (Min.)	1.40 (Min.)	1.40 (Min.)	1.40 (Min.)	1.40 (Min.)	1.24 (Min.)	1.24 (Min.)	1.40 (Min.)
	e) Color		Black									
	f) Tolerance of Thickness	mm	Minimum is mandatory									
14	Approximate Overall Diameter	mm	14.5	16.0	18.5	21.5	22.0	24.5	25.5	16.0	18.0	20.0
15	Standard Drum Length with Tolerance	metres	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs	1000 mtrs
16	Net Weight of Cable Approx.	kg / km	450	570	750	850	950	1150	1290	550	720	830
16.1	Approximate Weight of Empty Drum	kg	As per IS 10418									
17	Continuous Current Rating for Standard IS Condition laid Direct											
	a) In Ground at 30°C		36	31	24	21	18	16	16	47	41	31
	b) In Duct at 30°C		31	27	21	17	16	14	14	40	34	26
	c) In Air at 40°C		32	29	22	18	17	14	14	42	36	28
17.1	Is the Cable guaranteed to safely Withstand Continuous Current for											
	Temperature of 90 ° / 85 ° / 70 °C (as the case may be) and also withstand		Confirm									
	Temperature of 130 °C for a duration of 100 hrs. per year		Confirm									
18	Short Circuit Current for 1 second	kA	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42
19	Electrical Parameters at Maximum Operating Temperature :											
	a) i) D. C. Resistance at 20 °C	ohm / km	7.41	7.41	7.41	7.41	7.41	7.41	7.41	4.61	4.61	4.61
	ii) A. C. Resistance at 85 °C	ohm / km	9.30	9.30	9.30	9.30	9.30	9.30	9.30	5.79	5.79	5.79
	b) Reactance at 50 Hz	ohm / km	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.102	0.102	0.102
	c) Impedance	ohm / km	9.30	9.30	9.30	9.30	9.30	9.30	9.30	5.79	5.79	5.79
	d) Capacitance per Phase	microf / km	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.48	0.48	0.48
	e) Volume Resistivity at Rated Operating Temperature	ohm cm	1×10^{10} (Min.)									
	f) Loss Tangent		0.1									
	g) Partial Discharge Value at	kV	Not Applicable									
	h) Charging Current at Normal Operating Voltage	mA / km	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.063	0.063	0.063

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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20	Recommended Minimum Bending Radius		12 times Overall diameter
21	Derating Factor for following Ambient Temperature in Air / Ground		
a)	at 30 °C		As per Annexure attached
b)	at 35 °C		As per Annexure attached
c)	at 45 °C		As per Annexure attached
d)	at 50 °C		As per Annexure attached
22	Group Factor for following Number of Cables laid Touching / 2 x Diameter		
	center to center apart :		
a)	Single Core Cable (in Trefoil)		
	i) 2 Number		Not Applicable
	ii) 3 Number		Not Applicable
	iii) 4 Number		Not Applicable
b)	Multi - Core Cable		
	i) 3 Number		As per Annexure attached
	ii) 4 Number		As per Annexure attached
	iii) 5 Number		As per Annexure attached
	iv) 6 Number		As per Annexure attached
23	The Cables shall be Tested as specified in Specification		As per relevant IS
	(Add Sheets, if necessary)		

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Rating Factors for Variation in Ground and Air Temperatures

Ambient Temperature °C	15	20	25	30	35	40	45	50	55	60
Cables Laid in Ground	1.12	1.08	1.03	1.00	0.96	0.91	0.87	0.82	0.76	0.71
Cables Laid in Air	1.22	1.18	1.14	1.10	1.04	1.00	0.95	0.90	0.84	0.77

Rating Factors for Depth of Laying for Direct Buried Cables

Voltage Grade of Cables	Depth of Laying (cm)				
	90	105	120	150	180 and above
3.3 kV, 6.6 kV & 11 kV	1.00	0.99	0.98	0.96	0.95
22 kV & 33 kV	-	1.00	0.99	0.97	0.96

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
25	1.13	1.08	1.00	0.91	0.84	0.78
35	1.13	1.08	1.00	0.91	0.83	0.78
50	1.14	1.08	1.00	0.91	0.83	0.77
70	1.14	1.08	1.00	0.90	0.83	0.77
95	1.14	1.08	1.00	0.90	0.83	0.77
120	1.14	1.08	1.00	0.90	0.83	0.77
150	1.15	1.09	1.00	0.90	0.83	0.77
185	1.15	1.09	1.00	0.90	0.83	0.77
240	1.15	1.09	1.00	0.90	0.83	0.77
300	1.15	1.09	1.00	0.90	0.83	0.77
400	1.15	1.09	1.00	0.90	0.82	0.76

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
25	1.16	1.10	1.00	0.89	0.81	0.75
35	1.16	1.10	1.00	0.89	0.81	0.75
50	1.16	1.10	1.00	0.89	0.81	0.74
70	1.17	1.10	1.00	0.89	0.81	0.74
95	1.18	1.11	1.00	0.89	0.80	0.74
120	1.18	1.11	1.00	0.88	0.80	0.74
150	1.18	1.11	1.00	0.88	0.80	0.74
185	1.18	1.11	1.00	0.88	0.80	0.74
240	1.18	1.11	1.00	0.88	0.80	0.73
300	1.19	1.11	1.00	0.88	0.80	0.73
400	1.19	1.11	1.00	0.88	0.79	0.73
500	1.19	1.11	1.00	0.88	0.79	0.73
630	1.19	1.11	1.00	0.88	0.79	0.73
800	1.19	1.11	1.00	0.88	0.79	0.73
1000	1.19	1.11	1.00	0.88	0.79	0.73

Correction factors for groups of three-core cables in horizontal formation laid direct in the ground

Number of cables in group	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.80	0.86	0.90	0.92	0.94
3	0.69	0.77	0.82	0.86	0.89
4	0.62	0.72	0.79	0.83	0.87
5	0.57	0.68	0.76	0.81	0.85
6	0.54	0.65	0.74	0.80	0.84
7	0.51	0.63	0.72	0.78	0.83
8	0.49	0.61	0.71	0.78	-
9	0.47	0.60	0.70	0.77	-
10	0.45	0.59	0.69	-	-
11	0.43	0.57	0.69	-	-
12	0.43	0.56	0.68	-	-

Correction factors for groups of three-phase circuits of single-core cables laid direct in the ground

Number of circuits in group	Spacing between group centres (mm)				
	Touching	200	400	600	800
2	0.73	0.83	0.88	0.90	0.92
3	0.60	0.73	0.79	0.83	0.86
4	0.54	0.68	0.75	0.80	0.84
5	0.49	0.63	0.72	0.78	0.82
6	0.46	0.61	0.70	0.76	0.81
7	0.43	0.59	0.68	0.75	0.80
8	0.41	0.57	0.67	0.74	-
9	0.39	0.55	0.66	0.73	-
10	0.37	0.54	0.65	-	-
11	0.36	0.53	0.64	-	-
12	0.35	0.52	0.64	-	-

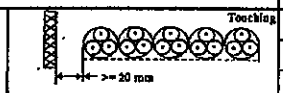
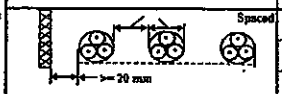
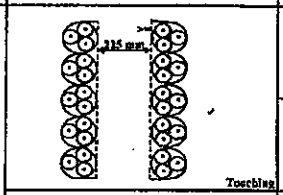
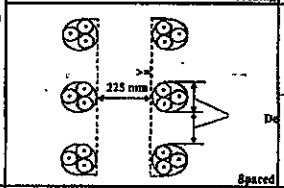
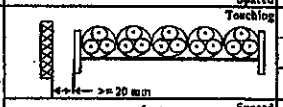
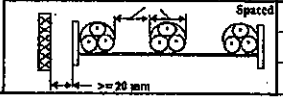
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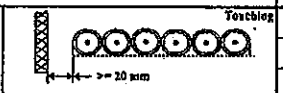
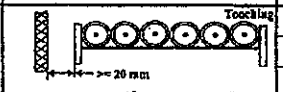
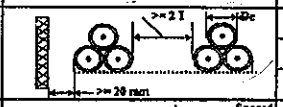
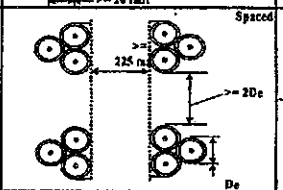
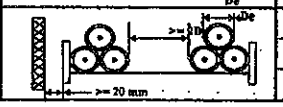
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Reduction factors for groups of more than one multi-core cable in air - To be applied to the current-carrying capacity for one multi-core cable in free air

Method of Installation		Number of trays	Number of Cables					
			1	2	3	4	6	9
Cables on perforated trays		1	1.00	0.88	0.82	0.79	0.76	0.73
		2	1.00	0.87	0.80	0.77	0.73	0.68
		3	1.00	0.86	0.79	0.76	0.71	0.66
		1	1.00	1.00	0.98	0.95	0.91	-
		2	1.00	0.99	0.96	0.92	0.87	-
		3	1.00	0.98	0.95	0.91	0.85	-
Cables on vertical perforated trays		1	1.00	0.88	0.82	0.78	0.73	0.72
		2	1.00	0.88	0.81	0.76	0.71	0.70
		1	1.00	0.91	0.89	0.88	0.87	-
		2	1.00	0.91	0.88	0.87	0.85	-
Cables on ladder supports, cleats, etc.		1	1.00	0.87	0.82	0.80	0.79	0.78
		2	1.00	0.86	0.80	0.78	0.76	0.73
		3	1.00	0.85	0.79	0.76	0.73	0.70
		1	1.00	1.00	1.00	1.00	1.00	-
		2	1.00	0.99	0.98	0.97	0.96	-
		3	1.00	0.98	0.97	0.96	0.93	-

NOTE: 1 Factors apply to single layer groups of cables as shown above.
NOTE: 2 Factors are given for vertical spacings between trays of 300 mm and at least 20 mm between trays and wall.
NOTE: 3 Factors are given for horizontal spacings between trays of 225 mm with trays mounted back to back.

Reduction factors for groups of more than one circuit of single-core cables in air - To be applied to the current-carrying capacity for one circuit of single-core cables in free air

Method of Installation		Number of trays	Number of three-phase circuits		
			1	2	3
Perforated trays		1	0.98	0.91	0.87
		2	0.96	0.87	0.81
		3	0.95	0.85	0.78
Ladder supports, cleats, etc.		1	1.00	0.97	0.96
		2	0.98	0.93	0.89
		3	0.97	0.90	0.86
Perforated trays		1	1.00	0.98	0.96
		2	0.97	0.93	0.89
		3	0.96	0.92	0.86
Vertical Perforated Trays		1	1.00	0.91	0.89
		2	1.00	0.90	0.86
Ladder supports, cleats, etc.		1	1.00	1.00	1.00
		2	0.97	0.95	0.93
		3	0.96	0.94	0.90

NOTE: 1 Factors are given for single layers of cables (or trefoil groups) as shown above.
NOTE: 2 Factors are given for vertical spacings between trays of 300 mm and at least 20 mm between trays and wall.
NOTE: 3 Factors are given for horizontal spacings between trays of 225 mm with trays mounted back to back.
NOTE: 4 For circuits having more than one cable in parallel per phase, each three phase set of conductors should be considered as a circuit for the purpose of this table.

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RATING FACTORS FOR DEPTH OF LAYING
(CABLES LAID DIRECT IN THE GROUND)

Depth of Laying cm	Cable Size		
	Upto 25 mm²	Above 25 mm² Upto 300 mm²	Above 300 mm²
75	1.00	1.00	1.00
90	0.99	0.98	0.97
105	0.98	0.97	0.96
120	0.97	0.96	0.95
150	0.96	0.94	0.92
180 or more	0.95	0.93	0.91

RATING FACTORS FOR VARIATION IN GROUND TEMPERATURE
(FOR CABLES LAID DIRECT IN THE GROUND)

Ground Temperature °C	15	20	25	30	35	40	45	50
Rating Factor	1.12	1.08	1.03	1.00	0.96	0.91	0.87	0.82

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(TWIN AND MULTI-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.00	0.92	0.86	0.81
2.5	1.10	1.05	1.00	0.92	0.86	0.81
4	1.10	1.05	1.00	0.92	0.86	0.81
6	1.10	1.05	1.00	0.92	0.86	0.81
10	1.10	1.06	1.00	0.92	0.85	0.80
16	1.12	1.06	1.00	0.91	0.84	0.79
25	1.14	1.08	1.00	0.91	0.84	0.78
35	1.15	1.08	1.00	0.91	0.84	0.77
50	1.15	1.08	1.00	0.91	0.84	0.77
70	1.15	1.08	1.00	0.90	0.83	0.76
95	1.15	1.08	1.00	0.90	0.83	0.76
120	1.17	1.09	1.00	0.90	0.82	0.76
150	1.17	1.09	1.00	0.90	0.82	0.76
185	1.18	1.09	1.00	0.89	0.81	0.75
240	1.18	1.09	1.00	0.89	0.81	0.75
300	1.18	1.09	1.00	0.89	0.81	0.75
400	1.19	1.10	1.00	0.89	0.81	0.75

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.00	0.90	0.82	0.76
2.5	1.18	1.09	1.00	0.90	0.82	0.76
4	1.18	1.09	1.00	0.90	0.82	0.76
6	1.18	1.09	1.00	0.90	0.82	0.76
10	1.18	1.09	1.00	0.89	0.81	0.75
16	1.19	1.09	1.00	0.89	0.81	0.74
25	1.19	1.09	1.00	0.88	0.80	0.74
35	1.20	1.09	1.00	0.88	0.80	0.74
50	1.20	1.09	1.00	0.88	0.80	0.74
70	1.21	1.10	1.00	0.88	0.80	0.74
95	1.22	1.10	1.00	0.88	0.80	0.74
120	1.22	1.10	1.00	0.88	0.79	0.74
150	1.22	1.10	1.00	0.88	0.79	0.73
185	1.22	1.10	1.00	0.88	0.79	0.73
240	1.22	1.10	1.00	0.88	0.79	0.73
300	1.22	1.10	1.00	0.88	0.79	0.72
400	1.24	1.11	1.00	0.88	0.79	0.72
500	1.24	1.11	1.00	0.88	0.79	0.72
630	1.24	1.11	1.00	0.88	0.79	0.72
800	1.24	1.11	1.00	0.88	0.79	0.72

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1000	1.24	1.11	1.00	0.88	0.79	0.72

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Cables	Spacing of cables (Centre to Centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.80	0.84	0.87	0.90	0.91
3	0.68	0.74	0.79	0.83	0.86
4	0.62	0.69	0.75	0.80	0.83
5	0.58	0.65	0.72	0.77	0.80
6	0.55	0.62	0.69	0.75	0.78
7	0.52	0.59	0.67	0.73	0.77
8	0.50	0.57	0.66	0.72	0.75
9	0.48	0.55	0.65	0.71	0.75
10	0.46	0.54	0.64	0.70	0.74
11	0.45	0.53	0.63	0.70	0.74
12	0.44	0.52	0.62	0.69	0.73

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN TIER FORMATION, LAID DIRECT IN THE GROUND

No of Cables	No of Tiers	Spacing of cables (Centre to Centre)				
		Touching	15 cm	30 cm	45 cm	60 cm
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.60	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.40	0.45	0.49	0.53	0.54

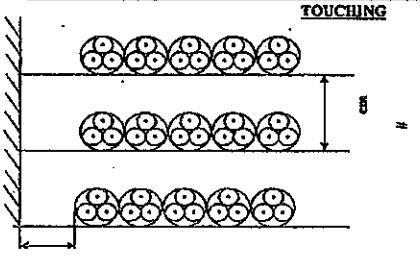
GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL AND TOUCHING, HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Circuits	Spacing of trefoil groups of three cables (centre to centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.77	0.81	0.86	0.88	0.89
3	0.67	0.71	0.78	0.81	0.83
4	0.61	0.64	0.72	0.76	0.80
5	0.57	0.60	0.69	0.74	0.77
6	0.53	0.57	0.66	0.72	0.75
7	0.51	0.55	0.64	0.70	0.74
8	0.49	0.53	0.63	0.69	0.73
9	0.47	0.52	0.62	0.68	0.73
10	0.45	0.51	0.61	0.67	0.72
11	0.44	0.50	0.60	0.66	0.72
12	0.43	0.49	0.59	0.65	0.71

RATING FACTORS FOR VARIATION IN AMBIENT AIR TEMPERATURE

Air Temperature ° C	25	30	35	40	45	50
Rating Factor	1.14	1.10	1.04	1.00	0.95	0.90

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH CABLE TOUCHING



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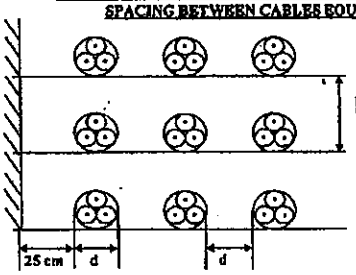
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25 cm

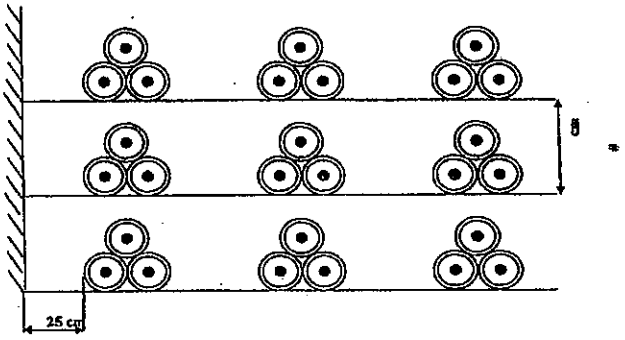
No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.84	0.80	0.75	0.73
2	1.00	0.90	0.76	0.71	0.69
3	1.00	0.78	0.74	0.70	0.68
6	1.00	0.76	0.72	0.68	0.66

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH SPACING BETWEEN CABLES EQUAL TO DIAMETER OF CABLE



No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92
2	1.00	0.95	0.93	0.90	0.89
3	1.00	0.94	0.92	0.89	0.88
6	1.00	0.93	0.90	0.87	0.86

RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL ON RACKS IN AIR WITH SPACING BETWEEN CIRCUITS - EQUAL TO TWICE THE CABLE DIAMETER



No of Racks	Number of Circuits		
	1	2	3
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
6	1.00	0.93	0.90

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RATING FACTORS FOR DEPTH OF LAYING
(CABLES LAID DIRECT IN THE GROUND)

Depth of Laying cm	Cable Size		
	Upto 25 mm²	Above 25 mm² Upto 300 mm²	Above 300 mm²
75	1.00	1.00	1.00
90	0.99	0.98	0.97
105	0.98	0.97	0.96
120	0.97	0.96	0.95
150	0.96	0.94	0.92
180 or more	0.95	0.93	0.91

RATING FACTORS FOR VARIATION IN GROUND TEMPERATURE
(FOR CABLES LAID DIRECT IN THE GROUND)

Ground Temperature °C	15	20	25	30	35	40	45	50
Rating Factor For 70 °C PVC	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
Rating Factor For 85 °C PVC	1.13	1.09	1.04	1.00	0.95	0.90	0.85	0.80

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(TWIN AND MULTI-CORE CABLES LAID DIRECT IN THE GROUND)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.10	1.05	1.00	0.92	0.86	0.81
2.5	1.10	1.05	1.00	0.92	0.86	0.81
4	1.10	1.05	1.00	0.92	0.86	0.81
6	1.10	1.05	1.00	0.92	0.86	0.81
10	1.10	1.06	1.00	0.92	0.85	0.80
16	1.12	1.06	1.00	0.91	0.84	0.79
25	1.14	1.08	1.00	0.91	0.84	0.78
35	1.15	1.08	1.00	0.91	0.84	0.77
50	1.15	1.08	1.00	0.91	0.84	0.77
70	1.15	1.08	1.00	0.90	0.83	0.76
95	1.15	1.08	1.00	0.90	0.83	0.76
120	1.17	1.09	1.00	0.90	0.82	0.76
150	1.17	1.09	1.00	0.90	0.82	0.76
185	1.18	1.09	1.00	0.89	0.81	0.75
240	1.18	1.09	1.00	0.89	0.81	0.75
300	1.18	1.09	1.00	0.89	0.81	0.75
400	1.19	1.10	1.00	0.89	0.81	0.75

RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
(THREE SINGLE-CORE CABLES LAID DIRECT IN THE GROUND, IN TREFOIL TOUCHING)

Nominal Area of Conductor mm²	For Values of Thermal Resistivity of Soil in °C cm/W					
	100	120	150	200	250	300
1.5	1.18	1.09	1.00	0.90	0.82	0.76
2.5	1.18	1.09	1.00	0.90	0.82	0.76
4	1.18	1.09	1.00	0.90	0.82	0.76
6	1.18	1.09	1.00	0.90	0.82	0.76
10	1.18	1.09	1.00	0.89	0.81	0.75
16	1.19	1.09	1.00	0.89	0.81	0.74
25	1.19	1.09	1.00	0.88	0.80	0.74
35	1.20	1.09	1.00	0.88	0.80	0.74
50	1.20	1.09	1.00	0.88	0.80	0.74
70	1.21	1.10	1.00	0.88	0.80	0.74
95	1.22	1.10	1.00	0.88	0.80	0.74
120	1.22	1.10	1.00	0.88	0.79	0.74
150	1.22	1.10	1.00	0.88	0.79	0.73
185	1.22	1.10	1.00	0.88	0.79	0.73
240	1.22	1.10	1.00	0.88	0.79	0.73
300	1.22	1.10	1.00	0.88	0.79	0.72
400	1.24	1.11	1.00	0.88	0.79	0.72
500	1.24	1.11	1.00	0.88	0.79	0.72
630	1.24	1.11	1.00	0.88	0.79	0.72
800	1.24	1.11	1.00	0.88	0.79	0.72
1000	1.24	1.11	1.00	0.88	0.79	0.72

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GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Cables	Spacing of cables (Centre to Centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.80	0.84	0.87	0.90	0.91
3	0.68	0.74	0.79	0.83	0.86
4	0.62	0.69	0.75	0.80	0.83
5	0.58	0.65	0.72	0.77	0.80
6	0.55	0.62	0.69	0.75	0.78
7	0.52	0.59	0.67	0.73	0.77
8	0.50	0.57	0.66	0.72	0.75
9	0.48	0.55	0.65	0.71	0.75
10	0.46	0.54	0.64	0.70	0.74
11	0.45	0.53	0.63	0.70	0.74
12	0.44	0.52	0.62	0.69	0.73

GROUP RATING FACTORS FOR TWIN AND MULTI-CORE CABLES IN TIER FORMATION, LAID DIRECT IN THE GROUND

No of Cables	No of Tiers	Spacing of cables (Centre to Centre)				
		Touching	15 cm	30 cm	45 cm	60 cm
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.60	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.40	0.45	0.49	0.53	0.54

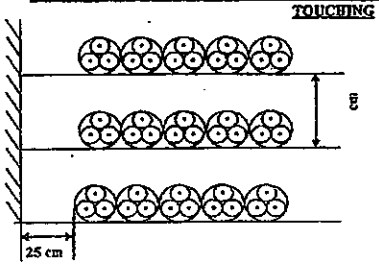
GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL AND TOUCHING, HORIZONTAL FORMATION, LAID DIRECT IN THE GROUND

No of Circuits	Spacing of trefoil groups of three cables (centre to centre)				
	Touching	15 cm	30 cm	45 cm	60 cm
2	0.77	0.81	0.86	0.88	0.89
3	0.67	0.71	0.78	0.81	0.83
4	0.61	0.64	0.72	0.76	0.80
5	0.57	0.60	0.69	0.74	0.77
6	0.53	0.57	0.66	0.72	0.75
7	0.51	0.55	0.64	0.70	0.74
8	0.49	0.53	0.63	0.69	0.73
9	0.47	0.52	0.62	0.68	0.73
10	0.45	0.51	0.61	0.67	0.72
11	0.44	0.50	0.60	0.66	0.72
12	0.43	0.49	0.59	0.65	0.71

RATING FACTORS FOR VARIATION IN AMBIENT AIR TEMPERATURE

Air Temperature ° C	25	30	35	40	45	50
Rating Factor For 70 °C PVC	1.25	1.16	1.09	1.00	0.90	0.81
Rating Factor For 85 °C PVC	1.15	1.11	1.05	1.00	0.94	0.88

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH CABLE TOUCHING



No of Racks	Number of cables per rack

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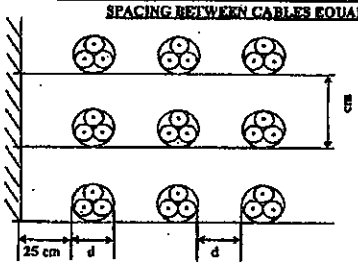
CHENNAI 600 086

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Vidyut Bhawan, Khalini, Shimla-2

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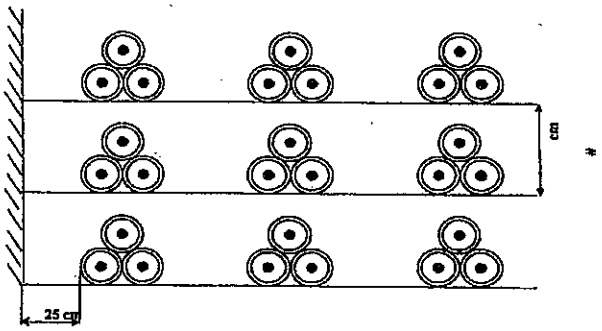
No of Racks	1	2	3	6	9
1	1.00	0.84	0.80	0.75	0.73
2	1.00	0.80	0.76	0.71	0.69
3	1.00	0.78	0.74	0.70	0.68
6	1.00	0.76	0.72	0.68	0.66

RATING FACTORS FOR MULTI CORE CABLES LAID ON RACKS IN AIR WITH SPACING BETWEEN CABLES EQUAL TO DIAMETER OF CABLE



No of Racks	Number of cables per rack				
	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92
2	1.00	0.95	0.93	0.90	0.89
3	1.00	0.94	0.92	0.89	0.88
6	1.00	0.93	0.90	0.87	0.86

RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLES IN TREFOIL ON RACKS IN AIR WITH SPACING BETWEEN CIRCUITS - EQUAL TO TWICE THE CABLE DIAMETER



No of Racks	Number of Circuits		
	1	2	3
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
6	1.00	0.93	0.90

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LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

085

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

250KVA LT TRANSFORMER

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002
NAME OF WORK :CONSTRUCTION OF 220/33 kV SUB STATION AT PALCHAN IN KULLU DISTRICT
DATA REQUIREMENT SHEET - O
33/0.440 KV POWER TRANSFORMER

Sr. No.	PARAMETER	Unit	TO BE FILLED IN BY THE BIDDER
1	Name & Address of Manufacturer		As per our proposed vendor list
2	Voltage Ratio		33000/433
3	Rating	KVA	250
4	Standards Applicable		IS : 2026 - 1977, IS : 335 - 1993
5	Rated Frequency	Hz	50
6	Number of Phases		3
7	Vector Group		Dyn 11
8	Type of Cooling		ONAN
9	Tap Changing Equipment		
i)	Type		Off circuit, Bridge type
ii)	Number of Steps & Tap Range		4 Steps, 5 Positions
*10	**Positive Sequence Impedance at 75 ° C with 100% rating at**		
a	Principal Tap		5
b	Maximum Tap		5.25
c	Minimum Tap		4.75
11	Temperature Rise over an Ambient of 40 degree Centigrade		
a	Top Oil Degree Centigrade		35
b	Windings (by Resistance Measurement Method) degree Centigrade		45
*12	**GUARANTEED LOSSES**		
a	Maximum No Load Loss on Principal Tap at Rated Voltage and Frequency	kW	550
b	Maximum Load Loss at Rated Current at Principal Tap at 75 degree Centigrade	kW	3500
13	Withstand Time for Three Phase Short Circuit at Terminals	sec	2 sec
14	**INSULATION LEVEL**		
a	Full Wave Lightning Impulse Withstanding		
i	HV Winding	kVp	75
ii	LV Winding	kVp	
15	Confirm whether similar Equipment is Type Tested and are in successful operation for atleast two years.		Yes, confirmed
16	Confirm whether similar Equipment is Tested for Dynamic Short Circuit Withstand Capability (Furnish details)		We have done type test on higher rating of transformer (630 KVA, 1600 KVA and 10000 KVA)

L&T Larsen & Toubro Limited

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

PLCC EQUIPMENTS & WAVE TRAP

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

NAME OF WORK : CONSTRUCTION OF 220 /33 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - F1

BIDDER'S NAME AND ADDRESS:

PLCC EQUIPMENT & WAVE TRAP 220 kV

Sr. No.		PARAMETER		TO BE FILLED BY BIDDER
1	A	**COUPLING DEVICE**		
	1.1	Make		As per our proposed vendor list
	1.2	Type, Model		
	1.3	Suitable Matching Transformer provided		Yes
	1.4	Nominal Primary Side Impedance		150-300 ohms / 600 ohms
	1.5	Nominal Secondary Side Impedance		75/125 ohms Unbalanced (ABB) 75 ohms Unbalanced (BPL)
	1.6	Rated Current at Carrier Frequency		1.2 Amp rms
	1.7	Rate Voltage at Carrier Frequency		Impulse (1.2/50 micro sec) Withstand level between Primary terminal and secondary terminals of Coupling Device = 10kV peak
	1.8	Range of Capacitance of the Coupling Capacitor to which Line Matching Units are suitable		From 1500pF to 13000pF
	1.9	Frequency Response of the Unit		72-500 kHz for CC value of 6500pF
	1.10	Operating Attenuation	mm	-2dB (including CC)
	1.11	Whether Impedance Matching Units have provision for matching either Phase to Phase or Phase to Earth Coupling	YES / NO	YES
	1.12	Pass Band Range		Depends on carrier frequency approval. Typical band is 120-500 kHz
	1.13	Insertion Loss in Pass Band Range		
		1) Coupling Unit		2 dB Max (incl. of CC)
		2) Matching Transformer		[illegible]
	1.14	Frequency Range		Depends on carrier frequency value of [illegible]
	1.15	Maximum Composite Loss		[illegible]
	1.16	Return Loss		[illegible]
	1.17	Test Voltage of Transformer		[illegible]
	1.18	Withstand Voltage between Primary & Secondary Winding or Ground Terminal		[illegible]
	1.19	Discharge Voltage and Protection Device		[illegible]
	1.20	Details of Mounting of the Units		[illegible]
	1.21	1 Minute Power Frequency Insulation Level Primary & Secondary Terminal Coupling Device		10 kV rms (As per IEC 60481)

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

	1.22	Impulse (1.2 / 50 µs Wave) Withstand Level between Primary	10 kV peak
		& Secondary Terminals of Coupling Device	
	1.23	Drainage Coil	
		1) Inductance	0.7 mH +/- 30% (Depending upon Capacitance value of CC)
		2) Power Frequency Current Carrying Capacity of Drainage Coil	
		(or Primary Winding of Matching Transformer)	
		a) Permanent Current	During Detailed Engineering
		b) Short Time Current of 0.2 sec	During Detailed Engineering
	1.24	Lightning Arrester	
		1) on Primary Side of Coupling Device	
		a) Type	RV 0.66 ABB / M/s Lamco or equl
		b) Power Frequency Spark Over Voltage	Greater than or equal to 1.5kV
		c) Maximum Permissible Arrester Discharge Current	As per IS 3070 (Part-I)
		d) Maximum Permissible Short Time (0.2 secs)	As per IS 3070 (Part-I)
		Power Frequency Discharge Current	As per IS 3070 (Part-I)
		2) on Secondary Side of the Coupling Device	
		a) Type	
		b) Power Frequency Spark Over Voltage	
	1.25	Ground Switch Rated Voltage	
2	B	**HF COAXIAL CABLE**	
	2.1	Make	
	2.2	Type	
	2.3	Characteristic Impedance	
	2.4	Capacitance	
	2.5	Attenuation per km of Cable at various Carrier Frequency in the	
		Range of 5 to 500 kHz	
	2.6	Conductor Diameter	
	2.7	Dielectric Material	
	2.8	Shielding	

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Dy. General Manager (Contracts)
HP Power Transmission Corpn. Ltd.
Vidyut Bhawan, Khalini, Shimla-2

	2.9	Details of Protective Armouring provided		Single braid of 0.30mm GI wire with 70% coverage
	2.10	Test vVoltage (Center Core to Shielding 1 min 50 Hz)		4.5 kV rms
	2.11	Withstand Voltage		4 kV
	2.12	Details and Particulars of Insulation Loop		Center conductor wrapped with Polythene string & extruded over with Polythene tube Radial thickness 1.00 mm
	2.13	Resistance per km		30.0 ohm / km at 20 deg cent
	2.14	Overall Diameter of the Cable		13.00 mm (nom)
	2.15	Cross Section Drawing of the Cable furnished		Enclosed along with the offer
3	C	**WAVE TRAP**		
	3.1	Make		As per our proposed vendor list
	3.2	Type, Model & Catalogue No.		Air cooled / Epoxy impregnated
	3.3	System voltage rating		72 kV
	3.4	Continuous Current Rating at 50 °C Ambient		2000A
	3.5	Maximum Symmetrical Short Circuit Current Rating for 1 sec duration		50 kA
	3.6	Asymmetrical Peak Value of first Half Wave of Rated Short Time Current		127.5 kA
	3.7	Rated Inductance		1.0 mH
	3.8	Blocking Range		90-150 KHz or 110-500 KHz
	3.9	Minimum Guaranteed Resistive Component in Blocking Frequency Range		570 ohm
	3.10	Type of Tuning		[illegible]
	3.11	Variation in 50 Hz Impedance per degree Centigrade variation in Ambient Temperature		[illegible]
	3.12	Variation in Resonant Frequency Band per degree Centigrade variation in Ambient Temperature		[illegible]
	3.13	Details of Protection of Capacitors & Coils against Voltage Surges. Indicate Type of Protective Device		[illegible]
	3.14	Basic Insulation Level		[illegible]
	3.15	Standard Nominal discharge Current or 8 / 20 µs Wave Impulse		[illegible]
	3.16	Rated Voltage of Arrester Protective Device		[illegible]
	3.17	Maximum Discharge Capacity referred to Rated Voltage	Kj / kV	[illegible]
	3.18	Maximum Equivalent Front of Wave Protection Level at a Discharge Voltage with 0.5 x 1.5 µs (10 kA Impulse Current)		[illegible]

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

3.19	Maximum Switching Surge Residual Voltage at 1 kA	kVp	During Detailed Engineering
3.20	Minimum Switching Surge Residual V oltage at 1 kA	kVp	During Detailed Engineering
3.21	Maximum Residual Voltage of Protective Device for 8 / 20 µs		
	Discharge Current of		
	a) 5000 Amperes		40 kV
	b) 10,000 Amperes		90 kV
3.22	Class of Insulation of Line Trap as per Table - I of IEC: 353		Class F
3.33	Visual Corona Extinction Voltage		> 320 kV
3.34	Radio Interference Voltage at ....kVrms		Less than 500 Micro V at 320 kV
3.35	Resistive Component of Impedance within its Carrier Blocking Range		During Detailed Engineering
3.36	Type of Incoming & Outgoing Terminals		Aluminium flat pads
3.37	Corona Rings provided	YES / NO	Copper Coils provided
3.38	Bird Barriers provided	YES / NO	Yes
3.39	Number of Turns in Line Trap Main Coil & Number of Layers		During Detailed Engineering
3.40	Overall Dimension		2210mm
3.41	Type of Mounting		Pedestal type

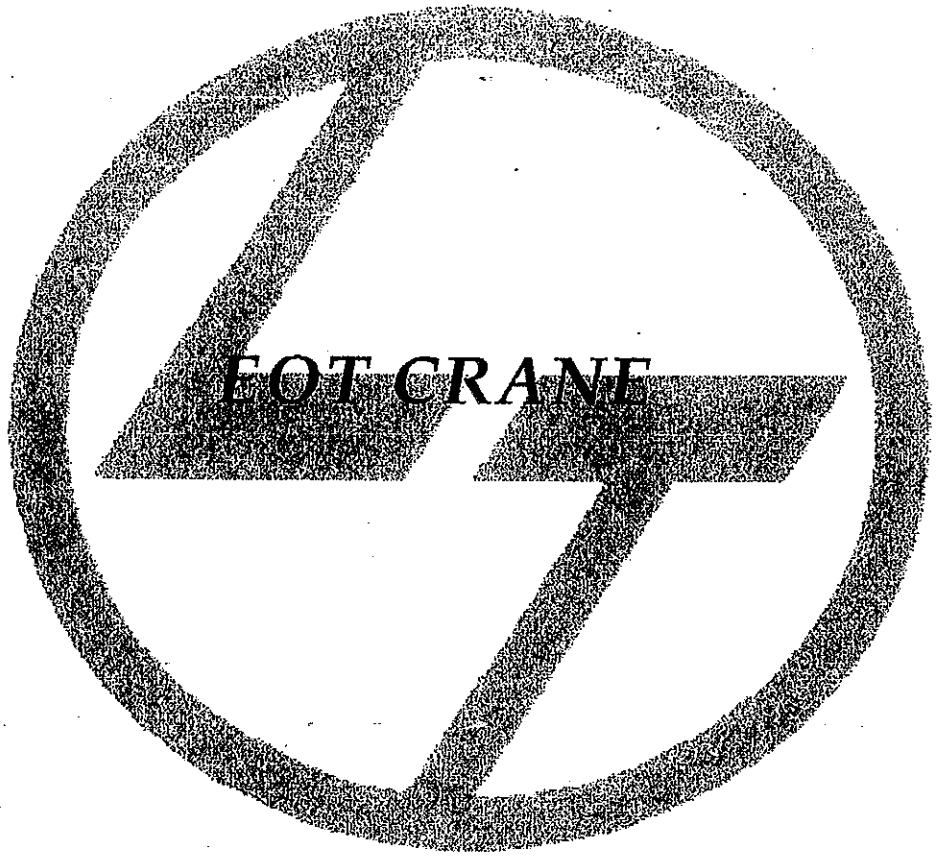
LARSEN & TOUBRO LIMITED CHENNAI 600 089 ELECTRICAL & AUTOMATION

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Group

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009



BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

CRANE PARAMETERS

DESIGN CRANE	:	SINGLE GIRDER ELECTRICALLY OPERATED TRAVELLING confirming to IS:807, IS:3177 & IS:3938 Class-II, Medium duty Indoor, suitable for operation at 415±10% volts, 3 phase, 50 Cs, A.C supply and tested to 25% overload and other wise as per following specifications:-
Quantity	:	**1 No.**
Type of Crane	:	Single Girder
Capacity	:	3.5 ton
Span	:	11.0 mtr.
Clear lift	:	6.0 mtr.
Side Clearance	:	250 mm
Bay Length	:	22.0 mtr.
L.T. WHEEL LOAD	:	3.3 ton
WEIGHT OF CRANE	:	3.5 ton
SPEEDS		
Hoist – Main	:	---------- 3.0 M/min. ----------
C.T.	:	---------- 10.0 M/min. ----------
L.T.	:	---------- 20.0 M/min. ----------
Operation	:	Electrically operated by means of pendant push button stations.
Size of gantry rail (recommended)	:	40 mm sq. bar
BRIDGE GIRDER	:	Single Girder RSJ / plate box from steel Sections as per IS:2062.
END CARRIAGE	:	Fabricated from Mild Steel Plates / Channels.
HOISTING MECHANISM	:	By means of Wire rope Hoist arrangement confirming to relevant IS:3938.
CROSS TRAVEL MECHANISM	:	By means of Motorised Travelling trolley running along the Lower flange of the Bridge Girder.
LONG TRAVEL MECHANISM	:	By means of Electric Motors fitted one number each on both End Carriages.
L.T.WHEELS		
Type	:	Double Flanged Geared wheel mounted in fixed Axles on Self aligned anti friction type bearings.
Tread Dia.	:	Ø 200 mm
Lubrication	:	Grease packed with Grease Nipples.
WIRE ROPE		
Type of Construction	:	6x36 Construction, Hemp Core as per IS:2266.
Rope Diameter	:	10 mm
Number of Rope Falls	:	4
Factor of Safety	:	5 As per IS:3938

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Dy. General Manager (Comml.)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-3

ROPE DRUM

Materials	:	M.S. Fabricated / Seamless as per IS:2062

GEAR BOX

Type & Material of Gear Box

Hoist	:	Cast Steel
C.T.	:	Cast Steel
L.T.	:	Cast Steel

Lubrication

Hoist	:	Splash Oil lubrication with oil level sight glass indication, drain plug & inspection cover etc.
C.T & L.T	:	Grease packed lubrication with necessary seals and grease nipples.

GEAR & PINION	:	Spur / Helical as per IS:4460
Material - Gear	:	SAE:8620
- Pinion	:	20 Mn Cr 5

BEARINGS

Type	:	Needle / Ball / Roller Anti friction Bearings
Lubrication	:	Grease

LIFTING HOOK

Type	:	'C' shank type
Material	:	En-3A as per IS:1875

BUFFERS : 4 no. rubber type buffers will be mounted on each end of End carriage to absorb shock during normal operation of L.T. drive.

BRAKE : 'FAIL TO SAFE' action type electro magnetic disc type brake shall be provided.

MOTORS

Type	:	Totally enclosed Squiral Cage Induction Motors.

Rating

Hoist	:	3.0 H.P.
C.T.	:	0.5 H.P.
L.T.	:	2 x 0.5 H.P.
Class of Insulation	:	'F'

LIMIT SWITCHES

Type

L.T. & C.T.	:	Roller lever type
Hoisting	:	Snap Action type

Quantity

C.T.	:	1 no. of two way type
L.T.	:	2 no. of one way type
Hoisting	:	2 no. of snap action type

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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POWER SUPPLY	:	415V ± 10%, 50 Hz., 3 phase, A.C.
CONTROL VOLTAGE	:	110V A.C.
PENDANT PUSH BUTTON	:	The pendant will consist of push buttons having provision for emergency OFF, ON, HOISTING,LOWERING, LEFT, RIGHT, FORWARD, REVERSE.
PAINTING	:	The structure will be painted with 2 coats of Synthetic Enamel Pain of Golden Yellow color with Black bands after applying Red Oxide Primer.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

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DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

FIBER OPTIC TERMINAL EQUIPMENT

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

FIBRE OPTIC MULTIPLEXER EQUIPMENT

SL. No.	Description	Unit	Bidder's Data
1	**GENERAL:**		
	Manufacturer		As per our list of proposed makes
	Model No.		During detailed engineering
	Type		During detailed engineering
	Type of multiplexer		Digital
	Complying to ITU-T rec.		Yes
	Transmission Capacity	Mbit/s	155 Mbps
	Access capacity on 64 kbit/s	channels	>120 Channels
	Access capacity on 2 Mbit/s	channels	16E1
	Redundant central processor		Yes
	Digital cross connect function		Yes
2	**Available AGGREGATES:**		
	Optical aggregates (ITU-T G.957)		S-1.2, L-1.1, L-1.2,S-4.2, L-4.1, L-4.2
3	**Available TRUNK INTERFACES:**		
	HDB3, 2 Mbit/s interfaces per module	No.	1/4
	Complying to ITU-T rec.		Yes
	HDSL, 2Mbit/s interface: no of copper wires - Capacity on 2Mbit/s or on 1Mbit/s - Capacity selectable	No. ch ch / pair of wire	2/4 Yes
4	**Available USER INTERFACES**		
5	**Voice interfaces for trunk lines:**		E&M, FXO
	1 + 1 com path protection, available for all		Yes
	Analogue, 4wire with E&M: Input level Output level	dBr dBr	-21 to +10dB for both
	Analogue, 2wire with E&M: Input level Output level	dBr dBr	-21 to +10dB for both
	Digital, 2Mbit/s CAS or PRI		Yes CAS and PRI
6	**Voice interfaces for remote Subscriber:**		
	2wire, subscriber side	dBr	-21 to +10dB
	2wire, PABX side	dBr	-21 to +10dB
7	**Integrated teleprotection**		
8	**Interface for Commands:**		

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LARSEN & TOUBRO LIMITED CHENNAI 600 086

Deputy General Manager (Contracts)
Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SL. No.	Description	Unit	Bidder's Data
	Number of independent commands	No.	8
	Transmission time max.	ms	20ms as per IEC
	Signal voltage	Vpeak	Input 48 - 250VDC Output upto 290 Volt
	1 + 1 com path protection		Yes available
9	**Interface(s) for Differential Protection:**		
	Electrical interface: G.703	kbit/s	64 kbps
	Optical Interface	kbit/s	Nx64kbps with C37.94
10	**Data: channels per module**		
	1 + 1 com path protection, available for all		Yes through SDH MSP protection
	V.24/V.28 (RS-232): up to 38.4kbit/s	No.	5 / 8
	V.11/X.24 (RS-422): 64kbit/s	No.	6
	V.35: 64kbit/s	No.	6
	V.36 (RS-449): 64kbit/s	No.	6
	G.703: 64kbit/s	No.	8
	Ethernet: 10/100 BaseT WAN capacity Protocols	No. Mbit/s Mbit/s	2 / 8 Upto 2 Mbps TCP/IP, PPP, HDLC
11	**Integrated alarm gathering module:**		
	Number of external alarms per module	No.	8 IN+8 OUT
	Auxiliary power supply for ext. contacts		Dry Contacts
12	**Network Management System**		
	Type/Name of configuration tool		LCT5000
	For fault / configuration management		Yes
	For local / remote operation		Yes
	Data communication network (DCN)		Yes
13	**Ambient Conditions:**		
	Storage: ETS 300 019-1-1, class 1.2	°C / % hum	Yes
	Transport: ETS 300 019-1-2, class 2.2	°C / % hum	Yes
	Operation: ETS 300 019-1-3, class 3.1E	°C / % hum	Yes
14	**Power Supply**		
	Operation	VDC	-48VDC
	Fully redundant power supply		Yes

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L&T L&T

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

099

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

LEAD ACID TUBULAR BATTERY & BATTERY CHARGER

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED Construction Group

Deputy General Manager (Contracts)
[illegible] Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

TENDER SPECIFICATION No. : HPPTCL / DGM (Contracts) /

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - H

BIDDER'S NAME AND ADDRESS:

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BATTERY & BATTERY CHARGER

Sr. No.	PARAMETER		TO BE FILLED IN BY THE BIDDER
A.	BATTERY		
1	GENERAL		As per our list of proposed makes During Detailed Engineering
1.1	Make		
1.2	Catalogue Number		
1.3	Type		LEAD ACID TUBULAR
1.4	Reference Standard		IS 1651
2	RATING		
2.1	Rated Voltage	Volt	220 V / 48 V
2.2	5 hour Rating at 27 °C to 1.1 Volt per Cell	AH	333.20 AH at 1.82 E.C.V.
2.3	1 hour Discharge Rate to 1.1 Volt per Cell	Amp	200 AH at 1.75 E.C.V.
2.4	1 minute Discharge Rate to 1.1 Volt per Cell	Amp	

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TOUBRO LIMITED H CHENNAI 600 059

Sr. No.	PARAMETER		TO BE FILLED IN BY THE BIDDER
3	PERFORMANCE		
3.1	Required Duty Cycle		
3.2	Is the Battery furnished meets Duty Cycle	Yes / No	Quoted as per BOQ furnished for you
3.3	Cell Voltage Characteristics during Duty furnished ?	Yes / No	During detailed Engineering
3.4	Minimum Cell Voltage during Duty Cycle	Volt	≥85%
3.5	AH Efficiency at 5 hour Discharge Rate	%	10-12 years at 27°C in ideal float condition
3.6	Expected Life of Battery	Hr.	
4	BATTERY CHARACTERSTICS		
4.1	Recommended Charging Rate for	Volt / Cell	Ampere
a.	Float Charging		2.2 V/cell 60A
b.	Equalizing Charge		2.3 V/cell 20A
c.	Boost Charging in 10 hrs.	Start	2.75 V/cell 48A (Start)
		Finish	24A (Finish)
4.2	Recommend Specific Gravity at 27°C		
a)	For First Filling		1.190 +/- 0.005
b)	At Full Charge		1.200 +/- 0.005
c)	At end of 5 hour Discharge		
4.3	Short Circuit Current for a Dead - Short across Battery Terminals when:		
a)	Float Charge at Rated Volt / Cell		} Shall be furnished later During detailed Engineering.
b)	Boost Charge at Rated Volt / Cell		
4.4	Battery Internal Resistance	ohm	
4.5	Cell Voltage Characteristics during Charging furnished ?		

Deputy General Manager (Contracts)
Himachal Pradesh Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
5	CELLS			220V 48V
5.1	Number of Cells per Battery			110 24
5.2	Type of the Cell			Lead Acid Tubular (NDP) TM 400H MARK 1
5.3	Cell Designation as per I.S.			
5.4	Material of the Container			
5.5	Overall Dimension of each Cell		mm	320 x 186 x 466 mm (tentative)
5.6	Weight of Complete Cell			
a)		Without Electrolyte	kg	27.2 kg ± 5%
b)		With Electrolyte	kg	41.5 kg ± 5% (approx)
5.7	Internal Resistance of Cell		ohm	0.535 milliohms (tentative)
6	INTER CELL CONNECTOR			
6.1	Inter Cell Connector furnished ?			Yes
6.2	Type of Inter Cell Connector Bolted / Burned			Bolted
6.3	Material of Inter Cell Connector			Lead plated Copper
7	PLATES			
7.1	Number of Positive Plates per Cell			10
7.2	Type of Positive Plate			Lead- Antimony alloy spine
7.3	Type of Negative Plate			Lead- antimony alloy grid
8	SEPARATOR			
8.1	Type			PVC
8.2	Material			PVC
8.3	Thickness			1.27 mm

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T-TOUBRO LIMITED (Electrical & Construction)

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
9	ELECTROLYTE			
9.1	Amount of Electrolyte for First Filling			
a)		Per Cell	Litre	12 l
b)		Per Set	Litre	1452 l (for 220V) / 316 l (for 48V)
9.2	First Filling with 10 % extra furnished ?			Yes
9.3	Electrolyte conform to			
10	RACKS			
10.1	Number of Racks per Battery			} Depends on Battery layout
10.2	Number of Cells per Rack			
10.3	Type of Racks Rows /		Rows / Tiers	
10.4	Material of Rack			Good quality wood
10.5	Racks provided with			
a)		Numbering Tags for Cells		Yes
b)		Teakwood Clamps for Cables		
10.6	Insulator with 5 % extra furnished for			
a)	Cell		Yes / No	No
b)	Stand		Yes / No	Yes
10.7	Inter Row, Inter Tier Connectors and End Take - Off furnished ?			Yes
10.8	Connection Hardware with 5 % extra furnished			Yes
11	DIMENSIONS AND WEIGHTS			
11.1	Overall Dimension (L x B x H)		mm	Depends on Battery Room Layout
11.2	Approximate Weight		kg	27.2 kg (without acid), 91.5 kg (with acid)
11.3	Battery Layout Drawing furnished ?			Yes
12	Ventilation requirements			

LARSEN & TOUBRO LIMITED Construction Electrical Channel

Regional Manager (Contracts)
Power Transmission Corpn. Ltd.
Baldwalia House, Khalini, Shimla-2

Sr. No.	PARAMETER		TO BE FILLED IN BY THE BIDDER
13	Accessories furnished with each Battery		Yes, as per the specifications
B.	BATTERY CHARGER		
1	GENERAL		
1.1	Make		As per our list of proposed makes During detailed Engineering
1.2	Catalogue Number		SF SFCBC (Float/Float-cum Boost Charger)
1.3	Type		IEEE/Tender
1.4	Reference Standard		
2	A. C. INPUT		
	a) Voltage % variation	Volt	415 V ± 10%
	b) Number of Phase		3-Phase
	c) Frequency % variation	Hz	50 Hz
2.2	D. C. OUTPUT		Float Charger / Float Cum Boost Charger
	a) Voltage	Volt / Cell	2.2 V/cell / 2.7 V/cell
	b) Current	Ampere	60 A / 60 A
2.3	Type of Cooling		Natural Air Cooled
2.4	Maximum Temperature within Cubicle above 30 °C Ambient		
	a) Rectifier Transformer	°C	75°C above ambient
	b) SCR	°C	55°C above ambient

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

TOUBRO LIMITED

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
3	PERFORMANCE			
3.1	Regulation for 0-100 % Rated Load with 10 % Input Voltage and 5 % Input Frequency Variation		%	±1%
3.2	Ripple Content in D. C. Output			
a)	With Battery		%	≤2% P-P
b)	Without Battery		%	≤2% P-P
3.3	Guaranteed Efficiency at Rated Load		%	≥80% at nominal Input & at rated load
3.4	Power Factor at Rated Load		%	>0.8 lagging
4	MISCELLANOUS			
4:1	CHARGER provided with following features			
a)		Automatic Voltage Regulation		Confirmed
b)		Current Limiting Circuitry		Confirmed
c)		Smoothing Filter Circuit		"
d)		Soft - Start Feature		"
e)		is Manual Operation Permissible		~~Yes~~
4.2	SCR Elements provided with			
a)		Surge Protection		Yes
b)		Fast acting HRC Fuse		Yes
5	A. C. SWITCH			
5.1	Make			MCCB used
5.2	Type / Catalogue Number			
5.3	Reference Standard			Thermomagnetic
5.4	Rated Current		Ampere	120% of the rated reqd. current
6	A. C. FUSE			
6.1	Make			

Manager (Contracts)
Transmission Corpn. Ltd.
Vidyut House, Khalini, Shimla-2

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
6.2	Type / Catalogue Number			HRC / HBC
6.3	Reference Standard			As per IS
6.4	Current Rating			
a)	[illegible]	Continuous	Ampere	As per circuit requirement
b)	[illegible]	Interrupting	kA	33 kA/80 kA
7	A. C. CONTACTOR			
7.1	Make			Electromagnetic
7.2	Type / Catalogue Number			IS 13947
7.3	Reference Standard			120% of reqd- rated current
7.4	Rated Current		Ampere	AC-1 duty
7.5	Utilization category			Separate SPP card provided
7.6	Thermal Overload with in - built Single Phase Preventor provided ?			
8	RECTIFIER TRANSFORMER			Statcon
8.1	Make			Double Copper wound vacuum impregnated
8.2	Type / Catalogue Number			IS 1180
8.3	Reference Standard			
8.4	Ratings			
a)		kVA		220 V 48 V
b)		Voltage		FC FCBC FC FCBC
c)		% Reactance		KVA 18.9 23.13 4.35 5.27
8.5	Class of Insulation			Voltage 415V 415V 415V 415V
8.6	Method of Cooling			+/- Reactance 5 +/-
				Class F
				Natural Air Cooled
9	CONTROLLED RECTIFIER (SCR)			
9.1	Make →			Monocrystalline Silicon
9.2	Type / Catalogue Number			

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
9.3	Reference Standard			As per IS
9.4	rms Current Rating		Ampere	140 A
9.5	Surge Current			
a)	One - Cycle	One - Cycle	Ampere	1.70 KA for 10 ms
b)	Repetitive Cycle	Repetitive Cycle	Ampere	140 A
9.6	Peak Inverse Voltage			
a)		Continuous	Volt	800 V min
b)		Surge	Volt	1200 V
10	D. C. FUSE			
10.1	Make			As per IS
10.2	Type / Catalogue Number			
10.3	Reference Standard			
10.4	Current Rating			
a)		Continuous	Ampere	As per circuit requirement
b)		Interrupting	kA	33 kA / 80 kA
11	D. C. CONTACTOR			
11.1	Make			Electromagnetic
11.2	Type / Catalogue Number			
11.3	Reference Standard			As per IS 13947
11.4	Current rating		Ampere	120% of resp. rated current
11.5	Utilization category			AC-1 duty
12	BLOCKING DIODE			
12.1	Make			Monocrystalline Silicon
12.2	Type / Catalogue Number			

LARSEN & TOUBRO LIMITED Construction Group
Manager (Contracts)
Transmission Corpn. Ltd.
Vidyut Vyapar Bhawan, Khalini, Shimla-2

Sr. No.	PARAMETER			TO BE FILLED IN BY THE BIDDER
12.3	Reference Standard			As per IS
12.4	Current Rating			
a)		One Minute	Ampere	3-6 KA for 10 ms
b)		One Hour	Ampere	200 A (rms)
12.5	Peak Inverse Voltage		Volt	800 V min.
13	INDICATION LIGHTS			
13.1	Make			
13.2	Type / Catalogue Number			
13.3	Reference Standard			LED type As per IS
13.4	Wattage		Watt	
13.5	Series resistor		Ohm	
14	METERS			
14.1	Make			
14.2	Type / Catalogue Number			
14.3	Reference Standard			Digital As per IS
14.4	Size			96 x 96 mm
14.5	Accuracy			±1.5 %
15	ALARM FACIA			
15.1	Make			
15.2	Type / Catalogue Number			
15.3	Reference Standard			As per IS
15.4	Number of Window per Facia			Two
16	CHANGE OVER SWITCH			
16.1	Make			

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED

Sr. No.	PARAMETER		TO BE FILLED IN BY THE BIDDER
16.2	Type / Catalogue Number		Rotary
16.3	Reference Standard		As per IS
16.4	Rating	Ampere	120% of reqd-rated current
16.5	Number of Poles		As per circuit requirement
16.6	Key Interlock furnished ?		No
17	D. C. SWITCH		MCCB used
17.1	Make		
17.2	Type / Catalogue Number		
17.3	Reference Standard		
17.4	Rating	Ampere	Thermomagnetic 120% of reqd-rated current
17.5	Number of Poles		
17.6	Key Interlock furnished ?		
18	CHARGER PANEL		
18.1	Make		
18.2	Type		Free Standing, floor mounting
18.3	Reference Standard		As per IS's
18.4	Enclosure		
	a) Degree of Protection		IP-42
	b) Sheet Steel Thickness	mm	2 mm
18.5	Panel provided with		
	a)	Internal Lamp with Door - Switch	Yes
	b)	Space Heater with Thermostat	Yes
	c)	5A, 3 Pin Receptacle	Yes
18.6	Internal Wiring		
	a)	Insulation	PVC
	b)	Voltage Grade	660V/1100V

LARSEN & TOUBRO Construction Group
Transmission Corp.
Lawrie House, Khalini, Shimla

Sr. No.	PARAMETER		TO BE FILLED IN BY THE BIDDER
	c)	Minimum Conductor Size	0.5 mm^2 for Electronic Cards, 1.5 mm^2 for Control equipments
18.7	Power Terminals		
	a)	Make	
	b)	Size / Catalogue Number	
18.8	Control Terminals		
	a)	Make	
	b)	Size / Catalogue Number	Screw type base mounted 2-5 mm^2 minimum
	c)	20 % Spare Terminal furnished ?	Yes
18.9	Ground Terminal furnished ?		Yes
18.10	Overall Dimension (L x B x H)	mm	1200H x 1300D x 650D (tentative)
18.11	Approximate Weight	kg	Shall be furnished later
18.12	General Arrangement drawings furnished ?		As per the specification
18.13	Accessories as specified furnished with Battery Charger		

Date:
Place:

(Signature)
(Printed Name)
(Designation)
(Common Seal)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED Power Construction Group

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

STRUCTURAL STEEL

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED Construction Chennai

Transmission Corp.
Himachal House, Khalini, Shimla

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - M

BIDDER'S NAME AND ADDRESS:

STRUCTURAL STEEL MATERIALS

Sr. No.	PARAMETER	TO BE FILLED IN BY THE BIDDER
1	**STEEL**	
1.1	Make	Reputed Make
1.2	Reference Standard	IS
1.3	Ultimate Tensile Strength of Steel Sections	Limited to 2600kg/sq.cm
1.4	Weight of Zinc Coating	Shall be furnished during detailed engineering
1.5	Thickness of Zinc Coating	0.610kg/sqm
1.6	Nuts & Bolts	
i)	Make	Reputed Make
ii)	IS to which conform	6639

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

245KV CVT

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED Construction Channel

(Design)
Transmission Corp.
House, Khalini, Shimla

AREVA

CAPACITOR VOLTAGE TRANSFORMER

SL.NO	DESCRIPTION	PARTICULARS
1	Name and address of Manufacturer	AREVA T&D India Ltd./ABB/ SIEMENS/ CGL
2	Manufacturer's type designation	During Detailed Engineering
3	Standards applicable	IEC 60044-5, 60358 & IS 3156
4	Rated primary voltage	245KV / ROOT3
5	Rated secondary voltage	110V / ROOT3
6	Number of secondaries	Three
7	Rated freaquency	50HZ
8	Rated output of each winding	50VA Each
9	Total simultaneous burden	100VA
10	Rated total thermal burden	750VA
11	Highest system voltage	245KV rms
12	Rated voltage factor and corresponding time	1.2 Continous and 1.5 for 30 Seconds
13	Accuracy class of each secondary winding	3P 3P 0.2
14	CAPACITANCE	
	High voltage	Durind Detailed Engineering
	Intermediate voltage	Durind Detailed Engineering
15	Carrier freaquency coupling	8800pF +10%-5%
16	Natural frequency of Coupling	> 500KHz
17	Self tuning frequency of CVT	> 500KHz
18	Band width	40-500KHZ
19	One minute power freaquency test voltage of secondary winding	3KV rms
20	One minute power freaquency test voltage of HF terminal	4KV rms
21	One minute power freaquency test voltage of capacitor	460KV rms Dry and Wet
22	1.2/50 micro-sec impulse withstand voltage of capacitor	1050KVp
23	250/2500 micro sec switching surge withstand	NA
24	Corona extinction voltage	>156KV rms
25	Max.Radio Interference voltage at 1.1Ur/root3 at 1.0MHz	<2500micro-volts
26	Total weight	As per Drg
27	Quantity of oil	As per Drg
28	Whether CVTs are hermetically sealed.	Yes, by using Gaskets
29	Compliance to technical specification	Yes for Bushing Insulator
30	Confirm whether similar equipment is type tested as per IEC 186 and in successful operation for at least 2 years	Yes

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SPECIFICATION NO.: DGMC/PALCHAN SUBSTATION/2/2009

198KV OUTDOOR SURGE ARRESTOR

BIDDER:
LARSEN & TOUBRO LIMITED
ECC DIVISION, EI&C SECTOR,
CHENNAI, INDIA.

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LARSEN & TOUBRO LIMITED Construction Chennai

Transmission Corpn.
House, Khalini, Shimla

GUARANTEED TECHNICAL PARTICULARS OF SURGE ARRESTERS
(198KV 10KA CLASS-3 31mm/KV)

1.	Name and Address of the manufacturer		: LAMCO INDUSTRIES PRIVATE LIMITED., B-39,I.E,Sanathnagar, HYDERABAD- 018 (A.P) : INDIA
2.	Manufacturer's Type Designation		: Station class & Outdoor,Metal oxide Gapless "MORESTER" type " LMAS "
3.	Applicable Standard		: IEC 99-4 of 2004/ IS 3070 (Part-3) 1993
4.	Arrester Class and Type		: Heavy duty Station class Metal oxide gapless "MORESTER" type " LMAS "
5.	Rated Arrester Voltage	KV	: 198
6.	Rated System Voltage	KV	: 220/245
7.	Max. Continuous operating voltage (MCOV) at 40 degree centigrade ambient temperature	KV	: 168
8.	Nominal Discharge current (8/20 micro sec.wave)	KA	: 10
9.	Min. Discharge Capability	(KJ/KV)	: 9 (for 3 shots)
10. a.	Max. Residual Voltage at Nominal Discharge Current	(KVpeak)	: 550
10. b.	Min. Residual Voltage at Nominal Discharge Current	(KVpeak)	: 475
11. a.	Max. Residual Voltage at 50% Nominal Discharge Current	(KVpeak)	: 515
11. b.	Max. Residual Voltage at 200% Nominal Discharge Current	(KVpeak)	: 610
12.	Steep Fronted Wave Residual Voltage at 1 KA	(KVpeak)	: 600
13.	Long Duration Discharge Class		: 3
14.	Impulse Current Withstand		
	a. High Current Short Duration (4/10 micro sec wave) in	KVp	: 100 KAp
	b. Low Current Long Duration (2000 micro sec)		: 500-600A & 2400us
15.	Current for Pressure Relief Test	KA	: 40
16.	Pressure Relief Class (as per IEC 99)		: " A "

Cont.....2

LARSEN & TOUBRO LIMITED Construction Chennai

LARSEN & TOUBRO LIMITED CHENNAI 600 058

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

17. One minute power frequency (Dry) withstand voltage of arrester housing	KVrms	: 460
18. Lightning Impulse withstand test voltage of Arrester housing with 1.2/50 micro sec wave	KVp	: 1050
19. Total Creepage Distance of whole Arrester Hosuing		: 7595
20. Cantilever Strength of complete Arrester(N)		: 10,000
21. Total Height of the Arrester	mm	: 3420 ±132
22. Total Weight of the Arrester	Kgs	: 230 ±10%
23. Max. Radio Interference Voltage at 1.1 Ur//3 Voltage at 1 MHz (micro volts)		: 2500
24. Partial Discharge at 1.05 Continuous Operating Voltage (pC)		: Less than 10pC
25. Min. prospective Symmetrical Fault Current	KArms	: 40

26. **ZnO BLOCK DETAILS**

a. Confirm whether Equipment are Type Tested with offered type of ZnO Block	: Yes
b. Confirm whether similar Equipment are type Tested as per IEC/IS or equivalent Standard and are in sucessful operation for at least two years	: Yes
27. Overall General Arrangement Drawing of surge Arreser is to enclosed	: Yes
28. Minimum Creepage Distance	: 7595

for LAMCO INDUSTRIES PRIVATE LIMITED.

(B. RAJAIAH)
MANAGER (D&D)
19/4/10

LARSEN & TOUBRO LIMITED CHENNAI 600 059 EPC DIVISION

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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OBLUM ELECTRICAL INDUSTRIES PRIVATE LIMITED

A-19 & 17 Aashish Private Industrial Estate, Balanagar, Hyderabad - 500 037. A.P. (INDIA)
Grams : OBLUM, Phone : 2377 1660, 2377 4184, 23772708, Fax : 0091 (040) 23771166
E-MAIL : oblumelectricals@yahoo.co.in, oblumelectricals@hotmail.com : Website : www.oblum.com

ISO 9001

Arrestors

Ref. No. QUARANTEED TECHNICAL PARTICULAR FOR 198KV 10kA CLASS-III METAL OXIDE GAPLESS SURGE ARRESTERS Date :

Sl.no	Description	198 KV 10 KA CLASS-III
1	Name of the Manufacturer	M/s Oblum Electrical Industries Private Limited Hyderabad.
2	Type and Designation	Gapless Type, MITOVAR.
3	Model	ZAG-198-SM
4	Applicable Standards	IEC 60099-4 of 2006&IS: 3070(Part-III).
5	Rated frequency	50Hz.
5	No. of units per set	Three units of 66 kV each.
6	Highest system voltage	245 kV.
7	Nominal system voltage (kV)	220 kV.
8	System neutral earthing	Solidly Earthed system.
9	Rated voltage (kV rms)	198 kV.
10	Nominal discharge current (8/20μsecond wave)	10 kA.
11	Long duration discharge class	Discharge class – III.
12	Maximum continuous operating Voltage (kV)	168 kV.
13	Insulation withstand test Voltages a) One Min. Power Frequency Withstand Voltage (Dry&Wet) b) Lightning Impulse Withstand Voltage	 460kV. 1050KVp.
14	Max. Residual Voltage for Discharge Current of 8/20 μseconds a) 5000 Amps. b) 10000 Amps. c) 20000 Amps.	 518kVp. 550kVp. 610kVp.
15	Maximum Steep Current Impulse Residual Voltage at 10kA of 1 μ second front Time.	610kVp.
16	Maximum Switching Impulse Residual Voltage 30/60μ second at 1000 Amps.	455kVp.
17	Minimum energy discharge capability	6kJ/kV (OD test).
18	Long Duration Current impulse a) Current peak Amps. b) Virtual duration μ sec.	 600Amps. 2400μsec.
19	Reference Current	3mA.
20	Protective ratio = BIL of equipment / Max.RDV	1050kV / 550kV = 1.9.
21	High Current Impulse Withstand Value (4/10 μ second)	100kA.
22	Pressure relief class i) High current ii) Low Current	 40kA / Class-'A'. 600±200A.
23	Currents at MCOV (Maximum Continuous Operating Voltage) i) Resistive Current ii) Capacitive Current	 Less than 500 μAmps. About 1500 μAmps.
24	Partial discharge P.D	Less than 10 pC.

GTP-198KV 10kA CL-III

LARSEN & TOUBRO LIMITED EPC Division CHENNAI 600 034

LARSEN & TOUBRO LIMITED Construction Chennai

By, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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OBLUM ELECTRICAL INDUSTRIES PRIVATE LIMITED

A-16 & 17 Asstiged Private Industrial Estate, Balanagar, Hyderabad - 500 037, A.P. (INDIA).
Grams : OBLUM, Phone : 23771880, 23774184, 23772708, Fax : 009 (040) 23771100.
E-MAIL : oblumelectricals@yahoo.co.in, oblumelectricals@hotmail.com Website : www.oblum.com

ISO 9001

Surge Arresters

Sl.no	Description	198 kV 10 kA CLASS-III
25	Temporary Over Voltage Capability i) 0.1 Second ii) 1.0 Second iii) 10 Seconds iv) 100 Seconds	 350kVp 336kVp 322kVp 308kVp
26	Total Creepage Distance	6125mm (min).
27	Minimum Clearance i) Between Arresters ii) Arrester and adjoining earthed objects	 3600mm. 3000mm.
28	Over all dimensions i) Height from mounting plane ii) Diameter of Shed	 2790±150mm. Bigger: 270mm; Smaller: 240mm.
29	Cantilever Strength	1000 KGM.
30	Mounting flange dimensional details	4-holes of 17 mm dia over a PCD of 296±6mm.
31	Weight	220kGS±10%.

GUARANTEED TECHNICAL PARTICULARS FOR SURGE MONITOR

Sl. No.	Description	Technical Particulars
Counter Operation		
1	Make	Oblum Electrical Industries Private Limited
2	Model	SM-TZP-3R
3	Type	Non Reset, Rectified Type milli ammeter.
4	Sensitivity of Surge Counter (min. current at which the Counter operates)	100A-8x20 µSec.
5	Nominal Discharge Current	10 kA
6	Max. Current to be withstood by the Surge Monitor	100 kA
7	Counter operation	One count per Surge
Operation of Current Meter		
8	Safe Leakage Current Indication	0 to 2 mA (Green Band)
9	Indication of deterioration of Surge Arrester	2 to 5 mA (Red Band)
10	Mtg. Weight	2.5 KGS. (approx.)

For OBLUM ELECTRICAL INDUSTRIES PVT.LTD.

(O.BALAGANGADHAR)
MANAGING DIRECTOR.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters : Mount Poonamallee Road Manapakkam P B No 979 Chennai – 600 089. INDIA
Tel : +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345
Web : www.lntecc.com
www.larsentoubro.com

LTCD/EIC/HPPTCL/PALCHAN/NJ/BID07

30th August, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002.

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

With reference to the telephonic discussion our Mr. S Kirupa Shankar with you on 28th August, please find our point wise confirmation herewith.

HPPTCL Queries	L&T Replies
Please confirm the following Panels has been included in your offer 1) LT Transformer Protection Panel 2) 33kV Bus Coupler Panel 3) Disturbance Recorder Panel	1) Confirmed 2) Confirmed 3) Confirmed

Hope the above is in line with the requirements.

Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

(K.Rajaram)
Head Business Development & Contracts
EI&C Sector

Regd. Office: L&T House, Ballard Estate, P.O.Box 278, Mumbai – 400 001. Tel: 022-6752 5656 Fax: 022-55525858
Website : www.larsentoubro.com

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

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LTCD/EIC/HPPTCL/PALCHAN/KRJ/2109

21ST September, 2010

The Director (Planning & Contract)
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002,

Kind Attention: Er. V.K. Kaprate

Fax No.0177-2626284

Dear Sir,

Sub: Negotiation of Rates against tender for Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

Ref: 1. Your letter No. HPPTCL/DGMC/L&T-PALCHAN/2010-3651 dated 09.09.10
2. Negotiation meeting held at your office on 21st September 2010

We thank you very much for the kind courtesy extended to the undersigned when we visited your office today.

We are enclosing herewith the List of Spares along with price break-up as per your requirement.

As explained during the Negotiations meeting, we have already offered our best possible price during bidding stage considering the stiff competition from equipment manufacturers. This is also evident from the tender opening results, wherein our prices are almost ten per cent lower than the next lowest.

Also, as informed, the job involves construction in a difficult terrain within a very short duration which requires timely mobilization, Design, Detailing, and expert Project Management and Construction capabilities which are our domain strength.

Regd. Office: L&T House, Ballard Estate, P.O.Box 278, Mumbai – 400 001. Tel.:022- 55525656 Fax: +022-55525858
Website : www.larsentoubro.com

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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However, in deference to your request for price reduction, we are pleased to offer a token price reduction of Rs. 7,00,000/- (Rupees Seven lakhs only) on our quoted price for Mandatory spares:

MANDATORY SPARES (Before discount)	-	1,55,28,766/-
MANDATORY SPARES (After discount)	-	1,48,28,766/

Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

(K.Rajaram)
Head Business Development & Contracts
EI&C Sector

LARSEN & TOUBRO LIMITED Construction Chennai

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

PRICES OF MANDATORY SPARES

Sr. No.	DESCRIPTION	UNIT	QTY.	PRICE	TOTAL
1	2	3	4	5	6 = 4 x 5
A	**220 kV GIS CIRCUIT BREAKER**				
i	245 kV, Three Phase, Circuit Breaker Interrupting Chamber complete with all necessary Apparatus. (1 no. of each Rating)	No.	1	4,808,901	4,808,901
ii	Rubber Gasket, 'O' Rings and Seal	Set	1	30,281	30,281
iii	Trip Coils with Resistor	Nos.	3	10,093	30,279
iv	Closing Coils with resistor	Nos.	3	10,093	30,279
v	Molecular Filter	Set	3	30,281	90,843
vi	Density / Pressure Monitoring System	No.	1	50,468	50,468
vii	Relays, Power Contactors, Push Buttons, Timers & MCB etc.	Set	1	121,124	121,124
viii	Closing Assembly / Valve	No.	1	Not Applicable	Not Applicable
ix	Trip Assembly / Valve	No.	1	Not Applicable	Not Applicable
x	Pressure Switches	Set	1	50,468	50,468
xi	Auxiliary Switch Assembly	No.	1	49,458	49,458
xii	Operation Counter	No.	1	40,375	40,375
xiii	Rupture Disc / Diaphram	No.	1	121,124	121,124
xiv	Windoscope / Observing Window	No.	1	Not Applicable	Not Applicable
xv	245 kV Three Phase Circuit Breaker Operating Mechanism, complete with all necessary connecting Apparatus. (Each Rating)	No.	1	Included in A i	Included in A i
xvi	All Type of Coupling for SF6 Gas (1 No. of each type)	Set	1	60,562	60,562
	TOTAL - A	-			**5,484,162**
B	**220 kV CURRENT TRANSFORMER**				-
1	Multi Ratio Single Phase Current Transformers of each Rating (3 Nos. of each Rating)	Set	1	2,230,374	2,230,374
	TOTAL - B				**2,230,374**
C	**220 kV POTENTIAL TRANSFORMER**				-
1	Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware.	Set	1	1,121,116	1,121,116

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED Power Construction

	TOTAL - C				**1,121,116**
D	**198 kV SURGE ARRESTOR**				
1	Complete Surge Arrestor (For 1 Phase) : GIS Type	Nos.	1	89,119	89,119
2	Surge Counter / Monitor	Nos.	1	597	597
	TOTAL - D				**89,716**
E	**245 kV ISOLATOR & EARTH SWITCH**				
i	245 kV, Single Phase Disconnecting Switch Internal Parts, complete with all necessary Gaskets, Mounting Hardware, etc.	Set	1	1,126,523	1,126,523
ii	245 kV, Single Phase Grounding Switch Internal Parts, complete with all necessary Gaskets, Mounting Hardware etc	Set	1	933,663	933,663
iii	245 kV, Single Phase High Speed Fault Making Grounding Switch, Internal Parts complete with all necessary Gaskets, Mounting Hardware etc	Set	1	1,126,523	1,126,523
	TOTAL - E				**3,186,709**
F	**33 kV GIS CIRCUIT BREAKER**				
i	36 kV, Three Phase, Circuit Breaker Interrupting Chamber complete with all necessary Apparatus. (1 no. of each Rating)	No.	1	Not Applicable	Not Applicable
ii	Rubber Gasket, 'O' Rings and Seal	Set	1	22,337	22,337
iii	Trip Coils	Nos.	3	8,775	26,325
iv	Closing Coils	Nos.	3	8,775	26,325
v	Molecular Filter	Set	3	3,191	9,573
vi	Density / Pressure Monitoring System	No.	1	23,932	23,932
vii	Relays, Power Contactors, Push Buttons, Timers & MCB etc.	Set	1	478,641	478,641
viii	Closing Assembly / Valve	No.	1	2,393	2,393
ix	Trip Assembly / Valve	No.	1	Not Applicable	Not Applicable
x	Pressure Switches	Set	1	2,393	2,393
xi	Auxiliary Switch Assembly (For CB)	No.	1	31,112	31,112
xii	Operation Counter (For CB)	No.	1	Not Applicable	Not Applicable
xiii	Rupture Disc / Diaphram	No.	1	16,752	16,752
xiv	Windoscope / Observing Window (If Applicable)	No.	1	Not Applicable	Not Applicable
xv	36 kV, Three Phase, Circuit Breaker Operating Mechanism, complete with all necessary connecting Apparatus. (Each Rating)	No.	1	780,184	780,184
xvi	All Type of Coupling for SF6 Gas (1 No. of each type) (If Applicable)	Set	1	Not Applicable	Not Applicable
	TOTAL - F				**1,419,967**

LARSEN & TOUBRO Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

G	**33 kV CURRENT TRANSFORMER**				-
1	Multi Ratio Single Phase Current Transformers of each Rating (3 Nos. of each Rating)	Set	1	264,449	264,449
	TOTAL - G				**264,449**
H	**33 kV POTENTIAL TRANSFORMER**				-
1	Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware	Set	1	198,636	198,636
	TOTAL - H				**198,636**
I	**30 kV SURGE ARRESTOR**				-
1	Complete Surge Arrestor including Insulating Base with Surge Counter & Accessories. : AIS Type	Nos.	1	16,441	16,441
2	Surge Counter / Monitor	Nos.	1	9,134	9,134
	TOTAL - I				**25,575**
J	**33 kV ISOLATOR & EARTH SWITCH**				-
i	36 kV, Three Phase 1250 Amperes Disconnecting Switch Operating Mechanism, complete with all necessary Connecting Apparatus.	Set	1	96,526	96,526
ii	36 kV, Three Phase 1250 Amperes Grounding Switch Operating Mechanism, complete with all necessary Connecting Apparatus.	Set	1	Part of Three Position Switch	
iii	36 kV, 2500 Amperes, Three Phase High Speed Fault Making Grounding Switch Operating Mechanism complete with all necessary Gaskets, Connecting Apparatus	Set	1	Not Applicable	Not Applicable
	TOTAL - J				**96,526**
K	**BATTERY**				-
	220 Volt / 48 Volt BATTERIES				-
a	Spare Battery Cell without Electrolyte	Nos.	10	29,707	297,070
b	Terminal Connectors with Bolts & Nuts (each type)	Nos.	10	4,570	45,700
c	Float Level Indicators (each type)	Nos.	10	1,427	14,270
d	Vent Plugs (each type)	Nos.	10	1,713	17,130
	TOTAL - K				**374,170**
L	**BATTERY CHARGER**				-
	220 Volt / 48 Volt BATTERIES CHARGERS				-
a	Set of Control Cards (of each type)	Set	1	73,204	73,204
b	Set of Relays	Set	1	8,785	8,785
c	Set of Contactor	Set	1	26,354	26,354
d	Micro - Switches	Set	1	Not Applicable	Not Applicable
e	Filter Capacitors	Set	1	8,785	8,785

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED

f	Thyristor / Diode	Set	1	11,713	11,713
g	Set of Switches	Set	1	24,012	24,012
h	Set of Wound RRsistors	Set	1	4,391	4,391
i	Potentiometers	Set	1	4,391	4,391
j	Fuses of Thyristor with Indicators	Set	6	3,806	22,836
	TOTAL - L				**184,471**
M	**LT SWITCHGEAR**				-
1	Relays (Aux.)	Set	1	99,877	99,877
2	CTs AND PTs	Set	1	8,615	8,615
3	Switches / Push Buttons and Meters	Set	1	28,799	28,799
4	TPN Switches / MCB	Set	1	98,434	98,434
5	L.T. Breaker Spares			-	-
	a) Spring Charging Motor	No.	1	28,802	28,802
	b) Auxiliary Contact Sets	Set	2	1,320	2,640
	c) Busbar Seal off Insulators	Nos.	5	480	2,400
	d) Arc-chutes	Set	2	3,960	7,920
	e) Moving Contacts	Set	1	3,360	3,360
	f) Arcing Contacts (Fixed / Moving)	Set	1	3,360	3,360
	g) Springs (Closing / Opening)	No.	1	600	600
	h) Closing Coil	No.	1	1,799	1,799
	i) Tripping Coil	No.	1	1,320	1,320
	j) Auxiliary Finger Contact	Set	1	1,260	1,260
	k) Limit Switches	Set	1	5,399	5,399
	l) Jaw Contacts	Set	1	390	390
6	Busbar			-	-
	a) Busbar Insulators	No.	5	150	750
	b) Interphase Barrier	No.	2	750	1,500
	c) Busbar Strip 1 mm (Aluminium)	metres	5	1,125	5,625
	TOTAL - M				**302,850**
N	**DG SET**				-
1	Set of Filters 1 set (Lubeoil / Fuel / Air Circuit)	Set	1	6,915	6,915

LARSEN & TOUBRO Construction Group CHENNAI

By. General Manager (Cont...
H.P. Power Transmission C...
Barowalia House, Kitalini, Shimla-...

2	Solenoid Coil Assembly	No.	1	3,073	3,073
3	Self Starter Assembly	No.	1	57,523	57,523
4	Lub-oil Pressure Safety Control	No	1	14,537	14,537
5	High Water Temperature Safety Control	No.	1	2,301	2,301
6	Diode	Nos.	2	788	1,576
	TOTAL - N				**85,925**
					-
O	**OPTICAL FIBRE CABLE**	metres	500	100	50,000
	TOTAL - O				**50,000**
					-
P	**220 kV CVT**	Nos.	1	414,120	414,120
	TOTAL - P				**414,120**
	GRAND TOTAL				**15,528,766**

Dy General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

TOUBRO LIMITED

KRJ

HPPTCL

HP POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002
(Telefax: 0177 - 2626284)

REFERENCE: HPPTCL / DGMC / L & T - SUPPLY / 2010 - 4414-17 DATED: 19/6/10

TO,

M/S LARSEN & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P. B. No. 979, CHENNAI – 600089
FAX No.: 044 – 22493317; 044 – 22526345

SUBJECT: LETTER OF INTENT (LOI) FOR SUPPLY OF EQUIPMENT / MATERIALS FOR CONSTRUCTION OF 220 / 33 kV PALCHAN GIS SUBSTATION AGAINST TENDER DOCUMENT No.: DGMC / PALCHAN SUBSTATION / 2 / 2009

REFERENCE: This has reference to the following: -

1) This office Tender Document No.: DGMC / PALCHAN SUBSTATION / 2 / 2009
2) Your Offer No.: LTCD / EI&C / HPPTCL – PALCHAN / NJ / BID / 01 dated 18.12.2009
3) Your Price Letter No.: LTCD / EI&C / HPPTCL – PALCHAN / NJ / BID / 04 dated 18.12.2009
4) Your Letter No.: LTCD / EIC / HPPTCL / NJ / PALCHAN / 1603 dated 16th March, 2010.
5) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID04 dated 14th April, 2010
6) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID05 dated 12th July, 2010
7) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ dated 29th July, 2010
8) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID06 dated 17th August, 2010
9) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID07 dated 30th August, 2010
10) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / KRJ / 2109 dated 21st September, 2010

Sir,

I have been directed to place Letter of Intent (LOI) on you for Supply of Equipment / Material (also referred to as 'First Contract') required for Construction of 220 / 33 kV GIS Sub Station at

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Palchan in Kullu District of Himachal Pradesh amounting to Rs. 21,69,02,344.00 (Rupees Twenty One Crore Sixty Nine Lac Two Thousand Three Hundred Forty Four) only. The Scope of Work covered under this Letter of Intent interalia includes the following: -

Design, Engineering, Manufacture, Testing at Manufacturer's Works, Transportation and Insurance and Supply of all Equipment / Material including Mandatory Spares and Testing required for the complete execution of Construction of 220 / 33 kV GIS Sub-Station as set forth in the Bidding Document No.: DGMC / PALCHAN SUBSTATION / 02 / 2009.

1. The detailed List of Equipment and Material alongwith their tentative quantities to be supplied and Unit Rates under the subject LOA are given in ANNEXURE – I to this Letter of Intent.

2. The Scope of Work under this Contract shall also include all such Items, Equipment and Materials which are not specifically mentioned in the Bidding Documents and / or the Bid Proposal but are necessary for successful completion of the Scope of Work under the Contract, unless otherwise specifically excluded in the Bidding Documents and / or this Letter of Intent.

3. The Completion period for Supply of Equipment / Material shall be six months from the Date of Issue of Detailed Award.

4. All other Terms and Conditions shall be as per Tender Document No.: DGMC / PALCHAN SUBSTATION / 02 / 2009.

Please convey your acceptance so that further detailed Award can be placed on your Firm.

Yours faithfully,

Enclosure: Annexure - I

Dy. GENERAL MANAGER (CONTRACTS)

No.: HPPTCL / DGMC / L & T - SUPPLY / 2010 - DATED:

Copy for information and necessary action to: -

1. P. S. to Director (Planning & Contracts), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
2. P. A. to Director (Projects), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
3. Sr. Accounts Officer, HPPTCL, Sangla House, Khalini, Shimla – 171002.

Dy. GENERAL MANAGER (CONTRACTS)

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters: Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089, INDIA Tel: 22526308/6316
Fax: +91-44-2249 2517, 22526345

Website: www.intecc.com
www.larsentoubro.com

Ref: LTCD/EI&C/KRJ/PALCHAN/01
E-mail: krj@intecc.com

22nd October, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002.

30-9
26/10/10

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Intent (LOI) for supply, of Equipment / Materials for Construction of 220 / 33 kV Palchan GIS Substation against Tender document No. DGMC / Palchan Substation / 2 /2009

Ref: Your Letter of Intent No. HPPTCL/DGMC/L&T-SUPPLY/2010-4414-17 dated 19.10.2010

We acknowledge with thanks the receipt of "Letter of Intent" referred to above. As a token of our acknowledgement and confirmation, we herewith enclose the copy of "Letter of Intent" duly stamped and signed, as required by you subject to the following amendment.

a) Please refer to Clause No.3 The completion period for complete supply of Equipment / Material shall be Six (6) months from the date of issue of Detailed Award. But in the tender document there is no separate milestone available for Supply and Services while we shall endeavor for early supplies, for the purpose of LD the completion time will be 8 months.

b) Some of the items which were mentioned in the BOQ during tendering stage is not appearing in the LOI, which are

1) 33kV HT Cable interconnecting 33kV GIS and Transformer
2) 1no LT Transformer
3) Signal Generator
4) Micro-ohm meter
5) Spliced Ladders 20mtrs
6) Polyamide Braided White Nylon Rope – 12mm
7) Polyamide Braided White Nylon Rope – 14mm
8) Polyamide Braided White Nylon Rope – 20mm

DGM(C) & MS(C) 25/10

For doing successful completion of the above mentioned works, we feel that 33kV HT Cable, LT Transformer are to be included in the LOI. We request you to kindly incorporate the same.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

c) During Negotiation the prices for Mandatory spares has been provided by us as per the Spares quantity provided by you after Price bid opening, then our final total price including Mandatory spare became Rs. 28,92,48,146/- and as a special case we have given a discount of 7 Lacs on our total price and this 7 lacs was accounted as discount in Spares. But in the LOI, we observe that the Spares price has been further discounted to 4% from the agreed prices. Please note that the 4% mentioned during tendering stage is for only Main items, as the spares prices were not offered then and hence the 4% is not applicable in spares prices. We request you to kindly arrange to remove the discount and do needful.

Since the job has to be completed within 8 months from the date of Detailed LOA, we request you to kindly arrange to provide the encumbrance free land along-with the Detailed LOA. We have also enclosed the preliminary Construction Schedule (L1) for your ready reference

Thanking you, and assuring you of our best attention at all times.

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

K. RAJARAM
Geneal Manager & Head
Business Development & Contracts (EI&C)
Electrical Projects (Domestic)

Encl.: As above

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters : Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089, INDIA
Tel : +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345

Web : www.lntecc.com
www.larsentoubro.com

Ref.: LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/1901 19th January, 2011

E-mail: krj@lntecc.com

To
M/s. HP Power Transmission Corporation Limited,
(A State Government Undertaking)
Barowalias House, Khalini,
Shimla – 171002
Fax: 0177-2626284

Kind Attn. Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Award (LOA) for Supply of equipment / materials for Construction of 220/33kV Palchan GIS Substation against Tender Document No. : DGMC/PALCHAN SUBSTATION / 2 / 2009 (FIRST CONTRACT)

Ref: Your reference LOA No. HPPTCL / DGMC / L&T – SUPPLY / 2010-5107-12 dated 23.12.2010

We thank you for releasing the above referred "Letter of Award" for the subject package. We acknowledge the receipt of this LOA subject to the following conditions.

1) Payment Terms : As per Clause No. 5.18.1 of SCC (ii) The balance 10% of the Ex-works Price of each item as per Price Schedule shall be made within 30 days of Issuance of the Certificate by the Purchaser's Engineer that the item(s) have been received and provided and on submission of Bank Guarantee for 10% of the Full Amount valid till completion of Testing and Issuance of Taking – Over Certificate by the Purchaser's Engineer, whereas in LOA it has been mentioned as 10% payment will be released within 45 days after Taking over Certificate

2) Data Requirement Sheets : As you aware during tendering stage, the GTP's provided by Bidders are for Tender purpose only. However we fully confirm to the tender specification & technical requirements except the deviations provided in our offer. We will provide job specific GTP once we finalise our Sub-vendor. Also the Vendor names mentioned in the GTP is for sample only and the actual Vendor will be selected based on the Vendor Proposed during the tender stage, the same as been enclosed for your ready reference.

3) Mandatory Spares : As you aware HPPTCL had not mentioned any quantities for Mandatory Spares and each CRP vendor has given their own typical list of Spares and the same has been enclosed in our offer. But in this LOA, you have summated the list of spares of two Vendors, while only one set shall be applicable. We request you to consider the list of Spares as mentioned in Page 172 of our offer, the same is enclosed for your ready reference.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters : Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089. INDIA
Tel : +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345

Web : www.lntecc.com
www.larsentoubro.com

4) LOA issue Date : LOA has been dated on 23/12/2010, but we have received on 14/01/2011, since the Project duration is 8 Months, we request you to consider the LOA date as 14/01/2011 only.

Each of these items have price implication and as you aware we have taken this project on a very competitive price. We request you to kindly incorporate these changes in the Contract Agreement, in line with tender specification and documents.

Thanking you once again, and assuring you of our best attention at all times,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**
ECC DIVISION

L&T CHENNAI 600 089 ECC DIVISION

K.RAJARAM
General Manager & Head
Business Development & Contracts (EI&C)

L&T Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division
Headquarters : Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai - 600 089. INDIA
Tel.: +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345
Web : www.lntecc.com
www.larsentoubro.com

Ref.: LTCD/EIC/KRJ/HPPTCL/PALCHAN-ERECTION/1901 19th January, 2011
E-mail: krj@lntecc.com

To
M/s. HP Power Transmission Corporation Limited,
(A State Government Undertaking)
Barowalias House, Khalini,
Shimla – 171002
Fax: 0177-2626284

Kind Attn. Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Award (LOA) for Civil Works and Erection of equipment / materials for Construction of 220/33kV Palchan GIS Substation against Tender Document No. : DGMC/PALCHAN SUBSTATION / 2 / 2009 (SECOND CONTRACT)

Ref: Your reference LOA No. HPPTCL / DGMC / L&T – ERECTION / 2010-5099-5104 dated 23.12.2010

We thank you for releasing the above referred "Letter of Award" for the subject package. We acknowledge the receipt of this LOA subject to the following conditions.

1) LOA issue Date : LOA has been dated on 23/12/2010, but we have received on 14/01/2011, since the Project duration is 8 Months, we request you to consider the LOA date as 14/01/2011 only.

We request you to kindly incorporate the above mentioned change in the Contract Agreement, in line with tender specification and documents.

Thanking you once again, and assuring you of our best attention at all times,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**
ECC DIVISION

K.RAJARAM
General Manager & Head
Business Development & Contracts (EI&C)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Speed Post

HP POWER TRANSMISSION CORPORATION LIMITED

(A State Government Undertaking)

BAROWALIAS HOUSE, KHALINI, SHIMLA-2

Ph:-0177-2626283, FAX:-2626284

NO: HPPTCL/L & T – SUPPLY / 2010-11- 5747 **Dated:-** 4/2/2011

To

M/S. LARSON & TOUBRO LIMITED,
ENGINEERING CONSTUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B. No. 979, CHENNAI - 600089.
Fax. No.: 044 – 22493317, 22526345.

NJ / KK
Please / brief

Subject : Letter of Award (LOA) for Supply Of Equipment / Material for Construction of 220 / 33 kv PALCHAN GIS Sub-Station against Tender Document No.: DGMC / PALCHAN SUBSTATION / 2 / 2009 (FIRST CONTRACT).

Reference: Your letter No.: LTCD / EIC / KRJ / HPPTCL/ PALCHAN –SUPPLY /1901 Dated: 19-01-2010.

Sirs,

In connection with subject cited above, the conditions of your acceptance of Award are clarified hereunder:-

1. **Payment Term:** Due to topographical error 10 % payment will be released within 45 days after taking over certificate has been mentioned which may be read as **30 days** after taking over certificate. Necessary amendment is being issued separately.

2. **Data Requirement Sheet:** The Vendors List Supplied by your Firm is Approved subject to submission and Approval of GTP, Type Test Report and Performance Certificate of Make Of Equipment by this office and is enclosed for further necessary action at your end.

3. **Mandatory Spares:** The Mandatory Spares mentioned in our LAO from Sr.No.: 1 to 26 are for Control and Relay Panels (ABB Make) and from Sr. No.: 27 to 30 are for Bay Control Unit (Areva Make).

4. **LOA Issue Date:** The Date Of LOA is agreed to as **14-01-2011. Necessary** amendment is being issued separately.

Cntd – 2-

LARSEN & TOUBRO LIMITED Construction Channel

Regd Post

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Your kind attention is drawn to Clause No.: 16 **(Signing Of Contract)** vide which you are to **Execute a Contract Agreement** within 30 Days of Receipt of Award. You are requested to Execute the Agreement immediately at Shimla.

Your kind attention is drawn to Clause No.: 17 (**Performance Security**) vide which you are required to **Furnish Contract Performance Security** of 10 % of the **Total Contract Price** ,within 30 Days of Receipt of Award. You are requested to furnish the same immediately.

Yours faithfully,

General Manager (Contracts),
H.P. Power Transmission Corporation Limited,
Barowalias House, Khalini, Shimla-171002.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

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DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

(VENDORS LIST)

Bidder's Name & Address
Larsen & Toubro Limited,
ECC Division, EI&C Sector,
Mount Poonamallee Road,
Manapakkam, CHENNAI - 600 089.

Sl.	Item Description	Source of Supply	
		Name	Nationality
1	220kV GIS	AREVA	Indian
		~~HYOSUNG~~	~~Korean~~ — May be deleted.
		✓ SIEMENS	INDIAN
		✓ ABB	INDIAN — May be added.
2	33kV GIS	✓ ABB	Indian
		✓ AREVA	Indian
		✓ SIEMENS	Indian
3	250kVA Transformer	✓ Indotech Transformers Ltd	Indian
		✓ Kanohar Elect Ltd.	Indian — May be added.
		✓ Gujarat Transformer	Indian
		✓ P.S Electricals	Indian
		✓ Current Electricals Ltd	Indian
		✓ Tesla Transformers	Indian
		~~Intravidyut Transformers~~	~~Indian~~
		~~ECE Transformers~~	~~Indian~~
		~~Quality Power~~	~~Indian~~
		~~Indcoil Transformers~~	~~Indian~~
		~~Victory Electricals~~	~~Indian~~
4	Surge Arrestor	✓ Oblum Electrical Industries Ltd	Indian
		✓ LAMCO	Indian
		✓ Crompton Greaves Ltd	Indian
5	Capacitor Voltage Transformer	✓ Areva Ltd	Indian
		✓ BHEL	Indian
		✓ Crompton Greaves Ltd	Indian
		✓ ABB Ltd	Indian

Not quoted in Annx-A (Vendors List) of Enforcers BOQ-Schedule at P-30.

LARSEN & TOUBRO LIMITED ECC DIVISION CHENNAI 600 089

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sl.	Item Description	Source of Supply	
		Name	Nationality
6	Sub station Automation System a/w. Mandatory Spares as per Page No:- 200 of your offer.	ABB Ltd	Indian.
		Areva Ltd	Indian
		Siemens	Indian
		~~Easun-Reyrolle-Ltd~~	~~Indian~~
		~~NR~~	~~China~~ — May be deleted
7	220/33kV Relay Panels a/w Mandatory Spares as per Page No- 172 ABB, CRP & SAS of your offer.	ABB Ltd	Indian
		~~Siemens~~	~~Indian~~
		~~Areva Ltd~~	~~Indian~~
		~~Easun-Reyrolle-Ltd~~	~~Indian~~
		~~NR~~	~~China~~ — May be deleted.
8	Line Trap	Areva Ltd	Indian
		BPL Ltd	Indian
9	PLCC Equipment	BPL Ltd	Indian
		ABB	Indian
		~~Areava Ltd~~	Indian — May be added.
10	LT Switchgear	Unilec	Indian
		Pyrotech	Indian
		Sarvana Switchgear	Indian
		Jakson Engineers Ltd	Indian
		Amararaja Power System (P) ltd	Indian
		~~SEGO~~	~~Indian~~ — May be deleted
		Adlec	Indian
		~~Lotus Powergear~~	~~Indian~~
		~~Jasper~~	~~Indian~~ — May be deleted
11	220V & 48V Batteries	HBL Nife Power System Ltd	Indian
		Kirloskar Battery Pvt Ltd	Indian — May be added.
		Exide Industries Ltd	Indian
		Amararaja Power System (P) ltd	Indian
12	220V & 48V Battery Charger	HBL Nife Power System Ltd	Indian
		Caldyne Automatic Ltd	Indian
		Statcon Power Controls Ltd	Indian
		Amararaja Power System (P) ltd	Indian
		Chhabi Electrical (P) Ltd	Indian
		Dubas	Indian

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

Sl.	Item Description	Source of Supply Name	Nationality
13	DG Sets	Jakson Ltd	Indian
		TIL	Indian
		Greaves Ltd	Indian
		Jeevan Diesels	Indian
14	2TR Split Air Conditioning System	Blue Star Ltd	Indian
		Voltas Ltd	Indian
		Carrier Aircon Ltd	Indian
		Amtrex Hitachi Appliances Ltd	Indian
		Samsung	Indian
		LG India	Indian
15	Ventilation System	Vision Controls	Indian
		Tracfujico	Indian
		Voltas	Indian
		Eta engg.	Indian — May be added at
16	Fire Fighting System	Techno Fire	Indian
		Mehta Fire	Indian
		Agnice	Indian
		BCFSL	Indian
17	Lighting Fixures	Philips India Ltd	Indian
		CGL	Indian
		Bajaj Electrical Ltd	Indian
		Wipro Ltd	Indian
		Thorn	Indian
		GE Lighting	Indian
		SURYA ROSHNI	Indian
18	Power & Control cable	Polycab Cables Ltd	Indian
		Gemscab Ltd	Indian
		KEI Indutries Ltd	Indian
		Krishna Electrical Industries Ltd	Indian
		Govind	Indian
		Sriram	Indian
		Havells	Indian
		Finolex	Indian
		Ravin Cables Ltd	Indian
		Suyog Electrical Ltd	Indian
		Prew	Indian
		Teracom	Indian
		Universal Cables Ltd	Indian
		Gupta Cables	Indian
		RPG Cables	Indian — May be deleted

L&T CHENNAI 600 089 ENGINEERS DIVISION

L&T Construction Channel

Deputy General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sl.	Item Description	Source of Supply Name	Nationality
19	Earthing material	Reputed Make	Indian
20	Steel Structure	Reputed make	Indian
21	Bus Post Insulator	✓ Sarvana Insulators Ltd	Indian
		✓ WS Industries India Ltd	Indian
		✓ Modern Insulators ltd	Indian
		✓ BIRLA NGK Iinsulators Pvt Ltd	Indian
22	EOT Crane	✓ Reva Cranes & Hoist	Indian
		✓ Anupam Industries Ltd	Indian
		✓ Eddy Cranes Engineers Ltd	Indian
		✓ Unique Industrial Handlers Pvt. Ltd	Indian
		✓ Indef Hercules Hoist Ltd	Indian
		✓ Avon Cranes Pvt Ltd	Indian
		~~Dynamech~~	~~Indian~~ — may be deleted
		✓ Armsel	Indian
		✓ GRIP Engineers	Indian

APPROVED SUBJECT TO Submission and approval of GTP, Type Test Report and Performance Certificate of Make of Equipment.

Dy. Manager HPPTCL | Sr. Manager HPPTCL, Shimla | [redacted], Gen. Mgr, HPPTCL, Shimla

LARSEN & TOUBRO LIMITED CHENNAI 600 089 HEAVY ENGG. DIVISION

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

(94)

H.P. Power Transmission Corporation Limited

(A State Govt. Undertaking)
Barowalias House, Khalini, Shimla-171002
(Telefax: 0177-2626284)

No.HPPTCL/L&T-SUPPLY/2010-11-5845-50 Dated : 8/2/11

To

M/S LARSON & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACT DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B.NO. 979, CHENNAI – 6000089.

FAX NO. 044-22493317, 22526345

Sub :- **Letter of Award (LOA) for supply of Equipment / Material for Construction of 220/33 kV PALCHAN GIS Sub-Station against Tender Document No. DGMC/ PALCHAN SUB-STATION/2/2009 (FIRST CONTRACT) .**

Sir,

Following amendments in Award No. HPPTCL/L&T-SUPPLY/2010-5107-12 Dated 23.12.2010 are hereby made :-

AMENDMENTS.

Ref./ Clause No.	Existing	Amended
8	**Terms of Payment.** i) Ninety percent (90%) of the Ex works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within 45 days on receipt of the Material in your Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract , Acceptance of Bank Guarantee by the Purchaser **whichever is later** . The payment shall be released by the Engineer or by the Central Payment Cell of the HPPTCL upon submission of the documents specified below . a) Original and 4 copies of the Invoices showing Purchase Order number,	**Terms of Payment.** i) Ninety percent (90%) of the Ex works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within **30 days** on receipt of the Material in your Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract , Acceptance of Bank Guarantee by the Purchaser **whichever is later** . The payment shall be released by the Engineer or by the Central Payment Cell of the HPPTCL upon submission of the documents specified below : a) Original and 4 copies of the Invoices showing Purchase Order number, Goods Description, Quantity, Unit Price and

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

	Goods Description, Quantity, Unit Price and Total Amount. b) Packing List (4 copies) c) Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g) The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within 45 days of the issuance of Taking over Certificate by the Purchaser's Engineers. iii) However, in case the Payment is delayed beyond 45 days due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.	Total Amount. b) Packing List (4 copies) c)Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g)The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within **30 days** of the issuance of Taking over Certificate by the Purchaser's Engineers. iii) However, in case the Payment is delayed beyond **30 days** due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.
11	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date of issue of this Contract and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex-works delivery for all the equipment and Materials covered under this Contract within 15 days of the Letter of Award.	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date of receipt of this Contract by the Contractor and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex- works delivery for all the equipment and Materials covered under this Contract within 15 days of the receipt of Letter of Award by the Contractor.

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Dowalia House, Khalini, Shimla-2

11.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction, testing and successful commissioning of 220/ 33 kV GIS Sub-Station at Palchan shall be reckoned as 8 months from the date of LOA.	11.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction, testing and successful commissioning of 220/ 33 kV GIS Sub-Station at Palchan shall be reckoned as 8 months from the date of receipt of LOA by the Contractor.

Yours faithfully,

8.2.11

Dy. General Manager (Contracts),

Copy forwarded to the following for information please

1. P.S. to Director (P&C), HPPTCl, Shimla-171002.
2. P.A. to Director (Projects), HPPTCl, Shimla-171002.
3. The Dy. General Manager (Projects), HPPTCl, Shimla-171002.
4. The Sr. Manager, HPPTCL, Sarabai Bhunter, Distt. Kullu (HP).
5. Sr. Accounts Officer, HPPTCL, Shimla-2.

8.2.11

Dy General Manager (Contracts),

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

POWER TRANSMISSION & DISTRIBUTION (DOMESTIC)

Headquarters : Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089, INDIA
Tel.: +91-44-22526000/8000 Fax : +91-44-2249 3317 / 044-22526345
Web : www.lntecc.com
www.larsentoubro.com

Ref.: LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/1002 10th February, 2011
E-mail: krj@lntecc.com

To
M/s. HP Power Transmission Corporation Limited,
(A State Government Undertaking)
Barowalias House, Khalini,
Shimla – 171002
Fax: 0177-2626284

Kind Attn. Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Award (LOA) for Supply of equipment / materials for Construction of 220/33kV Palchan GIS Substation against Tender Document No. : DGMC/PALCHAN SUBSTATION / 2 / 2009 (FIRST CONTRACT)

Ref:
1. Your reference LOA No. HPPTCL / DGMC / L&T – SUPPLY / 2010-5107-12 Dated 23.12.2010
2. Our Letter No.: LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/1901 Dated 19.01.2011
3. Your Letter No.: HPPTCL/ L&T–SUPPLY / 2010-11/5747 & 5748 Dated 04.02.2011

With reference to the above reference under sl.no.3 to the subject project, we enclose herewith Annexure-I for our replies.

Request you to incorporate the same in contract agreement.

Reference your letter no. 5748, our regional office in Delhi already made arrangement for submission of Contract Performance Security. The same shall be submitted shortly.

Thanking you and assuring you of our best attention at all times,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

LARSEN & TOUBRO LIMITED CHENNAI 600 089 CCC DIVISION

(K.RAJARAM)
General Manager &
Head -Business Development & Contracts (EI&C)
Power Transmission & Distribution (Domestic)

Encl.: Annexure-I

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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ANNEXURE-I

S.No.	Client Queries	Bidders Reply
1	**Payment Terms :** Due to topographical error 10% payment will be released within 45 days after taking over certificate has been mentioned which may be read as **30 days** after taking over certificate. Necessary amendment is being issued separately.	As per Clause No. 5.18.1 of SCC (ii) The balance 10% of the Ex-works Price of each item as per Price Schedule shall be made within 30 days of Issuance of the Certificate by the Purchaser's Engineer that the item(s) **have been received** and provided and on submission of Bank Guarantee for 10% of the Full Amount valid till completion of Testing and Issuance of Taking – Over Certificate by the Purchaser's Engineer, whereas in LOA it has been mentioned as 10% payment will be released within 45 days **after Taking over Certificate.** (Tender document enclosed along with this)
2	**Mandatary Spares:** The Mandatary spares mentioned in our LOA from Sr.No. 1 to 26 are for Control and Relay Panels (ABB Make) and from Sr.No. 27 to 30 are for Bay Control Unit (Areva Make).	The CRP and BCU's shall be of same make. The list of mandatory spares in the LOA do not match with technical list in the tender specification, Vol.II, Part-I, Annexure-II, Page 67. We shall supply the list as per tender specification.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

counted backward from the Contracted Completion Date shall be paid to the Contractor. It is clarified that Part of Week shall not be counted for any Incentive

5.17 PLANT, TEMPORARY WORKS, AND MATERIAL

5.17.1 With a view to securing in the event of a forfeiture under Clause 3.38 of Section - 3 to this Volume, the continued availability for the purpose of executing of Works of any Hired Equipment, the Contractor shall not bring on to the Site any hired equipment unless there is an agreement for the hire thereof, which contains a provision that the owner thereof will on request in writing made by the Purchaser within seven days after the date on which any forfeiture has become effective, and on the Purchaser under taking to pay all hire charges in respect thereof from such date, hire such equipment to the Purchaser on the same terms in all respect as the same was hired to the Contractor save that the Purchaser shall be entitled to permit the use thereof by any other Contractor employed by him for the purpose of completing and maintaining the Works under the terms of the said Clause 3.38 of Section – 3 to this Volume.

5.17.2 In the event of the Purchaser entering in to any agreement for the hire of equipment pursuant to Sub - Clause 5.17.1 of this Clause, all sum properly paid by the Purchaser under the provisions of any such agreement and all expenses incurred by him (including stamp duties) in entering in to such agreement shall be deemed for the purpose of Clause 3.38 to be part of the cost of completing and maintaining the Works.

5.17.3 For the purpose of Sub - Clause 5.17.1 and 5.17.2 of this Clause, the following expressions shall have the meanings hereby assigned to them: -

a) The expression "Equipment" shall mean any Constructional Plant, Equipment, Temporary Works and Materials For Temporary Works and includes Vehicles engaged in transporting these and Supervisory Staff and Materials for the permanent Works on the Site, but shall exclude any vehicle engaged in Transporting of any Constructional Plant, Equipment, Temporary Works and Materials for the permanent Works to or from the Site.

b) The expression "Agreement for Hire" shall be deemed not to include any agreement for Hire/Purchase.

5.18 CERTIFICATES AND PAYMENTS

5.18.1 PAYMENTS FOR MATERIALS & ACCESSORIES

i) Ninety percent (90 %) of the Ex - Works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within 30 days on receipt of the Material in the Contractor's Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract, Acceptance of Bank Guarantee by the Purchaser, whichever is later. The Payment shall be released by the Engineer

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

or by the Central Payment Cell of the Purchaser upon submission of the documents specified below:

(a) Original and 4 copies of the Invoices showing Purchase Order number, Goods Description, Quantity, Unit Price and Total Amount

(b) Packing Lists (4 copies)

(c) Railway Receipt / Receipted L. R.

(d) Manufacturers / Contractors Guarantee Certificate of quality

(e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report, Transit Insurance Certificate and an Indemnity Bond as per Form – IX for full value of the Material valid till the taking over of the said Sub Station by the Purchaser.

(f) Taxes & Duties shall be paid against Documentary Evidence.

(g) The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the Purchaser.

(ii) The balance 10 % of the Ex - Works Price of each Item as per Price Schedule shall be made within 30 days of the Issuance of the Certificate by the Purchaser's Engineer that the Item(s) have been received and provided and on submission of Bank Guarantee for 10 % of the Full Amount valid till completion of Testing and Issuance of Taking - Over Certificate by the Purchaser's Engineer.

(iii) However, in case the Payment is delayed beyond 30 days due to one or the other reason NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.

5.18.2 PAYMENTS FOR ERECTION

5.18.2.1 The Contractor shall submit an application for *Interim Payment* in quadruplicate to the Engineer at the end of each month in a Form approved by the Engineer. The application shall include the following items, as applicable, which shall be taken in to account in the sequence listed.

a) The Estimated Contract Value in Indian Rupees of the Permanent Works executed up to the end of the month in question, obtained by applying the Base Unit Rates and Prices to the quantities measured by the Engineer pursuant to Clause 4.28 of Part – 4.

b) The Estimated Contract Value of the Permanent Works obtained as above executed up to the end of the previous month.

c) The Estimated Contract Value at Base Unit Rates and Prices, expressed in Indian Rupees, of the Permanent Works for the month in question obtained by deducting b) from a).

d) Any amount reflecting any changes in cost and legislation pursuant to Clause 3.37 of Part - 3 to this Volume.

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIAS HOUSE, KHALINI, SHIMLA-2
Ph:-0177-2626283, FAX:-2626284

NO: HPPTCL/L & T – SUPPLY / 2010-11-5933 **Dated:-** 21/2/11

To

M/S. LARSON & TOUBRO LIMITED,
ENGINEERING CONSTUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B. No. 979, CHENNAI - 600089.
Fax. No.: 044 – 22493317, 22526345.

Subject : Letter of Award (LOA) for Supply Of Equipment / Material for Construction of 220 / 33 kv PALCHAN GIS Sub-Station against Tender Document No.: DOMC / PALCHAN SUBSTATION / 2 / 2009 **(FIRST CONTRACT).**

Reference: Your letter No.: LTCD / EIC / KRJ / HPPTCL / PALCHAN –SUPPLY /1002 Dated: 10-02-2011.

D/Sirs,

With reference to above the reply to your queries is appended as under:-

1. Regarding Clause No. 5.18.1 of SCC (ii) the clause has now been completed and is enclosed.

2. The Control Relay Panel (CRP) and Bay Control Unit (BCU) will be of the same make i.e. ABB Make. Accordingly Spares quoted in your offer at Page No. 172 & 200 may be supplied (Free Of Cost) alongwith Main Equipment.

D.A.- 1 No.

Yours faithfully,

21.2.11

Dy. General Manager (Contracts)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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	Goods Description, Quantity, Unit Price and Total Amount. b) Packing List (4 copies) c) Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g) The Type Test Charges shall0 be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within 45 days of the issuance of Taking over Certificate by the Purchaser's Engineers. iii) However, in case the Payment is delayed beyond 45 days due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.	Total Amount. b) Packing List (4 copies) c) Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g)The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within **30 days** of the issuance of Taking over Certificate by the Purchaser's Engineers that the Item(s) have been received and provided and on submission of Bank Guarantee fo r 10 % of the Full Amount valid till Completion of Testing and issuance of Taking – Over Certificate by the Purchasers Engineer. iii) However, in case the Payment is delayed beyond **30 days** due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.
11	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date of issue of this Contract and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex-works delivery for all the equipment and Materials covered under this Contract within 15 days of the Letter of Award.	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date receipt of this Contract by the Contractor and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex- works delivery for all the equipment and Materials covered under this Contract within 15 days of the receipt of Letter of Award by the Contractor.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Mandatory Spares

B make Numerical relay for Transformer differential protection type **RET 670.**	1
B make Numerical relay for Distance protection type **REL 670.**	1
B make Numerical relay for **O/C & E/F** protection type **REF 615.**	1
B make Numerical relay for**REF** protection type **REF615.**	1
B make Numerical relay for **Busbar** protection type **REB 670**/Eqvt	1
er Flux Relay- Inbuilt in T/F Differential Protection Relay (RET670)	-
B make Fuse failure relay type FFR.	1
B make Aux relay type RXSF.	1
B make Flag relay type RXSF.	1
B make DC Supply supervision relay type TSR	1
ner Relay-NA	-
B make High speed tripping relay type RXMVB4+RXTMA+TSR+PBMODULE	1
aker Failure Relay- Inbuilt in Main Protection Relay	-
B make Trip Circuit supervision relays type TSR	1
to Reclose Relay with Check Synchronising Relay and Dead Line Charging lay- Inbuilt in BCU.	-
B make under voltage relay type **RXEG**/eqv	1
to Reclosing Relay- Inbuilt in BCU.	-
cal Breaker Back up Protection Relay- Inbuilt in Main Protection Relay .	-
U & MODULE for conversion of conversion of signals from Optical Fibre ound Wire provided for Remote Control / SCADA in place of Earthwire on nsmission Line	NA

ABB

CRP

e for this document and its contents. Copying, disclosure to third parties are strictly forbidden without our expressed permission.

LARSEN & TOUBRO LIMITED Construction Chennai

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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This list specifies types and quantities of the Mandatory spare parts in our offer and not included in the main price as per section SASCOM1 – COMMERCIAL PROPOSAL.

S/N	SPARE PARTS	UNIT	QUANTITY
			PALCHAN S/S
M	**RELAY & PROTECTION PANEL SPARES**		
M.5	**COMMON SPARES**		
1.	Power supply module for Bus Bar protection.	No.	1
M.6	**SUBSTATION AUTOMATION SYSTEM**		
1	Bay Control IED of each type	Set	1
2	Ethernet switch of each type	Set	1
3	Longest Optical Cable with end equipment	Set	1

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division
Headquarters : Mount Poonamallee Road, Manapakkam P.B.No.979, Chennai – 600 089, INDIA Tel.: 22526308/6316
Fax : +91-44-2249 3317 / 22526345

Website : www.lntecc.com
www.larsentoubro.com

Ref: LTCD/EI&C/KRJ/PALCHAN/1902 — 19th February, 2011
E-mail: krj@lntecc.com

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002.

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Intent (LOI) for supply, of Equipment / Materials for Construction of 220 / 33 kV Palchan GIS Substation against Tender document No. DGMC / Palchan Substation / 2 /2009

Ref: Your Letter No. HPPTCL/L&T-SUPPLY/2010-11-5903 dated 19.02.2011 (First Contract)
Your Letter No. HPPTCL/L&T-SUPPLY/2010-11-5904 dated 19.02.2011 (Second Contract)

This has reference to your letters referred above.

In this connection we wish to inform you that "Contract Performance Security" has already been obtained from Bank and couriered to our Delhi Office. One of our staff from Delhi Office will come and submit the same in person in next two to three days. A copy of the same is enclosed for your ready reference.

Regarding execution of "Contract Agreement", our person who will be visiting to your office to submit "Contract Performance Security", will discuss regarding the preparation of "Agreement format" and other relevant attachments, which are required for execution of "Contract Agreement". Kindly bear with us till then.

Thanking you, and assuring you of our best attention at all times,

Yours faithfully,
For **LARSEN & TOUBRO LIMITED**

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

K. RAJARAM
General Manager &
Head -Business Development & Contracts (EI&C)
Power Transmission & Distribution (Domestic)

Encl.: As above

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED
ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)
New Delhi Regional Office: 211, Okhla Industrial Estate, Phase-III, New Delhi - 110020. Tel.:011-41614310-17, Fax: +011-41615125-26
e-mail: vr@lntecc.com ; skc@lntecc.com
Website: www.lntecc.com

Ref: L&T- PT&D/HPPTCL/002 **28 April 2011**

To
H.P.POWER TRANSMISSION CORPORATION LIMITED
Barowalias House,
Khalini, **Shimla – 171 002**

Kind Attention:. Dy. General Manager (Contracts)

Sub: Letter of Award (LOA) for supply of Equipment / Material for construction of 220/33kV Palchan GIS against tender Document No. DGMC/PALCHAN SUBSTATION/2/2009 (FIRST CONTRACT)

Ref: HPPTCL/L7T-SUPPLY/2010-11-5905 dated 19.2.2011

Dear Sir

This has reference to the subject contracts and meeting held at your office in Shimla today with our Mr. Pankaj Garg & Mr. U R K Murthy regarding the following issues:

1. **The payment Terms for balance 10% of Ex-works of each Item:** As discussed and agreed that there is topographical error for **Taking over** mentioned two times in amendment issued to LOI payment terms ref. HPPTCL/L&T-SUPPLY/2010-11-5933 dated 21.02.11. The terms to be maintained as per contract Commercial condition page no. 137 & 138 enclosed as per our earlier communication ref LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/ 1002 dated 10th Feb 2011.
2. ***The Mandatory Spares for CRP & BCU:*** As informed to you that our response is same as per our ref LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/ 1002 dated 10th Feb 2011, along with this the tender specification page no. 67 (enclosed).
3. **Project Completion Schedule (L-2 Network):** As got informed that leveling work has been awarded by you to some party. We wish to inform you that we are putting our best efforts to expedite the works in terms of Drawing submission and Procurement. Since, the project completion period is 8 months from the date of LOA (14-01-2011) and as Civil Works will need at

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED
ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)
New Delhi Regional Office: 211, Okhla Industrial Estate, Phase-III, New Delhi - 110020. Tel.:011-41614310-17, Fax: +011-41615125-26
e-mail: vr@lntecc.com ; skc@lntecc.com
Website: www.lntecc.com

least **6 months for completion**, it is not possible for us to complete the Work until the Developed Land is handed over to us. Moreover, Storage and Safety of Procured material shall also become an area of concern without proper storage yard. Therefore, we request you to consider the contractual start date as the date of handing over of encumbrance free, Developed and leveled Site to us.

A line of confirmation is highly solicited.

Thanking you and assuring you of our best attention at all times we remain,

Yours truly
For **LARSEN & TOUBRO LIMITED**
ECC DIVISION

(S K CHAKRABORTY)
SECTOR PROJECT MANAGER
PT&D Division
New Delhi

Enclosed: a/a

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd,
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)
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e-mail: vr@lntecc.com ; skc@lntecc.com
Website: www.lntecc.com

Ref: L&T- PT&D/HPPTCL/002

28 April 2011

To
H.P.POWER TRANSMISSION CORPORATION LIMITED
Barowalias House,
Khalini, **Shimla – 171 002**

Kind Attention: Dy. General Manager (Contracts)

Sub: Letter of Award (LOA) for supply of Equipment / Material for construction of 220/33kV Palchan GIS against tender Document No. DGMC/PALCHAN SUBSTATION/2/2009 (FIRST CONTRACT)

Ref: HPPTCL/L7T-SUPPLY/2010-11-5905 dated 19.2.2011

Dear Sir

This has reference to the subject contracts and meeting held at your office in Shimla today with our Mr. Pankaj Garg & Mr. U R K Murthy regarding the following issues:

1. **<u>The payment Terms for balance 10% of Ex-works of each item:</u>** As discussed and agreed that there is topographical error for **<u>Taking over</u>** mentioned two times in amendment issued to LOI payment terms ref. HPPTCL/L&T-SUPPLY/2010-11-5933 dated 21.02.11. The terms to be maintained as per contract Commercial condition page no. 137 & 138 enclosed as per our earlier communication ref LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/ 1002 dated 10th Feb 2011.
2. ***<u>The Mandatory Spares for CRP & BCU:</u>*** As informed to you that our response is same as per our ref LTCD/EIC/KRJ/HPPTCL/PALCHAN-SUPPLY/ 1002 dated 10th Feb 2011, along with this the tender specification page no. 67 (enclosed).
3. **<u>Project Completion Schedule (L-2 Network):</u>** As got informed that leveling work has been awarded by you to some party. We wish to inform you that we are putting our best efforts to expedite the works in terms of Drawing submission and Procurement. Since, the project completion period is 8 months from the date of LOA (14-01-2011) and as Civil Works will need at

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)

New Delhi Regional Office 211, Okhla Industrial Estate, Phase-III, New Delhi - 110020 Tel +011-41614310-17, Fax +011-41615125-26

e-mail: vr@lntecc.com ; skc@lntecc.com

Website: www.lntecc.com

least **6 months for completion**, it is not possible for us to complete the Work until the Developed Land is handed over to us. Moreover, Storage and Safety of Procured material shall also become an area of concern without proper storage yard. Therefore, we request you to consider the contractual start date as the date of handing over of encumbrance free, Developed and leveled Site to us.

A line of confirmation is highly solicited.

Thanking you and assuring you of our best attention at all times we remain,

Yours truly
For **LARSEN & TOUBRO LIMITED**
ECC DIVISION

(S K CHAKRABORTY)
SECTOR PROJECT MANAGER
PT&D Division
New Delhi

Enclosed: a/a

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HP POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIAS HOUSE, KHALINI, SHIMLA-2
Ph:-0177-2626283, FAX:-2626284
HPPTCL

NO: HPPTCL/L & T – SUPPLY / 2011-12- 808 **Dated:-** 11-5-11

To

M/S. LARSON & TOUBRO LIMITED,
ENGINEERING CONSTUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B. No. 979, CHENNAI - 600089.
Fax. No.: 044 – 22493317, 22526345.

Subject : Letter of Award (LOA) for Supply Of Equipment / Material for Construction of 220 / 33 kv PALCHAN GIS Sub-Station against Tender Document No.: DGMC / PALCHAN SUBSTATION / 2 / 2009 (FIRST CONTRACT).

Reference: Your letter No.: L&T-PT&G / HPPTCL / 002 Dated: 28-04-2011.

D Sirs,

With reference to above the reply to your queries is appended as under:-

1. The Payment Term for balance 10 % of Ex-works of each item shall be as per Tender Specification Clause No.:5.18.1 (ii) accepted by your firm reproduced as below for ready reference:
   "The balance 10 % of the Ex - Works Price of each Item as per Price Schedule shall be made within 30 days of the issuance of the Certificate by the Purchaser's Engineers that the item(s) have been received and provided and on submission of Bank Guarantee for 10 % of full amount valid till completion of Testing and Issuance of Taking - Over Certificate by the Purchaser's Engineer".
2. The spares as detailed in LAO for CR Panel from Sr.No. 1 to 26 shall be of ABB make. The make of Bay Control Unit be intimated and the spares from Sr.No. 27 to 30 will be of that manufacturer.
3. Regarding Project Completion Schedule it is requested that this issue needs discussion and there after we can decide the same. Therefore, you may plan to visit this office on any working day with prior intimation.

Yours faithfully,

Dy. General Manager (Contracts)

LARSEN & TOUBRO LIMITED Construction Division

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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FAX .0177 - 2662284

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LARSEN & TOUBRO LIMITED

ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)

New Delhi Regional Office: 211 Okhla Industrial Estate Phase-III New Delhi - 110020 Tel: 011-41614310-17 Fax: +011-41615125-26

e-mail: vrr@lntecc.com ; skc@lntecc.com

Website: www.lntecc.com

Ref: L&T- PT&D/HPPTCL/004 **23rd Aug' 2011**

To

H.P.POWER TRANSMISSION CORPORATION LIMITED
Barowalias House.
Khalini, **Shimla – 171 002**

Kind Attention: Dy. General Manager (Contracts)

Sub: Letter of Award (LOA) for supply of Equipment / Material for construction of 220/33kV Palchan GIS against tender Document No. DGMC/PALCHAN SUBSTATION/2/2009 (FIRST CONTRACT)

Our Reference Letter No.:

1. LTCD/EIC/KRJ/HPPTCL/Palchan-Supply/1002
2. L&T PT&D/HPPTCL/001 DATED 01.03.011
3. L&T PT&D/HPPTCL/002 DATED 28.04.011
4. L&T PT&D/HPPTCL/003 DATED 12.05.011

Your Ref Letter No.: HPPTCL/L7T-SUPPLY/2011-12-808 dated 11.05.2011

Sir,

With reference to our correspondence we would like to request you you to confirm regarding the following issues as listed in Annexure-I.

Annexure-I

S.No	As per Contract	Amended to
1.	Clause No.11 Time Schedule of Contract:	Project completion schedule (L2 network) zero date will be taken from the date of site handover encumbrance free, leveled land and with confirmed orientation of 220KV I/C line and 33 KV O/G lines.

The Manager, HP Power Transmission Corpn. Ltd. Dy. No. 2662 Dt. 29/8/11 Barowalia Shimla-2

Headquarters: Mount Poonamallee Road Manapakkam P B No 979, Chennai - 600 089 Tel: 2492747 / 2493318 Fax: +044-2492317

Regd. Office: L&T House, Ballard Estate, P.O.Box 278, Mumbai - 400 001. Tel.:2618181 / 82 Fax: +022-2620223

Website: www.larsentoubro.com

Larsen & Toubro Limited Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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LARSEN & TOUBRO LIMITED

ECC DIVISION (ENGINEERING, CONSTRUCTION & CONTRACTS)

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e-mail: vr@lntecc.com ; skc@lntecc.com

Website: www.lntecc.com

2.	Mandatory spares	The Mandatory spares mentioned in our LOA from Sr. No. 1 to 26 are for control and relay panels(ABB make) and Sr. No. 27 to 30 are for Bay control unit (Areva Make). The CRP and BCU's shall be of same make. The list of mandatory spares in the LOA do not match with technical list in the tender specification, Vol-II, Part-I, Annexure-II, Page-67. We shall supply the list as per tender specification.

We request you to confirm the above issues; so that we can complete the formalities of signing the contract agreement documents.

Thanking you and assuring you of our best attention at all times we remain,

Yours truly
For **LARSEN & TOUBRO LIMITED**
ECC DIVISION

(Pankaj Garg)
Manager-Electrical
PT&D Division
New Delhi

L&T TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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H.P. Power Transmission Corporation Limited
(A State Govt. Undertaking)
Barowalias House, Khalini, Shimla-171002
(Telefax: 0177-2626284)

No.HPPTCL/L&T-SUPPLY/2011-12- 3676 Dated: 7/09/2011

To

M/S LARSON & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACT DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B.NO. 979, CHENNAI – 6000089.
Fax: 044-2492317.
Kind Attention : Mr.Pankaj Garg, Manager- Elel.PT&D Division.

Subject : Letter of Award (LOA) for supply of Equipment / Material for Construction of 220/33 kV PALCHAN G/S Sub-Station against Tender Document No DGM/C/ PALCHAN SUB-STATION/2/2009 (FIRST CONTRACT)

Reference : 1 This office letter No HPPTCL/ L&T Supply/2011-12-3445 dated 01-06-2011
2 Your letter No L&T – PT&D/ HPPTCL/004 dated 23-05-2011

D/Sir

Please refer to this office letter mentioned above wherein we had requested to finalise the General Layout Drawing so that all the GIS Equipments and Power Transformer are adjusted in the proposed Two Benches and so far the same is still awaited from your office. It is further stated that the Land in question will be handed over to your Site Engineer developed as per the Tender Specifications.
You are requested to expedite the Revised General Layout Drawing.

Regarding Mandatory Spares it is stated by your Firm that the List will be supplied as per Tender Specification. However it is clarified that in the Tender Document we had mentioned the Tentative requirement of Mandatory Spares and successful Tenderer is required to specify the exact requirement of Mandatory Spares. Therefore it is requested to supply the List of Mandatory Spares to be procured by your Firm Free of Cost as per Tender Specification required for our perusal and approval. It is further mentioned that the List of Mandatory Spares submitted by your Firm in your Offer and the cost of which is not included in your Offered Price Bid is not expected with cost. In case these are Mandatory Spares and high value mandatory spares please clarify regarding costing.

LARSEN & TOUBRO LIMITED Construction Council

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

You may submit the revised Pert Chart / Bar Chart for various activities matching with the Scheduled date of Commissioning as per LOA

Yours faithfully

Dy. General Manager (Contracts)

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED

Engineering Construction & Contracts Division

Headquarters : Mount Poonamallee Road, Manapakkam, P.B.No.979, Chennai – 600 089, INDIA
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www.larsentoubro.com

LTCD/EIC/HPPTCL/PALCHAN/NJ/BID03

26th March, 2010

To
M/s. HP Power Transmission Corporation Limited,
Barowalias House,
Khalini,
Shimla – 171 002,

Kind Attn: Dy. General Manager (Contracts)

Dear Sir,

Sub: Replies to your queries for Design, Engineering, Manufacturing, Testing of equipment, erection, commissioning along with other allied works such as earthmat & civil works on turnkey basis for 220/33kV substation at Palchan, District Kullu – H.P

Letter Ref No :HPPTCL /PALCHAN /2009-4048 DATED 04 /03 /10

With reference to our above mentioned letter, please find enclosed our point wise replies along with relevant attachments. We hope that our replies are inline with your requirement.
Thanking you and assuring you of our best services at all times,

Yours faithfully,
For LARSEN & TOUBRO LIMITED
ECC DIVISION

LARSEN & TOUBRO LIMITED CHENNAI 600 089 ECC DIVISION

(K.RAJARAM)
Head – Business Development & Contracts
EI&C Sector

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SUBJECT: TENDER. FOR CONSTRUCTION OF 220 /33 kV GIS SUB STATION AT PALCHAN ON TURNKEY BASIS
REFERENCE: OUR OFFER NO.: LTCD / EI&C / HPPTCL - PALCHAN / NJ / BID/02 DATED 08.12.2009

Sl.No.	Description	L&T's Replies to Queries
1.	Confirm that the Prices of all the Equipments / Materials / Items of Work quoted against Tender Document No.: DGMC/PALCHAN SUBSTATION/2 /2009 are on FIRM Basis. Further, confirm that No PRICE VARIATIONS and Taxes shall be claimed on Bought - Out-Items.	We confirm that prices quoted are firm in our offer. We also confirm that no price variations & taxes shall be claimed except service tax for type tests , erection , testing & commissioning indicated in our price bid.
2.	Confirm that the Rates of all the Equipments / Materials / Items necessarily required for successful commissioning of the 220/33kV GIS Sub Station at Palchan have been included in your offer. The same may be certified by submitting the following Certificate: -	Confirmed for scope of work provided in the tender document. If there is any change in the scope of work, then there will be price implications which will be mutually discussed & agreed.
	"It is certified that if during execution of the Work, it is felt that certain Equipments / Materials/ Items for which No Rates have been quoted are required for Construction, Erection and successful Commissioning of the Sub Station, nothing EXTRA shall be charged for such Equipments / Materials /Items from the Purchaser."	
3.	Mention the Origin of Country from where the GIS shall be supplied.	India
4.	Certify that your Firm do not anticipate any change in the Ownership during the period from Bid submission to TWO Years after Commercial Operation of the Sub Station (if such a change is anticipated, the Scope and Effect thereof may be defined).	Confirmed
5.	Supply Copies of Awards for Design, Supply; Erection, Testing and Commissioning of 245 kV; 50 kA Class and 1 or above GIS Sub Stations (Turnkey) executed during the last Seven Years may be submitted in support of your Eligible Criteria (Clause No.: 2.7.1 (c).)	Copy enclosed. Please refer Sl. No 3.a.ii)
6.	Certify that the GIS to be supplied shall be from the Manufacturer of GIS who or his Principals should have manufactured and supplied atleast 15 Nos. of GIS Bays of 245 kV; 50 kA Class and / or above Rating during the last Five Years out of which at least 5 Nos. should be in satisfactory operation for a period not less than two years on the date of Opening of	Confirmed. Copy enclosed. Please refer Sl. No 3.a.ii)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED ECC DIVISION CHENNAI 600089

Sl.No.	Description	L&T's Replies to Queries
	Bid.	
7.	Supply Copy of Registration Certificate of your Firm.	Copy enclosed. Please Refer Sl.No 3.d)
8.	Submit the Field Service Organization Chart to provide the necessary Field Erection and Management Services required to successfully Erect, Test and Commission the Equipment as required by the Specifications and Documents.	Copy enclosed. Please Refer Sl.No 3.e)
9.	Supply copies of Award No.: C.13421 -S219 A – 3/ LOA II /2223 dated 08.12.2006 and C 13421- S219 A - 3/LOA - III /2224 dated 08.12.2006 of PGCIL for which Performance Certificate has been attached with the Offer.	Copy enclosed. Please Refer Sl.No 3.c)
10.	GIS offered is of AREVA T& D Make. Similarly ABB Make Equipment is being offered by your Firm against this office Tender. It is requested to submit the Undertaking from these Firms regarding their commitment to Supply and after Sales Service of the Equipment to be supplied by them.	We are offering M/s Areva's make 220kV GIS & M/s ABB's make 33kV GIS. The undertakings of the respective vendors enclosed Please refer Sl.No 3.a.i) & 3.b.i)
11.	Form - VIII "Letter of Undertaking" has not been signed by Mr. P. Sridharan, the Witness.	We have attached a new "Letter of Undertaking". Please refer Sl.No. 3.g)
12.	Your offer is Silent on most of the important Commercial Terms and Conditions of the Tender Document viz Clause No.: 3.5 (Contract Performance Security), 3.12 (Time Schedule of Contract), 3.20 (Guarantee), 3.21 (Warranty / Guarantee), 3.47 & 4.36 (Liquidated Damages), 3.49 (Farce Majeure), 4.30 (maintenance), 5.18 (Certificate & Payments), 5.29 (Mobilization Advance) and 5.34 (Fake Inspection Call) etc. convey acceptance of the same in TOTO.	Confirmed.
13.	**Your acceptance to the entire Commercial Terms and Conditions of the Tender Document in TOTO needs to be conveyed to HPPTCL.** **TECHNICAL**	
	a. As per Clause No: 3 (PHYSICAL AND OTHER PARAMETERS) of Section -1 (PROJECT), Volume - II of the Tender Document, the Sub Station is located at an Altitude of 2400 metres above Sea Level and Minimum Ambient Air Temperature is (-) 20°C. Confirm that the GIS / Equipment / Material are suitable for installation at an Altitude of 2400	For 245kV GIS-We confirm our GIS operate from -25 Deg C to 40 Deg C ambient. We have offered 10350mm bushing which takes care of the derating factor.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED

Sl.No.	Description	L&T's Replies to Queries
	metres above Sea Level and for (-) 20°C. Further confirm that Derating Factor have been taken into account while quoting I designing the Sub Station.	For 33kV GIS-We have considered the necessary provisions for 2400 Mts.
	b. It is confirmed that the Length of 220 kV DC Transmission Line en DC Towers is 12 km.	Noted
	c. Submit the Guaranteed Technical Particulars of all the Equipment en the GTP Format attached with the Tender Document in order to evaluate the bid with other Bidders offer.	Please refer Sl.No 3.f)
	d. Supply List of Mandatory Spares and Tools with GIS Equipment that have been considered in the Offer and shall be handed over to the Purchaser / Owner for Maintenance and Operation of the GIS Sub Station after the same is taken over by Purchaser / Owner.	We have not considered any mandatory spares in our offer since the break-up is not provided in the spec. Please refer our unpriced bid for the list of tools envisaged.
	e. Confirm that the entire Equipment / Material shall be in line with Technical Specification of the Tender Document and that there shall be No Deviation in the same.	Confirmed except deviations /comments mentioned in our offer
	f. According to Section - 6 of Volume - II of the Tender Document, the Rated Voltage Factor Time has been specified as 1.9 for 30 sec and 1.2 continuous for Potential Transformers whereas in your offer it has been specified as 1.5 for 30 sec and 12 continuous. Moreover, there is deviation in Accuracy Burden (VA). Clarify.	For 245kV GIS, we have offered as per specification table 1B in Spec. For 33kV GIS the CT Burden shall be 15VA.
	g. The Ratio of Transformer bay Current Transformer offered is different from what has been called for in the Tender Specification. Clarify.	For 245kV GIS, we have proposed the transformer bay ratio150-300A as against 90-180A of the specification.This is due to design limitation to accommodate all the cores in GIS enclosure.
	h. The Secondary ratio of Potential Transformer called for is 110/ √3 - 110 / √3 - 110 Volts but the offered Ratio is 110 √3 -110/√3 - 110 / √3 Clarify.	For 245 kV GIS, we have offered as per specification table 1B in spec which is inline with your requirement. For 33kV GIS Secondary Ratio of potential Transformer will be 110/√3-110/√3-110/√3

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sl.No.	Description	L&T's Replies to Queries
		which is inline with your requirement as per table-2B of your spec.
	i. The Technical Parameters of offered Surge Arrestor is not in line with the Tender Specification requirement viz MCOV, Maximum Lightning Impulse Discharge Current of 10 kA Residual Voltage for 8/20 us Current Wave etc.	For 245kV GIS-Noted & Confirmed For 33kV GIS-Surge Arrester offered shall be of ABB Polim Make. with Discharge current of 10KA at wave 8/20us. Brochure attached for your kind reference. Please refer Sl.No 3.b.ii)
	j. Confirm SF6 Gas Monitoring System for complete pay shall be provided in each of the bays.	For 245kV GIS-We confirm that all the Gas alarm indication will be wired up to respective LCC of each bay. For 33kV GIS- Each gas tank shall have its own pressure sensing device which will give indication if pressure go above certain level
	k. Confirm that the offered GIS bays including Accessories shall be complete in all respects for their successful commissioning and reliable operation.	Noted & Confirmed
	l. l. Confirm that the .Protection Schemes offered shall be complete in all respects for their successful commissioning and reliable operation and that they shall be connected to Remote SCADA (State Load Dispatch Centre at Shimla) for Monitoring and Operation.	Noted. We have considered provision of link on IEC-60850-101 protocol at substation end for remote SCADA (SLDC) in our present scope of supply. We have offered Protection Schemes inline with specification requirement except our comments & deviation in the offer
	m. Confirm that "df / dt" Relays shall be supplied on all the Feeder Panels since your offer is Silent on the same.	As specification does not call for df/dt relay, we can provide df/dt protection as inbuilt in main protection relay for 220kV Line & T/F Feeders.
	n. Confirm that RELAY TEST KIT to be supplied to the Purchaser / Owner shall consist elf: - i) Relay Tools Kits 3 sets ii) Test Plugs 2 Nos. iii) Special Type Test Plugs for using with Modular Type Cases	 Confirmed Confirmed Not Applicable

Dy. General Manager (Contracts)
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L&T TOUSRO LIMITED Construction Division

L&T ECC DIVISION CHENNAI 600 089

Sl.No.	Description	L&T's Replies to Queries
	1 No. iv) Numerical Relay testing Equipment 1 No. v) Necessary Software and Hardware 1 set	 Confirmed Confirmed
	o. Please supply Technical Write up of all the Numerical Relays offered by you along with Type Test Reports thereof.	Shall be furnished after award of contract. GTP enclosed. Please refer Sl.No 3.f.iv)
	p. Short Circuit Capacity of the offered Power and Control Cables is less than required 40 kA for 3.0 seconds. Clarify.	The tech spec doesn't call for short circuit current capacity of 40kA for 3 sec. Also It is generally not possible to achieve 40kA for 3sec for the majority of conductors of lesser c/s area . To substantiate we have enclosed a write up with the GTP.However we have modified the GTP for short circuit current rating for 3 sec
	q. Since the equipment / material shall be covered under Warranty / Guarantee, as such the same shall be supplied by the Contractor for the requirement during O&M of the Sub Station. Hence, the Schedule of Maintenance of Sub Station has to be modified and is required to be re submitted by you.	Since GIS is a maintenance free equipment, we do not envisage any items during O&M. If anything is required, then it will be on client's account.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref.: LTCD/EIC/KRJ/HPPTCL/PHOJAL-SUPPLY/1403 — 18th March, 2013
E-mail: krj@lntecc.com

To
M/s. HP Power Transmission Corporation Limited,
(A State Government Undertaking)
Barowalias House, Khalini,
Shimla – 171002
Fax: 0177-2620227

Kind Attn. Dy. General Manager (Contracts)

Dear Sir,

Sub: Letter of Award (LOA) No.: HPPTCL/DGMC/L&T-SUPPLY/2010-5107 dated 23.12.2010 (First Contract) for supply of equipment / materials for construction of 220/33kV GIS substation at Phojal (earlier Palchan) – Amendment Thereon

Ref: Your reference LOA No. HPPTCL / DGMC / L&T – SUPPLY / 2013-6855-61 dated 08-03-2013

We thank you for releasing the above referred amended "Letter of Award" for construction of 220/33kV GIS substation at Phojal in place of Palchan. Please find enclosed " Notification of Award" pertaining to supply, duly stamped and signed on each page, as requested by you, as a token of our acceptance. Power of Attorney of the signatory is attached herewith.

However, we request you to issue an amendment to the "Letter of Award" by incorporating changes to following clauses.

Payment Terms:

As per tender document, all payments shall be made within 30days on receipt of Materials in the Contractor's store. However in the earlier LOA / amended LOA issued the same has been mentioned as 45 days. We request HPPTCL to consider payment of due amounts within 30 days as per tender document.

Further, in line with original tender conditions, please also confirm that balance 10% of the Ex-works price shall be paid within 30 days of the Issuance of the Certificate by the Purchaser's Engineer that the item(s) have been received and provided and on submission of Bank Guarantee for 10% of the Full amount valid till Completion of Testing and issuance of Taking over certificate by the Purchaser.

.../....

Dy. General Manager (Contracts) 16 9
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Mandatory Spares: (Schedule PCPS)

In the tender document HPPTCL have not provided for any Spares list for CRP & SAS. We have provided a combined list of spares as recommended by manufacturers ABB and Areva in our bid. We wish to clarify that we shall finalize the order on one of the manufacturers and we shall supply the spares as applicable to respective manufacturer during execution.

Stage Penalty:

As per tender document GCC Clause no. 3.12.6 and earlier LOA Clause No. 12 states that, Stage-wise penalties would be levied if defined percentage of progress is not achieved in time. These stage wise penalties are not applicable in the context of revised scope, location of the Project and enhanced time line for completion as notified through the amended LOA. In view of these contractual changes to scope and time, we request you to delete the said clause (earlier LOA Clause No. 12 for stage penalty). We confirm that we will complete the entire Project as per Project duration of this LOA.

Thanking you once again, and assuring you of our best attention at all times,

Yours faithfully,

For LARSEN & TOUBRO LIMITED

M.V.VIJAYABABU
Head - Contracts
Substation Business Unit
Power Transmission & Distribution

Encl.: As above

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HVB

HPPTCL

HP POWER TRANSMISSION CORPORATION LIMITED

(A State Government Undertaking)

BAROWALIAS HOUSE, KHALINI, SHIMLA-2

Ph:-0177-2626272, FAX:-2626284 , 2620227.

NO: HPPTCL/ Palchan S / Stn. / 2011-12- 6113 **Dated:-** 3-12-11

To

M/S LARSON & TOUBRO LIMITED,
ECC DIVISION - EDRC,
TC -- III Building, Tower -- B, 6th Floor, C- Block,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B.NO. 979, CHENNAI -- 6000089,
Fax -- 044-22333123, Kind attention : Sh. Shravan.

Subject:- Construction of 33/220 kv , 25 / 31.5 MVA GIS Sub Station at Palchan in Distt Kullu, H.P. against this office Award No. HPPTCL/L&T-SUPPLY/2010-5107 12 Dated: 23.12.2010 (FIRST CONTRACT) and HPPTCL/L&T-ERECTION/2010-6099-6104 Dated: 23.12.2010 (SECOND CONTRACT) against Tender Document No. DGMC/ PALCHAN SUB-STATION / 2 / 2009.

Sir ,

In this connection, it is intimated that the scope of the work to construct 33 / 220 kv, 25 / 31.5 MVA GIS Sub-/ Station Palchan has now been changed and shall be as under :-

Construction of 33 / 220 KV , 2 X 50 / 63 MVA GIS Sub-Station at Fozal , Distt. Kullu with the provision of :-

1.	*220 KV System:*	*a)*	*Feeder Bays -* 2 Nos. (LILO)
		b)	*Bus Coupler Bay -* 1 No.
		c)	*220 / 33 Kv Transformer Bay -- 2 Nos.*
2.	*33 KV System :*	*a)*	*Transformer Bays --* 2 Nos.
		b)	*Station Transformer Bay -- 1 No.*
		c)	*Bus Coupler Bay --* 1 No.
		d)	*Feeder Bays -* 6 Nos.

LARSEN & TOUBRO LTD. Construction Contracts

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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c) Space for Future Bay- *2 Nos.*

It is therefore requested to convey your acceptance to execute the work at new site on the same Rates, Terms and Conditions.

TREAT IT MOST URGENT PLEASE.

Yours faithfully,

For Managing Director

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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MINUTES OF MEETING HELD ON DATED: 06-01-2012 IN THE HPPTCL CONFERENCE HALL, SANGLA HOUSE , KHALINI, SHIMLA-2.

A meeting in compliance to Office Order No.: HPPTCL/ Contract / Fozal/ 2011-12-6624-30 Dated: 31-12-2011 was convened under the Chairmanship of Er. Ashok Sharma, G M (C & D), HPPTCL, Shimla.

Following attended the meeting:-

From HPPTCL

1)	Er. Ashok Sharma, G M (C & D), HPPTCL, Shimla	Chairman
2)	Er. S.K. Chauhan, D G M & Head Trans. Design, H/Pur	Member
3)	Er. R.D. Sandhu, D G M (Contracts),HPPTCL, Shimla	Member
4)	Er. R.C. Kaundal, D G M (Projects),HPPTCL, Shimla	Member
5)	Mr. Amrit Chauhan, D G M (Finance),HPPTCL, Shimla	Member
6)	Er. Amar Singh, Sr. Manager (Projects),HPPTCL, Kullu	Member
7)	Er. Harish Kapoor, Sr. Manager (Contracts), HPPTCL, Shimla	Member

From M/S L & T Ltd., Chennai

1) Mr. Pankaj Garg, Manager (Electrical).
2) Mr. U.R.K. Murthy, Construction Manager.
3) Mr. Saurabh Jain, Asstt. Engineering manager.

Chairman of the Committee welcomed the representatives of M/S L&T Ltd., Chennai and apprised the representatives of M/S L&T Ltd., Chennai about various issues relating to change in scope of work for Construction of 33/220 KV, 25 / 31.5 MVA GIS Sub Station from Palchan to Fozal in Distt. Kullu. H.P.

The following points were discussed:-

- The Firm was requested to convey their acceptance for executing the works at Fozal instead of Palchan on same Rates, Terms & Conditions of Award issued to them.
- The Firm submitted their conditional acceptance vide their letter NO.: L&T – PT & D / HPPTCL / DLRO dated: 06-01-2012.
- HPPTCL's parawise comments on aforesaid Firm's letter are as follows:-

1. **Change In Scope** : This is as per HPPTCL's requirement .
2. **Detailed Engineering**: HPPTCL will take the necessary action to make available required Technical support for the execution of works at new site.
3. **Commercial Implications**: The Firm has mentioned that they would submit their Commercial Offer for Revised Scope with revised rates, which is not acceptable to HPPTCL. Since HPPTCL reserve the right to increase or decrease

LARSEN & TOUBRO LIMITED Construction Organisation

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

upto 20% of the contract value as per terms of both the contracts viz. supply and Erection portion and beyond 20% variation, rates applicable will be based on IEEMA.

4. **Project Completion Period:** The Firm has proposed the Project completion Period to be Revised from 8 Months to 16 Months which is not acceptable to HPPTCL and HPPTCL requested the Firm to reduce the completion period to 10 Months.

5. Representatives of M/S L&T Ltd. Conveyed that they shall revert back after discussing these issues with their higher authorities and detailed acceptance accordingly will be submitted by them to HPPTCL within 2 weeks.

For HPPTCL	For M/S L & T Ltd.
Er. Harish Kapoor Sr. Manager (Contracts)	Mr. Pankaj Garg, Manager (Electrical)
Er. Amar Singh Sr. Manager (Projects)	Mr. U.R.K. Murthy , Construction Manager.
Mr. Amrit Chauhan D G M (Finance)	Mr. Saurabh Jain, Asstt. Engineering manager.
Er. R.C. Kaundal, D G M (Projects)	
Er. R.D. Sandhu, D G M (Contracts)	
Er. S.K. Chauhan, D G M & Head Trans. Design	
Er. Ashok Sharma, G M (C & D)	

L&T-SUBROS LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2403 21st April, 2012
Email: KRJ@LNTECC.COM.

To
Deputy General Manager (Contracts),
M/s. HP Power Transmission Corporation Limited,
Barowallas House, Khalini,
Shimla – 171002,
Himachal Pradesh.

Fax: 2626284 / 2620227

Dear Sir,

Sub: Construction of 33/220kV, 25/31.5MVA GIS Substation at Palchan in Distt. Kullu, H.P against LoA No. HPPTCL/L&T-SUPPLY/2010-5107 DATED 23.12.2010 (First Contract) and HPPTCL/L&T-Erection/2010-5099-5104 dated 23.12.2010 (Second Contract) against Tender Document No.DGMC/Palchan Sub-Station/2/2009.

Ref: 1. Your Letter Ref No. HPPTCL/Palchan S/Stn/2011-12-7534 dated 14.02.2012
2. Our Letter No: L&T-PT&D/HPPTCL/07 dated: 18.04.2012

This is in reference to the meeting we had in your office on 06/01/2012 and your above referred letter under reference. We are hereby submitting our price proposal for the revised scope of work.

We sincerely regret the delay in submission of offer. Our revised proposal was delayed due to the Re-Engineering to be carried out due to major change in scope. We assure you that we are sincerely committed in executing the project. We wish to inform you that we are the first EPC Contractor in India to be awarded a 765kV GIS Substation. We have executed more than 20 Nos. of GIS substations in India and abroad and are executing around 20 Nos. of GIS Substations of various voltage levels in India and Abroad. Other than OEMS, we are the only Contractor who had done maximum no of GIS in India. We reassure you that we are very much committed to this project.

In this connection, we would like to bring the following points for your kind consideration.

Offer for the subject project was submitted in Dec'09. Subsequently, Letter of Award was issued on 23rd Dec 2010. We have taken up Engineering and procurement activities immediately on award of LOA. We had finalized major items and submitted drawings for approval. Further, upon approval of 33KV GIS drawings, under intimation to you, we have gone ahead with manufacturing. As per the project schedule, all the orders should have been finalized by Feb'11. If the project was on schedule, we could have completed all the procurement activities. However, due to the issues related finalization of layout and handing over of the land, ordering of some of the items got delayed. For those items which were already ordered, we weren't able to go ahead with the manufacturing.

.../...

Larsen & Toubro Limited, Power Transmission & Distribution
Mount Poonamallee Road, Manapakkam, P. B. No. 979, Chennai - 600 089, INDIA
Tel : +91-44-2270 4000,2270 5000 Fax : +91-44-2270 5482 www.Lntecc.com

Registered Office:
L&T House, N. M. Marg
Ballard Estate
Mumbai 400 001, INDIA

(L&T Construction is a business brand of Larsen & Toubro Limited)

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

We had also mobilized our team for taking up site works but we couldn't take up any work since the land wasn't handed over to us. We had also expressed our concern on the storage and safety of materials to be procured due to the non-availability of land vide our letter no: L&T-P&D/HPPTCL/002 Dated: 28.04.2011.

Though we were fully geared up to take up the work, we couldn't proceed fast due to the above issues. You would appreciate that if the above issues like land handing over etc completed on time, work could have proceeded on schedule. Meanwhile, we have received your communication on 03/12/2011 informing about the change in change in quantities and location.

During this period, cost of raw materials have gone up and there is high volatility in prices. There is also considerable variation in currency rates. Due to this, all the vendors are demanding increase in prices. Had we gone ahead as per project schedule, we would have avoided these costs.

Also, if the clearance was issued in time, we would have completed the project within the last financial year even with slight delay in handing over of the land. However, since this project has to be executed in this financial year, there is an increase in the statutory taxes and duties (like Excise Duty and Service tax from 10.30% to 12.36%).

Since the delay in the execution of the project including supplies is not attributable to us, we request you to consider favourably the price variation and statutory variation for supplies and erection works as proposed below.

1. Supply of following Equipments will be firm. Unit rates are in line with the LOA and increase/decrease is based on the change in scope of works
   a. Substation Automation System
   b. FOTE

2. Currency variation (EURO) is considered from the scheduled placement of order and till Mar'12 for the following items since major components are imported for these equipments
   a. 33KV GIS – Since original qty is already manufactured, we are claiming variation only for additional quantities
   b. 220KV GIS – Though the order was already placed for this item, since manufacturing couldn't be taken up, vendor is insisting for increase in prices. Hence, we request for currency variation for the total quantity.

3. Price variation as per IEEMA is considered from the scheduled placement of order as per L2 and till Mar'12 for the following items since these items couldn't be delivered as per L2.
   a. LT Transformers
   b. CVT & LA
   c. Control & Relay Panel
   d. Structures
   e. Cables
   f. LT Panels
   g. Battery & Battery Charger
   h. PLCC

.../...

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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4. Price variation as per IEEMA is considered from Apr'11 to Mar'12 for the following works.
   a. Erection works
   b. Civil works

We haven't increased any unit rates except for the proportional increase due to scope change for lumpsum items and to account for price and statutory variation as detailed above. You would appreciate that the increase requested by us is very nominal considering the huge delay which is not attributable to us.

Regarding contract duration, we had requested for a contract duration of 16 Months considering the increased scope of works. In the interest of the project, we agree for a duration of 14Months from the date of award of order amendment.

All other terms and conditions shall be as per the Tender documents.

We once again regret for the delay in submission of this proposal. Now, we look forward for your valuable amended order at the earliest and we assure you that we would put our best efforts to complete the project at an early date. We would be eager to clarify should you require any clarifications and we can meet you at your convenience for any discussions.

We seek your appointment to sit across and clarify your queries.

Thanking you and assuring you of our best services at all times, we remain.

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

K. RAJARAM
General Manager &
Head-Substation Business Unit

LARSEN & TOUBRO LIMITED Construction Chennai

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

TENDER SPECIFICATION No.: DGMC / PALCHAN SUB STATION /2/2009

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PALCHAN IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
A	**POWER TRANSFORMER**									
1	250 kVA; 33 / 0.433 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	407,221	INCLUDED		4,907	6,360	418,488	418,488
B	**245 KVGIS EQUIPMENT**			-	-		-	-	-	-
1	245 kV, 1600 A, 50 kA SF6 Gas Insulated TRANSFORMER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Surge Arresters (196 W), SF6Gas Monitoring System for complete Bay, LCC, Three 1 - Phase SF6 Ducts and SF6 / Oil Bushing to connect to 220 / 33 kV, 25 / 31.5 MVA Transformer and Accessories with GIS etc to complete Transformer Bay Module	Nos.	2	42,062,138	INCLUDED		2,726,281	671,592	45,460,011	90,960,022
2	245 kV, 2000 A, 50 GAS F6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnector with Grounding Switch, Line Disconnector with Safety Grounding Switch, High, Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module.	Nos.	2	40,083,745	INCLUDED		2,726,281	639,779	43,454,805	86,909,610

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUSRO LIMITED Construction Chennai

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Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
3	245kV, 4000 A, 50 kA, 3 Single Phase (isolated) Units SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch	Nos.	2	-	INCLUDED	-	5,452,562	-	5,452,562	10,905,124
4	245 kV, 4000 A, 50 kA SF6 Gas Insualted BUS COUPLER BAY MODULE comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches SF6 Gas Monitoring System for complete Bay, LCC etc	Nos.	1	22,928,008	INCLUDED		2,726,281	365,910	26,020,199	26,020,199
5	245 kV-CVT with Junction Box	Nos.	6	394,340	INCLUDED		13,631	6,678	414,649	2,487,894
6	198 kV Lightning Arrester with Counter and Leakage Meter	Nos.	6	80,233	INCLUDED		682	1,336	82,251	493,506
C	36 kV, 2000 A, 40 kA for 3 sec., SF6 Gas insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch			-		-	-	-	-	-
1	36 kV 1600A SF6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, ~~GIS Duct, and Air / SF6, Bushing Termination~~ Enclosure and Accessories with GIS etc to complete Feeder/Bay Module	Nos.	6	3,771,015	INCLUDED		13,631	61,967	3,846,613	23,079,678
2	36kV 2000 A SF6 Gas Insulated BUS COUPLER BAY comprising of SF6 Gas Insulated Circuit Breaker Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Line Panel	Nos.	1	3,124,474	INCLUDED		13,631	52,912	3,191,017	3,191,017

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction-Chennai

Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
3	36 kV, 1600 A SF6 Gas Insulated POWER TRANSFORMER PANEL each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, Surge Arrester (30 kV), SF6 Gas Monitoring System for complete Power Transformer Pane	Nos.	2	3,254,290	INCLUDED		13,631	53,476	3,321,397	6,642,794
4	36 kV, 630 A SF6 Gas Insulated 250 kVA, L. T. TRANSFORMER PANEL-each comprising of SF6 Gas insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Power Transformer Panel	Nos.	1	2,714,411	INCLUDED		13,631	45,968	2,774,010	2,774,010
D	**SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Station alongwith Associated Equipments as per Technical Specification**	Lot	1	15,188,814	INCLUDED		132,315	154,336	15,475,265	15,475,265
	BAY CONTROL UNITS			-	-		-	-	-	-
1	220kV Bays	Nos	5	INCLUDED ABOVE						
2	33kV Bays	Nos	10							
E1	220 kV CONTROL AND RELAY PANEL									
1	Circuit Breaker Control Panel			-			-	-	-	-
a)	With Auto Reclose	Nos.	2	538,543	INCLUDED		4,560	8,904	552,027	1,104,054
b)	With out Auto Reclose	Nos.	2	512,897	INCLUDED		4,352	8,480	525,739	1,051,478
2	Line Protection Panel (Main I + Main II)	Nos.	2	1,282,244	INCLUDED		10,905	21,200	1,314,349	2,628,698
3	Bus bar Protection Panel	Set	1	2,487,553	INCLUDED		21,156	41,128	2,549,837	2,549,837
	220 kV(Double Bus Bar Protection)			-			-	-	-	-
4	Transformer Protection Panel - H. V. Side	Nos	2	805,249	INCLUDED		6,848	13,314	825,411	1,650,822
E2	33 kV CONTROL AND RELAY PANEL			-			-	-	-	-
1	Circuit Breaker Control Panel			-			-	-	-	-
a)	With Auto Reclose	Nos.	6	486,735	INCLUDED		4,144	8,056	498,935	2,993,610
b)	With out Auto Reclose	Nos.	4	486,735	INCLUDED		4,144	8,056	498,935	1,995,740
2	Line Protection Panel	Nos.	5	INCLUDED ABOVE						
3	Transformer Protection Panel - L. V. Side	Nos.	2							
F	PLCC for 220 kV LINE FEEDER			-			-	-	-	-
1	2000 A, 0.5 mH /1.0 mH, 50 kA Line Traps	Nos.	4	450,221	INCLUDED		5,758	7,462	463,441	1,853,764
2	Coupling Device (Phase to Phase)	Nos	4	75,396	INCLUDED		962	1,247	77,605	310,420

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T LARSEN & TOUBRO LIMITED Construction-Chennai

Sr. No.	Decription of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
3	HF Cable	Ls	1	12,268	INCLUDED		160	208	12,636	12,636
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos	6	320,560	INCLUDED		4,089	5,300	329,949	1,979,694
5	Protection Coupler	Nos	4	136,969	INCLUDED		1,747	2,265	140,981	563,924
6	Print Testing Kit	Set	1	108,991	INCLUDED		1,390	1,802	112,183	112,183
7	EPBAX (24 / 8) with Telephone Sets	Set	1	281,478	INCLUDED		3,591	4,654	289,723	289,723
F.1	FOTE Equipment	Set	1.5	9,576,829	INCLUDED		125,136	162,180	9,864,145	14,796,218
				-		-	-	-	-	-
G	AIR CONDITIONER AND VENTILATION SYSTEM			-		-	-	-	-	-
1	Split AC (Capacity - 2T)	Nos	10	30,045	INCLUDED		393	509	30,947	309,470
2	Ventilation System for 220kV & 33kV GIS Hall	LS	1	2,040,192	INCLUDED		28,855	37,397	2,106,444	2,106,444
H	LT SWITCHBOARD			-		-	-	-	-	-
1	415V Main Switchboard	Nos	1	3,202,197	INCLUDED		40,894	53,000	3,296,091	3,296,091
2	415V A C Distribution Board	Nos	1	1,474,491	INCLUDED		18,830	24,404	1,517,725	1,517,725
3	220V DCDB	Nos	2	574,206	INCLUDED		7,333	9,504	591,043	1,182,086
4	48V, DC DB	Nos	2	366,254	INCLUDED		4,677	6,062	376,993	753,986
I.	BATTERIES			-		-	-	-	-	-
1	220V, 400 AH	Set	2	673,897	INCLUDED		8,421	10,914	693,232	1,386,464
2	48V, 400 AH	Set	2	147,032	INCLUDED		1,837	2,381	151,250	302,500
	Bidder shall estimate and indicate the AH Capacities of the Batteries to meet the Functional Requirement			-		-	-	-	-	-
J	BATTERY CHARGER SYSTEM			-		-	-	-	-	-
1	220V	Set	2	484,475	INCLUDED		6,330	8,204	499,009	998,018
2	48V	Set	2	360,539	INCLUDED		4,711	6,106	371,356	742,712
K	DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)	Set	1	1,877,809	INCLUDED		24,537	31,800	1,934,146	1,934,146
L	FIRE PREVENTION AND EXTINGUISHING SYSTEM			-		-	-	-	-	-
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	2	619,677	INCLUDED		8,097	10,494	638,268	1,276,536
2	Fire Protection for GIS cum Control Room Building, etc. (Portable type the Extinguishers System)	Lot	1	684,075	INCLUDED		9,675	12,539	706,289	706,289
M	ILLUMINATION SYSTEM	Lot	1	4,868,519	INCLUDED		49,573	64,248	4,982,340	4,982,340
1	Control Room / GIS Building	LS	1	INCLUDED ABOVE						
2	Switchyard Lighting	LS	1							
3	Solar Light System for Street Light	LS	1	-		-	-	-	-	-
N	Power Cables and Copper Conductor Armoured Control Cables alongwith:Lugs, Glands and Straight Joints	LS	1	5,871,110	INCLUDED		68,740	45,677	5,975,527	5,975,527
				-		-	-	-	-	-

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Unit					Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
O	1.1kV XLPE POWER CABLE AND ACCESSORIES			-		-	-	-	-	-
1	XLPE POWER CABLE			-		-	-	-	-	-
	3.5c x 300 Sq.mm	km	0.5	648,032	INCLUDED		8,064	10,452	666,548	333,274
2	PVC POWER CABLE			-		-	-	-	-	-
	3.5 c x 90 Sq. mm	km	0.2	320,021	INCLUDED		3,982	5,161	329,164	65,833
	3.5 c x 70 Sq. mm	km	0.5	259,607	INCLUDED		3,231	4,187	267,025	133,513
	3.5 c x 35 Sq. mm	km	0.2	149,980	INCLUDED		1,866	2,419	154,265	30,853
	4 c x 16 Sq. mm	km	0.5	103,580	INCLUDED		1,289	1,671	106,540	53,270
	4 c x 4 Sq. mm	km	1	51,264	INCLUDED		638	827	52,729	52,729
3	HR FRLS CONTROL CABLE			-		-	-	-	-	-
	2c x2.5 Sq.mm	km	1	46,569	INCLUDED		597	773	47,939	47,939
	4 c X 2.5 sq. mm	km	2	79,437	INCLUDED		1,018	1,319	81,774	163,548
	7 cX 2.5 sq. mm	km	1	132,122	INCLUDED		1,693	2,194	136,009	136,009
	10cX2.5sq. mm	km	0.75	185,089	INCLUDED		2,371	3,073	190,533	142,900
	12cX2.5sq. mm	km	0.5	219,948	INCLUDED		2,818	3,652	226,418	113,209
	16cX2.5sq. mm	km	0.5	290,280	INCLUDED		3,719	4,819	298,818	149,409
	19cX2.5sq. mm	km	0.2	341,318	INCLUDED		4,372	5,667	351,357	70,271
	2cX4sq.mm	km	1	62,748	INCLUDED		804	1,042	64,594	64,594
	4c X 4 sq.mm	km	1	114,833	INCLUDED		1,471	1,907	118,211	118,211
	7cX4sq. mm	km	1	204,727	INCLUDED		2,623	3,399	210,749	210,749
4	36 kV XLPE CABLE			-		-	-	-	-	-
a)	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)	km	1	921,646	INCLUDED		12,104	15,687	949,437	949,437
b)	33kV Indoor Termination Suitable for above Cable	Nos	6	4,882	INCLUDED		64	83	5,029	30,174
c)	33kV Outdoor Termination Suitable for above Cable	Nos	6	3,080	INCLUDED		40	52	3,172	19,032
P	GROUNDING / EARTHING SYSTEM	Lot	1	2,424,291	INCLUDED		121,520	35,436	2,581,247	2,581,247
a)	40 mm MS Rod for Earthmat(*)	LS	1							
b)	GIS / MS Flats	LS	1							
c)	Electrodes	LS	1							
	Bidder to estimate and fill the quantites as per his own requirement.									
d)	Lightning Mast / GS Shield Wire (*)	LS	1							
	(*Bidder to Estimate and Design)			-		-	-	-	-	-
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT	LS	1	4,152,798	INCLUDED		109,223	25,480	4,287,501	4,287,501
R	EOT CRANE			-		-	-	-	-	-
a.	3.5T for 220kV GIS ROOM	Set	1	672,246	INCLUDED		8,784	11,384	692,414	692,414
b.	2.5T for 33kV GIS ROOM	Set	1	451,240	INCLUDED		5,896	7,642	464,778	464,778

INCLUDED ABOVE

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUSRO LIMITED Chennai Larsen & Toubro Construction

L&T TOUSRO LIMITED Construction-Chennai

Sr. No.	Decription of Material	Unit	Quantity	Unit					Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
c.	Moveable Ladder of suitable Capacity for 220 kV &33kV GIS Room	Nos	2	125,188	INCLUDED		1,636	2,120	128,944	257,888
S	**Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, Including Equipment Connectors, Pipes for Equipment & Lighting, all Accessories etc**	LS	1	1,790,340	INCLUDED		27,492	21,378	1,839,210	1,839,210
				-		-	-	-	-	-
T	**TESTING AND MAINTENANCE EQUIPMENT**			-		-	-	-	-	-
1	Meggar 5 kV (Motorized)	No	1	68,238	INCLUDED		965	1,251	70,454	70,454
2	Meggar 1 kV (Motorized)	No	1	6,940	INCLUDED		98	127	7,165	7,165
3	Digital Multimeter	Nos	2	9,831	INCLUDED		139	180	10,150	20,300
6	D - Spanner Set (Insulated)	Nos	2	665	INCLUDED		9	12	686	1,372
7	Ring - Spanner Set (Insulated)	Nos	2	694	INCLUDED		10	13	717	1,434
8	Torque Wrench Set	Nos	2	11,565	INCLUDED		164	212	11,941	23,882
9	Insulating Gloves	Set	5	1,446	INCLUDED		20	27	1,493	7,465
10	Helmets	Set	5	520	INCLUDED		7	10	537	2,685
17	Gas Evacuating and Refilling Device	Set	1	3,307,794	INCLUDED		46,783	60,632	3,415,209	3,415,209
18	Gas Leakage Monitor	Nos	2	69,394	INCLUDED		981	1,272	71,647	143,294
19	Dew Point Meter	Nos		404,800	INCLUDED		5,725	7,420	417,945	-
20	Relay Test Kit	Nos	1	2,544,458	INCLUDED		35,987	46,640	2,627,085	2,627,085
21	Synchronizing Trolley	Set	1	143,965	INCLUDED		1,881	2,438	148,284	148,284
22	Time Synchronisation Equipment	Lot	1	INCLUDED IN SUBSTATION AUTOMATION SYSTEM						
				-			-	-	-	-
	GRAND TOTAL									350,197,863

LARSEN & TOUBRO LIMITED
Construction

K. RAJARAM
General Manager & Head
Substation Business Unit
Power Transmission & Distribution (Domestic)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)

Price Schedule Erection

TENDER SPECIFICATION No.: DGMC / PALCHAN SUB STATION /2/2009

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PALCHAN IN KULLU DISTRICT

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
A	**POWER TRANSFORMER**				
1	25 / 31.5 MVA, 220 / 33 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	527,021	527,021
2	250 kVA; 33 / 0.433 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	147,422	147,422
B	**245 KVGIS EQUIPMENT**			-	-
1	245 kV, 1600 A, 50 kA SF6 Gas Insulated TRANSFORMER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Surge Arresters (196 W), SF6Gas Monitoring System for complete Bay, LCC, Three 1 - Phase SF6 Ducts and SF6 / Oil Bushing to connect to 220 / 33 kV, 25 / 31.5 MVA Transformer and Accessories with GIS etc to complete Transformer Bay Module	Nos.	2	565,449	1,130,898

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T LARSEN & TOUBRO LIMITED Construction-Chennai

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
2	245 kV, 2000 A, 50 GAS F6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnector with Grounding Switch, Line Disconnector with Safety Grounding Switch, High, Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module.	Nos.	2	565,449	1,130,898
3	245kV, 4000 A, 50 kA, 3 Single Phase (isolated) Units SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module Each Bus Bar Set shaft be complete with Voltage Transformer complete with Safety Grounding Switch	Nos.	2	998,506	1,997,012
4	245 kV, 4000 A, 50 kA SF6 Gas Insualted BUS COUPLER BAY MODULE comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches SF6 Gas Monitoring System for complete Bay, LCC etc	Nos.	1	565,449	565,449
5	245 kV-CVT with Junction Box	Nos.	6	9,456	56,736
6	198 kV Lightning Arrester with Counter and Leakage Meter	Nos.	6	5,673	34,038
C	**36 kV, 2000 A, 40 kA for 3 sec., SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch**			-	-

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
1	36 kV 1600A SF6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, ~~GIS Duct, and Air / SF6. Bushing Termination~~ Enclosure and Accessories with GIS etc-to complete Feeder/Bay Module	Nos.	6	56,739	340,434
2	36kV 2000 A SF6 Gas Insulated BUS COUPLER BAY comprising of SF6 Gas Insulated Circuit Breaker Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Line Panel	Nos.	1	56,739	56,739
3	36 kV, 1600 A SF6 Gas Insulated POWER TRANSFORMER PANEL each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, Surge Arrester (30 kV), SF6 Gas Monitoring System for complete Power Transformer Pane	Nos.	2	56,739	113,478
4	36 kV, 630 A SF6 Gas Insulated 250 kVA, L. T. TRANSFORMER PANEL-each comprising of SF6 Gas insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Power Transformer Panel	Nos.	1	56,739	56,739

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
D	**SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Station aiongwith Associated Equipments as per Technical Specification**	Lot	1	283,695	283,695
	BAY CONTROL UNITS			-	-
1	220kV Bays	Nos	5	INCLUDED ABOVE	-
2	33kV Bays	Nos	10		-
E1	**220 kV CONTROL AND RELAY PANEL**			-	-
1	Circuit Breaker Control Panel			-	-
a)	With Auto Reclose	Nos.	2	18,913	37,826
b)	With out Auto Reclose	Nos.	2	18,913	37,826
2	Line Protection Panel (Main I + Main II)	Nos.	2	18,913	37,826
3	Bus bar Protection Panel	Set	1	18,913	18,913
	220 kV(Double Bus Bar Protection)			-	-
4	Transformer Protection Panel - H. V. Side	Nos	2	18,913	37,826
E2	**33 kV CONTROL AND RELAY PANEL**			-	-
1	Circuit Breaker Control Panel			-	-
a)	With Auto Reclose	Nos.	6	18,913	113,478
b)	With out Auto Rectose	Nos.	4	18,913	75,652
2	Line Protection Panel	Nos.	6	INCLUDED ABOVE	-
3	Transformer Protection Panel - L. V. Side	Nos.	2		-
F	**PLCC for 220 kV LINE FEEDER**			-	-
1	2000 A, 0.5 mH /1.0 mH, 50 kA Line Traps	Nos.	4	15,131	60,524
2	Coupling Device (Phase to Phase)	Nos	4	11,348	45,392
3	HF Cable	Ls	1	9,456	9,456
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos	6	11,348	68,088
5	Protection Coupler	Nos	4	11,348	45,392
6	Print Testing Kit	Set	1	11,348	11,348

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
7	EPBAX (24 / 8) with Telephone Sets	Set	1	11,348	11,348
F.1	**FOTE Equipment**	Set	1.5	5,285,741	7,928,612
				-	-
G	**AIR CONDITIONER AND VENTILATION SYSTEM**			-	-
1	Split AC (Capacity - 2T)	Nos	10	18,913	189,130
2	Ventilation System for 220kV & 33kV GIS Hall	LS	1	2,590,013	2,590,013
H	**LT SWITCHBOARD**			-	-
1	415V Main Switchboard	Nos	1	160,760	160,760
2	415V A.C Distribution Board	Nos	1	113,478	113,478
3	220V DCDB	Nos	2	94,565	189,130
4	48V, DC DB	Nos	2	94,565	189,130
I.	**BATTERIES**			-	-
1	220V, 400 AH	Set	2	94,565	189,130
2	48V, 400 AH	Set	2	56,739	113,478
	Bidder shall estimate and indicate the AH Capacities of the Batteries to meet the Functional Requirement			-	-
J	**BATTERY CHARGER SYSTEM**			-	-
1	220V	Set	2	18,913	37,826
2	48V	Set	2	18,913	37,826
K	**DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)**	Set	1	94,565	94,565
L	**FIRE PREVENTION AND EXTINGUISHING SYSTEM**			-	-
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	2	343,574	687,148
2	Fire Protection for GIS cum Control Room Building, etc. (Portable type the Extinguishers System)	Lot	1	559,295	559,295
M	**ILLUMINATION SYSTEM**	Lot	1	907,144	907,144
1	Control Room / GIS Building	LS	1	-	-
2	Switchyard Lighting	LS	1	INCLUDED ABOVE	
3	Solar Light System for Street Light	LS	1		

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
N	**Power Cables and Copper Conductor Armoured Control Cables alongwith:Lugs, Glands and Straight Joints**	LS	1	3,760,117	3,760,117
				-	-
O	**1.1kV XLPE POWER CABLE AND ACCESSORIES**			-	-
1	**XLPE POWER CABLE**			-	-
	3.5c x 300 Sq.mm	km	0.5	112,701	56,351
2	**PVC POWER CABLE**			-	-
	3.5 c x 90 Sq. mm	km	0.2	87,169	17,434
	3.5 c x 70 Sq. mm	km	0.5	87,169	43,585
	3.5 c x 35 Sq. mm	km	0.2	61,637	12,327
	4 c x 16 Sq. mm	km	0.5	61,637	30,819
	4 c x 4 Sq. mm	km	1	36,105	36,105
3	**HR FRLS CONTROL CABLE**			-	-
	2c x2.5 Sq.mm	km	1	34,402	34,402
	4 c X 2.5 sq. mm	km	2	34,402	68,804
	7 cX 2.5 sq. mm	km	1	38,373	38,373
	10cX2.5sq. mm	km	0.75	44,332	33,249
	12cX2.5sq. mm	km	0.5	44,332	22,166
	16cX2.5sq. mm	km	0.5	52,370	26,185
	19cX2.5sq. mm	km	0.2	54,261	10,852
	2cX4sq.mm	km	1	37,806	37,806
	4c X 4 sq.mm	km	1	44,615	44,615
	7cX4sq. mm	km	1	66,176	66,176
4	**36 kV XLPE CABLE**			-	-
a)	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)	km	1	196,645	196,645
b)	33kV Indoor Termination Suitable for above Cable	Nos	6	3,836	23,016
c)	33kV Outdoor Termination Suitable for above Cable	Nos	6	3,836	23,016
P	**GROUNDING / EARTHING SYSTEM**	Lot	1	2,896,089	2,896,089

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
a)	40 mm MS Rod for Earthmat(*)	LS	1		-
b)	GIS / MS Flats	LS	1		-
c)	Electrodes	LS	1	INCLUDED ABOVE	-
	Bidder to estimate and fill the quantites as per his own requirement.				-
d)	Lightning Mast / GS Shield Wire (*)	LS	1		-
	(*Bidder to Estimate and Design)			-	-
Q	**STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT**	LS	1	370,663	370,663
R	**EOT CRANE**			-	-
a.	3.5T for 220kV GIS ROOM	Set	1	225,123	225,123
b.	2.5T for 33kV GIS ROOM	Set	1	168,797	168,797
c.	Moveable Ladder of suitable Capacity for 220 kV &33kV GIS Room	Nos	2	52,857	105,714
S	**Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, including Equipment Connectors, Pipes for Equipment & Lighting, all Accessories etc**	LS	1	757,143	757,143
				-	-
T	**Civil Works as per Specification**				-
1	Soil Investigation	LS	1	397,649	397,649
2	Excavation & Filling for Land Development	LS	1	AS PER CLARIFICATION CLIENT WILL PROVIDE LEVELLED LAND TO US SO WE HAVEN'T QUOTED	
3	Retaining Wall	LS	1	3,133,614	3,133,614

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED Heavy Civil Construction Division

L&T LARSEN & TOUBRO LIMITED Construction-Chennai

19v

Sr. No.	Decription of Material	Unit	Quantity Present	Erection Price Unit	Erection Price Total Present
1	2	3	4	5	6=5X4
4	Tower & Equipment Foundation, Transformer Foundation, Fire Wall Cable Trenches Including all Types of Crossings and all Metallic Work Including Steel Racks for Cable, Cable Supports MS Angle Edging and RCC Covers with Lifting Arrangements	LS	1	11,685,152	11,685,152
5	Buried Cable Trenches for Auxiliary Power Arrangement	LS	1	414,394	414,394
6	Site Surfacing and Antiweed Treatment	LS	1	1,576,764	1,576,764
7	Cement Concrete Roads including all Types of Crossings			-	-
a)	5.00 metres wide Road cum Rail Track	LS	1	1,584,501	1,584,501
b)	3.5 Metres wide	LS	1	1,740,383	1,740,383
	Rail for laying of Rail Track shall be arranged / Supplied by the bidder at his own cost.				-
8	Storm Water Drainage including Culverts	LS	1	1,049,372	1,049,372
9	Security Fencing along with Gates and Security Room	LS	1	1,109,175	1,109,175
10	Buildings			-	-
a)	Control Room Building cum 220kV GIS Room alongwith Battery Room, PLCC Room, SCADA Room, Offices and Stores	LS	1	15,499,769	15,499,769
b)	33k GIS Building	LS	1	2,737,918	2,737,918
11	D.G. Set Outdoor Silent Type	LS	1	142,737	142,737
12	Store Shed	LS	1	2,630,723	2,630,723
13	Transformer Oil Drainage System	LS	1	INCLUDED IN SL.NO. 4 ABOVE	
	GRAND TOTAL				73,545,842

By, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED
Construction
K. RAJARAM
General Manager & Head
Substation Business Unit
Power Transmission & Distribution (Domestic)

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

TENDER SPECIFICATION No.: DGMC / PALCHAN SUB STATION /2/2009

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PALCHAN IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
				-		-	-	-	-	-
T	MANDATORY SPARES			-		-	-	-	-	-
	Mandatory Spares as per the List indicated in the contract			Same as Original Contract						-
				-			-	-	-	-
	GRAND TOTAL			-			-	-	-	-

LARSEN & TOUBRO LIMITED
Construction

K. RAJARAM
General Manager & Head
Substation Business Unit
Power Transmission & Distribution (Domestic)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DESIGN, ENGINEERING, MANUFACTURING, TESTING OF EQUIPMENT, ERECTION, COMMISSIONING ALONG WITH OTHER ALLIED WORKS SUCH AS EARTHMAT & CIVIL WORKS ON TURN KEY BASIS FOR 220/33KV SUBSTATION AT PALCHAN, DISTRICT KULLU-H.P. (GIS)

SCHEDULE OF MAINTENANCE OF SUBSTATION

S.No.	Name of Substation	Maintenance Charges/Month	Total Charges for One Year	Remarks
1	2	3	4	5
1	220/33 kV GIS Substation at Palchan, Kullu	Same as Original Contract		

LARSEN & TOUBRO LIMITED
Construction

K. RAJARAM
General Manager & Head
Substation Business Unit
Power Transmission & Distribution (Domestic)

LARSEN & TOUBRO LIMITED Construction-Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2404 24th April, 2012
Email: KRJ@LNTECC.COM.

To
The Deputy General Manager (Contracts),
M/s. HP Power Transmission Corporation Limited,
Barowalias House, Khalini,
Shimla – 171002,
Himachal Pradesh.

Fax: 2626284 / 2620227

Dear Sir,

Sub: Construction of 33/220kV, 25/31.5MVA GIS Substation at Palchan in Distt. Kullu, H.P against LoA No. HPPTCL/L&T-SUPPLY/2010-5107 DATED 23.12.2010 (First Contract) and HPPTCL/L&T-Erection/2010-5099-5104 dated 23.12.2012 (Second Contract) against Tender Document No.DGMC/Palchan Sub-Station/2/2009.

Ref: Your Letter Ref No. HPPTCL/Palchan S/Stn/2012-13-440-41 dated 23.04.2012

We are in receipt of your above cited letter and we are really concerned to note the contents.

We sincerely regret the delay in submission of our price proposal for the change in location and quantities. We couldn't respond to you as committed in the MOM due to the following reasons.

1. Since there are major changes in the scope and location of the substations including change in the Altitude, re-engineering had to be carried out.
2. The changes are to be reviewed and vetted by manufacturers of major equipment like GIS.
3. Due to the change in location, we had to carry out the soil investigation, analysis and detailed engineering for civil works.

Due to the above reasons, submission of our offer got delayed. However, we have submitted our price proposal on 21/04/2012 vide our letter no: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2403.

We assure you that we are sincerely committed in executing the project and the delay in response only due to the above stated reasons. You would appreciate, till date, we have already completed the following activities for the project.

1. We have placed order for most of the supply items like 220KV GIS, 33KV GIS, CRP & SAS, FOTE, LT System, Battery & Chargers, PLCC, LA etc.
2. We have submitted drawings for equipment like 33KV GIS, 220KV GIS, PLCC, CRP&SAS, FOTE and LA.

.../...

Larsen & Toubro Limited, Power Transmission & Distribution
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Ballard Estate
Mumbai 400 001, INDIA

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

3. Drawings are already approved for 33KV GIS and commented drawings received for 220KV GIS & PLCC.
4. Based on the approved drawings, we have gone ahead with the manufacturing of 33KV GIS. This was intimated to you vide our Letter No: L&T-PT&D/HPPTCL/002 Dated:10-06-2011. Materials are manufactured already and ready for inspection.
5. We have also carried out Soil investigation in the new location and carried out Re-Engineering activities.

You can note that we had taken up various activities including manufacturing of GIS to ensure completion of the project in time. However, there was a huge delay in handing over of the land and subsequently, location of the substation itself changed to a new location. It may be noted that we are intimated about the change in the location of the project nearly 12Months after the award of contract. We have incurred huge cost towards Engineering and idling of resources identified for the project.

Delay in signing of Contract Agreement for the project is attributed to the delay in handing over of the land and scope clarity and not attributable to us. Despite all these delay of one year in finalising the location, we had gone ahead with Engineering/Re-Engineering and Order placements. Under the circumstances, we request you not to proceed with the termination of the contract and we once again assure you of our sincere commitments for the execution of the project.

We request you to arrange for a meeting to discuss & formalise order amendment and formulate action plan for completion of the project.

Once you have reviewed our proposal, we would meet you for discussion at a date convenient to you.

Thanking you and assuring you of our best services at all times, we remain.

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

LARSEN & TOUBRO LIMITED Construction Chennai

K. RAJARAM
General Manager &
Head-Substation Business Unit

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2405 10th May, 2012
Email: KRJ@LNTECC.COM.

To
The Deputy General Manager (Contracts),
M/s. HP Power Transmission Corporation Limited,
Barowalias House, Khalini,
Shimla – 171002,
Himachal Pradesh.

Fax: 2626284 / 2620227

Dear Sir,

Sub: Construction of 33/220kV, 25/31.5MVA GIS Substation at Palchan in Distt. Kullu, H.P (Revised location in Fozal I Dist. Kullu, H.P)

Ref: 1. LOA No. HPPTCL/L&T-SUPPLY/2010-5107 DATED 23.12.2010 (First Contract)
2. LOA No.HPPTCL/L&T-Erection/2010-5099-5104 dated 23.12.2012 (Second Contract)
on 09-05-12

We thank you for the kind courtesy extended to us during our visit to discuss the revised offer submitted by us vide our Letter No L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2403.Dated: 21.04.2012.

During the meeting, you have expressed your concern on the delay in execution of agreement for the subject contract. We have explained to you that the delay is unintentional and we were waiting for the handing over of the land. Since the completion period is 8 months from the date of LOA, delay in handing over would have had serious implications in completion of the project within the contractual period and hence wanted the completion period to incorporated in the agreement. However, we had gone ahead with Engineering, procurement and manufacturing activities and were fully geared up to complete the job. We had ordered all the major items and had various meetings with your team for approval of drawings. Majority of the drawings were in final stage of approval. 33KV GIS drawings are already approved and we had gone ahead with manufacturing and materials are ready for inspection.

We have already incurred huge cost towards Engineering, mobilisation and manufacturing. We were always ready for signing of the contract but only requested for incorporation of completion period due to the delay in handing over of the land and clarification regarding the mandatory spares. Please refer our letter no. L&T-PT&D/HPPTCL/004 Dated: 23/08/2011 in this regard. Even now, we are ready for signing of the contract. Also, as per the contract, non execution of the contract agreement shall not absolve the contractor of the responsibility of the faithful execution of the contract. Accordingly and considering that the order issued being the "Letter of Award", we had gone ahead with discharging the above responsibilities.

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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During the discussions, you have informed us about the further change in the layout in Fozal due to the conversion of 3Ph Transformers to 1Ph Transformers. We thank you for sharing the revised BOQ for Electrical Portion. As discussed, we request you to share the layout drawing for the new proposal on 14th May'12. We would submit our revised proposal within 3days from the date of receipt of revised layout drawing and specification. We also request to you to limit the changes in items like 33KV GIS which are already manufactured and ready for inspection.

We look forward for your continued cooperation and we assure you that we would put our best efforts to complete the project at an early date.

Thanking you and assuring you of our best services at all times, we remain.

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager(Planning & Contract),** M/s HPPTCL, Shimla – We thank you for your time and kind courtesy extended to us during the meeting.

LARSEN & TOUBRO LIMITED
Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2406 18th May, 2012
Email: KRJ@LNTECC.COM.

To
The Deputy General Manager (Contracts),
M/s. HP Power Transmission Corporation Limited,
Barowalias House, Khalini,
Shimla – 171002,
Himachal Pradesh.

Fax: 2626284 / 2620227

Dear Sir,

Sub: Construction of 33/220kV, 25/31.5MVA GIS Substation at Palchan in Distt. Kullu, H.P (Revised location in Phozal I Dist. Kullu, H.P)

Ref:
1. LOA No. HPPTCL/L&T-SUPPLY/2010-5107 DATED 23.12.2010 (First Contract)
2. LOA No.HPPTCL/L&T-Erection/2010-5099-5104 dated 23.12.2012 (Second Contract)
3. Our Letter No: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2404 dated 21.04.2012
4. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2405 dated 10.05.2012

This is in reference to the meeting we had on 09.05.2012 at your office and our above cited letter under reference.

We thank you for sending the BOM for Erection and civil works and the Contour Map for the project. Based on the inputs provided by you, we have worked out the revised rates in line with the LOA rates but incorporating the changes in the technical requirements and as detailed in our letter under reference no.3. Since 33KV GIS is already manufactured, we would be offering the system with 40KA rating instead of 31.5KA. We are enclosing the price break up for supply, erection and civil works.

However, due to the non-availability of the Layout drawing and detailed specification, we aren't able to offer the prices for the new systems like HVWS and EOT Crane related activities. Instead we have included the cost of Nitrogen based Fire Fighting System in line with the LOA. We will be able to further fine tune our prices and offer the prices for new systems once the layout drawing and detailed specifications are issued. We would submit the offer for mandatory spares by 22.05.2012. Since lot of new spares are added, we are working out the prices with our vendors.

As you are aware, we have already incurred huge cost towards Engineering and other costs associated with procurement of equipment from manufacturers. Apart from this, 33KV GIS worth Rs 210L is manufactured and lying ready for inspection at our sub vendors works.

We request you to arrange for a meeting to discuss & formalise order amendment based on which we can formulate action plan for completion of the project.

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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L&T Construction
Power Transmission & Distribution

We request you to convey a date convenient for the proposed discussions. Further, we request you to issue the layout drawing and detailed specification for the additional/revised items before the meeting so that we can finalise our prices for the entire scope of work including spares.

We look forward for our continued association and we assure you that we would put our best efforts to complete the project at an early date.

Thanking you and assuring you of our best services at all times, we remain.

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager (Planning & Contract),** M/s HPPTCL, Shimla

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Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

TENDER SPECIFICATION No.: DGMC / PALCHAN SUB STATION /2/2009

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOJAL

PRICES IN INR

Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
A	220 kV EQUIPMENT									
A1	220 kV GIS EQUIPMENT									
1	TRANSFORMER BAY MODULE: 245 kV, 1600 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1600 A); Current Transformers (Ratio: 600 - 300 /1 -1 -1 -1 -1 -1 A), Bus Bar Disconnectors (1600 A) with Common Grounding Switch, Line Disconnector with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Monitoring System for complete Bay, Single Phase Cable and Terminal Connectors (SF6 / Air and Air / Oil interface alongwith all Accessories) for connecting 26 66 / 33.33 MVA, Single Phase Bank of 33 / 220 kV Transformers with GIS through Gas Insulated Interconnection Bus and Accessories with GIS etc to complete Transformer Bay Module.	Set	1	41,348,783	INCLUDED		2,777,778	950,366	45,076,927	45,076,927
2	FEEDER BAY MODULE: 245 kV, 2000 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (2000 A), Current Transformers (Ratio: 2000 -1000 - 500 /1 -1 - 1 -1 -1 -1 A), Bus Bar Disconnectors (2000 A) with common Grounding Switch, Line Disconnector with one normal Safety Grounding Switches, High Speed Fault making Grounding Switch, Local Control Cubicle, SF6 Gas Monitoring System for complete Bay, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc.to complete Feeder Bay Module	Set	2	39,399,128	INCLUDED		2,777,778	905,348	43,073,254	86,146,508
3	BUS BARS: 245 kV, 3150 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, 3 - Phase or 1 - Phase (Isolated) encapsulated Unit, SF6Gas Insulated, Metal enclosed Bus Bars, enclosed in Bus Enclosures running along the length of the Switchgear to interconnect each of the Circuit Breaker Bay Module. Each Bus Bar set shall be complete with Voltage Transformers, Disconnectors, Safety Grounding Switch, LCC, SF6 Gas Monitoring System and Accessories with GIS etc to complete Bus Bar Module	Set	2	INCLUDED	INCLUDED		2,777,778	-	2,777,778	5,555,556
4	BUS COUPLER MODULE: 245 kV, 3150 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Bus Coupler Bay Module comprising of SF6 Gas Insulated Circuit Breaker (3150 A), Current Transformers (Ratio 3000 - 2000/1 - 1 - 1 - 1 - 1 - 1 A), Bus Bar Disconnectors (3150 A) each with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Monitoring System and Accessories with GIS etc to complete the Bus Coupler Bay Module	Set	1	22,528,448	INCLUDED		2,777,778	517,797	25,824,023	25,824,023
A2	220 kV OUTDOOR EQUIPMENT									
a	196 / 216 kV (to be finalised during detailed engineering), Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos	10	52,210	INCLUDED		694	1,200	54,104	541,040
b	4400 pF, 245 kV single phase Capacitive Voltage Transformer	Nos	6	391,675	INCLUDED		13,889	9,000	414,464	2,486,784
A3	Single Phase Breaker Bay Module for Spare Transformer	Set	1	16,539,513	INCLUDED		1,388,889	380,146	18,308,548	18,308,548
B	33 kV EQUIPMENT									
B1	33 kV GIS EQUIPMENT									
1	TRANSFORMER BAY MODULE: 36 kV, 2500 A, Short Circuit Current Rating of 31.5-kA 40KA for 3.0 seconds, SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (2500 A), Current Transformers (Ratio: 2400 - 1200 /1 - 1 - 1 A), Bus Bar Disconnectors (2500 A) with Common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, suitable size Cables and Cable Termination Connectors for connecting 33 kV side of 26 66 / 33.33 MVA, Single Phase Bank of 33 / V3 / 220 / V3 kV Transformers with GIS and Accessories etc to complete Transformer Bay Module	Set	1	3,793,319	INCLUDED		13,889	87,166	3,894,394	3,894,394
2	FEEDER BAY MODULE: 36 kV, 1600 A, Short Circuit Current Rating of 31.5-kA 40KA for 3.0 seconds, SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1600 A), Current Transformers (Ratio: 1600-800-400/1 -1 -1 A), Bus Bar Disconnectors (1600 A) with Common common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, GIS Duct and Air / SF6 Bushing-Termination, Enclosures Accessories with GIS etc to complete Feeder Bay Module	Set	6	3,039,288	INCLUDED		13,889	98,585	3,051,760	23,710,560

LARSEN & TOUBRO LIMITED Construction Contracts

LARSEN & TOUBRO LIMITED Construction Contracts

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
3	BUS BARS: 36 kV, 2500 A, Short Circuit Current Rating of 31.5 kA 40KA for 3.0 seconds, 3 - Phase or 1 - Phase (Isolated) encapsulated Unit, SF6 Gas Insulated Metal enclosed Bus Bars, enclosed in Bus Enclosures running along the length of the Switchgearto Interconnect each of the Circuit Breaker Bay Module. Each Bus Bar set shall be complete with Voltage Transformers, Disconnectors, Safety Grounding Switch, LCC, SF6 Gas Pressure Sensor for each Tank and Accessories with GIS etc to complete Bus Bar Module.	Set	2	INCLUDED	INCLUDED		27,778	-	27,778	55,556
4	BUS COUPLER MODULE: 36 kV, 2500 A, Short Circuit Current Rating of 31.5 kA 40KA for 3.0 seconds, SF6 Gas Insulated Bus Coupler Bay Module comprising of SF6 Gas Insulated Circuit Breaker (2500 A), Current Transformers (Ratio 2500 - 1200/1 - 1 -1 A), Bus Bar Disconnectors (2500 A) each with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Sensor for each Gas Tank and Accessories with GIS etc to complete the Bus Coupler Bay Module.	Set	1	3,299,460	INCLUDED		13,889	75,835	3,389,184	3,389,184
5	LT TRANSFORMER BAY MODULE: 36 kV, 1200 A, Short Circuit Current Rating of 31.5 kA 40KA for 3.0 seconds, SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1200 A), Current Transformers (Ratio: 15 - 7.5/1 -1 -1 A), Bus - Bar Disconnectors (1200 A) with Common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, Cables and Cable Termination Connectors for connecting 33 kVside of 630 kVA, 3310.415 kV LT Transformers with GIS and Accessories with GIS etc to complete LT Transformer Bay Module	Set	1	3,004,092	INCLUDED		13,889	69,040	3,086,997	3,086,997
B2	36 kV OUTDOOR EQUIPMENT									
a	30 kV, Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.	26	15,663	INCLUDED		200	360	16,223	405,575
b	36 kV, Line Isolator Switch with Earth Switch	Set	6	161,430	INCLUDED		2,317	4,170	167,917	1,127,502
c	36 kV, Cable suitable for Feeder and Transformers Bay Modules (size to be finalised during detailed engineering)	LS	1	1,931,690	INCLUDED		24,666	44,398	2,000,754	2,000,754
B3	Single Phase Breaker Bay Module for Spare Transformer	Set	1	1,517,927	INCLUDED		19,375	34,874	1,571,576	1,571,576
C	LT Transformer and Associated Equipment									
1	630 kVA, 33 / 0.433 kV, three phase, Transformer including 33 kV Oil to Air Bushings, and Cable Box for L. T. Termination, Accessories and first filling Oil and 10 % extra Oil alongwith HT (33 kV) GIS complete in all respect, etc.	Nos	1	1,859,979	INCLUDED		23,750	42,750	1,926,479	1,926,479
2	Micro Gas Analyzer	Nos	1	3,256,595	INCLUDED		41,583	74,850	3,373,028	3,373,028
D	TESTING AND MAINTENANCE EQUIPMENTS FOR GIS									
1	SF6 Gas filling and evacuating Plant with storage capacity of a complete set of 220 kV GIS Bay including Gas Sections of all Bus Bar and Associated Equipments	Set	1	3,307,794	INCLUDED		46,783	60,632	3,415,209	3,415,209
2	Partial Discharge Monitoring System - Portable Type	Set	1	2,610,497	INCLUDED		33,333	60,000	2,703,830	2,703,830
3	Dew Point Meter	Set	1	404,800	INCLUDED		5,725	7,420	417,945	417,945
4	Circuit Breaker Operahonal Analyzer	Set	1	1,230,986	INCLUDED		15,833	28,500	1,284,319	1,284,319
5	SF6 Gas Leak Detector	Set	1	391,575	INCLUDED		5,000	9,000	405,575	405,575
6	Digital Manometer	Nos.	2	21,537	INCLUDED		275	495	22,307	44,614
E	RELAY AND PROTECTION PANELS AND SUB STATION AUTOMATION SYSTEM									
1	220 kV RELAY AND PROTECTION PANELS									
1.1	Line Protection Panel (Main 1 + Main 2)	Nos.	2	1,292,244			16,905	21,200	1,314,349	2,628,698
1.2	Circuit Breaker Relay Panel without Auto Recloser									
	with Auto Recloser	Nos.	2	538,543			4,580	8,904	552,027	1,104,054
	without Auto Recloser	Nos	2	512,897			4,362	8,480	525,739	1,051,478
1.3	Transformer Protection Panel (for HVside of 26.66/33.33 MVA, Single Phase, 33/220 kV Transformer)	Nos	1	805,249			6,848	13,314	825,411	825,411
1.4	Single Bus Bar Protection Panel	Set	1	2,116,240			20,638	37,148	2,174,026	2,174,026
2	33 kV CONTROL AND RELAY PANEL									
2.1	Line Protection Panel	Nos.	6				Included in 2.2			
2.2	Circuit Breaker Relay Panel									
	with Auto Recloser	Nos	6	480,735			4,144	8,056	492,935	2,903,610
	without Auto Recloser	Nos.	3	480,735			4,144	8,056	492,935	1,406,805
2.3	Transformer Protection Panel (for HVside of 26.66/33.33 MVA, 33/220 kV Transformer)	Nos	1				Included above			
2.4	Transformer Protection Panel (for HVside of 630 kVA, 3310.415kV,T Transformer)	Nos.	1	391,575			5,000	9,000	405,575	405,575
2.5	Single Bus Bar Protection Panel	Nos	1	1,616,240			20,638	37,148	1,674,026	1,674,026

BHEL & TOUBRO LIMITED

Page 2 of 5

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
				Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	
			Present							Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
3	AUTOMATION AND SCADA			-			-	-	-	-
3.1	Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Stations alongwith Associated Equipments, Optic Fibre and other Interface Converter Equipment Main Bays to be automated (Including Future Bays)	Set	1	22,153,488			167,220	300,996	22,621,704	22,621,704
a	220 kV System	Nos	6	Included above						
b	33 kV System	Nos	15	Included above						
c	For Auxiliary System	Set	1	Included above						
d	Fibre Optic Termination Equipment (FOTE) complete in all respect for 220 kV Proposed System (AD Hydro Power Project - Phojal, Phojal - 400 / 220 kV Nalagarh)	LS	1	9,576,629			126,136	182,180	9,884,145	9,884,145
3.2	SCADA Equipment as required to complete the Scheme	Set	1	Not required since SAS is included						
3.2	Testing and Maintenance Equipment	Set	1	Included above						
3.4	Inverter of suitable capacity with standby unit for Station HMI and Peripheral Devices i.e. Printer etc.	Set	1	Included above						
F	AIR CONDITIONER AND VENTILATION SYSTEM									
F.1	High Wall type Split AC Unit of 2 TR capacity	Nos	30	30,045	INCLUDED		393	509	30,947	928,410
F.2	Ventilation and Heating system									
a	220kV	Set	1	2,040,197	INCLUDED		28,655	37,397	2,106,444	2,106,444
b	33kV	Set	1	INCLUDED ABOVE						
G	PLCC for 220 kV LINE FEEDER									
G.1	2000 A, 0.5 mH, 03 kA, 220 kV Line Trap	Nos	4	518,184	INCLUDED		6,617	11,910	530,711	2,146,844
G.2	220 kV Coupling Device	Nos	6	75,399	INCLUDED		962	1,247	77,606	465,630
G.3	Carrier Equipment (for Speech + Protection and for Speech +	Nos	6	320,560	INCLUDED		4,089	5,300	329,949	1,979,694
G.4	Protection Coupler	Nos	4	136,909	INCLUDED		1,747	2,265	140,981	563,924
G.5	EPAX (24/8) with 24 Telephones, Cables etc.	Set	1	281,478	INCLUDED		3,591	4,654	289,723	289,723
G.6	Testing & Maintenance Equipment	Set	1	913,674	INCLUDED		11,667	21,000	946,341	946,341
G.7	HF Cable	KM	1.0	143,577	INCLUDED		1,833	3,300	148,710	148,710
H	LT SWITCHBOARD									
H.1	415 V Main Switchboard	Set	1	3,202,197	INCLUDED		40,894	53,000	3,296,091	3,296,091
H.2	415 VAC Distribution Board	Set	1	1,474,401	INCLUDED		18,830	24,404	1,517,725	1,517,725
H.3	415 V Main Lighting Distribution Board	Set	1	1,182,555	INCLUDED		15,100	27,180	1,224,835	1,224,835
H.4	415 V Emergency Lighting Distribution Board	Set	1	536,457	INCLUDED		6,850	12,330	555,637	555,637
H.5	415 V Air Conditioning Distribution Board	Set	1	182,735	INCLUDED		2,333	4,200	189,268	189,268
H.6	220 V DC Distribution Board	Sets	2	574,206	INCLUDED		7,333	9,504	591,043	1,182,086
H.7	48 V DC Distribution Board	Sets	2	366,254	INCLUDED		4,677	6,062	376,993	753,986
I.	BATTERY BANK									
I.1	220 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	746,602	INCLUDED		9,533	17,169	773,305	1,546,609
I.2	48 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	162,885	INCLUDED		2,080	3,744	168,710	337,438
J	FLOAT CUM BOOST BATTERY CHARGER SYSTEM									
J.1	220 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	561,257	INCLUDED		7,167	12,900	581,324	1,162,648
J.2	48 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	417,600	INCLUDED		5,333	9,600	432,613	865,226
K	DG Set along with Control Panel (250 kVA) Outdoor type	Set	1	2,479,972	INCLUDED		31,667	57,000	2,568,639	2,568,639
L	FIRE PREVENTION AND EXTINGUISHING SYSTEM									
L.1	HVW Spray System, Hydrant System and complete U/G & O/G Piping and Accessories etc outside the Pump House for 220 / √3 / 33 / √3 kV, 26.66 /33.33 MVA, 1 - Phase Transformers as per CBIP Publication No.: 295 (Manual on Transformer)	Nos	4	Not quoted since detailed specification is not available						
L.2	Fire Protection for GIS cum Control Room Building, etc. (Portable type fire Extinguishers System)	Lot	1	772,013	INCLUDED		9,050	17,744	799,615	799,615
L.3	Pumping arrangement for HVW System and Hydrant System complete with all piping, valves, fittings etc inside Pump House	Set	1	Not quoted since detailed specification is not available						
L.4	Hydrant System complete U/G Piping and accessories etc outside the Pump House.	Set	1	Not quoted since detailed specification is not available						
L.5	Smoke Detection System	Sol	1	Not quoted since detailed specification is not available						
L.6	Fire Alarm System	Set	1	Not quoted since detailed specification is not available						
L.7	Portable / Trolley / Wheel mounted Extinguishers (For Transformer Bank)									
1	9 Litre Sand and Water Type	Nos	12	32,031	INCLUDED		417	750	33,798	405,576
2	4.5 kg DCP Type	Nos	4	45,684	INCLUDED		583	1,050	47,317	189,268
3	4.5 kg CO2 Type	Nos	4	7,831	INCLUDED		100	180	8,111	32,444
4	22.5 kg DCP Type	Nos	4	76,315	INCLUDED		1,000	1,800	81,115	324,460
5	22.5 kg CO2 Type	Nos	4	13,052	INCLUDED		167	300	13,519	54,076
6	45 litres Foam Type Extinguishers	Nos	6	153,156	INCLUDED		2,083	3,750	160,989	1,013,934
7	9 litres Foam Type Extinguishers	Nos	10	97,894	INCLUDED		1,250	2,250	101,394	
L.8	Nitrogen Injection Fire Protection System For Power Transformers	Set	4	913,674	INCLUDED		11,667	21,000	946,341	3,785,364

LARSEN & TOUBRO Limited Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	8	9	10	11	12	13
S	TOOLS AND PLANTS									
	High Vacuum Filtration Machine with Root Pump for Transformer Oil Filtration 10,000 Litres per Hour	Set	1	2,506,077	INCLUDED		32,000	57,600	2,595,677	2,595,677
	Digital Insulation Tester (5 kV) with Voltage Control Switch (special provision for measurement of P.I.)	No	1	123,999	INCLUDED		1,583	2,850	128,432	128,432
	Earth Resistance Tester (4 Terminal Digital Type with data storage and retrieval)	No.	1	108,521	INCLUDED		1,386	2,494	112,401	112,401
	Clip-on-Meter (Digital); (0-300-600 A)	No.	1	14,358	INCLUDED		183	330	14,871	14,871
T	CCTV Cameras alongwith Accessories Lot		1	783,149	INCLUDED		10,000	18,000	811,149	811,149
	GRAND TOTAL									344,088,284

LARSEN & TOUBRO LIMITED Construction - Chennai

LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Description of Material	Unit	Quantity	Unit						Total FOR Destination Cost
			Present	Ex-Works Price	Excise Duty & Cess	Sales Tax / VAT	Freight	Insurance	FOR	Present (13 = 4 x 12)
1	2	3	4	7	9	9	10	11	12	13
M	ILLUMINATION SYSTEM	Lot	1	3,376,617	INCLUDED		43,103	77,586	3,496,306	3,496,306
M.1	220 kV and 33 kV GIS Buildings, DG Set, Relay and Protection Panel Room, Control Room Building, Fire Fighting Pump House and Illumination with CFL /Metal Halide Lamp	LS	1	INCLUDED IN ABOVE						
M.2	Switchyard Lighting (High Mast Lighting System)	LS	1							
M.3	Solar Light System for Street Light	LS	1							
N	Power Cables and Copper Conductor Armoured Control Cables alongwith Lugs,Glands, Straight									
N.1	Power Cables (XLPE)									
	1 C x 630 sq. mm	km	1	576,920	INCLUDED		7,367	13,260	597,547	597,547
	3.5c x 300 Sq mm	km	2	648,032	INCLUDED		8,004	10,462	666,648	1,333,096
N.2	Power Cable (PVC)									
	1c x 150 Sq . mm	km	1	212,103	INCLUDED		2,708	4,875	219,686	219,686
	3.5 c x 70 Sq. mm	km	2	259,607	INCLUDED		3,231	4,187	267,025	534,050
	4 c x 16 Sq. mm	km	1.5	103,580	INCLUDED		1,209	1,671	106,540	159,810
	4 c x 6 Sq. mm	km	1	66,176	INCLUDED		845	1,021	68,542	68,542
	2 c x 6 Sq. mm	km	1.5	52,602	INCLUDED		672	1,209	54,483	81,725
N.3	Control Cables (FRLS)									
	2c x2 5 Sq.mm	km	1	46,609	INCLUDED		597	773	47,939	47,939
	4 c X 2.5 sq. mm	km	1.5	79,437	INCLUDED		1,018	1,319	81,774	122,661
	7 cX 2.5 sq. mm	km	1	132,122	INCLUDED		1,693	2,194	136,009	136,009
	10cX2.5sq. mm	km	0.75	185,089	INCLUDED		2,371	3,073	190,533	142,900
	12cX2.5sq. mm	km	0.5	219,940	INCLUDED		2,818	3,652	226,410	113,209
	16cX2.5sq. mm	km	0.5	290,260	INCLUDED		3,719	4,819	298,818	149,409
	19cX2.5sq. mm	km	0.2	341,318	INCLUDED		4,372	5,667	351,357	70,271
	27cX2.5sq.mm	km	1	551,468	INCLUDED		7,042	12,675	571,185	571,185
O	40 mm MS Rod for Earthmat(*)	km	10	574,309	INCLUDED		24,444	13,200	611,953	6,119,530
P	STEEL STRUCTURE	LS	1	5,417,163	INCLUDED		69,172	124,509	5,610,844	5,610,844
P.1	Lattice Structure	LS	1	INCLUDED ABOVE						
P.2	Supporting Structure for 220 kV									
	BPI for Line Trap	Nos	4	INCLUDED ABOVE						
	Surge Arrestor	Nos	10	INCLUDED ABOVE						
	CVT	Nos	6	INCLUDED ABOVE						
P.3	Supporting Structure for 33 kV									
	30 kV Surge Arrestor	Nos	25	INCLUDED ABOVE						
	36 kV Line Isolator with Earth Switch	Set	6	INCLUDED ABOVE						
Q	Miscellaneous Items, Earthing Material and Erection Hardware such as:BPI, Insulator Strings, Disc Insulator, Hardware, Spacers, Conductor (s), Cable Trays, Clamps, Connectors including Equipment Connectors, Junction Box, Earthwire, Lighting Protection, Buried Cable Trenches / Pipes for Equipment and Lighting, all Accessories, etc for completion of Scope of Work.	LS	1	2,384,749	INCLUDED		30,195	54,352	2,449,296	2,449,296
R	EOT CRANE									
	5 MT EOT Crane for 220 kV GIS Room	Set	1	1,164,934	INCLUDED		14,875	26,775	1,206,584	1,206,584
	5 MT EOT Crane for 33 kV GIS Room	Set	1	1,164,934	INCLUDED		14,875	26,775	1,206,584	1,206,584
	100/30 MT EOT Crane for Loading / Unloading and Inspection of Winding of Transformers	Set	1	Not quoted since detailed specification is not available						

M/S TOUBRO LIMITED Transmission Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)

Price Schedule Erection & Civil Works

TENDER SPECIFICATION No.: DGMC / PALCHAN SUB STATION /2/2009

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOJAL

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
	MAIN EQUIPMENT				
A	**POWER TRANSFORMER AND ASSOCIATED EQUIPMENT**				
1.1	26.66 / 33.33 MVA, 33 / 220 kV Single Phase Transformer including Bushings, Accessories, first filling Oil and 10 % extra Oil	Nos.	4	426,327	1,705,308
1.2	630 kVA, 33 / 0.433 kV, three phase, Transformer Including 33 kV Oil to Air Bushings, and Cable Box for L. T. Termination, Accessories and first filling Oil and 10 % extra Oil alongwith HT (33 kV) GIS complete in all respect, etc.	Nos.	1	119,256	119,256
1.3	Micro Gas Analyzer	Nos.	1	122,196	122,196
1.4	Oil Storage Tank (20 kL capacity)	Nos.	1	7,650	7,650
1.5	On - Line Dissolved Hydrogen and Moisture Monitor for 33 / 220 kV Transformer	Set	1	15,300	15,300
1.6	On - Line Insulating Oil Drying System for 33 / 220 kV Transformer	Set	1	15,300	15,300
B	**220 kV EQUIPMENT**			-	-
B.1	**220 kV GIS EQUIPMENT**			-	-
1	TRANSFORMER BAY MODULE: 245 kV, 1600 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1600 A), Current Transformers (Ratio: 600 - 300 /1 -1 -1 -1 -1 -1 A), Bus Bar Disconnectors (1600 A) with Common Grounding Switch, Line Disconnector with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Monitoring System for complete Bay, Single Phase Cable and Terminal Connectors (SF6 / Air and Air / Oil Interface alongwith all Accessories) for connecting 26.66 / 33.33 MVA, Single Phase Bank of 33 / 220 kV Transformers with GIS through Gas Insulated Interconnection Bus and Accessories with GIS etc to complete Transformer Bay Module.	Set	1	565,449	565,449
2	FEEDER BAY MODULE: 245 kV, 2000 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (2000 A), Current Transformers (Ratio: 2000 - 1000 - 500 /1 -1 -1 -1 -1 -1 A), Bus Bar Disconnectors (2000 A) with common Grounding Switch, Line Disconnector with one normal Safety Grounding Switches, High Speed Fault making Grounding Switch, Local Control Cubicle, SF6 Gas Monitoring System for complete Bay, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module	Set	2	565,449	1,130,898

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn, Ltd.
Barowalia House, Khalini, Shimla-2

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Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
3	BUS BARS: 245 kV, 3150 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, 3 - Phase or 1 - Phase (Isolated) encapsulated Unit, SF6Gas Insulated, Metal enclosed Bus Bars, enclosed in Bus Enclosures running along the length of the Switchgear to Interconnect each of the Circuit Breaker Bay Module. Each Bus Bar set shall be complete with Voltage Transformers, Disconnectors, Safety Grounding Switch, LCC, SF6 Gas Monitoring System and Accessories with GIS etc to complete Bus Bar Module.	Set	2	998,506	1,997,012
4	BUS COUPLER MODULE: 245 kV, 3150 A, Short Circuit Current Rating of 50 kA for 3.0 seconds, SF6 Gas Insulated Bus Coupler Bay Module comprising of SF6 Gas Insulated Circuit Breaker (3150 A), Current Transformers (Ratio 3000 - 200011 - 1 - 1 - 1 - 1 - 1 A), Bus Bar Disconnectors (3150 A) each with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Monitoring System and Accessories with GIS etc to complete the Bus Coupler Bay Module	Set	1	565,449	565,449
B.2	220 kV OUTDOOR EQUIPMENT			-	-
a	196 / 216 kV (to be finalised during detailed engineering), Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.	10	5,673	56,730
b	4400 pF, 245 kV single phase Capacitive Voltage Transformer	Nos.	6	9,456	56,736
B.3	Single Phase Breaker Bay Module for Spare Transformer	Set	1	145,345	145,345
C	33 kV EQUIPMENT			-	-
C.1	33 kV GIS EQUIPMENT			-	-
1	TRANSFORMER BAY MODULE: 36 kV, 2500 A, Short Circuit Current Rating of 31.5 kA for 3.0 seconds, SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (2500 A), Current Transformers (Ratio: 2400 - 1200 /1 - 1 - 1 A), Bus Bar Disconnectors (2500 A) with Common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, suitable size Cables and Cable Termination Connectors for connecting 33 kV side of 26.66 / 33.33 MVA, Single Phase Bank of 33 / V3 / 220 / V3 kV Transformers with GIS and Accessories etc to complete Transformer Bay Module.	Set	1	56,739	56,739
2	FEEDER BAY MODULE: 36 kV, 1600 A, Short Circuit Current Rating of 31.5 kA for 3.0 seconds, SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1600 A), Current Transformers (Ratio: 1600-800-400/1 -1 -1 A), Bus Bar Disconnectors (1600 A) with Common common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, GIS Duct and Air / SF6 Bushing Termination, Enclosures Accessories with GIS etc to complete Feeder Bay Module	Set	6	56,739	340,434
3	BUS BARS: 36 kV, 2500 A, Short Circuit Current Rating of 31.5 kA for 3.0 seconds, 3 - Phase or 1 - Phase (Isolated) encapsulated Unit, SF6 Gas Insulated Metal enclosed Bus Bars, enclosed in Bus Enclosures running along the length of the Switchgearto interconnect each of the Circuit Breaker Bay Module. Each Bus Bar set shall be complete with Voltage Transformers, Disconnectors, Safety Grounding Switch, LCC, SF6 Gas Pressure Sensor for each Tank and Accessories with GIS etc to complete Bus Bar Module.	Set	2	91,796	183,592

ABB ALSTOM POWER & TOUBRO LIMITED

By, General Manager (Contracts)
H.P. Power Transmission Corpn. L.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
4	BUS COUPLER MODULE: 36 kV, 2500 A, Short Circuit Current Rating of 31.5 kA for 3.0 seconds, SF6 Gas Insulated Bus Coupler Bay Module comprising of SF6 Gas Insulated Circuit Breaker (2500 A), Current Transformers (Ratio 2500 - 1200/1 - 1 -1 A), Bus Bar Disconnectors (2500 A) each with Safety Grounding Switches, Local Control Cubicle, SF6 Gas Sensor for each Gas Tank and Accessories with GIS etc to complete the Bus Coupler Bay Module.	Set	1	56,739	56,739
5	LT TRANSFORMER BAY MODULE: 36 kV, 1200 A; Short Circuit Current Rating of 31.5 kA for 3.0 seconds; SF6 Gas Insulated Transformer Bay Module each comprising of SF6 Gas Insulated Circuit Breaker (1200 A), Current Transformers (Ratio: 15 - 7.5/1 -1 -1 A), Bus - Bar Disconnectors (1200 A) with Common Grounding Switch, Local Control Cubicle, SF6 Gas Pressure Sensor for each Gas Tank, Cables and Cable Termination Connectors for connecting 33 kVside of 630 kVA, 3310.415 kV LT Transformers with GIS and Accessories with GIS etc to complete LT Transformer Bay Module	Set	1	56,739	56,739
C.2	36 kV OUTDOOR EQUIPMENT			-	-
a)	30 kV, Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.	25	4,590	114,750
b)	36 kV, Line Isolator Switch with Earth Switch	Set	6	7,650	45,900
c)	36 kV, Cable suitable for Feeder and Transformers Bay Modules (size to be finalised during detailed engineering)	LS	1	289,754	289,754
C.3	Single Phase Breaker Bay Module for Spare Transformer	Set	1	22,696	22,696
D	**RELAY AND PROTECTION PANELS AND SUB STATION AUTOMATION SYSTEM**			-	-
1	**220 kV RELAY AND PROTECTION PANELS**			-	-
1.1	Line Protection Panel (Main 1 + Main 2)	Nos.	2	18,913	37,826
1.2	Circuit Breaker Relay Panel without Auto Recloser			-	-
	with Auto Recloser	Nos.	2	18,913	37,826
	without Auto Recloser	Nos.	2	18,913	37,826
1.3	Transformer Protection Panel (for HVside of 26.66/33.33 MVA, Single Phase, 33/220 kV Transformer)	Nos	1	18,913	18,913
1.4	Single Bus Bar Protection Panel	Set	1	18,913	18,913
2	**33 kV CONTROL AND RELAY PANEL**			-	-
2.1	Line Protection Panel	Nos.	6	INCLUDED	
2.2	Circuit Breaker Relay Panel			-	-
	with Auto Recloser	Nos.	6	18,913	113,478
	without Auto Recloser	Nos.	3	18,913	56,739
2.3	Transformer Protection Panel (for LVside of 26.66/33.33 MVA, 33/220 kV Transformer)	Nos.	1	INCLUDED ABOVE	
2.4	Transformer Protection Panel (for HVside of 630 kVA, 33/0.415kVLT Transformer)	Nos.	1	18,913	18,913
2.5	Single Bus Bar Protection Panel	Nos.	1	18,913	18,913
3	**AUTOMATION AND SCADA**			-	-
3.1	Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Stations alongwith Associated Equipments, Optic Fibre and other Interface Converter Equipment Main Bays to be automated (including Future Bays)	Set	1	336,587	336,587
a)	220 kV System	Nos.	6	INCLUDED ABOVE	
b)	33 kV System	Nos.	15	INCLUDED ABOVE	

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
c)	For Auxiliary System	Set	1	INCLUDED ABOVE	
d)	Fibre Optic Termination Equipment (FOTE) complete in all respect for 220 kV Proposed System	LS	1	5,285,741	5,285,741
	(AD Hydro Power Project - Phojal, Phojal - 400 / 220 kV Nalagarh)				
3.2	SCADA Equipment as required to complete the Scheme	Set	1	NOT REQUIRED	
3.3	Testing and Maintenance Equipment	Set	1	15,000	15,000
3.4	Inverter of suitable capacity with standby unit for Station HMI and Peripheral Devices i.e. Printer etc.	Set	1	INCLUDED ABOVE	
E	**AIR CONDITIONER AND VENTILATION SYSTEM**				
E.1	High Wall type Split AC Unit of 2 TR capacity	Nos	30	15,300	459,000
E.2	Ventillation and Heating system				
	220kV	Set	1	2,590,013	2,590,013
	33kV	Set	1	INCLUDED ABOVE	
F	**PLCC for 220 kV LINE FEEDER**				
F.1	2000 A, 0.5 mH, 63 kA, 220 kV Line Trap	Nos.	4	15,131	60,524
F.2	220 kV Coupling Device	Nos	6	11,348	68,088
F.3	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos	6	11,348	68,088
F.4	Protection Coupler	Nos	4	11,348	45,392
F.5	EPAX (24/8) with 24 Telephones, Cables etc.	Set	1	11,348	11,348
F.6	Testing & Maintenance Equipment	Set	1	9,180	9,180
F.7	HF Cable	KM	1	9,456	9,456
G	**LT SWITCHBOARD**				
G.1	415 V Main Switchboard	Set	1	160,760	160,760
G.2	415 VAC Distribution Board	Set	1	113,478	113,478
G.3	415 V Main Lighting Distribution Board	Set	1	94,565	94,565
G.4	415 V Emergency Lighting Distribution Board	Set	1	94,565	94,565
G.5	415 V Air Conditioning Distribution Board	Set	1	94,565	94,565
G.6	220 V DC Distribution Board	Sets	2	94,565	189,130
G.7	48 V DC Distribution Board	Sets	2	94,565	189,130
H	**BATTERY BANK**				
H.1	220 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	94,565	189,130
H.2	48 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	56,739	113,478
I	**FLOAT CUM BOOST BATTERY CHARGER SYSTEM**				
I.1	220 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	18,913	37,826
I.2	48 V, AH Rating to be designed by the Bidder keeping in view the provision of Future Bays	Set	2	18,913	37,826
J	**DG Set along with Control Panel (250 kVA) Outdoor type**	Set	1	94,565	94,565
K.	**FIRE PREVENTION AND EXTINGUISHING SYSTEM**			-	-
K.1	HVW Spray System, Hydrant System and complete U/G & O/G Piping and Accessories etc outside the Pump House for 220 / √3 / 33 / √3 kV, 26.66 / 33.33 MVA, 1 - Phase Transformers as per CBIP Publication No.: 295 (Manual on Transformer)	Nos	4	Not quoted since detailed specification is not available	
K.2	Fire Protection for GIS cum Control Room Building, etc. (Portable type the Extinguishers System)	Lot	1	452,434	452,434
K.3	Pumping arrangement for HVW System and Hydrant System complete with all piping, valves, fittings etc inside Pump House	Set	1	Not quoted since detailed specification is not available	
K.4	Hydrant System complete U/G Piping and accessories etc outside the Pump House.	Set	1		

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H.P. Power Transmission Corpn. Ltd.
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Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
K.5	Smoke Detection System	Set	1		
K.6	Fire Alarm System	Set	1		
K.7	Portable / Trolley / Wheel mounted Extinguishers (For Transformer Bank)				
a)	9 Litre Sand and Water Type	Nos	12	100	1,200
d)	4.5 kg DCP Type	Nos	4	100	400
c)	4.5 kg CO2 Type	Nos	4	100	400
d)	22.5 kg DCP Type	Nos	4	100	400
e)	22.5 kg CO2 Type	Nos	4	100	400
f)	45 litres Foam Type Extinguishers	Nos	6	100	600
g)	2 litres Foam Type Extinguishers	Nos	10	100	1,000
K.8	Nitrogen Injection Fire Protection System For Power Transformers	Set	4	277,929	1,111,716
L	**ILLUMINATION SYSTEM**	Lot	1	1,122,643	1,122,643
L.1	220 kV and 33 kV GIS Buildings, DG Set, Relay and Protection Panel Room, Control Room Building, Fire Fighting	LS	1	INCLUDED ABOVE	
L.2	Switchyard Lighting (High Mast Lighting System)	LS	1	INCLUDED ABOVE	
L.3	Solar Light System for Street Light	LS	1	INCLUDED ABOVE	
M.	**1.1 kV Grade PVC Insulated Aluminium Conductor Power Cables and Copper Conductor Armoured Control Cables**				
M.1	**Power Cables (XLPE)**				
	1 C x 630 sq. mm	km	1	130,000	130,000
	3.5c x 300 Sq.mm	km	2	112,701	225,402
M.2	**Power Cable (PVC)**				
	1c x 150 Sq . mm	km	1	87,169	87,169
	3.5 c x 70 Sq. mm	km	2	87,169	174,338
	4 c x 16 Sq. mm	km	1.5	61,637	92,456
	4 c x 6 Sq. mm	km	1	44,615	44,615
	2 c x 6 Sq. mm	km	1.5	44,615	66,923
M.4	**Control Cables (FRLS)**				
	2c x2.5 Sq.mm	km	1	34,402	34,402
	4 c X 2.5 sq. mm	km	1.5	34,402	51,603
	7 cX 2.5 sq. mm	km	1	38,373	38,373
	10cX2.5sq. mm	km	0.75	44,332	33,249
	12cX2.5sq. mm	km	0.5	44,332	22,166
	16cX2.5sq. mm	km	0.5	52,370	26,185
	19cX2.5sq. mm	km	0.2	54,261	10,852

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Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
	27cX2.5sq.mm	km	1	70,725	70,725
N	40 mm MS Rod for Earthmat(*)	km	10	246,928	2,469,280
Q	STEEL STRUCTURE	LS	1	527,615	527,615
Q.1	Lattice Structure	LS	1	INCLUDED ABOVE	
Q.2	Supporting Structure for 220 kV				
	BPI for Line Trap	Nos	4	INCLUDED ABOVE	
	Surge Arrestor	Nos	10	INCLUDED ABOVE	
	CVT	Nos	6	INCLUDED ABOVE	
Q.3	Supporting Structure for 33 kV				
	30 kV Surge Arrestor	Nos.	25	INCLUDED ABOVE	
	36 kV Line Isolator with Earth Switch	Set	6	INCLUDED ABOVE	
P	Miscellaneous Items, Earthing Material and Erection Hardware such as BPI, Insulator Strings, Disc Insulator,	LS	1	445,052	445,052
Q	EOT CRANE			-	-
	5 MT EOT Crane for 220 kV GIS Room	Set	1	273,165	273,165
	5 MT EOT Crane for 33 kV GIS Room	Set	1	273,165	273,165
	100/30 MT EOT Crane for Loading / Unloading and Inspection of Winding of Transformers	Set	1	Not quoted since detailed specification is not available	
R	CCTV Cameras alongwith Accessories Lot		1	272,000	272,000
2	Civil Works as per Specification				
A	FOUNDATIONS FOR:				
A.1	26.66 / 33.33 MVA, 33 / 220 kV Single Phase Transformer *as per Drawing approved by HPPTCL*	Nos	4	450,078	1,800,312
A.3	630 kVA, 33 / 0.433 kV, three phase, Transformer *as per Drawing approved by HPPTCL*	Nos	1	73,752	73,752
A.4	Lighting cum Lightning Mast with Fixtures	LS	1	894,310	894,310
A.5				-	-
B.1	Cutting in Earth Work in all kinds of Soils and Disposal of excavated Earth upto all leads	Cum	25120	402	10,098,240
				-	-
B.2	Excavation in all types of soil and rock including backfilling, disposal etc for all leads and lifts in all types of Foundations viz for Sub Station and Equipment Supporting Structures, Transformer, Fencing, Boundary Wall, Roads, Trenches, etc;	Cum	6500	525	3,412,500
				-	-

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
C	Providing and laying of Plain Cement Concrete (PCC: 1: 4: 8) in all types of Foundations for Sub Station and Equipment Supporting Structures, Buildings, Transformer, Fencing, Boundary Wall, Roads, Trenches, etc	Cum	600	4,043	2,425,800
				-	-
D	Providing and laying of Reinforced Cement Concrete (RCC: 1: 1:5: 3) including centering, shuttering complete in Foundation of Sub Station and Equipment Supporting Structures, Transformer, Tranches, etc ;	Cum	450	7,147	3,216,150
				-	-
E	Providing and laying of Plain Cement Concrete (PCC: 1: 2: 4) including finishing the Top Surface in beds, floors etc;	Cum	500	5,183	2,591,500
				-	-
F	Steel Reinforcement including bending, binding and placing complete in Foundation of Sub Station and Equipment Supporting Structures, Transformers, Tranches	MT	50	64,011	3,200,550
				-	-
G	Miscellaneous Structural Steel including embedments, edge protection angles, gratings etc but excluding the Reinforcement Steel and Steel for Lattice and Pipe	MT	25	73,923	1,848,075
				-	-
H	Stone Spreading and Antiweed Treatment in Switchyard excluding PCC;	Sqm	1800	166	298,800
I	5.0 metres wide Concrete Road Cum Rail Track;	Sqm	300	7,735	2,320,500
	3.00 metres wide Concrete Road (Switchyard Road);	Sqm	200	1,684	336,800
J	2.40 metres High Chain Link Fencing complete in all respects;	RM	500	4,813	2,406,500
K	5.00 metres Wide and 2 40 metres high Steel Gate complete in all respects	Nos	2	352,894	705,788
L	Providing and Laying Rail Track of standard design and drawings as approved by HPPTCL;	RM	75	13,923	1,044,225
M	Storm Water Drainage and Rainwater Harvesting as per Site conditions	RM	300	4,700	1,410,000
N	External Water Supply from Borewell to Fire Water Tank, Control Room Building;				
i)	80 mm dia. G. I. Pipe	35	35	770	26,950

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	Decription of Material	Unit	Quantity	Erection Price	
			Present	Unit	Total Present
1	2	3	4	5	6=5X4
ii)	25 mm dia. G. I. Pipe	100	100	320	32,000
O	All Civil Works including External Finish for following Buildings: -				
i)	Fire Fighting Pump House	LS	1	Not quoted since specification is not available	
ii)	Water Tank	LS	1		
				-	-
P	Cable Trench including all types of Crossings as per Site Condition and Drawings approved by HPPTCL;	RM	100	15,724	1,572,400
Q	Soil Investigation	Job	1	397,649	397,649
R	BUILDINGS (*as per entire satisfaction of Engineer - in - Charge*)				
R.1	Well furnished (including Modern furniture) Control Room Building with Office Rooms, AC, etc	Job	1	8,031,064	8,031,064
R.3	220 kV GIS Building	Job	1	7,468,312	7,468,312
R.4	33 kV GIS Building	Job	1	2,737,918	2,737,918
R.5	DG Set Room	Job	1	328,096	328,096
R.6	Pump House Building	Job	1	Not quoted since detailed specification is not available	
R.7	Building for 100 / 30 MT EOT Crane for Transformer	Job	1		
S	Transformer Fire Wall;	Cum	30	14,193	425,790
T	Septic Tank and Soak Pit complete for Control Room Building as per standard and direction of Engineer - in - Charge	Job	1	579,043	579,043
				-	-
U	Oil Soak Pit for Transformer Oil as per standard and direction of Engineer - in - Charge	Job	1	289,522	289,522
	GRAND TOTAL				**86,429,228**

TOUBRO LIMITED

TOUBRO LIMITED

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2409 11th June, 2012
Email: KRJ@LNTECC.COM.

To
The Deputy General Manager (Contracts),
M/s. HP Power Transmission Corporation Limited,
Barowalias House, Khalini,
Shimla – 171002,
Himachal Pradesh.
Fax: 2626284 / 2620227

Dear Sir,

Sub.: Construction of 33/220 KV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P. (Revised location at Phozal, Distt. Kullu, H.P.

Ref.1. LOA No. HPPTCL/L&T-Supply/2010-5107 dated 23.12.2010 (First Contract)
2. LOA No. HPPTCL/L&T-ErectionI2010=5099-5104 dated 23.12.2010 (Second Contract)
3. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2404 dated 21.04.2012.
4. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2405 dated 10.05.2012.
5. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2406 dated 18.05.2012.
6. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2407 dated 22.05.2012.

This has reference to our above referred letters and the meeting we had on 06.06.2012 at your office. We again thank you for the courtesy extended during our visit to your office. As already conveyed to you, we have incurred huge cost towards engineering & other costs associated with procurement of equipment from manufacturers.

We further refer the confirmation given by yourself during the discussions that no change in the specifications & ratings to be considered for original/revised quantities. Based on above & looking for a continued association for a long term working relations with your esteemed organization, we hereby agree to give a discount of 1% (One per cent) on our LOA prices, despite cost overrun due to time overrun beyond our control.

We attach herewith our revised offer considering above proposed discount for original & revised quantities. Revised quantities have been arrived at based on SLD & other related inputs provided to us.

We wish to inform you that following form the basis of our revised offer being submitted with this letter:

1. Due to certain changes in requirements, the quantities for the items quoted by us on LS basis (i.e. Structures, Earthing, Cables, Illumination & Hardwares etc.) are likely to get increased. Therefore, we have provided the breakup of quantities that formed basis of our LS prices to facilitate payments for additional quantity if any, on unit rate basis.

.../...

Dy. General Manager (Contracts)
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2. Due to change in transformers from 1 no. of 3 Phase to 4 Nos. of 1 Phase, we envisage that there shall be an increase in Bus Duct length compared to original requirement. Commercial implication, if any, in this regard shall be submitted after finalization of layout.

3. Prices for 220 KV & 33 KV CRPs for spare transformer are not included and shall be submitted after detailed engineering.

4. We have not envisaged any changes for LT Switchboards considering that spare feeders shall be used for additional requirements.

5. Despite substantial increase in input cost for civil works, we have agreed to maintain the same prices with the assurance from M/s HPPTCL that PV shall be paid to us as per IEEMA with base date being as per original tender issue date.

6. Due to change in certain requirements like change from 1 no. 3 Phase transformer to 4 nos. 1 Phase transformers & increase in 220 KV & 33 KV feeders, quantities for certain civil works are also likely to increase. Since these items are priced on LS basis, our prices for original scope have remained unchanged. For civil works, in addition to original scope, our commercial offer shall be submitted to you after detail engineering.

We would further like to make the submission that though there is no provision for variation towards statutory taxes & duties within the contractual period, there has been an abnormal delay in identification & handing over of land by HPPTCL. In the meantime, there has been an increase of 2 % in excise duty & service tax which directly add to our cost. All above factors adding to our cost are beyond our reasonable control & therefore, we will request you to allow us for increase in prices for above statutory variations by way of an amendment.

We now hope that you will find our offer in line with your requirement and request you to formalize order amendment so that we can formulate action plan for completion of the project in line with your requirements.

Thanking you and assuring you of our best services always we remain,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

LARSEN & TOUBRO LIMITED Construction-Chennai

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager(Planning & Contract),** M/s HPPTCL, Shimla

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
A	POWER TRANSFORMER										
1	25 / 31.5 MVA, 220 / 33 kV Single Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.		-		-					
2	Oil Storage Tank	Nos.		-		-	-	-			
3	Oil Sampling Bottle	Nos.		-		-	-	-			
4	Micro Gas Analyzer / On-line DGA / PPM Meter	Nos.		-		-	-	-			
5	250 kVA; 33 / 0.433 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	3,97,384	3,81,489	3,81,488.64	3,77,674	3,77,674	2	3,77,674	7,55,348
B	245 KVGIS EQUIPMENT			-	-	-	-				
1	245 kV, 1600 A, 50 kA SF6 Gas Insulated TRANSFORMER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Surge Arresters (196 W), SF6Gas Monitoring System for complete Bay, LCC, Three 1 - Phase SF6 Ducts and SF6 / Oil Bushing to connect to 220 / 33 kV, 25 / 31.5 MVA Transformer and Accessories with GIS etc to complete Transformer Bay Module	Nos.	1	4,42,63,071	4,24,92,548	4,24,92,548.16	4,20,67,623	4,20,67,623	1	4,20,67,623	4,20,67,623
2	245 kV, 2000 A, 50 GAS F6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnector with Grounding Switch, Line Disconnector with Safety Grounding Switch, High, Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module.	Nos.	1	4,23,00,940	4,06,08,902	4,06,08,902.40	4,02,02,813	4,02,02,813	2	4,02,02,813	8,04,05,626

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP).
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
3	245kV, 4000 A, 50 kA, 3 Single Phase (isolated) Units SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module Each Bus Bar Set shaft be complete with Voltage Transformer complete with Safety Grounding Switch	Nos.	2	28,40,909	27,27,273	54,54,545.28	27,00,000	54,00,000	2	27,00,000	54,00,000
4	245 kV, 4000 A, 50 kA SF6 Gas Insualted BUS COUPLER BAY MODULE comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches SF6 Gas Monitoring System for complete Bay, LCC etc	Nos.	1	2,54,09,337	2,43,92,964	2,43,92,963.52	2,41,49,034	2,41,49,034	1	2,41,49,034	2,41,49,034
5	245 kV-CVT with Junction Box	Nos.	3	4,26,088	4,09,044	12,27,133.44	4,04,954	12,14,862	6	4,04,954	24,29,724
6	198 kV Lightning Arrester with Counter and Leakage Meter	Nos.	3	83,087	79,764	2,39,290.56	78,966	2,36,898	10	78,966	7,89,660
C	36 kV, 2000 A, 40 kA for 3 sec., SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch			-	-	-	-	-	-	-	-

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction - Chennai

LARSEN & TOUBRO LIMITED (Public) Construction

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
1	36 kV 1600A SF6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, ~~GIS Duct, and Air / SF6 Bushing Termination~~ Enclosure and Accessories with GIS etc to complete Feeder/Bay Module	Nos.	3	38,36,165	36,82,718	1,10,48,155.20	36,45,891	1,09,37,673	6	36,45,891	2,18,75,346
2	36kV 2000 A SF6 Gas Insulated BUS COUPLER BAY comprising of SF6 Gas Insulated Circuit Breaker Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Line Panel	Nos.	1	32,77,678	31,46,571	31,46,570.88	31,15,105	31,15,105	1	31,15,105	31,15,105
3	36 kV, 1600 A SF6 Gas Insulated POWER TRANSFORMER PANEL each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, Surge Arrester (30 kV), SF6 Gas Monitoring System for complete Power Transformer Pane	Nos.	1	33,12,460	31,79,962	31,79,961.60	31,48,162	31,48,162	1	31,48,162	31,48,162
4	36 kV, 630 A SF6 Gas Insulated 250 kVA, L. T. TRANSFORMER PANEL-each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Power Transformer Panel	Nos.	1	28,49,372	27,35,397	27,35,397.12	27,08,043	27,08,043	1	27,08,043	27,08,043

Dy. General Manager (Contracts)
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LARSEN & TOUBRO LIMITED Construction - Chennai

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
D	**SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Station alongwith Associated Equipments as per Technical Specification**	Lot (9 bays)	1	96,01,800	92,17,728	92,17,728.00	91,25,551	91,25,551	1	91,25,551	91,25,551
	BAY CONTROL UNITS		-	-	-	-	-	-			-
1	220kV Bays	Nos	3	INCLUDED ABOVE			INCLUDED ABOVE		3	INCLUDED ABOVE	
2	33kV Bays	Nos	6						6		
E1	**220 kV CONTROL AND RELAY PANEL**			-	-	-	-	-			-
1	Circuit Breaker Control Panel			-	-	-	-	-			-
a)	With Auto Reclose	Nos.	1	5,53,950	5,31,792	5,31,792.00	5,26,474	5,26,474	2	5,26,474	10,52,948
b)	With out Auto Reclose	Nos.	2	5,27,571	5,06,468	10,12,936.32	5,01,403	10,02,806	2	5,01,403	10,02,806
2	Line Protection Panel (Main I + Main II)	Nos.	1	13,18,929	12,66,172	12,66,171.84	12,53,510	12,53,510	2	12,53,510	25,07,020
3	Bus bar Protection Panel	Set	1	25,58,721	24,56,372	24,56,372.16	24,31,808	24,31,808	1	24,31,808	24,31,808
	220 kV(Double Bus Bar Protection)			-	-	-	-	-			-
4	Transformer Protection Panel - H. V. Side	Nos	1	8,28,287	7,95,156	7,95,155.52	7,87,204	7,87,204	1	7,87,204	7,87,204
E2	**33 kV CONTROL AND RELAY PANEL**				-	-	-	-			-
1	Circuit Breaker Control Panel			-	-	-	-	-			-
a)	With Auto Reclose	Nos.	3	5,01,193	4,81,145	14,43,435.84	4,76,334	14,29,002	6	4,76,334	28,58,004
b)	With out Auto Reclose	Nos.	3	5,01,193	4,81,145	14,43,435.84	4,76,334	14,29,002	3	4,76,334	14,29,002
2	Line Protection Panel	Nos.	3	INCLUDED ABOVE			INCLUDED ABOVE		6	INCLUDED ABOVE	
3	Transformer Protection Panel - L. V. Side	Nos.	1						1		
F	**PLCC for 220 kV LINE FEEDER**				-	-	-				-
1	2000 A, 0.5 mH /1.0 mH, 50 kA Line Traps	Nos.	2	4,66,263	4,47,612	8,95,224.96	4,43,136	8,86,272	4	4,43,136	17,72,544
2	Coupling Device (Phase to Phase)	Nos	2	77,887	74,772	1,49,543.04	74,024	1,48,048	4	74,024	2,96,096
3	HF Cable	Ls	1	12,981	12,462	12,461.76	12,337	12,337	1	12,337	12,337
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos	3	3,31,152	3,17,906	9,53,717.76	3,14,727	9,44,181	6	3,14,727	18,88,362
5	Protection Coupler	Nos	2	1,41,495	1,35,835	2,71,670.40	1,34,477	2,68,954	4	1,34,477	5,37,908
6	Print Testing Kit	Set	1	1,12,592	1,08,088	1,08,088.32	1,07,007	1,07,007	1	1,07,007	1,07,007
7	EPBAX (24 / 8) with Telephone Sets	Set	1	2,90,779	2,79,148	2,79,147.84	2,76,356	2,76,356	1	2,76,356	2,76,356

Dy. General Manager (Contracts)
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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
F.1	FOTE Equipment	Set	1	1,01,33,270	97,27,939	97,27,939.20	96,30,660	96,30,660	1	96,30,660	96,30,660
					-	-	-				
G	AIR CONDITIONER AND VENTILATION SYSTEM				-	-	-				
1	Split AC (Capacity - 2T)	Nos	10	31,790	30,518	3,05,184.00	30,213	3,02,130	10	30,213	3,02,130
2	Ventilation System for 220kV & 33kV GIS Hall	LS	1	21,63,922	20,77,365	20,77,365.12	20,56,591	20,56,591	1	20,56,591	20,56,591
H	LT SWITCHBOARD			-	-	-	-	-			-
1	415V Main Switchboard	Nos	1	33,11,527	31,79,066	31,79,065.92	31,47,275	31,47,275	1	31,47,275	31,47,275
2	415V A C Distribution Board	Nos	1	15,24,832	14,63,839	14,63,838.72	14,49,200	14,49,200	1	14,49,200	14,49,200
3	220V DCDB	Nos	2	5,93,809	5,70,057	11,40,113.28	5,64,356	11,28,712	2	5,64,356	11,28,712
4	48V, DC DB	Nos	2	3,78,759	3,63,609	7,27,217.28	3,59,973	7,19,946	2	3,59,973	7,19,946
I.	BATTERIES			-	-	-	-	-			-
1	220V, 400 AH	Set	2	6,81,910	6,54,634	13,09,267.20	6,48,087	12,96,174	2	6,48,087	12,96,174
2	48V, 400 AH	Set	2	1,48,781	1,42,830	2,85,659.52	1,41,401	2,82,802	2	1,41,401	2,82,802
#REF!	Bidder shall estimate and indicate the AH Capacities of the Batteries to meet the Functional Requirement				-	-	-				
J	BATTERY CHARGER SYSTEM			-	-	-	-	-			-
1	220V	Set	2	5,12,624	4,92,119	9,84,238.08	4,87,198	9,74,396	2	4,87,198	9,74,396
2	48V	Set	2	3,81,488	3,66,228	7,32,456.96	3,62,566	7,25,132	2	3,62,566	7,25,132
K	DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)	Set	1	19,86,916	19,07,439	19,07,439.36	18,88,365	18,88,365	1	18,88,365	18,88,365
L	FIRE PREVENTION AND EXTINGUISHING SYSTEM			-	-	-	-	-			-
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	1	6,55,683	6,29,456	6,29,455.68	6,23,161	6,23,161	4	6,23,161	24,92,644
2	Fire Protection for GIS cum Control Room Building, etc. (Portable type the Extinguishers System)	Lot	1	7,25,562	6,96,540	6,96,539.52	6,89,574	6,89,574	1	6,89,574	6,89,574
M	ILLUMINATION SYSTEM	Lot	1	40,14,303	38,53,731	38,53,730.88	38,15,194	38,15,194	1	38,15,194	38,15,194
1	Control Room / GIS Building	LS	1	INCLUDED ABOVE			INCLUDED ABOVE		1	INCLUDED ABOVE	
2	Switchyard Lighting	LS	1						1		
3	Solar Light System for Street Light	LS	1						1		

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
N	Power Cables and Copper Conductor Armoured Control Cables alongwith:Lugs, Glands and Straight Joints	LS	1	28,53,994	27,39,834	27,39,834.24	27,12,436	27,12,436	1	27,12,436	27,12,436
	(Item break-up for Lot annexed)			-	-	-	-	-			-
O	33kV XLPE POWER CABLE AND ACCESSORIES			-	-	-	-	-			-
1	XLPE POWER CABLE			-	-	-	-	-			-
	3.5c x 300 Sq.mm	km	0.5	6,53,033	6,26,912	3,13,455.84	6,20,643	3,10,322	0.5	6,20,643	3,10,322
2	PVC POWER CABLE			-	-	-	-	-			-
	3.5 c x 90 Sq. mm	km	0.2	3,22,490	3,09,590	61,918.08	3,06,494	61,299	0.2	3,06,494	61,299
	3.5 c x 70 Sq. mm	km	0.5	2,61,610	2,51,146	1,25,572.80	2,48,634	1,24,317	0.5	2,48,634	1,24,317
	3.5 c x 35 Sq. mm	km	0.2	1,51,139	1,45,093	29,018.69	1,43,643	28,729	0.2	1,43,643	28,729
	4 c x 16 Sq. mm	km	0.5	1,04,379	1,00,204	50,101.92	99,202	49,601	0.5	99,202	49,601
	4 c x 4 Sq. mm	km	1	51,660	49,594	49,593.60	49,098	49,098	1	49,098	49,098
3	HR FRLS CONTROL CABLE			-	-	-	-	-			-
	2c x2.5 Sq.mm	km	1	48,309	46,377	46,376.64	45,913	45,913	1	45,913	45,913
	4 c X 2.5 sq. mm	km	2	82,404	79,108	1,58,215.68	78,317	1,56,634	2	78,317	1,56,634
	7 cX 2.5 sq. mm	km	1	1,37,058	1,31,576	1,31,575.68	1,30,260	1,30,260	1	1,30,260	1,30,260
	10cX2.5sq. mm	km	0.75	1,92,003	1,84,323	1,38,242.16	1,82,480	1,36,860	0.75	1,82,480	1,36,860
	12cX2.5sq. mm	km	0.5	2,28,164	2,19,037	1,09,518.72	2,16,847	1,08,424	0.5	2,16,847	1,08,424
	16cX2.5sq. mm	km	0.5	3,01,123	2,89,078	1,44,539.04	2,86,187	1,43,094	0.5	2,86,187	1,43,094
	19cX2.5sq. mm	km	0.2	3,54,068	3,39,905	67,981.06	3,36,506	67,301	0.2	3,36,506	67,301
	2cX4sq.mm	km	1	65,091	62,487	62,487.36	61,862	61,862	1	61,862	61,862
	4c X 4 sq.mm	km	1	1,19,122	1,14,357	1,14,357.12	1,13,214	1,13,214	1	1,13,214	1,13,214
	7cX4sq. mm	km	1	2,12,375	2,03,880	2,03,880.00	2,01,841	2,01,841	1	2,01,841	2,01,841
4	36 kV XLPE CABLE			-	-	-	-	-			-
a)	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)	km	1	9,61,513	9,23,052	9,23,052.48	9,13,822	9,13,822	1	9,13,822	9,13,822
b)	33kV Indoor Termination Suitable for above Cable	Nos	3	5,165	4,958	14,875.20	4,909	14,727	4	4,909	19,636
c)	33kV Outdoor Termination Suitable for above Cable	Nos	3	3,258	3,128	9,383.04	3,096	9,288	4	3,096	12,384
P	GROUNDING / EARTHING SYSTEM	Lot	1	22,61,570	21,71,107	21,71,107.20	21,49,396	21,49,396	1	21,49,396	21,49,396
a)	40 mm MS Rod for Earthmat(*)	LS	1						1		

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
b)	GIS / MS Flats	LS	1	INCLUDED ABOVE			INCLUDED ABOVE		1	INCLUDED ABOVE	
c)	Electrodes	LS	1						1		
	(Item Break-up for Lot annexed)										
d)	Lightning Mast / GS Shield Wire (*)	LS	1	-	-	-			1		
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT	LS	1	16,39,842	15,74,248	15,74,248.32	15,58,506	15,58,506	1	15,58,506	15,58,506
	(Item break-up for Lot annexed)					-	-	-			-
R	EOT CRANE			-	-						
a.	3.5T for 220kV GIS ROOM	Set	1	7,11,305	6,82,853	6,82,852.80	6,76,024	6,76,024	1	6,76,024	6,76,024
b.	2.5T for 33kV GIS ROOM	Set	1	4,77,459	4,58,361	4,58,360.64	4,53,777	4,53,777	1	4,53,777	4,53,777
c.	Moveable Ladder of suitable Capacity for 220 kV &33kV GIS Room	Nos	2	1,32,462	1,27,164	2,54,327.04	1,25,892	2,51,784	2	1,25,892	2,51,784
S	Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, including Equipment Connectors, Pipes for Equipment & Lighting, all Accessories etc	LS	1	13,35,705	12,82,277	12,82,276.80	12,69,454	12,69,454	1	12,69,454	12,69,454
	(Item Break-up for Lot annexed)					-	-	-			-
U	TESTING AND MAINTENANCE EQUIPMENT				-						
1	Meggar 5 kV (Motorized)	No	1	72,376	69,481	69,480.96	68,786	68,786	1	68,786	68,786
2	Meggar 1 kV (Motorized)	No	1	7,360	7,066	7,065.60	6,995	6,995	1	6,995	6,995
3	Digital Multimeter	Nos	2	10,428	10,011	20,021.76	9,911	19,822	2	9,911	19,822
4	D - Spanner Set (Insulated)	Nos	2	705	677	1,353.60	670	1,340	2	670	1,340
5	Ring - Spanner Set (Insulated)	Nos	2	736	707	1,413.12	699	1,398	2	699	1,398
6	Torque Wrench Set	Nos	2	12,267	11,776	23,552.64	11,659	23,318	2	11,659	23,318
7	Insulating Gloves	Set	5	1,533	1,472	7,358.40	1,457	7,285	5	1,457	7,285
8	Helmets	Set	5	553	531	2,654.40	526	2,630	5	526	2,630
9	Gas Evacuating and Refilling Device	Set	1	35,08,401	33,68,065	33,68,064.96	33,34,384	33,34,384	1	33,34,384	33,34,384
10	Gas Leakage Monitor	Nos	2	73,603	70,659	1,41,317.76	69,952	1,39,904	2	69,952	1,39,904
11	Relay Test Kit	Nos	1	26,98,770	25,90,819	25,90,819.20	25,64,911	25,64,911	1	25,64,911	25,64,911
12	Synchronizing Trolley	Set	1	1,52,330	1,46,237	1,46,236.80	1,44,774	1,44,774	1	1,44,774	1,44,774
13	Time Synchronisation Equipment	Lot	1	INCLUDED			INCLUDED		1	INCLUDED	

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

(Price Break UP)
Price Schedule Supply

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICES		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT PRICE	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
	Sub-Total - LOA Items (A)					20,30,59,840		20,10,29,239			26,16,48,952
						18.66%		17.84%			12.66%
NEW ITEMS											
A1	220KV Single Phase Breaker Bay Module for Spare Transformer	Set							1	18308548	18308548
B1	36 kV OUTDOOR EQUIPMENT										
a	30 kV, Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.							25	16223	405575
b	36 kV, Line Isolator Switch with Earth Switch	Set							6	187917	1127502
B2	33KV Single Phase Breaker Bay Module for Spare Transformer	Set							1	1571576	1571576
C1	SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System	Lot (12 bays)							1	12167590	12167590
	Sub-Total - New Items (B)										33580791
	TOTAL (A+B)					20,30,59,840		20,10,29,239			29,52,29,743

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
A	POWER TRANSFORMER									
1	25 / 31.5 MVA, 220 / 33 kV Single Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	4,87,635	4,87,635.00	4,82,759	4,82,759	1	4,82,759	4,82,759
2	Oil Storage Tank	Nos.	1	-	-	-				
3	Oil Sampling Bottle	Nos.	4	-	-	-				
4	Micro Gas Analyzer / On-line DGA / PPM Meter	Nos.	1	-	-	-				
5	250 kVA; 33 / 0.433 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	1,36,404	1,36,404.00	1,35,040	1,35,040	2	1,35,040	2,70,080
B	245 KVGIS EQUIPMENT			-	-					
1	245 kV, 1600 A, 50 kA SF6 Gas Insulated TRANSFORMER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Surge Arresters (196 W), SF6Gas Monitoring System for complete Bay, LCC, Three 1 - Phase SF6 Ducts and SF6 / Oil Bushing to connect to 220 / 33 kV, 25 / 31.5 MVA Transformer and Accessories with GIS etc to complete Transformer Bay Module	Nos.	1	5,23,191	5,23,191.00	5,17,959	5,17,959	1	5,17,959	5,17,959
2	245 kV, 2000 A, 50 GAS F6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnector with Grounding Switch, Line Disconnector with Safety Grounding Switch, High, Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module.	Nos.	1	5,23,191	5,23,191.00	5,17,959	5,17,959	2	5,17,959	10,35,918
3	245kV, 4000 A, 50 kA, 3 Single Phase (isolated) Units SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch	Nos.	2	4,61,942	9,23,884.00	4,57,323	9,14,646	2	4,57,323	9,14,646

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED Construction Chennai

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
4	245 kV, 4000 A, 50 kA SF6 Gas Insualted BUS COUPLER BAY MODULE comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches SF6 Gas Monitoring System for complete Bay, LCC etc	Nos.	1	5,23,191	5,23,191.00	5,17,959	5,17,959	1	5,17,959	5,17,959
5	245 kV-CVT with Junction Box	Nos.	3	8,749	26,247.00	8,662	25,985	6	8,662	51,972
6	198 kV Lightning Arrester with Counter and Leakage Meter	Nos.	3	5,249	15,747.00	5,197	15,591	10	5,197	51,970
C	36 kV, 2000 A, 40 kA for 3 sec., SF6 Gas Insulated, Metal Enclosed BUS BARS each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Bus Bar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch		-	-	-	-	-	-	-	-
1	36 kV 1600A SF6 Gas Insulated FEEDER BAY MODULE each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch, SF6 Gas Monitoring System for complete Bay, LCC, ~~GIS Duct, and Air / SF6, Bushing Termination~~ Enclosure and Accessories with GIS etc to complete Feeder/Bay Module	Nos.	3	52,499	1,57,497.00	51,974	1,55,922	6	51,974	3,11,844
2	36kV 2000 A SF6 Gas Insulated BUS COUPLER BAY comprising of SF6 Gas Insulated Circuit Breaker Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Line Panel	Nos.	1	52,499	52,499.00	51,974	51,974	1	51,974	51,974
3	36 kV, 1600 A SF6 Gas Insulated POWER TRANSFORMER PANEL each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, Surge Arrester (30 kV), SF6 Gas Monitoring System for complete Power Transformer Pane	Nos.	1	52,499	52,499.00	51,974	51,974	1	51,974	51,974

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
4	36 kV, 630 A SF6 Gas Insulated 250 kVA, L. T. TRANSFORMER PANEL-each comprising of SF6 Gas insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Power Transformer Panel	Nos.	1	52,499	52,499.00	51,974	51,974	1	51,974	51,974
D	SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Station alongwith Associated Equipments as per Technical Specification	Lot (9 Bays)	1	1,57,496	1,57,496.00	1,55,921	1,55,921	1	1,55,921	1,55,921
	BAY CONTROL UNITS			-	-					-
1	220kV Bays	Nos	3	INCLUDED ABOVE		INCLUDED ABOVE		3	INCLUDED ABOVE	
2	33kV Bays	Nos	6					6		
E1	220 kV CONTROL AND RELAY PANEL			-	-	-	-			-
1	Circuit Breaker Control Panel			-	-	-	-			-
a)	With Auto Reclose	Nos.	1	17,499	17,499.00	17,324	17,324	2	17,324	34,648
b)	With out Auto Reclose	Nos.	2	17,499	34,998.00	17,324	34,648	2	17,324	34,648
2	Line Protection Panel (Main I + Main II)	Nos.	1	17,499	17,499.00	17,324	17,324	2	17,324	34,648
3	Bus bar Protection Panel	Set	1	17,499	17,499.00	17,324	17,324	1	17,324	17,324
	220 kV(Double Bus Bar Protection)			-	-	-	-			-
4	Transformer Protection Panel - H. V. Side	Nos	1	17,499	17,499.00	17,324	17,324	1	17,324	17,324
E2	33 kV CONTROL AND RELAY PANEL			-	-					-
1	Circuit Breaker Control Panel			-	-	-	-			-
a)	With Auto Reclose	Nos.	3	17,499	52,497.00	17,324	51,972	6	17,324	1,03,944
b)	With out Auto Reclose	Nos.	3	17,499	52,497.00	17,324	51,972	3	17,324	51,972
2	Line Protection Panel	Nos.	3	INCLUDED ABOVE		INCLUDED ABOVE		6	INCLUDED ABOVE	
3	Transformer Protection Panel - L. V. Side	Nos.	1					1		
F	PLCC for 220 kV LINE FEEDER			-	-					-
1	2000 A, 0.5 mH /1.0 mH, 50 kA Line Traps	Nos.	2	13,999	27,998.00	13,859	27,718	4	13,859	55,436
2	Coupling Device (Phase to Phase)	Nos	2	10,500	21,000.00	10,395	20,790	4	10,395	41,580
3	HF Cable	Ls	1	8,749	8,749.00	8,662	8,662	1	8,662	8,662
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos	3	10,500	31,500.00	10,395	31,185	6	10,395	62,370
5	Protection Coupler	Nos	2	10,500	21,000.00	10,395	20,790	4	10,395	41,580
6	Print Testing Kit	Set	1	10,500	10,500.00	10,395	10,395	1	10,395	10,395
7	EPBAX (24 / 8) with Telephone Sets	Set	1	10,500	10,500.00	10,395	10,395	1	10,395	10,395
F.1	FOTE Equipment	Set	1	48,90,720	48,90,720.00	48,41,813	48,41,813	1	48,41,813	48,41,813
				-	-					
G	AIR CONDITIONER AND VENTILATION SYSTEM			-	-					
1	Split AC (Capacity - 2T)	Nos	10	17,499	1,74,990.00	17,324	1,73,240	10	17,324	1,73,240

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
2	Ventilation System for 220kV & 33kV GIS Hall	LS	1	23,96,453	23,96,453.00	23,72,488	23,72,488	1	23,72,488	23,72,488
H	LT SWITCHBOARD			-	-	-	-			-
1	415V Main Switchboard	Nos	1	1,48,746	1,48,746.00	1,47,259	1,47,259	1	1,47,259	1,47,259
2	415V A C Distribution Board	Nos	1	1,04,997	1,04,997.00	1,03,947	1,03,947	1	1,03,947	1,03,947
3	220V DCDB	Nos	2	87,498	1,74,996.00	86,623	1,73,246	2	86,623	1,73,246
4	48V, DC DB	Nos	2	87,498	1,74,996.00	86,623	1,73,246	2	86,623	1,73,246
I.	BATTERIES			-	-	-	-			-
1	220V, 400 AH	Set	2	87,498	1,74,996.00	86,623	1,73,246	2	86,623	1,73,246
2	48V, 400 AH	Set	2	52,499	1,04,998.00	51,974	1,03,948	2	51,974	1,03,948
#REFI	Bidder shall estimate and indicate the AH Capacities of the Batteries to meet the Functional Requirement			-	-					
J	BATTERY CHARGER SYSTEM			-	-	-	-			-
1	220V	Set	2	17,499	34,998.00	17,324	34,648	2	17,324	34,648
2	48V	Set	2	17,499	34,998.00	17,324	34,648	2	17,324	34,648
K	DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)	Set	1	87,498	87,498.00	86,623	86,623	1	86,623	86,623
L	FIRE PREVENTION AND EXTINGUISHING SYSTEM			-	-	-	-			-
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	1	3,17,897	3,17,897.00	3,14,718	3,14,718	4	3,14,718	12,58,872
2	Fire Protection for GIS cum Control Room Building, etc, (Portable type the Extinguishers System)	Lot	1	5,17,497	5,17,497.00	5,12,322	5,12,322	1	5,12,322	5,12,322
M	ILLUMINATION SYSTEM	Lot	1	8,39,350	8,39,350.00	8,30,957	8,30,957	1	8,30,957	8,30,957
1	Control Room / GIS Building	LS	1	INCLUDED ABOVE		INCLUDED ABOVE		1	INCLUDED ABOVE	
2	Switchyard Lighting	LS	1					1		
3	Solar Light System for Street Light	LS	1					1		
N	Power Cables and Copper Conductor Armoured Control Cables alongwith:Lugs, Glands and Straight Joints	LS	1	20,97,466	20,87,466.00	20,66,591	20,66,591	1	20,66,591	20,66,591
				-	-	-	-			-
O	33kV XLPE POWER CABLE AND ACCESSORIES			-	-	-	-			-
1	XLPE POWER CABLE			-	-	-	-			-
	3.5c x 300 Sq.mm	km	0.5	1,04,279	52,139.50	1,03,236	51,618	0.5	1,03,236	51,618
2	PVC POWER CABLE			-	-	-	-			-
	3.5 c x 90 Sq. mm	km	0.2	80,655	16,131.00	79,848	15,970	0.2	79,848	15,970
	3.5 c x 70 Sq. mm	km	0.5	80,655	40,327.50	79,848	39,924	0.5	79,848	39,924
	3.5 c x 35 Sq. mm	km	0.2	57,030	11,406.00	56,460	11,292	0.2	56,460	11,292
	4 c x 16 Sq. mm	km	0.5	57,030	28,515.00	56,460	28,230	0.5	56,460	28,230
	4 c x 4 Sq. mm	km	1	33,406	33,406.00	33,072	33,072	1	33,072	33,072
3	HR FRLS CONTROL CABLE			-	-	-	-			-
	2c x2.5 Sq.mm	km	1	31,831	31,831.00	31,513	31,513	1	31,513	31,513
	4 c X 2.5 sq. mm	km	2	31,831	63,662.00	31,513	63,026	2	31,513	63,026

Dy. General Manager (Contracts)
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Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
	7 cX 2.5 sq. mm	km	1	35,506	35,506.00	35,151	35,151	1	35,151	35,151
	10cX2.5sq. mm	km	0.75	41,018	30,763.50	40,608	30,456	0.75	40,608	30,456
	12cX2.5sq. mm	km	0.5	41,018	20,509.00	40,608	20,304	0.5	40,608	20,304
	16cX2.5sq. mm	km	0.5	48,456	24,228.00	47,971	23,986	0.5	47,971	23,986
	19cX2.5sq. mm	km	0.2	50,205	10,041.00	49,703	9,941	0.2	49,703	9,941
	2cX4sq.mm	km	1	34,981	34,981.00	34,631	34,631	1	34,631	34,631
	4c X 4 sq.mm	km	1	41,280	41,280.00	40,867	40,867	1	40,867	40,867
	7cX4sq. mm	km	1	61,230	61,230.00	60,618	60,618	1	60,618	60,618
4	36 kV XLPE CABLE			-	-	-	-		-	-
a)	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)	km	1	1,81,950	1,81,950.00	1,80,131	1,80,131	1	1,80,131	1,80,131
b)	33kV Indoor Termination Suitable for above Cable	Nos	3	3,549	10,647.00	3,514	10,542	4	3,514	14,056
c)	33kV Outdoor Termination Suitable for above Cable	Nos	3	3,549	10,647.00	3,514	10,542	4	3,514	14,056
P	GROUNDING / EARTHING SYSTEM	Lot	1	-	-	-	-	1	-	-
a)	40 mm MS Rod for Earthmat(*)	LS	1	16,07,793	16,07,793.00	15,91,715	15,91,715	1	15,91,715	15,91,715
b)	GIS / MS Flats	LS	1	INCLUDED ABOVE		INCLUDED ABOVE		1	INCLUDED ABOVE	
c)	Electrodes	LS	1					1		
d)	Lightning Mast / GS Shield Wire (*)	LS	1					1		
	(*Bidder to Estimate and Design)									
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT	LS	1	2,05,777	2,05,777.00	2,03,719	2,03,719	1	2,03,719	2,03,719
R	EOT CRANE			-	-	-	-			-
a.	3.5T for 220kV GIS ROOM	Set	1	2,08,298	2,08,298.00	2,06,215	2,06,215	1	2,06,215	2,06,215
b.	2.5T for 33kV GIS ROOM	Set	1	1,56,442	1,56,442.00	1,54,878	1,54,878	1	1,54,878	1,54,878
c.	Moveable Ladder of suitable Capacity for 220 kV &33kV GIS Room	Nos.	2	48,907	97,814.00	48,418	96,836	2	48,418	96,836
S	Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, including Equipment Connectors, Pipes for Equipment & Lighting, all Accessories etc	LS	1	4,20,335	4,20,335.00	4,16,132	4,16,132	1	4,16,132	4,16,132
	Sub-Total - LOA Items (A)				1,98,74,471		1,94,77,735			2,14,87,306
					38.51%		35.87%			35.42%
NEW ITEMS										
A1	220KV Single Phase Breaker Bay Module for Spare Transformer	Set						1	222500	222500
B1	36 kV OUTDOOR EQUIPMENT									
a	30 kV, Single phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.						25	2650	66250
b	36 kV, Line Isolator Switch with Earth Switch	Set						6	16500	99000

Dy. General Manager (Contracts)
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L&T TOUBRO LIMITED

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

PRICES IN INR

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES			ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT PRICE	TOTAL PRICE	QTY	UNIT PRICE	TOTAL PRICE
B2	33KV Single Phase Breaker Bay Module for Spare Transformer	Set						1	22500	22500
C1	SUBSTATION AUTOMATION SYSTEM Complete Sub Station Automation System including Hardware and Software for the Sub Station and Remote Control Station alongwith Associated Equipments as per Technical Specification	Lot (12 bays)						1	207895	2,07,895
										618145
	Sub-Total - New Items (B)				1,96,74,471		1,94,77,735			2,21,05,450
	TOTAL (A+B)									

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - LOA PRICES				ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		REVISED SCOPE - PRICES after 1% DISC.		
			QTY	UNIT SALES	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT SALES	TOTAL SALES	QTY	UNIT PRICE	TOTAL PRICE
	ORIGINAL SCOPE										
T	CIVIL WORKS as per Specification										
1.0	Soil investigation	LS	1	3,84,685	3,69,298	3,69,298	365605	3,65,605	1	365605	365605
2.0	Excavation & filling for land development.	LS	1		-	-		-			
3.0	Retaining wall	LS	1	7,81,192	7,49,944	7,49,944	742445	7,42,445	1	742445	742445
4.0	Tower & equipment foundation, Transformer Foundation, Fire Wall, Cable Trenches including all types of crossings & all metallic works including Steel racks for Cables, Cable Supports, MS angle edging & RCC covers with lifting arrangements.		1	63,74,611	61,19,627	61,19,627	6058431	60,58,431	1	6058431	6058431
a)	Tower	LS	1		-	-		-			
b)	Equipment structures	LS	1		-	-		-			
c)	Transformer foundation including fire wall, Railcum Road.	LS	1		-	-		-			
d)	Cable Trenches including all type of crossings	LS	1		-	-		-			
5.0	Buried Cable trench for Auxiliary Power Arrangement	LS	1	4,00,885	3,84,850	3,84,850	381002	3,81,002	1	381002	381002
6.0	Site Surfacing and Antiweed Treatment	LS	1	11,37,070	10,91,587	10,91,587	1080671	10,80,671	1	1080671	1080671
(a)	Site Surfacing - Base layer 50 thk. Using 20mm crushed/uncrushed/broken stone. Second layer 50 thk. Using 20mm crushed/uncrushed/broken stone. Final surface 50 thk. Using 20mm crushed/uncrushed/broken stone.	Sq.m	4,170		-	-		-			
(b)	Antiweeding Treatment (area under present scope i.e. fenced area)	Sq.m	4,170		-	-		-			
(c)	Micro grading (+/- 300mm)	Sq.m	4,910		-	-		-			
7.0	Cement Concrete roads including all types of crossings.				-	-		-			
a)	5.00 metres wide Road cum Rail Track*	LS	1	15,32,846	14,71,532	14,71,532	1456817	14,56,817	1	1456817	1456817
b)	3.5 metres wide	LS	1	7,57,640	7,27,334	7,27,334	720061	7,20,061	1	720061	720061
8.0	Storm Water Drainage including culverts	LS	1	6,93,434	6,65,697	6,65,697	659040	6,59,040	1	659040	659040
9.0	Security Fencing along with Gates and Security room.	LS	1	10,73,015	10,30,094	10,30,094	1019793	10,19,793	1	1019793	1019793
10.0	Buildings				-	-		-			

Dy. General Manager (Contracts)
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Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

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			QTY	UNIT SALES	Unit PRICE (with 4% Disc.)	TOTAL PRICE	UNIT SALES	TOTAL SALES	QTY	UNIT PRICE	TOTAL PRICE
a)	Control Room Building cum 220kV GIS Room along with Battery room, PLCC Room, SCADA Room, Offices and stores.	LS	1	1,49,00,012	1,43,04,012	1,43,04,012	14160972	1,41,60,972	1	14160972	14160972
b)	33kV GIS Building.	LS	1	25,54,205	24,52,037	24,52,037	2427517	24,27,517	1	2427517	2427517
11.0	DG set outdoor Silent type.	LS	1	1,38,083	1,32,560	1,32,560	131234	1,31,234	1	131234	131234
12.0	Store Shed	LS	1	25,44,960	24,43,162	24,43,162	2418730	24,18,730	1	2418730	2418730
13.0	Transformer Oil Drainage system	LS	1	Included							
	GRAND TOTAL					3,19,41,734		3,16,22,318			31622318
NEW ITEMS											
	Civil works for additional transformers related works & related to additional 220 KV & 33 KV Bays										
	Sub-Total - New Items							3,16,22,318			3,16,22,318
	Grand Total										

To be furnished after detailed engineering

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SPEED POST

Himachal Pradesh Power Transmission Corporation Limited

No. HPPTCL/DGM& Head(T)/Phozal Sub-Station-12-516-17 Dated: 21/7/12

To

Larsen & Turbo Ltd;
Power Transmission & Distribution,
Mount Poonamallee, Manapakkam, P.B No. 979,
Chennai-600089.
Fax: +914422705482.,

Sub: **Construction of 33/220 kV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P (Revised location at Phozal, Distt Kullu, H.P).**

Reference: **Your office letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220 kV SWYD/2409 dated 11.06.2012.**

Dear Sirs,

With reference to above, the point wise reply is as under:-

1. As indicated, the breakup of quantities has been provided to facilitate payments for additional quantities, if any, on per unit rate basis but the same has not been found attached with your price bid.
2. Regarding bus duct length, it is requested to finalise the layout of the sub-station immediately and also furnish the unit rates for bus ducts so that the payments shall be made as per actual measurement at site.
3. Please furnish the prices for 220 kV and 33 kV Control and Relay Panels for spare transformer as any financial implication after the award of works shall not be acceptable/payable.
5. Price Variation shall be paid as per IEEMA formula/circulars with base date as 1st September'2011 i.e. from the first date of next month after the expiry of scheduled period given for the completion/execution of original works,awarded (CIVIL WORKS ONLY).
6. Regarding civil works, it is requested that unit rates shall be furnished for all civil works (item wise) so that payments shall be made as per actual measurement by HPPTCL's official at site.

In view of above, it is requested to finalise the detailed layout drawing of the sub-station immediately so that the final quantities could be assessed accordingly. It is, therefore, requested to finalise all the additional quantities in respect of equipments/materials/civil works well in advance, required for the construction of the said Substation and furnish unit rates for all the quantities (item wise) as no financial implications shall be accepted after the award of works. Your detailed /revised price bid should reach in this office within 15 days from the issuance of this letter.

TREAT IT AS MOST URGENT.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005.

Copy forwarded to GM(C&D), Barowalias House, HPPTCL, Khalini, Shimla-171002 for information, please.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2410 30th July, 2012
Email: KRJ@LNTECC.COM.

To
The DGM & Head, Transmission (Design)
M/s HP Power Transmission Corporation Limited,
Anu, Hamirpur – 177005,
Himachal Pradesh.

Dear Sir,

Subject: Construction of 33/220 KV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P. (Revised location at Phozal, Distt. Kullu, H.P.

Reference: 1. LOA No. HPPTCL/L&T-Supply/2010-5107 dated 23.12.2010 (First Contract)
2. LOA No. HPPTCL/L&T-ErectionI2010=5099-5104 dated 23.12.2010 (Second Contract)
3. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2404 dated 21.04.2012.
4. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2405 dated 10.05.2012.
5. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2406 dated 18.05.2012.
6. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2407 dated 22.05.2012.
7. Our Letter No. L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2409 dated 11.06.2012.
8. Your Letter No. HPPTCL/DGM&Head/Phozal Substation-12-516-17 Dated: 21.07.2012.

This is in reference to your letter no. HPPTCL/DGM& Head(T)/Phozal Sub-Station-12 Dated: 21.07.12 regarding the subject.

With reference to various queries raised, our point wise reply is as under:-

1. The breakup of quantities is being attached to facilitate payments for additional quantities on per unit rate basis.
2. Regarding change in bus duct type from 3 phase to 1 phase & bus duct length, we shall be furnishing the unit rates for bus ducts latest by 01.08.2012 so that the payments shall be made as per actual measurement at site.
3. Prices for 220 kV and 33 kV Control and Relay Panels for spare transformer shall be as per the rates available in the contract for Transformer Protection Panel. However, we have noted that in most of the projects, spare Transformer is physically moved to the required location so that the requirement of Spare Transformer Bays, related CRP Panels and consequent increase in Building size can be avoided.
4. We agree for your proposal for the PV Base date of Sep'2011 as proposed in your above referred letter.
5. Regarding civil works, unit rates are furnished.

LARSEN & TOUBRO LIMITED Construction Chennai

Larsen & Toubro Limited, Power Transmission & Distribution
Mount Poonamallee Road, Manapakkam, P. B. No. 979, Chennai - 600 089, INDIA
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(L&T Construction is a business brand of Larsen & Toubro Limited)

Registered Office:
L&T House, N. M. Marg
Ballard Estate
Mumbai 400 001, INDIA

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

We now hope that you will find our offer in line with your requirement and request you to formalize order amendment so that we can formulate action plan for completion of the project in line with your requirements.

Thanking you and assuring you of our best services always we remain,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

LARSEN & TOUBRO LIMITED Construction Chennai

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager(Planning & Contract),** M/s HPPTCL, Shimla

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BREAK UP FOR ILLUMINATION

SI No.	Description	Unit	Qty.	Supply (Rs) Unit	Supply (Rs) Total
1.0	MLDB	nos.	1	15,55,720	15,55,720
2.0	ELDB	nos.	1	7,28,643	7,28,643
3.0	GIS cum Control room building illumination with CFL/Metal Halilde Lamps			-	-
a	2 x36 Watts Fluorescent Lamp in Industrial reflector type fixtures suitbale for surface /pendent mounting CGL Cat Ref. IBA1424EB	nos.	37	1,782	65,936
b	230V, 5/15A, Indoor receptacle 3 Pin type- R1	nos.	20	477	9,548
c	15A. 1Ph, 3 Pin Industrial Type Switch Socket Outlet	nos.	4	2,146	8,585
d	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket for A.C (indoor)	nos.	3	1,348	4,044
e	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket for A.C (outdoor)	nos.	3	2,696	8,088
f	450mm exhaust fan	nos.	2	2,385	4,770
g	450mm Acid proof exhaust fan(for battery room)	nos.	1	9,539	9,539
h	1400mm ceiling fans with electronic regulator	nos.	6	2,981	17,886
i	Point wiring	nos.	72	708	50,982
j	Indoor lighting panel (ACP-1 type) as per Technical specification	nos.	2	32,199	64,397
k	DC Lighting panel (DCP type) as per Technical specification	nos.	1	46,509	46,509
				-	
5.0	220/33kV GIS building illumination			-	
a	1x250W - Industrial metal halide Luminaire CGL. Cat ref.No. FAD 1314	nos.	14	1,864	26,099
b	1x60w GLS Bulk Head Light Fixture of CGL tupe IBH 1110/BC or equivalent	nos.	8	226	1,811
c	230V, 5/15A, Indoor receptacle 3 Pin type- R1	nos.	9	477	4,297
d	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket for A.C (indoor)	nos.	4	1,014	4,054
e	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket (outdoor)	nos.	4	2,027	8,109
f	1x11W Portable battery operated (3hrs. Backup) CFL emergency lamp (M/s BPL make/ Eqvt)	nos.	4	3,578	14,311
g	Point wiring	nos.	43	566	24,358
h	Indoor lighting panel (ACP-1 type) as per Technical specification	nos.	2	32,199	64,397
i	DC Lighting panel (DCP type) as per Technical specification	nos.	2	46,509	93,018
j	32A TPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket (inddor)	nos.	2	2,027	4,054
6.0	Switchyard Lightning			-	
a	Flood light luminaire with 2 x 400 W HPSV/T+ lamp - bajaj cat. BJEF22 CA-R0(2 x 400 W HPSV/T+	nos.	4	7,909	31,635
b	Lighting JB with 5 no's of terminal blocks	nos.	4	775	3,099
c	250A Oil filtration socket	nos.	1	2,981	2,981
				-	
7.0	Street Lighting (Solar lighting system)			-	
a	120W Solar lighting system for Street lighting with 9m height pole, inbuilt in long life maintenance free batteries (capacity is 12V, 120Ah)	nos.	8	1,19,254	9,54,031
				-	
8.0	Transformer Area Lighting as per specification			-	
	1x70W HPSV 240V AC industrial well glass fixture for pendant mounting with control gear box (BJDWI-70SV).	nos.	2	1,370	2,740
	Lighting JB	nos.	2	775	1,550
					38,15,194

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BREAK UP FOR CABLES

Sl No	Description	Unit	Qty	Supply (Rs)	
				Unit	Total
N	Power Cables and Copper Conductor Armoured Control Cables alongwith Lugs, Glands and Straight Joints				
	XLPE POWER CABLE				
	1c X 630sq.mm	km	0.5	10,78,001	5,39,000
	Terminations for the above				-
	1c X 630sq.mm	nos	8	2,103	16,824
	3.5c X 300sq.mm	nos	24	3,114	74,736
					-
	PVC POWER CABLE (Other than those available in the Contract)				-
	4c X 6sq.mm	km	0.22	96,369	21,201
	2c X 6sq.mm	km	2.1	76,601	1,60,862
	1c X 150sq.mm	km	0.4	3,01,864	1,20,746
	Terminations for the above				-
	3.5c X 90sq.mm	nos	16	1,584	25,344
	3.5c X 70sq.mm	nos	16	1,107	17,712
	3.5c X 35sq.mm	nos	42	642	26,964
	4c X 16sq.mm	nos	14	560	7,833
	4c X 6sq.mm	nos	54	395	21,303
	2c X 6sq.mm	nos	236	269	63,366
	1c X 150sq.mm	nos	40	653	26,100
				-	-
	HR- FRLS CONTROL CABLE			-	-
	5c X 2.5sq.mm	km	2	1,05,698	2,11,396
	27c X 2.5sq.mm	km	0.5	9,98,720	4,99,360
	4P,0.75	km	0.2	1,38,087	27,617
	Terminations for the above			-	-
	2c X 2.5sq.mm	nos.	56	295	16,546
	4c X 2.5sq.mm	nos.	166	423	70,291
	5c X 2.5sq.mm	nos.	344	455	1,56,534
	7c X 2.5sq.mm	nos.	286	479	1,36,920
	10c X 2.5sq.mm	nos.	370	542	2,00,518
	12c X 2.5sq.mm	nos.	62	668	41,437
	14c X 2.5sq.mm	nos.	40	724	28,946
	16c X 2.5sq.mm	nos.	52	757	39,355
	19c X 2.5sq.mm	nos.	52	779	40,505
	27c X 2.5sq.mm	nos.	32	946	30,285
	4P,0.75	nos.	2	333	667
	2c X 4sq.mm	nos.	54	479	25,852
	4c X 4sq.mm	nos.	42	720	30,260
	7c X 4sq.mm	nos.	36	943	33,957
					27,12,436

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BREAK UP FOR STRUCTURES

SI NO	DESCRIPTION	UNIT	QTY	UNIT QTY (Kgs)	Total QTY Kgs	SUPPLY RATES Unit (Paise)	SUPPLY RATES Total
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT					-	-
	Tower and Beams					-	-
	220 kV Tower					-	-
	CA Type	Nos	2	2550	5100	89.945	4,58,720
	BG1 (WITH DEV)-16m	Nos	1	1616	1616	89.946	1,45,353
	Lighting-cum-lightining Mast	Nos	1	4750.25	4750.25	89.946	4,27,266
						-	-
	33 kV Tower					-	-
	Tower-3T	Nos	4	657	2628	89.945	2,36,375
	Girder-3G	Nos	3	229	687	89.945	61,792
						-	-
	Equipments					-	-
	Standard structures for 220 KV equipments					-	-
	CVT	Nos	3	165	495	89.945	44,523
	WT	Nos	2	550	1100	89.945	98,940
	SA	Nos	3	157	471	89.945	42,364
	BPI	Nos	3	160	480	89.945	43,174
	Total					-	-
							15,58,506

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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BREAK UP FOR CLAMPS & CONNECTORS

Sl.No.	Description	Unit	Qty.	Supply Rates	
				Unit	Total
	220kV CLAMPS & CONNECTORS			-	-
	Terminal connector on 25/31.5MVA Transformer SF6 to Oil bushing to suit GIS Bus Duct	nos.	3	4,458	13,374
	Terminal connector on 198kV LA to suit 2xMOOSE ACSR	nos.	3	3,450	10,350
	Terminal connector on 245kV CVT to suit 2xMOOSE ACSR	nos.	3	2,962	8,886
	Terminal connector on Wave Trap to suit 2xMOOSE ACSR	nos.	4	2,709	10,836
	Terminal connector on 220kV BPI to suit 2xMOOSE ACSR	nos.	3	3,208	9,624
	Tee connectors to suit 2xMoose ACSR on both ways	nos.	6	3,413	20,478
	Rigid spacer to suit Twin ACSR Moose with 250mm subconductor spacing	nos.	28	852	23,856
				-	-
	33kV CLAMPS & CONNECTORS			-	-
	Terminal connector on 25/31.5MVA transformer LV bushing to suit 1X MOOSE ACSR Conductor	nos.	3	2,562	7,686
	Terminal connector on Cable Sealing End, to suit 1XMOOSE ACSR Conductor	nos.	4	1,552	6,208
	Terminal connector on 30kV Lightning Arrestor, to suit 2XMOOSE ACSR Conductor	nos.	9	2,818	25,362
	Terminal Connectors to suit 1CX630sq.mm XLPE Cable sealing end	nos.	6	2,962	17,772
	BUS BAR MATERIALS				
	Moose ACSR conductor	km	0.05	5,56,568	27,828
	Cable Trays:				
	600mm Wide perforated Tray	km	0.4	13,82,167	5,52,867
	300mm Wide perforated Tray	km	0.03	6,04,698	18,141
	150mm Wide perforated Tray	km	0.03	43,193	1,296
	Structural Steel for above	MT	1	65,653	65,653
				-	-
	PVC Pipes:			-	-
	50mm dia	km	0.1	4,31,927	43,193
				-	-
	Sump pumps			-	-
	5HP	Nos	1	2,48,820	2,48,820
	0.5HP	Nos	1	43,194	43,194
				-	-
	220kV Bus Post Insulators	Nos	3	38,010	1,14,030
					12,69,454

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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BREAK UP FOR CLAMPS & CONNECTORS

Sl No	Description	Unit	Qty	Supply Rates	
				Unit	Total
a)	40 mm MS Rod for Earthmat(*)				
	40mm MS rod for earthing	km	3.69	4,95,112	18,26,964
	75x12 G.S Flat	km	0.28	4,30,707	1,20,598
	50x6 G.S Flat	km	0.07	1,43,569	10,050
	50x6 M.S Flat	km	0.16	1,09,565	17,530
	Cleat type clamp to suit 75 x 12 G.S Flat	nos	61	192	11,736
	3 Mtr long,40mm dia M.S pipe earth electrode with test link and without pit	nos	17	2,406	40,907
	3m long, 40 mm dia Earth rod electrode with untreated pit	nos	23	1,925	44,282
	3m long, 20 mm dia earth rod electrode without pit	nos	8	2,406	19,250
	3m long, 40 mm dia GI Pipe earth electrode	nos	3	2,413	7,238
				-	-
				-	-
	Lightning Protection				
	7/3.66 mm GS earth wire	km	0.23	45,000	10,350
	Cleat clamp on structure to suit 7/3.66 mm GS earth wire	No	46	193	8,896
	Pad clamp on structure to suit 7/3.66 mm earth wire and 75 x 12 GS flat	No	4	1,845	7,379
	25x3 GI Flat	km	0.46	35,893	16,511
	1.5m long GI spike	Nos	8	723	5,780
	No of test links	Nos	8	241	1,924
				-	-
					21,49,396

LARSEN & TOUBRO LIMITED Construction Chennai

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By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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UNIT PRICES FOR CIVIL WORKS

S.No.	Description	Unit	UNIT PRICE
a)	Cutting in Earth Work in all kinds of Soils and Disposal of excavated Earth upto all leads	Cum	402
b)	Excavation in all types of soil and rock including backfilling, disposal etc for all leads and lifts in all types of Foundations viz for Sub Station and Equipment Supporting Structures, Transformer, Fencing, Boundary Wall, Roads, Trenches, etc;	Cum	525
c)	Providing and laying of Plain Cement Concrete (PCC: 1: 4: 8) in all types of Foundations for Sub Station and Equipment Supporting Structures, Buildings, Transformer, Fencing, Boundary Wall, Roads, Trenches, etc	Cum	4043
d)	Providing and laying of Reinforced Cement Concrete (RCC: 1: 1.5: 3) including centering, shuttering complete in Foundation of Sub Station and Equipment Supporting Structures, Transformer, Tranches, etc ;	Cum	7147
e)	Providing and laying of Plain Cement Concrete (PCC: 1: 2: 4) including finishing the Top Surface in beds, floors etc;	Cum	5183
f)	Steel Reinforcement including bending, binding and placing complete in Foundation of Sub Station and Equipment Supporting Structures, Transformers, Tranches	MT	64011
g)	Miscellaneous Structural Steel including embedments, edge protection angles, gratings etc but excluding the Reinforcement Steel and Steel for Lattice and Pipe Structures;	MT	73923
h)	Stone Spreading and Antiweed Treatment in Switchyard excluding PCC;	Sqm	166
i)	5.0 metres wide Concrete Road Cum Rail Track;	Sqm	7735
j)	3.00 metres wide Concrete Road (Switchyard Road);	Sqm	1684
k)	2.40 metres High Chain Link Fencing complete in all respects;	RM	4813
l)	Storm Water Drainage and Rainwater Harvesting as per Site conditions	RM	4700
m)	Cable Trench including all types of Crossings as per Site Condition and Drawings approved by HPPTCL;	RM	15724
n)	Transformer Fire Wall as per Spec	CuM	14193

LARSEN & TOUBRO LIMITED

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Construction

Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2411 1st August, 2012
Email: KRJ@LNTECC.COM.

To
The DGM & Head, Transmission (Design)
M/s HP Power Transmission Corporation Limited,
Anu, Hamirpur – 177005,
Himachal Pradesh.

Dear Sir,

Subject: Construction of 33/220 KV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P. (Revised location at Phozal, Distt. Kullu, H.P.)

Ref:1. LOA No. HPPTCL/L&T-Supply/2010-5107 dated 23.12.2010 (First Contract)
2. LOA No. HPPTCL/L&T-ErectionI2010=5099-5104 dated 23.12.2010 (Second Contract)
3. Our Letter No: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2410 dated:30.07.2012

Further to our above referred letter, we are submitting the unit rate for the bus duct as under.

Unit Rate for 220KV, Single Phase Bus duct between Transformer & GIS (Per Phase)	Rs 1,36,153/- per Meter (Rupees One Lakh Thirty Six Thousand One Hundred and Fifty Three only)

Unit rate is inclusive of all taxes and duties. This rate will be applicable for the quantity which would be over and above the quantity in the original drawings.

We hope that now you will find our offer in line with your requirement and request you to formalize order amendment so that we can formulate action plan for completion of the project in line with your requirements.

Thanking you and assuring you of our best services always we remain,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager(Planning & Contract),** M/s HPPTCL, Shimla

Larsen & Toubro Limited, Power Transmission & Distribution
Mount Poonamallee Road, Manapakkam, P. B. No. 979, Chennai - 600 089, INDIA
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Ballard Estate
Mumbai 400 001, INDIA

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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L&T Construction
Power Transmission & Distribution

Ref: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2412 6th August, 2012
Email: KRJ@LNTECC.COM.

To
The DGM & Head, Transmission (Design)
M/s HP Power Transmission Corporation Limited,
Anu, Hamirpur – 177005,
Himachal Pradesh.

Dear Sir,
Subject: Construction of 33/220 KV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P. (Revised location at Phozal, Distt. Kullu, H.P.)
Ref:1. LOA No. HPPTCL/L&T-Supply/2010-5107 dated 23.12.2010 (First Contract)
2. LOA No. HPPTCL/L&T-ErectionI2010=5099-5104 dated 23.12.2010 (Second Contract)
3. Our Letter No: L&T/PT&D/SSBU/KULLU/HPPTCL/220KV SWYD/2411 dated:01.08.2012

This has reference to our above referred letters and the discussions our Mr. A.K. Rajput & Mr. S.K. Sharma had with you in your office at Hamirpur on 30.07.2012.

We attach herewith quantified civil & electrical erection rates for the lot items for necessary incorporation in the amendment to facilitate unhindered execution of works for the additional quantities that might be necessitated due to additional requirements.

Regarding erection rates for transformers, we wish to clarify that prices furnished by us are for single unit of single phase transformers & accordingly in this case applicable quantity for revised scope shall be 4 nos.

Also, total bus duct length(Single Phase) considered in the original proposal is 85.5Mtrs (Qty of all the three phases put together). Any quantity over and above this quantity shall be paid as per our letter under reference No. 3.

We now hope that you will find our offer in line with your requirement and request you to formalize order amendment so that we can formulate action plan for completion of the project in line with your requirements.

Thanking you and assuring you of our best services always we remain,

Yours faithfully,

For **LARSEN & TOUBRO LIMITED**

K. RAJARAM
General Manager &
Head-Substation Business Unit

Cc: **The General Manager(Planning & Contract),** M/s HPPTCL, Shimla

Larsen & Toubro Limited, Power Transmission & Distribution
Mount Poonamallee Road, Manapakkam, P. B. No. 979, Chennai - 600 089, INDIA
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Mumbai 400 001, INDIA

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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BREAK UP FOR ILLUMINATION

S.NO.	Description	UOM	QTY	Erection Price	
				Unit Rate	Total Amount
1.0	MLDB	nos.	1	38,870	38,870
2.0	ELDB	nos.	1	28,504	28,504
3.0	GIS cum Control room building illumination with CFL/Metal Hallide Lamps			-	-
a	2 x36 Watts Fluorescent Lamp in industrial reflector type fixtures suitbale for surface /pendent mounting CGL Cat Ref. IBA1424EB	nos.	37	1,840	68,080
b	230V, 5/15A, Indoor receptacle 3 Pin type- R1	nos.	20	648	12,960
c	15A, 1Ph, 3 Pin Industrial Type Switch Socket Outlet	nos.	4	778	3,112
d	32A SPN MCB in.2mm thick sheet steel enclosure with 3 Pin Socket for A.C (Indoor)	nos.	3	1,555	4,665
e	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket for A.C (outdoor)	nos.	3	2,073	6,219
f	450mm exhaust fan	nos.	2	1,684	3,368
g	450mm Acid proof exhaust fan(for battery room)	nos.	1	4,146	4,146
h	1400mm ceiling fans with electronic regulator	nos.	6	1,684	10,104
i	Point wiring	nos.	72	1,425	1,02,600
j	Indoor lighting panel (ACP-1 type) as per Technical specification	nos..	2	41,461	82,922
k	DC Lighting panel (DCP type) as per Technical specification	nos.	1	41,461	41,461
				-	-
5.0	220/33kV GIS building illumination			-	-
a	1x250W - Industrial metal halide Luminaire CGL. Cat ref.No. FAD 1314	nos.	14	2,073	29,022
b	1x60w GLS Bulk Head Light Fixture of CGL type 18H 1110/BC or equivalent	nos.	8	648	5,184
c	230V, 5/15A, Indoor receptacle 3 Pin type- R1	nos.	9	648	5,832
d	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket for A.C (Indoor)	nos.	4	1,555	6,220
e	32A SPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket (outdoor)	nos.	4	2,073	8,292
f	1x11W Portable battery operated (3hrs. Backup) CFL emergency lamp (M/s BPL make/ Eqvt)	nos.	4	2,202	8,808
g	Point wiring	nos.	43	1,425	61,275
h	Indoor lighting panel (ACP-1 type) as per Technical specification	nos.	2	41,461	82,922
i	DC Lighting panel (DCP type) as per Technical specification	nos.	2	41,461	82,922
j	32A TPN MCB in 2mm thick sheet steel enclosure with 3 Pin Socket (inddor)	nos.	2	1,684	3,368
6.0	Switchyard Lightning			-	-
a	Flood light luminaire with 2 x 400 W HPSV/T+ lamp - bajaj cat. BJEF22 CA-R0(2 x 400 W HPSV/T+	nos.	4	5,183	20,732
b	Lighting JB with 5 no's of terminal blocks	nos.	4	914	3,656
c	250A Oil filtration socket	nos.	1	6,459	6,459
				-	-
7.0	Street Lighting (Solar lighting system)			-	-
a	120W Solar lighting system for Street lighting with 9m height pole, inbuilt in long life maintenance free batteries (capacity is 12V, 120Ah)	nos.	8	11,660	93,280
				-	-
8.0	Transformer Area Lighting as per specification			-	-
	1x70W HPSV 240V AC industrial well glass fixture for pendant mounting with control gear box (BJDWI-70SV).	nos.	2	2,073	4,146
	Lighting JB	nos.	2	914	1,828
					8,30,957

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LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

BREAK UP FOR CABLES

Sl.No.	Description	UoM	Qty	Erection Price	
				Unit Rate	Total Amount
N	Power Cables and Copper Conductor Armoured Control Cables alongwith Lugs, Glands and Straight Joints				
	XLPE POWER CABLE				
	1c X 630sq.mm	km	0.5	6,11,931	3,05,965.50
	Terminations for the above			-	-
	1c X 630sq.mm	nos	8	1,469	11,752.00
	3.5c X 300sq.mm	nos	24	2,040	48,960.00
	PVC POWER CABLE (Other than those available in the Contract)			-	-
	4c X 6sq.mm	km	0.22	1,10,147	24,232.34
	2c X 6sq.mm	km	2.1	74,246	1,55,916.60
	1c X 150sq.mm	km	0.4	2,04,787	81,914.80
	Terminations for the above			-	-
	3.5c X 90sq.mm	nos	16	1,526	24,416.00
	3.5c X 70sq.mm	nos	16	1,069	17,104.00
	3.5c X 35sq.mm	nos	42	709	29,778.00
	4c X 16sq.mm	nos	14	384	5,376.00
	4c X 6sq.mm	nos	54	310	16,740.00
	2c X 6sq.mm	nos	236	318	75,048.00
	1c X 150sq.mm	nos	40	587	23,480.00
	HR- FRLS CONTROL CABLE			-	-
	5c X 2.5sq.mm	km	2	89,749	1,79,498.00
	27c X 2.5sq.mm	km	0.5	2,44,771	1,22,385.50
	4P,0.75	km	0.2	89,749	17,949.80
	Terminations for the above			-	-
	2c X 2.5sq.mm	nos.	56	310	17,360.00
	4c X 2.5sq.mm	nos.	166	384	63,744.00
	5c X 2.5sq.mm	nos.	344	481	1,65,464.00
	7c X 2.5sq.mm	nos.	286	548	1,56,728.00
	10c X 2.5sq.mm	nos.	370	587	2,17,190.00
	12c X 2.5sq.mm	nos.	62	645	39,990.00
	14c X 2.5sq.mm	nos.	40	791	31,640.00
	16c X 2.5sq.mm	nos.	52	881	45,812.00
	19c X 2.5sq.mm	nos.	52	1,118	58,136.00
	27c X 2.5sq.mm	nos.	32	1,399	44,768.00
	4P,0.75	nos.	2	402	804.00
	2c X 4sq.mm	nos.	54	603	32,562.00
	4c X 4sq.mm	nos.	42	481	20,202.00
	7c X 4sq.mm	nos.	36	880	31,680.00
					20,66,597

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Barowalia House, Khalini, Shimla-2

BREAK UP FOR STRUCTURES

Sl No.	Description	UoM	Qty	Unit Qty (Kgs)	Total Qty (Kgs)	Erection Rate Unit Rate Kgs	Erection Rate Total Amount
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT						-
	Tower and Beams					-	-
	220 kV Tower					-	-
	CA Type	Nos	2	2550	5100	11.58	59,058
	BG1 (WITH DEV)-16m	Nos	1	1616	1616	11.58	18,713
	Lighting-cum-lightining Mast	Nos	1	4750.25	4750.25	11.58	55,008
						-	-
	33 kV Tower					-	-
	Tower-3T	Nos	4	657	2628	11.58	30,432
	Girder-3G	Nos	3	229	687	11.58	7,955
						-	-
	Equipments					-	-
	Standard structures for 220 KV equipments					-	-
	CVT	Nos	3	165	495	12.79	6,331
	WT	Nos	2	550	1100	12.79	14,069
	SA	Nos	3	157	471	12.79	6,024
	BPI	Nos	3	160	480	12.79	6,139
	Total					-	-
							2,03,730

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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BREAK UP FOR CLAMPS & CONNECTORS

Sl No	Description	UOM	Qty	Erection Rates	
				Unit Rate	Total Amount
	220kV CLAMPS & CONNECTORS			-	-
	Terminal connector on 25/31.5MVA Transformer SF6 to Oil bushing to suit GIS Bus Duct	nos.	3	3,047	9,141
	Terminal connector on 198kV LA to suit 2xMOOSE ACSR	nos.	3	2,011	6,033
	Terminal connector on 245kV CVT to suit 2xMOOSE ACSR	nos.	3	1,536	4,608
	Terminal connector on Wave Trap to suit 2xMOOSE ACSR	nos.	4	1,359	5,436
	Terminal connector on 220kV BPI to suit 2xMOOSE ACSR	nos.	3	1,737	5,211
	Tee connectors to suit 2xMoose ACSR on both ways	nos.	6	1,846	11,076
	Rigid spacer to suit Twin ACSR Moose with 250mm subconductor spacing	nos.	28	509	14,252
				-	-
	33kV CLAMPS & CONNECTORS			-	-
	Terminal connector on 25/31.5MVA transformer LV bushing to suit 1X MOOSE ACSR Conductor	nos.	3	1,261	3,783
	Terminal connector on Cable Sealing End, to suit 1XMOOSE ACSR Conductor	nos.	4	905	3,620
	Terminal connector on 30kV Lightning Arrestor, to suit 2XMOOSE ACSR Conductor	nos.	9	1,079	9,711
	Terminal Connectors to suit 1CX630sq.mm XLPE Cable sealing end	nos.	6	1,536	9,216
				-	
	BUS BAR MATERIALS			-	
	Moose ACSR conductor	km	0.05	1,76,709	8,835
				-	
	Cable Trays:			-	
	600mm Wide perforated Tray	km	0.4	1,03,588	41,435
	300mm Wide perforated Tray	km	0.03	73,121	2,194
	150mm Wide perforated Tray	km	0.03	42,654	1,280
	Structural Steel for above	MT	1	85,308	85,308
				-	-
	PVC Pipes:			-	-
	50mm dia	km	0.1	67,027	6,703
				-	-
	Sump pumps			-	-
	5HP	Nos	1	67,027	67,027
	0.5HP	Nos	1	11,577	11,577
				-	-
	220kV Bus Post Insulators	Nos	3	36,562	1,09,686
					4,16,132

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BREAK UP FOR EARTHING

Sl No	Description	Unit	Qty	Erection Price	
				Unit	Total
a)	40 mm MS Rod for Earthmat(*)				
	40mm MS rod for earthing	km	3.69	3,59,511	13,26,596
	75x12 G.S Flat	km	0.28	2,98,577	83,602
	50x6 G.S Flat	km	0.07	2,62,017	18,341
	50x6 M.S Flat	km	0.16	2,62,017	41,923
	Cleat type clamp to suit 75 x 12 G.S Flat	nos	61	158	9,638
	3 Mtr long,40mm dia M.S pipe earth electrode with test link and without pit	nos	17	2,084	35,428
	3m long, 40 mm dia Earth rod electrode with untreated pit	nos	23	1,475	33,925
	3m long, 20 mm dia earth rod electrode without pit	nos	8	829	6,632
	3m long, 40 mm dia GI Pipe earth electrode	nos	3	931	2,793
				-	-
	Lightning Protection			-	-
	7/3.66 mm GS earth wire	km	0.23	21,351	4,911
	Cleat clamp on structure to suit 7/3.66 mm GS earth wire	No	46	165	7,590
	Pad clamp on structure to suit 7/3.66 mm earth wire and 75 x 12 GS flat	No	4	797	3,188
	25x3 GI Flat	km	0.46	27,420	12,613
	1.5m long GI spike	Nos	8	402	3,216
	No of test links	Nos	8	165	1,320
				-	-
					15,91,715

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED, BAROWALIAS HOUSE, KHALINI, SHIMLA

Price Schedule Erection

NAME OF WORK : CONSTRUCTION OF 220/33KV SUB STATION AT PHOZAL IN KULLU DISTRICT

Sr. No.	Decription of Material	Unit	ORIGINAL SCOPE - PRICES after 1% DISC. ON LOA PRICE		
			QTY	Unit Price	Total Price
	ORIGINAL SCOPE				
T	CIVIL WORKS as per Specification				
1.0	Soil Investigation	LS	1	365605	3,65,605
2.0	Excavation & filling for land development.	LS	1	0	-
3.0	Retaining wall (Qty as per annex.)	LS	1	742445	7,42,445
4.0	Tower & equipment foundation, Transformer Foundation, Fire Wall, Cable Trenches including all types of crossings & all metallic works including Steel racks for Cables, Cable Supports, MS angle edging & RCC covers with lifting arrangements.		1		
a)	Tower (Qty as per annex.)	LS	1	1649645	16,49,645
b)	Equipment structures (Qty as per annex.)	LS	1	304016	3,04,016
c)	Transformer foundation including fire wall (Qty as per annex.)	LS	1	1129976	11,29,976
d)	Cable Trenches including all type of crossings (Qty as per annex.)	LS	1	2974794	29,74,794
5.0	Buried Cable trench for Auxillary Power Arrangement	RM	150	2540	3,81,000
6.0	Site Surfacing and Antiweed Treatment	Sq.Mtr.	4,170	259.15	10,80,656
7.0	Cement Concrete roads including all types of crossings.			0	-
a)	5.00 metres wide Road cum Rail Track*	RM	41	35532.1	14,56,816
b)	3.5 metres wide	RM	81	8889.6	7,20,058
8.0	Storm Water Drainage including culverts	RM	265	2486.95	6,59,042
9.0	Security Fencing along with Gates and Security room.	RM	182	5603.24	10,19,790
10.0	Buildings				-
a) - I	220kV GIS Room	Sq.Mtr.	193.155	29330	56,65,236
a) - II	Control Room Building along with Battery room, PLCC Room, SCADA Room, Offices and stores.				
	Ground Floor	Sq.Mtr.	206.9	23464	48,54,702
	First Floor	Sq.Mtr.	206.9	17598	36,41,026
b)	33kV GIS Building.	Sq.Mtr.	63.963	37952	24,27,524
11.0	DG set outdoor Silent type.	LS	1	131234	1,31,234
12.0	Store Shed	Sq.Mtr.	150	16124.85	24,18,728
13.0	Transformer Oil Drainage system	LS	1	Included above	
	GRAND TOTAL				3,16,22,291

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Barowalia House, Khalini, Shimla-2

Quantity Break-up for Retaining Wall

S.No.	Description	UOM	Quantity	Unit Price	Total Amt.
1	Excavation & backfilling	CuM	126	525	66150
4	PCC 1:3:6	CuM	16	4604	73664
5	RCC M20	CuM	11	7147	78617
6	Uncoursed Rubble Masonary	CuM	146	3013	439898
7	Reinforcement	Kg	1120	64.011	71692.32
8	Structural Steel	Kg	168	73.923	12419.064
	Tota				742440

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Barowalia House, Khalini, Shimla-2

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Tower & equipment foundation, Transformer Foundation, Fire Wall, Cable Trenches including all types of crossings & all metallic works including Steel racks for Cables, Cable Supports, MS angle edging & RCC covers with lifting arrangements.

Quantity Break-up for Gantry Foundation

S.No.	Description	UOM	Quantity	Unit Rate	Total Amt.
1	Excavation & Backfilling	CuM	487.775	525	256082
2	RCC M20	CuM	91.122	7147	651249
3	Reinforcement	Kg	10934.673	64.011	699939
4	PCC 1:4:8	CuM	10.481	4043	42375
	Total				1649645

Quantity Break-up for Equipment Foundation

S.No.	Description	UOM	Quantity	Unit Rate	Total Amt.
1	Excavation & Backfilling	CuM	106.118	525	55712
2	RCC M20	CuM	22.34	7147	159664
3	Reinforcement	Kg	1149.615	64.011	73588
4	PCC 1:4:8	CuM	3.723	4043	15052
	Total				304016

Quantity Break-up for Transformer Foundation

S.No.	Description	UOM	Quantity	Unit Rate	Total Amt.
1	Excavation & Backfilling	CuM	210.375	525	110447
2	RCC M20	CuM	65.16	7147	465699
3	Reinforcement	Kg	4598.46	64.011	294352
4	Structural Steel	Kg	1933.571	73.923	142935
5	PCC 1:4:8	CuM	17.686	4043	71504
6	40mm metal filling	CuM	26.064	1728	45039
	Total				1129976

Quantity Break-up for Cable Trench & Trench Crossing

S.No.	Description	UOM	Quantity	Unit Rate	Total Amt.
1	Excavation & Backfilling	CuM	417.724	525	219305
2	RCC M20	CuM	90.042	7147	643530
3	Reinforcement	Kg	6664.975	64.011	426632
4	Structural Steel	Kg	7767.116	73.923	574169
5	PCC 1:4:8	CuM	17.547	4043	70943
6	chq. Plate 6mm. Thk.	SqM	255.988	3990	1021392
7	PCC 1:2:4	CuM	3.165	5183	16404
8	300 dia PVC Pipe	RM	3.723	650	2420
	Total				2974794

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Himachal Pradesh Power Transmission Corporation Limited

No HPPTCL DGM& Head (T)/Phozal Sub-Station-12-573-74 Dated 7-9-12

To

Larsen & Toubro Ltd
Power Transmission & Distribution
Mount Poonamallee Manapakkam P B No 979
Chennai 600089
Fax +914422705482

Sub: **Construction of 33/220 kV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu. H.P (Revised location at Phozal, Distt Kullu, H.P).**

Reference: Your office letter No L&T/PT&D/SSBU/KULLU/HPPTCL/220 kV SWYD/2410 dated 30.07.2012 & SWYD/2412 dated 6-8-2012

Dear Sirs

With reference to above the point wise reply is as under

1. In the breakup for power cables unit rates for 33 kV XLPE power cable 1cX 1000 sq mm along with terminations may also be furnished
2. You have submitted the breakup for supply of clamps and connectors but you have not supplied the breakup for insulator strings/ disc insulators and hardwares It is also requested to submit the breakup for erection of these items In the breakup for supply of clamps and connectors you have mentioned ACSR moose conductor whereas the provision of ACSR zebra conductor was made in the 220/33 kV GIS Palchan Sub station the same may be confirmed, please
3. Please confirm that providing & laying of Rail Track have been covered at Sr No 7 (a) i.e. 5 metres wide Road Cum Rail Track The provision for the emergency lighting in control room & GIS buildings has been kept in your offer which may be clarified
4. In addition to above it is requested to submit the revised offer for 220/33 kV GIS Fozal sub-station after incorporating the breakup of quantities/unit rates as per your letters under reference and by considering revised quantities wherever possible

TREAT IT AS MOST URGENT.

DGM & Head Transmission (Design)
HPPTCL Anu Hamirpur (HP) 177005

Copy forwarded to GM(C&D) Barowalias House, HPPTCL Khalini, Shimla 171002 for information please

DGM & Head, Transmission (Design)
HPPTCL Anu Hamirpur (HP)-177005

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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01141615120

Kind attention Sunil K. Sharma.

HP Power Transmission Corporation Limited

No HPPTCL/DGM& Head (T)/Phozal Sub-Station-12-834-35 Dated 28/9/12

To

Larsen & Tubro Ltd;
Power Transmission & Distribution;
Mount Poonamallee, Manapakkam, P B No 979,
Chennai-600089
Fax. +914422705482.

Sub: Construction of 33/220 kV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P (Revised location at Phozal, Distt Kullu, H.P).

Dear Sirs,

With reference to your revised offer in respect of subject cited substation, it is requested, to clarify the following:-

Since the Price quoted for new items at Sr. No A.4 & B-2, 220 kV & 33 kV circuit breakers protection panel without auto reclose for spare transformer and at Sr. No A.5 Transformer Protection Panel HV side is same as for item No.E1-1b, E1-4 & E2-1b. Please confirm that BOM in both the panels shall be same. It is further stated that these new items appearing at A.4& A5 are for single phase transformer whereas items at E.1. 1b & E.1.4 are for three phase transformer. If BOM is same then it is not a new item but is an additional item. Your reply should reach in this office within two days positively.

TREAT IT AS MOST URGENT.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005

Copy forwarded to GM(C&D), Barowalias House, HPPTCL, Khalini, Shimla-171002 for information, please.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HP Power Transmission Corporation Limited

No. HPPTCL/DGM& Head (T)/Phozal Sub-Station-12-884-85 Dated: 3-10-12

To

Larsen & Tubro Ltd;
Power Transmission & Distribution,
Mount Poonamallee, Manapakkam, P.B No. 979,
Chennai-600089.
Fax: +914422705482.

Sub: **Construction of 33/220 kV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P (Revised location at Phozal, Distt Kullu, H.P).**

Reference: Your office letter No. LTCD/DLRO/HPTCL/PHOZAL/001 dated 1.10.2012

Dear Sirs,

With reference to your above referred letter in respect of subject cited substation, it is requested, to give substantial reduction in prices for new items at Sr. No A-4 & B-2, 220 kV & 33 kV circuit breakers protection panel without auto reclose for spare transformer and at Sr. No A-5, Transformer Protection Panel HV side being single phase items, otherwise HPPTCL will consider these items as three phase and place order as additional quantity against item No.E1-1b, E1-4 & E2-1b.

Your reply should reach in this office within two days positively.

TREAT IT AS MOST URGENT.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005.

Copy forwarded to GM(C&D), Barowalias House, HPPTCL, Khalini, Shimla-171002 for information, please.

DGM & Head, Transmission (Design),
HPPTCL, Anu, Hamirpur (HP)-177005.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

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01972221470

L&T Construction
Power Transmission & Distribution

LTCD/DLRO/HPTCL/PHOZAL/002
5th October, 2012

To,
Deputy General Manager
M/s HP Power Transmission Corporation Ltd.
Hamirpur – 177005 (Himachal Pardesh).

Kind Attn: Mr. Chauhan/ R. D. Dharma.

Sub: - Construction of 33/220kV 25/31.5 MVA GIS Substation at Palchan in Distt. Kullu, H.P. (Revised location at Phozal, Distt. Kullu, H.P.)- Clarification regarding BOM.

Dear Sir,

We hereby confirm that our supplied protection panel's for new item at Sl. No. A.4 & B-2 shall be similar to those of three phase equipment's & may please be considered as three phase equipment & be included as additional quantity against item no, E1-1b, E1-4 & E2-1b.

Thanking you and assuring you of our best services always we remain,

Yours faithfully,
For **Larsen & Toubro Limited**
PT & D Division

(S. K. Sharma)
Manager Operations

Dr. R.D. Sharma Sr. manager
Chauhan 05/10/2012
5/10/12

HPPTCL ANU (HMR)
DGM Sr. Manager-I
APS Sr. Manager-II
SQ Sr. Manager-III
Dy. No. 825 Dt. 5/10/12

Larsen & Toubro Limited, Construction, Power Transmission & Distribution
Mount Poonamallee Road, Manapakkam, P. B. No. 979, Chennai - 600 089, INDIA
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Regional Office: 1211, First Floor, Okhla Phase 3, New Delhi
Tel: 91 11 41295600,66373200 Fax: +91 11 41615125-26

Registered Office:
L&T House, N. M. Marg
Ballard Estate
Mumbai -400 001, INDIA

(L&T Construction is a business brand of Larsen & Toubro Limited)

By, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SECTION - II

General Conditions of Contract

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Construction Channai

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SECTION – 3

GENERAL CONDITIONS OF CONTRACT

G. C. C.

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SECTION - 3

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3.1 DEFINITIONS

3.1.1 In this Contract, the following Terms shall be interpreted as indicated: -

a) "COMPLETION" means that the Facilities (or a specific part thereof) have been completed operationally and structurally and put in a tight and clean condition and that all works in respect of pre-commissioning of the Facilities (or a specific part thereof) has been completed (wherever required, as per Technical Specifications) and Commissioning followed by Trail – Operation has been completed.

b) "COMMERCIAL OPERATION" shall mean the Conditions of Operation in which the complete Equipment covered under the Contract is officially declared by the Owner / Purchaser to be available for continuous Operation at different Loads up to and including Rated Capacity. *Such declaration by the Owner / Purchaser, however, shall not relieve or prejudice the Contractor of any of his obligations under the Contract.*

c) "CONSTRUCTIONAL PLANT" means all appliances or things of whatsoever nature required in or about execution or maintenance of the Works but does not include materials or other things intended to form or forming part of the permanent Works.

d) "CONSULTING ENGINEER / CONSULTANT" shall mean any Firm or Person duly appointed as such from time to time by the Owner / Purchaser.

e) "CONTRACT" means the Contract Agreement entered into between the Owner / Purchaser and the Contractor together, as per the Contract Agreement signed by the PARTIES, including all attachments and appendices thereto such as Specifications, Design, Drawings, Instructions issued from time to time, Letter of Acceptance, and all other documents incorporated by reference therein.

f) "CONTRACT PRICE" means the Total Price Quoted by the Bidder in his Bid with additions and / or deletions as may be agreed and incorporated in the letter of Award including amendments, if any, for the entire scope of the Work and payable to the Contractor under the Contract for the full and proper performance of its Contractual obligations.

g) "CONTRACTOR" means the Individual or Firm or Company, whether incorporated or not, undertaking the Work and shall include the Legal, Personal Representative of such Individual or the persons composing of such Firm, or Company, or the Successor of such Firm or Company and the permitted assigns of such Individual or Firm or Company.

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h) "CONTRACTOR'S EQUIPMENT" means all plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities

i) "DATE OF CONTRACT" shall mean the Date on which Notice of Award of Contract / Letter of Award / Letter of Intent has been issued.

j) "DEFECT LIABILITY PERIOD" shall mean the period during which the Contractor shall remain liable for repair or replacement of any defective part of the Work performed under the Contract without any financial implication to the Purchaser. The Words "Guarantee Period" and "Maintenance Period" wherever used shall also have the same meaning.

k) "DRAWING, PLANS" shall mean all:

a) Drawings furnished by the Owner as a basis of Bid / Proposals.

b) Supplementary drawings furnished by the Owner to clarify and to define in greater detail the intent of the Contract.

c) Drawings submitted by the Contractor with his Bid provided such drawings are acceptable to the Owner.

d) Drawings furnished by the Owner to the Contractor during the progress of the work; and

e) Engineering data and drawings submitted by the Contractor during the progress of the work provided such drawings are acceptable to the Engineer / Owner.

l) "Dy. GENERAL MANAGER" means the Dy. General Manager (Projects) of HPPTCL, who shall be responsible for supervision of the Work.

m) "ENGINEER" means the Sr. Manager (Projects) of HPPTCL, who shall supervise and issue Instructions to the Contractor with regard to the Detailed Survey, Excavation, Laying of Foundations, Erection, Testing and Commissioning of various Equipments / Materials and other allied works detailed under the Contract.

n) "ERECTION PORTION" of the Contract Price shall mean the value of field activities of the Works including loading, inland transportation and inland insurance for delivery at site, unloading, storage, handling at site, erection, testing and putting into satisfactory operation, including successful completion of Performance and Guarantee Tests to be performed at site by the Contractor including Cost of Comprehensive Insurance till expiry of Defect Liability Period covering all the above activities, and Training the Employees of the Purchaser.

o) "EQUIPMENT PORTION" of the Contract Price shall mean the Ex - Works (inclusive of Packing and Forwarding) value of all the equipment and material including Excise Duty, C. S. T., VAT, Insurance & Freight etc.

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p) 'EQUIPMENT', 'STORES' and 'MATERIALS' shall mean and include Equipment, Stores and Materials to be provided by the Contractor under the Contract.

q) "FACILITIES" means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.

r) "FINAL ACCEPTANCE / TAKING OVER" shall mean the Owner / Purchaser's written Acceptance of the Complete Works performed under the Contract, after successful Commissioning / Completion of the Performance and Guarantee Tests, as specified in the accompanying Technical Specification or otherwise agreed to in the Contract.

s) "GENERAL MANAGER" means the General Manager (Projects) of HPPTCL, who shall exercise overall supervision of work under this Contract.

t) "GUARANTEE PERIOD / MAINTENANCE PERIOD" shall mean the period during which the Contractor shall remain liable for repair or replacement of any defective part of the Works performed under the Contract.

u) "INITIAL OPERATION" shall mean the first integral operation of the complete Equipment covered under the Contract with the Sub System and Supporting Equipment in Service or available for Service.

v) "INSTALLATION SERVICES" means all those services ancillary to the supply of the Plant and Equipment for the Facilities, to be provided by the Contractor under the Contract; e.g., transportation and provision of marine or other similar insurance, inspection, expediting, site preparation works (including the provision and use of Contractor's Equipment and the supply of all construction materials required), installation, testing, pre- commissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc.

w) "INSPECTOR" shall mean the Owner / Purchaser or any Person nominated by the Owner / Purchaser from time to time, to inspect the Equipment, Stores or Works under the Contract.

x) "LATENT DEFECTS" shall mean such defects caused by Faulty Design, Material or Workmanship which cannot be detected during Inspection, Testing etc based on the Technology available for carrying out such Tests.

y) "MANUFACTURER'S WORKS or CONTRACTOR'S WORKS" shall mean the place of Work used by the Manufacturer, the Contractor, their Collaborators / Associates or Sub Contractor(s) for the performance of the Contract.

z) "MONTH" shall mean the Calendar month. "DAY" or "DAYS" unless herein otherwise expressly defined shall mean calendar day or days of 24 hours each.

aa) "NOTICE OF AWARD OF CONTRACT / LETTER OF AWARD" shall mean the official Notice issued by the Owner / Purchaser notifying the Contractor that his Bid has been accepted.

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bb) "OWNER / PURCHASER" means the Himachal Pradesh Power Transmission Corporation Limited, (HPPTCL) through Dy. General Manager (Contracts), HPPTCL, Barowalias House, Khalini, Shimla - 171002

cc) "PERFORMANCE AND GUARANTEE TEST" shall mean all Operational Checks and Tests required to determine and demonstrate Capacity, Efficiency and Operating Characteristic of the Equipment, as specified in the Contract Document.

dd) "PERMANENT WORKS" means the Permanent Works to be Executed and Maintained in accordance with the Contract.

ee) "SITE" means the Land and / or other Places on / into or through which Works and related facilities are to be erected or installed under the Contract or any adjacent land / path or street through which work is to be executed under the Contract or any adjacent land / path or street which may be allocated or used for the purpose of carrying out the Contract.

ff) "SITE ENGINEER" means the Dy. Manager / E1 - E3 appointed from time to time by the Purchaser or Engineer and as and when notified in writing by the Engineer to the Contractor to act as Engineer for the purpose of the Contract in place of the Site Engineer so designated.

gg) "SPECIFICATION" means the Technical Specifications and Bidding Documents referred to in the Bid and any modification thereof or addition thereto, as may from time to time be furnished or approved in writing by the Owner / Purchaser.

hh) "START UP" shall mean the Time Period required to bring the Equipment covered under the Contract from an inactive condition, when construction is essentially complete, to the State Ready for Trial Operation. The Start Up Period shall include preliminary inspection and checkout of Equipment and supporting Sub System, initial operation of the complete Equipment covered under the Contract to obtain necessary Pre - Trial Operation Data, perform calibration and corrective action, shut down, inspection and adjustment prior to the Trial Operation Period.

ii) "SUB – CONTRACTOR / VENDOR / SUB - VENDOR" means firms / corporations / government entities to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is sub - contracted directly or indirectly by the Contractor with the consent of the Employer in writing, and includes its legal successors or permitted assigns

jj) "TEMPORARY WORKS" means all Temporary Works of every kind required in or about the Execution or Maintenance of the Works.

kk) "TEST ON COMPLETION" shall mean such Tests as prescribed in the Contract to be performed by the Contractor before the Work is taken – over by the Owner / Purchaser.

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ll) "TRIAL OPERATION, RELIABILITY TEST, TRIAL RUN, COMPLETION TEST" shall mean the extended period of time after the Start Up Period. During this Trial Operation Period, the Unit shall be operated over the Full Load Range. The Length of Trial Operation shall be as determined by the Owner / Purchaser unless otherwise specified elsewhere in the Contract.

mm) "WORKS" shall mean and include the furnishing of equipment, labour and services, as per the Specifications and complete erection, testing and putting into satisfactory Operation including all transportation, insurance, handling, unloading and storage at Site including Comprehensive Insurance till expiry of Defect Liability Period.

nn) "WRITING" shall include any Manuscript, Type Written or Printed Statement under or over signature of the Authorised Representative of the Owner / Contractor and / or seal as the case may be.

oo) Words imparting Singular only shall also include the plural and vice versa where the context so requires.

pp) Words imparting "Person" shall include Firm, Companies, Corporations, and Association or Bodies of Individuals, whether incorporated or not. "He" shall include "She" and vice – versa.

qq) Terms and Expressions not herein defined shall have the same meaning as are assigned to them in the Indian Sale of Goods Act (1930), failing that in the Indian Contract Act (1872) and failing that in the General Clauses Act (1897) including amendments thereof, if any.

rr) In addition to above the following definitions shall also apply: -

i) "All Equipment and Materials" to be supplied shall also mean "GOODS".

ii) "CONSTRUCTED" shall also mean, "ERECTED AND INSTALLED".

iii) "CONTRACT PERFORMANCE GUARANTEE" shall also mean "CONTRACT PERFORMANCE SECURITY".

3.2 APPLICATION

These General Conditions shall apply to the extent that provisions in other parts of the Contract do not supersede them.

3.3 STANDARDS

The Goods Supplied and Services to be performed under this Contract shall conform to the Standards mentioned in the Technical Specifications (Annexure – A), and, when no applicable Standard is mentioned, to the Authoritative Standard appropriate to the Good and such Standards which shall be the latest issued by the concerned institution.

3.4 GOVERNING LANGUAGE

All documents pertaining to the Contract including Specification, Schedules, Notices, Correspondence, Operation and Maintenance Instructions, Drawings or any other writings shall

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be written in English Language. The Metric System of Measurement shall be exclusively used in the Contract.

3.5 CONTRACT PERFORMANCE SECURITY

3.5.1 Within 30 days after the Contractor's receipt of Notification of Award of the Contract, the Contractor shall furnish Contract Performance Security for the proper fulfilment of the Contract in the prescribed Form to the Purchaser in shape of Bank Guarantee for an amount equal to 10 % of the Contract Price.

3.5.2 The proceeds of the Contract Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Contractor's failure to complete its obligations under the Contract.

3.5.3 The Contract Performance Security shall be denominated in the currency of the Contract and shall be in the form of a Bank Guarantee issued by a Nationalised Bank located in India and in the Form provided in the Bidding Documents or any other Form acceptable to the Purchaser.

3.5.4 The Contract Performance Security will be discharged by the Purchaser and returned to the Contractor not later than 30 days following the Date of Completion of the Contract's performance obligations, including any Warranty obligations under the Contract. No interest will be payable on the Contract Performance Security.

3.5.5 Bidders offering any other terms of Contract Performance Security will be treated as NON - RESPONSIVE and Bid rejected.

3.6 PRICES

Prices charged by the Contractor for the Material / Services to be performed under the Contract shall not vary from the Contract Prices quoted in the Bid / Negotiated Prices if any, by the Contractor.

3.7 PRICES, TAXES, AND DUTIES

3.7.1 The Prices should be quoted preferably on FIRM Price Basis for which due preference will be given. However, if the Prices are quoted as VARIABLE, the detailed Price Variation Formulae (as per IEEMA Circular) and the Basic Indices on which the quoted Prices are based shall invariably be stated in the Tenders. The Formulae for the Price Variation shall be subject to approval by the Purchaser. In case of Variable Prices, the ceiling of Price Variation shall also be stated failing which the offer will be loaded suitably subject to the maximum ceiling of ± 15 % or the highest ceiling quoted by any Bidder.

3.7.2 All Custom Duties, Excise Duties, Sales Taxes, VAT, Other Taxes and Duties, Levies payable by the Bidder in respect of the transaction between the Bidders and their Vendors / Sub - Suppliers while procuring any Components, Sub Assemblies, Raw Materials and Equipment

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shall be included in the Ex - Works Bid Price and no other claim whatsoever, in this behalf shall be entertained by the Purchaser.

FOR BOUGHT - OUT ITEMS, the Excise Duty and Sales Tax will be included in Quoted Price. *No Excise Duty and No Sales Tax in any form shall be payable to the Supplier in respect of the Bought - Out Items which are despatched directly by Contractor's Sub Suppliers. The Prices for Bought - Out Items should be Firm and No Price Variation shall be payable on Bought - Out Item(s).*

3.7.3 Sales Tax, Excise Duty, VAT, Local Taxes and Other Levies for SELF MANUFACTURED ITEMS in respect of the transactions between the Purchaser and the Contractor under the Contract for all the goods dispatched from Manufacturing Works of the Contractor directly to Site should be indicated separately, wherever, applicable in the relevant Price Schedules.

Wherever Excise Duty is applicable, the Bidder while quoting Bid Price shall take the due credit under the MODVAT (Modified Value Added Tax) Scheme as per the relevant Government Polices, wherever applicable, into account.

3.7.4 Local Taxes, Duties or any Other Taxes payable by the Contractor under Any Local, State & Central Law or Statute shall be deducted from the payments due to the Contractor by the Purchaser, if so required, under such Laws / Statute. The amount so recovered shall be deposited with the respective Authority and the Engineer in this regard shall issue necessary certificate to the Contractor.

3.7.5 The Bidders indicating NIL or Concessional Rate of Excise Duty in their Bids will have to absorb Excise Duty up to Full Rate Applicable at the Time of Bidding. The Bidders, who do not agree to these stipulations or indicate Excise Duty as extra without indicating the applicable rate, shall be loaded with maximum rate of Excise Duty.

3.7.6 All variations in statutory levies / taxes, if any claimed must be specifically mentioned. If nothing is mentioned in this regard in the Bid, the Bidder shall have to absorb any variation in the statutory levies / taxes over the Quoted Rates themselves.

3.8 CONSTRUCTION OF THE CONTRACT

3.8.1 Notwithstanding anything stated elsewhere in the Bid Documents, the Contract to be entered into will be treated as divisible SUPPLY and ERECTION Contract.

a. The Supply Portion of the Contract will relate to the Supply of the Equipment and Material including Mandatory Spares and Type Testing including inspection at Manufacturer's Works and conduct Routine Tests etc.

b. The Erection Portion will relate to the Inland Transportation & Insurance for Delivery at Site, Unloading, Loading and Unloading and Handling at Site, Storage including Watch &

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Ward, Erection, Construction, Testing and Commissioning including Comprehensive Insurance for Handling, Transportation, Storage, Erection and Commissioning till expiry of Defect Liability Period etc, as defined in the Contract.

3.8.2 In case of Divisible Supply and Erection Contract or where the Purchaser Hands - Over his Equipment(s) to the Contractor for executing the Contract, then the Contractor shall at the Time of taking delivery of such Equipment(s) through Bill or other Dispatch Documents, be required to execute an Indemnity Bond in favour of the Purchaser, in the Form acceptable to the Owner / Purchaser, for keeping said Equipment(s) in the safe custody and to utilise the same exclusively for the purposes of the said Contract.

3.8.3 The Contract shall in all respects be construed and governed according to Indian Laws.

3.9 CONTRACT DOCUMENTS

The Term Contract Documents shall mean and include the following, which shall be deemed to form an Integral part of the Contract: -

a) Invitation of Bid including Letter forwarding the Bidding Documents, Instructions to Bidders, General Conditions of Contract, Erection Conditions of Contract and Special Conditions of Contract.

b) Specification of the Equipment to be Furnished and Erected under the Contract as brought out in the accompanying Technical Specifications.

c) Contractor's Bid proposal and the Documents attached thereto including the Letters of clarifications thereto between the Contractor and the Purchaser prior to the Award of Contract except to the extent of repugnancy.

d) All the Material, Literature, Data and Information of any sort given by the Contractor along with his Bid, subject to the approval of the Purchaser.

e) Letter of Award and any agreed Variation of the conditions of the Document and Special Terms and Conditions of Contract, if any.

3.10 DESIGN / DRAWINGS

3.10.1 The Successful Bidders shall follow the Schedule for the Submission of Design / Design Calculations, Structural Assembly Drawings, Drawings of various Materials / Equipments and the Bill of Material for Purchaser's Approval as per Contract Schedule.

3.10.2 Within four weeks of receiving these Design Calculations and Drawings, the Purchaser shall convey his Approval or otherwise directly to the Supplier / Contractor to make Corrections, Changes, or Amendments, which the Purchaser may deem necessary. Such corrected Design Calculations and Drawings shall have to be resubmitted by the Supplier / Contractor within 15

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days of their receipt from the Purchaser with accompanying comments and the Purchaser thereafter shall convey his FINAL APPROVAL within 15 days.

3.10.3 The Supplier / Contractor shall supply copies of all Calculations and Drawings, which require to be approved by the Purchaser, in triplicate. One approved copy signed by the Purchaser will be returned to the Supplier / Contractor. The Supplier / Contractor shall supply as many Additional Copies of the approved Calculations, Drawings and Bill of Materials as required by the Purchaser for his use, free of cost. The Final Drawings shall be supplied on Tracing Cloth or Reproducible Film as early as possible but prior to commencement of supply of the particular Equipment / Material. The Drawings as approved above shall not be changed without the written approval of the Purchaser.

3.10.4 The Structural Assembly Drawings shall indicate the complete Structural Arrangements, Details of Connections, Joints and Splices, Size of Sections, Bend Lines and any other details required for Assembling Sub Station Structures, Equipment Supporting Structures at the Erection Sites and also for their subsequent fabrication. The hole to hole dimensions and the length of the complete members shall also be incorporated on the Structural Drawings which will be submitted before Erection of PROTOTYPE ASSEMBLY by the Contractor for the approval of the Purchaser. The Structural Assembly Drawings shall also indicate Member Size, Length and Size of the Bolts and the Number and Thickness of the Spring Washers to be used in the Assembly of the Structure.

3.10.5 The Design / Drawings / Documents shall remain in the sole custody of the Engineer, but two copies shall be supplied to the Contractor at the time of Award of Contract. The Contractor shall provide and make at his own expenses any further copies required by him. At the time of completion of the Contract, the Contractor shall return to the Purchaser all the Design / Drawings / Documents provided under the Contract.

3.10.6 One copy each of Design / Drawings / Documents supplied to the Contractor shall be kept by him at the Site of Work and same shall at all reasonable time be available for inspection and use by the Engineer or his representative.

3.11 USE OF CONTRACT DOCUMENTS AND INFORMATION

3.11.1 The Contractor shall not, without the Purchaser's prior written consent, disclose the Contract or any provision thereof or any Specification, Plan, Drawing, Pattern, Sample or Information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Contractor in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purpose of such performance.

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3.11.2 The Contractor shall not, without the Purchaser's prior written consent, make use of any document or information enumerated in various Contracts Documents except for purpose of performing the Contract.

3.11.3 The Contractor shall not communicate or use in advertising, publicity, sale releases or in any other medium photographs or other reproduction of Works under this Contract or Description of Site, Dimensions, Quantity, Quality or other information's concerning the Works unless prior written permission has been obtained from the Purchaser.

3.11.4 Any document, other than the Contract itself, enumerated in various Contract Documents shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Contractor's Performance under the Contract, if so required by the Purchaser.

3.12 TIME SCHEDULE OF CONTRACT

3.12.1 The Time and the Date of Completion of the Contract as stipulated in the Contract by the Purchaser, without or with modifications, shall be deemed to be the essence of the Contract. The Contractor shall so organise his resources and perform his work as to complete it not later than the date agreed to.

3.12.2 The Contractor shall submit the detail PERT NETWORK / Bar Charts consisting of adequate number of activities covering various key phases of Work such as Design, Procurement, Manufacturing, Shipment, and Field Erection activities within 15 days of the Date of Notice of Award of Contract. This PERT NETWORK shall also indicate the Interface facilities to be provided by the Purchaser and the Dates by which such facilities are needed. The Contractor shall discuss the PERT NETWORK so submitted with the Purchaser and the agreed PERT NETWORK shall form the part of the Contract Documents. As provided in the Clause of Terms of Payment, finalisation of the PERT NETWORK / Bar Charts will be a precondition to release of any Initial Advance to the Contractor. During the Performance of the Contract, if in the opinion of HPPTCL, proper progress is not maintained, suitable changes shall be made in the Contractor's operations to ensure proper progress without any cost implications to the Purchaser. The Interface facilities to be provided by the Purchaser in accordance with the agreed PERT NETWORK shall also be reviewed while reviewing the progress of the Contractor.

3.12.3 Based on the above agreed PERT NETWORK / Bar Chart, fortnightly Report shall be submitted by the Contractor as directed by HPPTCL.

3.12.4 Subsequent to the finalisation of the PERT NETWORK, the Contractor shall make available to the HPPTCL a detailed manufacturing programme, in line with the agreed Contract PERT NETWORK. Such Manufacturing Programme shall be reviewed, updated and submitted to HPPTCL once every TWO MONTHS.

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3.12.5 The above Bar Charts / Manufacturing Programme shall be compatible with the Purchaser's Computer environment and furnished to the Purchaser on such media as may be desired by the Purchaser.

3.12.6 STAGE PENALTY:

To ensure that the Contractor starts the Work immediately after signing of the Contract, the following Minimum Progress of Work, both in respect of Supply of Equipment against Supply Contract and Physical Progress of Civil and Erection Activities at Site against Erection Contract separately, will have to be achieved by the Contractor in terms of Financial Values:-

PERIOD STARTING FROM SIGNING THE CONTRACT	FINANCIAL ACHIEVEMENT INCLUDING SUPPLY OF EQUIPMENT
Within 3 (Three) months	10 % of the Contract Value
Within 5 (Five) months	40 % of the Contract Value
Within 6 (Ten) months	60 % of the Contract Value

The Contractor shall ensure the Completion of Supply and Erection Activities separately for the above values, failing which the Stage Penalty @ ½ % per week or part thereof for the amount equal to shortfall in progress achieved will be levied for the period starting from the Due Date of Achievement of above targets.

The Stage Penalty shall be calculated separately for Supply Contract and the Contract for Erection and Civil Works. The Stage Penalty shall be calculated in number of days of shortfall.

The Achievement of Target will be the Date on which the Material Receipt or Erection Activity is completed by the Contractor at Site as indicated on the Bill / Invoice by the Engineer.

However, in any case, the total amount of Stage Penalty plus Liquidated Damages leviable for non -completion of Sub Station in time will not exceed 15 % of the Contract Value of the Sub Station not commissioned in time.

The Stage Penalty levied shall be reviewed on completion of the Work to the extent that where the Work as a Whole is completed within the stipulated Completion Period or the Total Delay in Commissioning of the Sub Station is less than 2 (Two) Weeks, no Stage Penalty shall be chargeable and the Stage Penalty already charged for the delay in completion of individual Stage(s), if any, shall be refundable to the Contractor through the Bill payable on completion of the Work.

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The Stages of the Work will be identifled and defined as per approved PERT Chart. The phasing of Execution of the Turnkey Project will be formulated in a way that appropriate linkage of expenditure would be made not only with Supply but also with the Physical Activities as Site.

The construction of Major Civil Works including Control Room Building, GIS Building, Outdoor Switchgear Foundations, Cable Trenches etc will be taken in hand within 2 (Two) months of the Award of the Contract and shall be completed atleast 3 months before the Schedule Completion Date.

The Contractor shall provide for proper checks and balances to ensure timely completion of the Turnkey Contract.

3.12.7 The Bidder shall include in his proposal his Programme for Furnishing and Erecting the Equipment covered under the Contract. The Programme shall be in the Form of Master Network identifying key phases in various areas of the total Work like Design, Procurement, Manufacture and field activities such that the GIS Sub Station shall be Erected, Tested and Commissioned within 8 months from the Date of Award of Contract.

3.12.8 The Contract Agreement will be signed within 30 days of Date of Award of Contract. In case there is delay in signing of the Contract, the Contractual Completion will be counted from 30th day of issue of Award of Contract irrespective of reason of delay in signing of the Contract.

3.12.9 Offers, which do not conform, to the requirements of the above Time Schedule are liable to be REJECTED.

3.12.10 INCENTIVE

As the Work is of urgent nature and its timely Commissioning is of utmost importance to evacuate the Power being generated by various IPPs, advanced Commissioning of this Sub Station will be appreciated and an Incentive @ 0.25 % of the Contracted Amount per Week counted backward from the Contracted Completion Date shall be paid to the Contractor. It is clarified that Part of Week shall not be counted for any Incentive.

3.13 TIME FOR COMPLETION

3.13.1 Subject to any requirement in the Contract as to completion of any Section of the Works, before completion of the whole, the Whole of the Works shall be completed within 8 months from the Date of Detailed Award of Work.

3.13.2 Should the amount of Extra or Additional Work of any kind or any cause of delay referred to in these conditions or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the Works, the Engineer shall determine the quantum of such extension and shall notify the Purchaser and the

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Contractor accordingly. The Purchaser shall grant such extension in time after ascertaining that it is not due to the fault of the Contractor and is beyond his control. Such extensions shall not be held up unreasonably and granted within minimum possible time, provided that Engineer is not bound to take into account any Extra or Additional Work or other special circumstances unless the Contractor has submitted to the Engineer, within thirty days after such Work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at that time.

3.14 TERMS OF PAYMENT (WITH REFERENCE TO CLAUSE NO.: 5.18 OF SPECIAL CONDITIONS OF CONTRACT)

4.1.1 Payment shall be made as specified in Clause No.: 5.18 of S. C. C.

3.14.1 The Payment will be made to the Supplier under this Contract in the currencies specified in the Bid as indicated in Clause No.: 2.19 of ITB.

3.14.2 The Purchaser as per the guidelines and conditions specified herein shall make the Payment to the Contractor for the performance of the Works under the Contract. All the payments made during the Contract shall be On Account Payments only. The Final Payment shall be made on completion of all Works and on fulfilment by the Contractor of all his liabilities under the Contract.

3.15 CONTRACT AMENDMENTS

Subject to Clause No.: 3.23 (Variations) hereof, no variations in or modification of the terms of the Contract shall be made except by written amendment signed by the Parties.

3.16 POWER AND DUTIES OF THE ENGINEER

3.16.1 The "Engineer" shall carryout such Duties in issuing Decisions, Certificates and Orders as are specified in the Contract. He shall have full power and authority to supply to the "Contractor" from time to time, during the progress of the Works such further instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works. The "Contractor" shall carryout and shall be bound by the same.

3.16.2 The "Site Engineer" shall be responsible to watch and supervise the Works and to test and examine any material to be used or workmanship employed in connection with the Works. He shall have no authority to relieve the Contractor of any of his duties or obligations neither under the Contract nor to order any work involving delay or any extra payment by the Purchaser or to make any variation in the Works.

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3.17 INSPECTIONS AND TESTS

3.17.1 The Purchaser or its representative shall have the right to inspect and / or to test the goods to confirm their conformity to the Contract. The Special Conditions of Contract and / or the Technical Specifications shall specify what Inspections and Tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing of the identity of any representative(s) deputed for these purposes.

3.17.2 The Inspections and Tests may be conducted on the premises of the Supplier or its Sub - Contractor(s), at point of delivery and / or at the good's final destination. When conducted on the premises of the Supplier or its Sub - Contractor(s), all reasonable facilities and assistance including access to drawings and production data shall be furnished to the inspectors at no charges to the Purchaser.

3.17.3 The Contractor shall give the Purchaser / Inspector thirty (30) days notice by fax of any Material being ready for Testing. Unless the Inspection of the Tests is virtually waived off, Inspector shall attend such Tests within thirty (30) days from the date on which the goods is notified as being ready for Inspection / Witnessing of Test.

3.17.4 Material being furnished against this Order shall only be dispatched after Factory Inspection / Test has been conducted and found to be satisfactory by the Purchaser and / or his representative. Such Inspection and Acceptance for shipment shall not however, relieve the Contractor from entire responsibility for furnishing goods conforming to the requirement of this Specification nor shall prejudice any claim, right or privilege, which the Purchaser may have, because of the use or supply of defective or unsatisfactory goods. Should the Purchaser waive the inspection, such waival shall not also relieve the Contractor in any way from his entire obligations under this Contract.

3.17.5 The Purchaser or Inspector shall within fifteen (15) days from the date of inspection, as defined herein, give notice in writing to the Contractor, of any objection to any drawings unless already approved earlier, Testing procedure and Testing facilities and all or any goods and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objection and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Purchaser / Inspector giving reasons therein, that no modifications are necessary to comply with the Contract.

3.17.6 When the Factory Inspection / Tests have been completed at the Contractor's or Sub - Contractor's Works, the Purchaser / Inspector shall issue a certificate to this effect within fifteen (15) days after completion of Tests but if the Tests are not witnessed by the Purchaser / Inspector, the certificate shall be issued within fifteen (15) days of the receipt of the

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Contractor's Test Certificate by the Purchaser / Inspector. Failure of the Purchaser / Inspector to issue such a certificate shall not prevent the Contractor from proceeding with the Contract. The completion of these Tests or the issue of the certificate shall not bind the Purchaser to accept the goods should it, on further Tests after erection, be found not to comply with the Contract.

3.17.7 The goods at factory or after installation shall be capable of performing satisfactorily and shall conform to the Contract's Guaranteed Technical Particulars. All Tests required by this Specification, including Retest and Inspection that may be necessary owing to failure to meet the requirement of any Test(s) specified shall be made at the Contractor's expense. Additional Tests, if necessary, shall be made to locate any such failure. After determining the cause of failure and rectifying it, specified Tests shall be repeated to establish that the rectified goods conform to the Specification in every respect. Should the goods ultimately fail to pass the Tests specified, the Purchaser will have the option to reject the unit.

3.17.8 Should any Inspected or Tested Goods fail to conform to the Specifications, the Purchaser may reject them and the Supplier shall either replace the rejected goods or make all alterations necessary to meet Specification requirements, free of cost to the Purchaser.

3.17.9 The Purchaser's right to Inspect, Test and, where necessary, to reject the goods after the good's arrival in the Purchaser premises shall in no way be limited or waived by reason of the goods having previously been Inspected, Tested and passed by the Purchaser or its representative prior to the goods dispatch from the factory.

3.17.10 Nothing in Clause No.: 3.17 shall in any way release the Supplier from any Warranty or other obligations under this Contract.

3.18 INSURANCE

3.18.1 The Goods supplied under the Contract shall be fully insured in a freely convertible currency against loss or damage incidental to Manufacture or Acquisition, Transportation, Storage, Delivery and Erection in the manner specified in the Special Conditions of Contract.

3.18.2 The Contractor at his cost shall arrange, secure and maintain all insurance as may be pertinent to the Works and obligatory in terms of law to protect his interest and interests of the Purchaser against all perils detailed herein. The Form and the Limit of such Insurance as defined herein together with the underwriter in each case shall be acceptable to the Purchaser.

3.18.3 However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage at all times during the period of Contract shall be that of Contractor alone. The Contractor's failure in this regard shall not relieve him of any of his Contractual responsibilities and obligations. The insurance shall be made in freely convertible currency. The Contractor shall be responsible for preferring all claims and realising the amounts from insurance. The

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scope of such insurance shall cover the entire value of the "Goods and Services. (Please also refer to Clause No.: 5.14 of Section Special Conditions of Contract).

3.18.4 All costs on account of insurance liabilities covered under the Contract will be reimbursed to the Contractor on actual basis. The Contractor shall provide the Purchaser with a copy of all insurance policies and documents taken out by him in pursuance of the 'Contract'. Such copies of documents shall be submitted to the Purchaser immediately after such insurance coverage. The Contractor shall also inform the Purchaser in writing at least sixty (60) days in advance, regarding the expiry, cancellation and / or change in any of such documents and ensure revalidation / renewal etc, as may be necessary, well in time. The Purchaser shall assist the Contractor, if required, in obtaining Licenses / Port Clearances etc. in respect of foreign supply required for the purpose of replacement of goods lost in transit. The risks that are to be covered under the insurance shall be comprehensive and shall include but not be limited to the Loss or Damage in Transit Storage, Due To Theft, Pilferage, Riot, Civil Commotion, Weather Conditions, Accident of All Kinds, Fire, Flood, War Risk (During Ocean Transportation) Bad or Rough Handling, Miscellaneous accidents (Erection Risks), Workman Compensation risks, etc. The scope of such insurance shall cover the entire value of the Works.

3.18.5 The Purchaser may from time to time, during the pendency of the Contract, ask the Contractor, in writing, to limit the insurance coverage risks and in such a case, the parties to "Contract" will agree for a mutual settlement, in reduction in Contract Price to the extent of reduced premium amounts.

3.18.6 For Supply Portion of the Contract, the Insurance shall include Transportation of the goods to the Site / Stores and storage for 30 days thereafter.

3.19 PACKING, FORWARDING, AND SHIPMENT

3.19.1 The Contractor, wherever applicable, shall after proper painting, pack and crate all Equipment in such a manner so as to protect them from deterioration and damage during Road Transportation to the Site and Storage at the Site till the time of Erection. The Contractor shall be held responsible for all damages due to improper packing.

3.19.2 The Contractor shall notify the Purchaser of the Date of each Shipment from his Works and the expected Date of arrival at the Site for the information of the Purchaser.

3.19.3 The following Documents shall be sent by registered post to the Purchaser within THREE (3) Days from the Date of Shipment to enable the Purchaser to make Progressive Payments to the Contractor:

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Application for Payment in the Standard Format of the Purchaser	*3 Copies*
Invoices	*6 Copies*
Packing List	*6 Copies*
Dispatch Authorisation issued by the Purchaser	*3 Copies*
Test Certificates, wherever applicable	*3 Copies*
Insurance Certificate	*3 Copies*

3.19.4 The Contractor shall prepare detailed Packing List of all Packages and Containers, Bundles and Loose Material forming each and every Consignment Dispatched to Site. The Contractor shall further be responsible for making all necessary arrangements for Loading, Unloading and other Handling Right from his Works up to the Site and also till the Equipment is Erected, Tested and Commissioned. He shall be solely responsible for proper storage and safe custody of all Equipment.

3.20 GUARANTEE

3.20.1 The Contractor shall Warrant that the Equipment shall be NEW, Unused and in accordance with the Contract documents and Free from defects in material and Workmanship for a period of 18 months from the date of Taking Over by the Purchaser or 24 months from the Date of Commissioning, whichever is earlier. The Contractor's liability shall be limited to replacement of any defective part in the Equipment of his own manufacture or those of his Sub Contractor's, under normal use and arising solely from faulty Design, Material and / or Workmanship, provided always that such defective parts are repairable at Site and are not in the mean time essential in the Commercial use of the Equipment. Such replacement / defective parts shall be returned to the Contractor unless otherwise arranged. The Purchaser shall normally carry out no repair or replacement when the Equipment is under the supervision of the Contractor's Supervisory Engineer.

3.20.2 In the event of any emergency wherein in the judgement of the Engineer, the delay would cause serious loss or damages, repair or adjustment may be made by the Purchaser or a third Party chosen by the Purchaser without advance Notice to the Contractor. The Contractor shall pay the cost of such work. In the event of such action being taken by the Purchaser, the Contractor will be notified promptly and he shall assist wherever possible in making the necessary corrections. This shall not relieve the Contractor of his liabilities under the Terms and Conditions of the Contract.

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3.20.3 If it becomes necessary for the Contractor to replace or renew any defective portions of the Works, the provision of this Clause shall apply to the portion of the Works so replaced or renewed until the expiry of 18 months from the date of such replacement / renewal of the defective part / portion of the Work. If any defects are not remedied within a reasonable time, the Purchaser may proceed to do the Work at the Contractor's cost and risk, but without prejudice to any other rights, which the Purchaser may have against the Contractor in respect of such defects.

3.20.4 The Repaired or Renewed Parts shall be furnished and erected free of cost by the Contractor. If any repair is carried out on his behalf at Site, the Contractor shall bear the cost of such repairs.

3.20.5 The Cost of any Special or General Overhaul rendered necessary during the Maintenance Period due to defect in the Equipment or Defective Work carried out by the Contractor, the same will be borne by the Contractor.

3.20.6 The Acceptance of the Equipment by the Purchaser shall in no way relieve the Contractor of his obligations under this Clause.

3.20.7 In case of those defective parts, which are not repairable at Site but are essential for the Commercial operation of the Equipment, the Contractor and the Purchaser shall mutually agree to a programme of replacement or renewal, which will minimise interruption to the maximum extent, in the operation of the Equipment.

3.20.8 At the end of Guarantee Period, the Contractor's liability ceases except for Latent Defects. For the Latent Defects, the Contractor's liability as mentioned in Clause No.: 3.20.1 to 3.20.7 shall remain till the end of THREE Years from the date of Completion of Guarantee Period.

3.20.9 The Provision contained in this Clause will not be applicable: -

a) If the Purchaser has not used the Equipment according to generally approved Industrial practice and in accordance with the conditions of operation specified and in accordance with operating manuals, if any.

b) In cases of normal wear and tear of the parts specifically mentioned by the Contractor in the offer.

3.21 WARRANTY / GUARANTEE

4.1.2 The Contractor shall Guarantee among other things the following:

4.1.3 Quality and Strength of Materials used.

4.1.4 Adequate Factors of Safety for the Material to withstand the Mechanical and / or Electrical Stresses developed therein. These shall be stated in the Bid.

4.1.5 The Delivery and Erection Periods given in the Bid.

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4.1.6 The Contractor shall warrant further that the services to be carried out under this Contract shall conform to generally accept professional Standards and Engineering Principles.

4.1.7 The Materials shall be guaranteed for satisfactory operation for a period of 18 months from the Date of Taking Over by the Purchaser or 24 months from the Date of Commissioning of the Sub Station, whichever is earlier.

4.1.8 However, any Engineering Error, Omission, Wrong Provision, Goods Failure etc, shall be attended to by the Contractor up to and on the Date of Actual Commissioning of the Goods without any revision in the price or extra cost.

4.1.9 If during the Period of Guarantee, any of the Materials, are found defective and / or fail in Test or Operation, such Materials shall be repaired or replaced by the Contractor free of cost to the HPPTCL irrespective of the reimbursements from the insurance company within reasonable time which shall in no circumstance be more than 15 days or such other reasonable time as the HPPTCL may deem proper to afford, failing which the cost of the failed Material will be deducted from the subsequent Bills / Bank Guarantee.

4.1.10 The Contractor shall bear all the expenses incurred in connection with the repair or replacement against such defective goods inclusive of all Freight (both inland overseas), Insurance, Customs, Levies, Forwarding and Clearing and Demurrage and Other Incidental Charges involved in delivering the said goods to the Purchaser's specified destination. The decision whether correction of the defects should be by the repair or replacement shall be the sole discretion of the Purchaser.

4.1.11 Provision of this Clause shall also apply to all Materials and Services repaired or replaced until the expiration of period of Twenty - Four months from the date of such repair or replacement.

4.1.12 The cost of any special or general overhaul rendered necessary during the Guarantee Period due to defective goods and services furnished by the Contractor shall be borne by the Contractor.

4.1.13 The taking over of the goods and services by the Purchaser shall in no way relieve the Contractor of his obligation under this Clause.

4.1.14 The Contractor shall co-operate with the Purchaser in all ways in repair or replacement of the defective part, so as to minimise to the extent possible the interruption in operation of goods.

4.1.15 Where the Sub - Contractors provide longer periods of warranty than mentioned above, the Purchaser shall be entitled for such longer guarantees.

4.1.16 If the Contractor, having been notified, fails to remedy the defect(s) within a reasonable period, the Purchaser may proceed to take such remedial action as may be necessary, at the

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Contractor's risk and expense and without prejudice to any other rights, which the Purchaser may have against the Contractor under the Contract.

4.1.17 The Contractor's full and extreme liabilities under this Clause shall be satisfied by the payments to the Purchaser of the extra cost, of such replacement procured including erection as provided for in the Contract, such extra cost being the ascertained difference between the price paid by the Purchaser for such replacements and the Contract Price by portion for such defective equipment / material / works and repayments of any sum paid by the Purchaser to the Contractor in respect of such defective equipment / material / works. Should the Purchaser not so replace the defective plant, the Contractor's extreme liability under this Clause shall be limited to repayment of all sums paid by the Purchaser under the Contract for such defective plant.

4.1.18 Bid proposals offering any other terms of Warranty / Guarantee will be treated as NON - RESPONSIVE and Rejected.

3.21 REPLACEMENT OF DEFECTIVE PARTS AND MATERIAL

3.21.1 During the performance of the Contract, the Purchaser can decide and inform in writing to the Contractor that the Contractor has manufactured Equipment, Material or part of Equipment unsound and imperfect or has furnished any Equipment inferior to the quality specified. The Contractor on receiving details of such defects or deficiencies, shall at his own expense within SEVEN (7) Days of his receiving the Notice, or otherwise, within such time as may be reasonably necessary for making it good, proceed to alter, reconstruct or remove such Works and furnish fresh Equipment / Materials up to the Standards of the Specifications. In case the Contractor fails to do so, the Purchaser may on giving the Contractor SEVEN (7) Days notice in writing of his intentions to do so, proceed to remove the portion of the Works so complained of. Purchaser at the cost of the Contractor shall perform all such Works or furnish all such Equipment / Material provided that nothing in this Clause shall be deemed to deprive the Purchaser of or affect any rights under the Contract, which the Purchaser may otherwise have in respect of such defects and deficiencies.

3.21.2 The Contractor's full and extreme liability under this Clause shall be satisfied by the payment to the Purchaser of the extra cost of such replacement procured including Erection, as provided for in the Contract. Such extra cost being the ascertained difference between the Price paid by the Purchaser for such replacements and the Contract Price by the portion for such defective Equipment / Materials/ Works and repayments of any sum paid by the Purchaser to the Contractor in respect of such defective Equipment / Material. Should the Purchaser not so replace the defective Equipment / Materials, the Contractor's extreme liability under this Clause

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shall be limited to repayment of all sums paid by the Purchaser under the Contract for such defective Equipment / Materials.

3.22 VARIATIONS

3.22.1 The Purchaser shall make any Variation of the Form, Quality or Quantity of Works or any part thereof that may in his opinion, be necessary and for that purpose, or if for any other reason, in his opinion be desirable, he shall have power to order the Contractor to do and the Contractor shall do any of the following:

a) increase or decrease the quantity of any Work included in the Contract,

b) omit any such Work,

c) change the character or quality or kind of any such Work

d) change the Levels, Lines, Position and Dimensions of any part of the Works, and

e) execute Additional Work of any kind necessary for the completion of the Works

f) change any specified Sequence, Method, or Timing of Construction of any part of the Works.

No such variation shall in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

3.22.2 The Contractor without an order in writing of the Purchaser shall make no such Variation. Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause, but is the result of the quantities exceeding or being less than those stated in Contract. Provided also that if for any reason the Engineer shall consider it desirable to give any such order verbally, the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Engineer, whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of this Clause. Provided further that if the Contractor shall within seven days confirm in writing to Purchaser and if such confirmation is not contradicted in writing within fourteen days by the Purchaser, it shall be deemed to be an order in writing by the Purchaser.

3.22.3 All extra or additional Work done or Work omitted by order of Purchaser shall be valued at the Rates and Prices set out in the Contract, if in the opinion of the Purchaser, the same shall be applicable. If the Contract does not contain any Rates or Prices applicable to the extra or additional work, then suitable Rates or Prices shall be agreed upon between the Purchaser and the Contractor. In the event of disagreement, the Purchaser shall fix such Rate(s) or Price(s) as shall be, in his opinion, reasonable and proper and the Rates fixed shall be binding on the Contractor.

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3.22.4 Provided that if the nature or amount of any omission or addition, relative to the nature or amount of the whole of the Works or to any part thereof shall be such that, in the opinion of the Purchaser, the Rates or Price contained in the Contract for any item of the Works is, by reason of such omission or addition, rendered unreasonable or inapplicable, then a suitable Rate or Price shall be agreed upon between the Purchaser and the Contractor. In the event of disagreement, the Purchaser shall fix such other Rate(s) or Price(s) as shall in his opinion, be reasonable and proper having regard to the circumstances and the Rate so fixed shall be binding on the Contractor.

3.22.5 Provided also that no increase or decrease under Sub - Clause No.: 3.23.3 of this Clause or variation of Rate or Price under Sub - Clause No.: 3.23.4 of this Clause shall be made unless as soon after the date of the order as is practicable and in the case of extra or additional work or as soon thereafter as is practicable, notice(s) have been given in writing:

a) by the Contractor to the Engineer of his intention to claim extra payment or a varied Rate or Price, or

b) by the Engineer to the Contractor of his intention to vary a Rate or Price.

3.24 CERTIFICATE NOT TO AFFECT RIGHT OF PURCHASER AND LIABILITY OF CONTRACTOR

No Interim Payment Certificate of the Purchaser, nor any sum paid on account by the Purchaser / Engineer, nor any extension of time for execution of the Works granted by the Purchaser, shall affect or prejudice the rights of the Purchaser against the Contractor or relieve the Contractor of his obligations for the due Performance of the Contract, or be interpreted as approval of the Works Done or of the Equipment furnished and no certificate shall create liability for the Purchaser to pay for Alterations, Amendments, Variations or Additional Works not ordered in writing by the Purchaser / Engineer or discharge the liability of the Contractor for the payment of damages whether due, ascertained, or certified or not or any sum against the payment of which he is bound to indemnify the Purchaser, nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of the Purchaser against the Contract.

3.25 TRAINING OF THE PURCHASER'S PERSONNEL

3.25.1 The Contractor shall undertake to train, FREE OF COST, Engineering personnel selected and sent by the Purchaser at the Works of the Contractor unless otherwise specified in the Technical Specification. The Period and the Nature of Training for the Individual Personnel shall be agreed upon mutually between the Contractor and the Purchaser. These Engineering Personnel shall be given Special Training in the Shops, where the Equipment will be Manufactured and / or in their Collaborator's Works and where possible, in any other Plant where Equipment Manufactured by

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the Contractor or his Collaborator is under Installation, Operation or Testing, to enable those Personnel to become familiar with the Equipment being furnished by the Contractor. The details of the number of persons to be trained, period of training, nature of training etc shall be as outlined in the accompanying Technical Specification / Special Conditions of Contract (S. C. C.).

3.25.2 All Travelling and Living Expenses for the Engineering Personnel to be trained during the Total Period of Training shall be borne by the Purchaser. These Engineering Personnel while undergoing Training shall be responsible to the Contractor for discipline.

3.25.3 The Purchaser shall not be entitled for any rebate whatsoever on any account in the event of his failing to avail of the Training Facilities, for any reason.

3.26 PROGRESS REPORTS AND PHOTOGRAPHS

During the various stages of the Work in pursuance of the Contract, the Contractor shall at his own cost submit Periodic Progress Reports as may be reasonably required by the Purchaser with such Materials as Charts, NETWORK, Photographs, Test Certificates etc. Such Progress Reports shall be in the Form and Size as may be required by the Purchaser and shall be submitted in atleast THREE (3) Copies.

3.27 POSSESSION OF SITE

3.27.1 Save insofar as the Contractor may prescribe, the extent of portions of the Site of which the Contracter is to be given possession from time to time and the order in which such portions shall be made available to him and, subject to any requirement in the Contract as to the order in which the Works shall be executed, the Engineer under his written order to commence the Works, shall give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in Clause No.: 3.12 hereof, if any, and otherwise in accordance with such reasonable proposals of the Contractor as he shall by written notice of the Engineer, make and will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with the said programme or proposals, as the case may be.

If the Contractor suffers delay or incurs cost from failure on the part of the Engineer to give possession in accordance with the terms of this Clause, the Purchaser shall grant an extension of time for the completion of the Works and certify such sums as in his opinion, shall be fair to cover the cost incurred, which sum shall be paid by the Purchaser.

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3.27.2 The Contractor shall bear all costs and charges for special or temporary way required by him in connection with access to Site. The Contractor shall also provide at his own cost any additional accommodation out side the Site required by him for the purpose of the Works.

3.28 COMMENCEMENT OF WORKS

The Contractor shall commence the Works on Site within the period mentioned in the Erection Schedule after the receipt of Notification of Award and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer, Purchaser, or be wholly beyond the Contractors control.

3.29 SUSPENSION OF WORKS

3.29.1 The Contractor shall on the written order of the Engineer suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the Work, so far as is necessary in the opinion of the Engineer. The extra cost incurred by the Contractor in giving effect to the Engineer's instruction under this Clause shall be borne and paid by the Purchaser unless such suspension is:

a) Otherwise provided for in the Contract, or

b) Necessary by reason of some default on the part of the Contractor, or

c) Necessary by reason of climatic conditions on the Site or

d) Necessary for the proper execution of the Works or for the safety of the Works or any part thereof insofar as such necessity does not arise from any act or default by the Engineer or Purchaser or from any of the excepted risks defined in Sub - Clause No.: 4.16.5 of Erection Conditions of Contract (E. C. C.).

Provided that the Contractor shall not be entitled to recover, any such extra cost unless he gives written notice of his intention to claim to the Engineer within thirty days of the Engineer's order. The Engineer shall settle and determine such extra payment and / or extension of time under Sub - Clause No.: 3.13.2 hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer, be fair and reasonable.

3.29.2 If the progress of the Works or any part thereof is suspended on the written order of the Engineer and if permission to resume work is not given within a period of ninety days from the date of suspension then, unless such suspension is within paragraph a, b, c or d of Sub - Clause No.: 3.29.1, the Contractor may serve a written notice on the Engineer requiring permission within thirty days from the receipt thereof to proceed with the Works, or that part thereof in regard to which progress is suspended and, if such permission is not granted within that time, the Contractor by a further written notice so served may, elect to treat the suspension,

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where it affects part only of the Works, as an omission / deletion of such part under Clause No.: 3.23 hereof, or where it affects the whole Works, as termination of the Contract by the Purchaser.

3.30 LIMITATION OF LIABILITIES

The Final Payment by the Purchaser in pursuance of the Contract shall mean the release of the Contractor from all his liabilities under the Contract. Such Final Payment shall be made only at the end of Guarantee / Warranty Period and till such time, the Contractual Liabilities and Responsibilities of the Contractor shall prevail. All other payments made under the Contract shall be treated as On – Account Payments.

3.31 PATENT RIGHTS AND ROYALTIES

3.31.1 Royalties and Fees for Patents covering materials, articles, apparatus, devices, equipment or processes used in the Works shall be deemed to have been included in the Contract Price. The Contractor shall satisfy all demands that may be made at any time for such Royalties or Fees and he alone shall be liable for any damages or claims for patent infringements and shall keep the Purchaser indemnified in this regard. The Contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted for alleged infringement of any patents involved in the Works, and in case of an award of damages, the Contractor shall pay for such award. In the event of any suit or other proceedings instituted against the Purchaser, the same shall be defended at the cost and expenses of the Contractor who shall also satisfy / comply with any decree, order or award made against the Purchaser. But, it shall be understood that no such Machine, Plant, Work, Material or Thing has been used by the Purchaser for any purpose or any manner other than that for which they have been furnished and installed by the Contractor and specified under these Specifications. Final Payment to the Contractor by the Purchaser will not be made while any such suit or claim remains unsettled. In the event any Apparatus or Equipment, or any part thereof furnished by the Contractor is in such suit or proceedings held to constitute infringement, and its use is enjoined, the Contractor shall at his option and at his own expense, either procure for the Purchaser the right to continue the use of said Apparatus, Equipment or part thereof, or replace it with non - infringing Apparatus or Equipment or modify it, so it becomes non - infringing Apparatus.

3.31.2 The Contractor shall indemnify and keep indemnified the Purchaser, his successors or assignees for and against any and all claims, suits, damages, losses, actions, demands costs, charges, royalties and expenses arising from or for infringement, real or claimed of patents, copy rights or other protected rights, if any Designs, Plants, Device, Machine, Diagrams, Drawings or in respect of the Material supplied by the Contractor or any of the construction

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methods or processes followed by the Contractor for the construction of the constructed portion of the project or for the operation of the constructed portion of the project are found to have infringed any such rights.

3.31.3 In the event of any claim being made or action being brought against the Purchaser in respect of any of the matters referred to in this Clause, the Contractor shall promptly be notified and he shall at his own expense, conduct all negotiations for the settlement of the same and any litigation that may arise there-from.

3.32 NO WAIVER OF RIGHT

Neither the Inspection by the Purchaser / any of his Officials, Employees or Agents nor any Order by the Purchaser for payment of money / any payment for or acceptance of the Whole or any part of the Works by the Purchaser nor any extension of time, nor any possession taken by the Purchaser / Engineer shall operate as a Waiver of any provision of the Contract, or of any Power herein reserved to the Purchaser or any right to damages herein provided nor shall any Waiver of any breach in the Contract be held to be a Waiver of any other or subsequent breach.

3.33 DEFAULT OF THE PURCHASER

3.33.1 In the event of the Purchaser: -

a) Failing to pay the Contractor the amount due under any certificate of the Engineer within 180 days after the same shall have become due under the Terms of the Contract, subject to any deduction that the Purchaser is entitled to make under the Contract, or

b) Interfering with or obstructing or refusing any required approval to the issue of any such certificate.

The Contractor shall be entitled to terminate his employment under the Contract after giving 30 days prior written notice to the Purchaser with a copy to the Engineer.

3.33.2 Upon the expiry of the 30 days notice referred to in Sub - Clause No.: 3.33.1 of this Clause, the Contractor shall, notwithstanding the provisions of Clause No.: 4.13.1 of Erection Conditions of Contract (E. C. C.) with all reasonable dispatch, remove all Constructional Plant brought by him thereon.

3.33.3 In the event of such Termination, the Purchaser shall be under the same obligations to the Contractor in regards to payments as if the Contract had been terminated under the provisions of Clause No.: 4.16 of Erection Conditions of Contract (E. C. C.), but in addition to the payments specified in Clause No.: 4.16.8 of Erection Conditions of Contract (E. C. C.), the Purchaser shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such Termination. But the Purchaser

shall not be responsible to the claims on account of interest etc on delayed payments as may occur due to financial constraint and / or procedural delays.

3.34 DEFAULT OF THE CONTRACTOR

3.34.1 If the Contractor shall neglect to execute the Works with due diligence and expedition or shall refuse or neglect to comply with any reasonable order given to him, in writing, by the Purchaser / Engineer in connection with the Works or shall contravene the provisions of the Contract, the Purchaser / Engineer may give Notice in writing to the Contractor to make good the failure, neglect or contravention complained of. Should the Contractor fail to comply with the Notice within 30 days from the Date of Serving the Notice, then in such case the Purchaser / Engineer shall be at liberty to employ other Workmen and forthwith execute such part of the Works as the Contractor may have neglected to do or if the Purchaser / Engineer shall think fit, without prejudice to any other right he may have under the Contract to take the Work, wholly or in part, out of the Contractor's hand and Re - Contract with any person or persons to complete the Works or any part thereof and in that event the Purchaser / Engineer shall have free use of all Contractor's equipment that may have been on the Site at that time in connection with the Works or any part thereof without being responsible to the Contractor for fair, wear and tear thereof and to the exclusion of any right of the Contractor over the same, and the Purchaser / Engineer shall be entitled to retain and apply any balance which may otherwise be due on the Contract by him to the Contractor, or such part thereof as may be necessary, to the payment of the cost of executing the said part of the Works or of completing the Works, as the case may be. If the cost of completing the Works or executing a part thereof as aforesaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess. Such payment of the excess amount shall be independent of Liquidated Damages for delay, which the Contractor shall have to pay for the completion of the Works if delayed.

3.34.2 In addition, such action by the Purchaser / Engineer as aforesaid shall not relieve the Contractor of his liability to pay Liquidated Damages due to delay in completion of Works as defined in the Clause No.: 3.47 along with Stage Penalty.

3.34.3 Such action by the Purchaser / Engineer as aforesaid, the Termination of the Contract under this Clause shall not entitle the Contractor to reduce the Value of the Contract Performance Guarantee nor the Time thereof. The Contract Performance Guarantee shall be valid for the full value and for the full period of the Contract including the Guarantee Period.

3.35 NOTICES

3.35.1 All Certificates, Notices or Written Orders to be given by the Purchaser or by the Engineer to the Contractor under the Terms of the Contract, shall be served by post or by delivering the same to

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the Contractor's principal place of business, or such other address as the Contractor shall nominate for this purpose.

3.35.2 All Notices to be given to the Purchaser or to the Engineer under the terms of the Contract shall be served by post or by delivering the same to the respective addresses nominated for this purpose.

3.35.3 Either PARTY may change a nominated address to another address in the country where the Works are being executed by giving prior written notice to the other PARTY and the Engineer may do so by prior written notice to both parties.

3.35.4 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

3.36 SETTLEMENT OF DISPUTES

3.36.1 Any dispute(s) or difference(s) arising out of or in connection with the Contract shall, to the extent possible, be settled amicably between the PARTIES.

3.36.2 If any dispute or difference of any kind, whatsoever, shall arise between the Purchaser and the Contractor or the Engineer and the Contractor in connection with, or arising out of the Contract, or the execution of the Works, whether during the progress of the Works or after their completion or whether before or after the Termination, Abandonment or Breach of the Contract, it shall, in the first place, be referred to and settled by the Empowered Officer appointed by Purchaser, who within a period of 90 days after being requested by either party to do so, shall give written notice of his decision to the Purchaser and the Contractor.

3.36.3 Unless as hereinafter provided, such decision in respect of every matter so referred shall be final and binding upon the Purchaser and the Contractor until the completion of the Works and shall forthwith be given effect to by the Contractor, who shall proceed with the execution of the Works with all due diligence whether he or the Purchaser requires arbitration, as hereinafter provided, or not.

3.36.4 If after the Empowered Officer has given written notice of his decision to the Purchaser and the Contractor, no claim to arbitration has been communicated to him by either the Purchaser or the Contractor within a period of ninety day's from receipt of such notice, the said decision shall remain final and binding upon the Purchaser and the Contractor.

3.36.5 In the event of Empowered Officer fails to give notice of his decision, as aforesaid, within a period of ninety days after being requested as aforesaid, or in the event of either the Purchaser or the Contractor being dissatisfied with any such decision, or within 90 days after the expiry of first mentioned period of 90 days, as the case may be, either the Purchaser or the Contractor may require that the matter or matters in dispute be referred to arbitration as per Clause No.: 4.41 of Erection Condition of Contract (E. C. C.).

3.37 CHANGES IN COSTS AND LEGISLATION

3.37.1 Adjustments to the Contract Price shall be made in respect of rise or fall in the costs of Material / Labour affecting the cost of the execution of the Works, as mentioned in Clause No.: 3.7 of General Conditions of Contract of this Volume and as quoted by the Bidder / Approved by the Purchaser.

3.37.2 If, after seven (07) days prior to the Date of Bid Opening, any law, regulation, ordinance, order or by - law having the force of law is enacted, promulgated, abrogated or changed in India (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and / or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and / or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. However, these adjustments would be restricted to direct transactions between the Purchaser and the Contractor and not on procurement of raw materials, intermediary components etc. by the Contractor for which the Purchaser shall be the sole judge. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable.

3.38 TERMINATION FOR DEFAULT

3.38.1 If the Contractor shall become Bankrupt, or have a receiving order made against him, or shall present his petition in Bankruptcy, or shall make an arrangement with or assignment in favour of his creditors, or shall agree to carryout the Contract under a committee of inspectors of his creditors or, being a corporation, shall go in to Liquidation (other than a voluntary Liquidation for the purpose of amalgamation or reconstruction) or if the Contractor shall assign the Contract, without the consent in writing of the Purchaser first obtained or shall have an execution levied on his goods or if the Engineer shall certify in writing to the Purchaser that in his opinion the Contractor

a) has abandoned the Contract, or

b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for thirty days after receiving from the Engineer written notice to proceed, or

c) has failed to remove materials from the Site or to pull down and replace work from thirty days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under these conditions, or

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d) despite previous warning by the Engineer, in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carryout his obligations under the Contract, or

e) has, to the detriment of good workmanship, or in defiance of the Engineer's instructions to the contrary, Sub - Let any part of the Contract.

Then the Purchaser may, after giving fourteen days notice in writing to the Contractor enter upon the Site and the Works and expel the Contractor there from without thereby voiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the Purchaser or the Engineer by the Contract, and may himself complete the Works or may employ any other Contractor to complete the Works. The Purchaser or such other Contractor may use for such completion so much of the Constructional Plant, Temporary Works and Materials, which have been deemed to be reserved exclusively for the execution of the Works under the provisions of the Contract, as he or they may think proper, and the Purchaser may, at any time, sell any of the said Constructional Plant, Temporary Works and unused material and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

3.38.2 The Engineer shall as soon as may be practicable after any such entry and expulsion by the Purchaser, fix and determine ex-party, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of Works then actually done by him under the Contract and the value of any of the said unused or partially used materials, any Constructional Plant and any Temporary Works.

3.38.3 If the Purchaser shall enter and expel the Contractor under this Clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the period of maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and all other expenses incurred by the Purchaser have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums, if any, as the Engineer may certify would have been payable to him on due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand pay to the Purchaser the amount of such excess and it shall be deemed a debt due by the Contractor to the Purchaser and shall be recoverable accordingly.

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3.38.4 If, by reason of any accident or failure, or other event occurring to in or in connection with the Works or any part thereof, either during the execution of the Works, or during the period of maintenance, any remedial or other Works or repair shall in the opinion of the Engineer or his authorised representative, be urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such work or repair, the Purchaser may employ and pay other to carryout such Works / repair as the Engineer or his authorised representative may consider necessary. If the work or repair so done by the Purchaser is work which, in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the Purchaser in so doing shall be recoverable from the Contractor by the Purchaser, or may be deducted by the Purchaser from any claims due or which may become due to the Contractor. Provided always that the Engineer or his authorised representative, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

3.39 CLAIMS

The Contractor shall send to the Engineer once in every month an account giving particulars and details justifying the claim(s) and of all extra or additional Works ordered by the Engineer, which he has executed during the preceding month.

3.40 ASSIGNMENT AND SUB – LETTING OF CONTRACT

3.40.1 The Contractor may, after informing the Purchaser and getting his written approval, Assign or Sub - Let the Contract or any part thereof, other than for Raw Materials, for Minor Details or for any part of the Plant for which Makes are identified in the Contract. Suppliers of the Equipment not identified in the Contract or any change in the Identified Supplier shall be subject to approval by the Purchaser. The experience, list of the Equipment, Vendors under consideration by the Contractor for this Contract shall be furnished to the Purchaser for approval prior to procurement of all such Items / Equipment. Such Assignment / Sub Letting shall not relieve the Contractor of any obligation, duty or responsibility under the Contract. Any assignment as above without prior written approval of the Purchaser shall be void.

3.40.2 For Component / Equipment procured by the Contractor for the purposes of the Contract, after obtaining the written approval of the Purchaser, the Contractor's Purchase Specifications and enquiries shall call for Quality Plans to be submitted by the Suppliers alongwith their proposals. The quality plans called for from the Vendors shall set out, during the various stages of Manufacture and Installation, the quality practices and procedures followed by the Vendor's Quality Control Organisation, the relevant Reference Documents / Standard used, Acceptance Level, Inspection Documentation raised etc. Such Quality Plans of the successful Vendors shall

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be discussed and finalised in consultation with the Purchaser and shall form a part of the Purchase Order / Contract between the Contractor and the Vendor. Within 3 weeks of the release of the Purchase Orders / Contracts for such Bought - Out Items / Components, a copy of the same without Price details but together with detailed Purchase Specifications, Quality Plans and Delivery conditions shall be furnished to the Purchaser by the Contractor.

3.41 SPECIAL LOADS

Should it be found necessary for the Contractor to move one or more loads of Constructional Plant, Machinery or parts of units of work (such as Electrical Equipment, Sub Station Structures Members, Conductor and Ground Wire along with their Accessories, Cement, Reinforcement, and Aggregates etc) over part of a highway or bridge, the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out, then the Contractor shall, before moving the load on to such highway or bridge, give notice to the Engineer or his authorised representative of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge. Unless within fourteen days after the receipt of such notice, the Engineer shall by counter - notice direct that such protection or strengthening is un-necessary, then the Contractor will carry out such proposals or any modification thereof that the Engineer shall require and the costs thereof shall be paid by the Purchaser to the Contractor.

3.42 CONTRACTOR'S SUPERINTENDENCE

The Contractor shall give or provide all necessary superintendence during the manufacturing, testing and execution of the Works and as long thereafter as the Purchaser / Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor or a competent and authorised agent or representative approved in writing by the Engineer, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Purchaser / Engineer, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving written notice of such withdrawal, remove the agent from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Purchaser / Engineer. Such authorised agent or representative shall receive, on behalf of the Contractor, directions and instructions from the Purchaser / Engineer or subject to the limitations of Sub - Clause No.: 3.1.1 hereof, the Engineers representative.

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3.43 NOMINATED SUB – CONTRACTORS / VENDORS

3.43.1 All Specialist, Merchants, Tradesmen and others executing any Work or Supplying any Goods, Materials or Services, who may have been or be nominated or selected or approved by the Purchaser, or the Engineer and all persons to whom by virtue of the provisions of the Contract, the Contractor is required to Sub - Let any work shall, in the execution of such work or the supply of such Goods, Materials or Services, be deemed to be Sub - Contractors employed by the Contractor and are referred to in this Contract as "Nominated Sub - Contractors."

3.43.2 The Contractor shall not be required by the Purchaser or the Engineer or be deemed to be under any obligation to employ any Nominated Sub - Contractor against whom the Contractor may raise reasonable objection, or who shall decline to enter in to a Sub – Contract deed with the Contractor containing provisions:

a) That in respect of the Work, Goods, Materials or Services of the Sub - Contract, the Nominated Sub - Contractor will undertake towards the Contractor the like obligations and liabilities as are imposed on the Contractor towards the Purchaser by the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all the claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities , and

b) That the Nominated Sub - Contractor will save harmless and indemnify the Contractor from and against any negligence by the Nominated Sub - Contractor, his agents, workmen and servants and from and against any misuse by him or them of any Constructional Plant or Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

3.43.3 For all Works Executed or Goods, Materials or Services supplied by any Nominated Sub - Contractor, these shall be included in the Contact Price.

3.43.4 Before issuing, under Clause No.: 4.29 of Erection Conditions of Contract (E. C. C.), any certificates, which includes any payment in respect of work done or Goods, Materials or Services supplied by any nominated Sub – Contractor, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments included in previous certificates in respect of the Work or Goods, Materials or Services of such nominated Sub - Contractor have been paid or discharged by the Contractor, in default whereof unless the Contractor shall

a) Inform the Engineer in writing that he has reasonable cause for withholding or refusing to make such payments, and

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b) Produce to the Engineer reasonable proof that he has so informed such nominated Sub - Contractor in writing. The Purchaser shall be entitled to pay to such nominated Sub - Contractor direct, upon the certificate of the Engineer, all payments less retention, provided for in the Sub - Contract which the Contractor has failed to make to such nominated Sub - Contractor and to deduct by way of set - off the amount so paid by the Purchaser from any sums due or which may become due from the Purchaser to the Contractor. Provided always that, where the Engineer has certified and the Purchaser has paid direct as aforesaid, the Engineer shall in issuing any further certificate in favour of the Contractor, deduct from the amount thereof the amount so paid direct as aforesaid but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

3.43.5 In the event of a nominated Sub - Contractor as herein before defined, having undertaken towards the Contractor in respect of the work executed, or the Goods, Materials or Services supplied by such nominated Sub - Contractor any continuing obligation extending for a period extending that of the period of maintenance under the Contract, the Contractor shall at any time, after the expiration of the period of maintenance, assign to the Purchaser, at the Purchaser's request and cost, the benefit or such obligation for the un-expired duration thereof.

3.43.6 In the event of Neglect, Default, Breach of Contract and / or Deficiency in the Services, Performance, Workmanship, Specification, Designs etc on the part of the nominated Sub - Contractor, the Contractor shall be liable to make good the damage / loss and this shall not in any way absolve / relieve the Contractor from his Contractual obligations.

3.44 FRUSTRATION

3.44.1 In the event of Frustration of the Contract because of supervening impossibility in terms of Section 56 of Indian Contract Act, the Parties shall be absolved of their responsibility to perform the balance portion of the Contract, subject to provision contained in Sub Clause No.: 3.44.3 below.

3.44.2 In the event of Non - Availability of Funds for any reason whatsoever (except for reason of wilful or flagrant breach by the Purchaser and / or Contractor), and then the Works under the Contract shall be suspended.

Furthermore, if the Purchaser is unable to make satisfactory alternative arrangements for financing to the Contractor in accordance with the Terms of the Contract within 3 months of the event, the Parties hereto shall be relieved from carrying out further obligations under the Contract treating it as Frustration of the Contract.

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3.44.3 In the event referred to in Sub Clause Nos.: 3.44.1 and 3.44.2 above, the Parties shall mutually discuss to arrive at reasonable settlement on all issues including the amounts due to either Party for the Work already done on "Quantum Merit Basis" which shall be determined by mutual agreement between the Parties.

3.45 APPLICABLE LAW

The Contract shall be interpreted in accordance with the Laws of India and shall be subject to the jurisdiction of Shimla Court irrespective of the place of the Works, the place of performance or the place of payments under the Contract.

3.46 TRANSFER OF TITLE

3.46.1 Transfer of Title in respect of Equipment and Materials supplied by the Contractor to HPPTCL pursuant to the Terms of the Contract shall pass on to HPPTCL on its actual delivery to HPPTCL at Site Stores.

3.46.2 This Transfer of Title shall not be construed to mean the "Acceptance" and consequent "Taking Over" of Equipment and Materials. The Contractor shall continue to be responsible for the quality and performance of such Equipment and Materials and for their compliance with the Specification until "Taking Over" and the fulfilment of Guarantee provision of this Contract.

3.46.3 This Transfer of Title shall not relieve the Contractor from the responsibility for all risk of loss or damage to the Equipment and the Materials as specified under the Clause No.: 3.18 entitled "Insurance."

3.47 LIQUIDATED DAMAGES

3.47.1 If the Contractor fails to successfully complete the Commissioning of the GIS Sub Station within the Time Schedule stipulated under the Contract, the Contractor shall pay to HPPTCL as Liquidated Damages and not as a penalty, a sum of one half of one percent (0.5 %) of the Contract Price for each calendar week or part thereof of delay.

3.47.2 Equipment and Materials shall be deemed to have been delivered only when all its Components, Parts, and SPARES are also delivered. If certain Components, Parts or Spares are not delivered in time, the Equipment and Materials will be considered as delayed until such time the same are also delivered.

3.47.3 The Total Amount of Liquidated Damages for delay under the Contract shall be subject to a Maximum of 10 % of the Contract Price.

3.47.4 Liquidated Damages for not meeting Performance Guarantee during the Performance and Guarantee Tests shall be assessed and recovered from the Contractor as detailed in the Technical Specification / Special Conditions of Contract. Such Liquidated Damages shall be

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without any Limitation whatsoever and shall be in addition to damages, if any payable under any other Clause of Conditions of Contract.

3.48 DEDUCTION FROM THE CONTRACT PRICE

The Purchaser shall claim all Costs, damages, or expenses that the Purchaser may have paid, for which under the Contract, the Contractor are liable. The Purchaser to the Contractor shall bill all such claims regularly as and when they fall due. Appropriate and certified vouchers or explanations, to enable the Contractor to properly identify such claims shall support such Bill. Such claim shall be paid by the Contractor within 30 days of receipt of the corresponding Bills and if not paid by the Contractor within the said period, the Purchaser may then deduct the amount, from any moneys due or becoming due by him to the Contractor under the Contract or may be recovered by actions of Law or otherwise.

3.49 FORCE MAJEURE

4.1.19 Force Majeure is herein defined as any cause which is beyond the control of the Contractor or the Purchaser as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the Performance of the Contract , such as :

4.1.20 Natural Phenomena, including but not limited to Floods, Drought, Earth quakes and Epidemics,

4.1.21 Acts of any Government, Domestic or Foreign, including but not limited to War, Declared or undeclared, Priorities, Guaranties, Embargoes,

4.1.22 Provided either Party shall within 15 days from the occurrence of such a cause notify the other in writing of such cause.

3.49.2 The Contractor shall not be liable for Loss or Damage due to delay in Manufacture and Delivery resulting from any causes beyond the Contractor's reasonable control including but not limited to compliance with the Regulations, Orders or Instructions of any Federal State or Municipal, Government or Agency thereof, Acts of God, Acts of Omission of the Purchaser, Acts of Civil and Military Authority, Fires, Strikes, Factory Shutdowns or Altercations, Embargoes, War, Riots.

3.49.3 The Contractor or Purchaser shall not be liable for delays in performing his obligations resulting from any Force Majeure cause as referred to and / or defined above.

The Date of Completion will, subject to herein after provided, be extended by a reasonable time even though such cause may occur after Contractor's performance of obligations has been delayed due to other causes.

3.50 RECONCILIATION OF ACCOUNTS

The Contractor shall prepare and submit every TWO months; a statement covering payments claimed and the payments received vis - a - vis the Works executed, for reconciliation of Accounts with the Purchaser. The Contractor shall also prepare and submit a detailed account of Purchaser's issue Material received and utilised by him for reconciliation purpose in a format to be discussed and finalised with the Purchaser before signing of the Contract.

END OF SECTION - 3

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SECTION - III

Special Conditions of Contract



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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SECTION - 5

SPECIAL CONDITIONS OF CONTRACT

S. C. C.

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SECTION – 5

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SECTION – 5

SPECIAL CONDITIONS OF CONTRACT

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5.1 GENERAL

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The corresponding Clause number of General Conditions is indicated in parentheses.

5.2 DEFINITIONS (Clause 3.1):

a) The Purchaser is Himachal Pradesh Power Transmission Corporation Limited (HPPTCL), Barowalias House, Shimla - 171002 / Dy. General Manager (Contracts), HPPTCL, Barowalias House, Shimla - 171002.

b) The Contractor is (To be mentioned at the time of signing of Contract).

5.3 SCOPE OF WORK AND SERVICES

5.3.1 Scope of Work shall include the Design, Engineering, Manufacturing, Testing, Supply on F. O. R. Destination Site Basis, including Transportation and Insurance, Unloading, Storage, Erection Including Associated Civil Works, Testing and Commissioning of New 220 / 33 kV Sub Station at PALCHAN. Major Equipment / Materials to be supplied includes Transformer, Circuit Breaker, Isolators, Current Transformers, CVTs, Surge Arrestors, Control & Relay Panels, RTU, SCADA, Modules for conversion of Signal from Optical Fibre Ground Wire at both ends of the Line i.e. at 220 / 33 kV Palchan Sub Station and 220 kV A. D. Hydro Switchyard and PLCC, Fire Protection System, Installation Hardware & Insulators, Sub Station Structures, Cables and Lighting etc as applicable.

The Contractor shall fully familiarise himself with the Site Conditions. It shall be the responsibility of the Contractor to arrange all inputs required for Detailed Engineering and execution. The Contractor shall be fully responsible for providing all Equipment, Material, System and Services specified or otherwise which are required to complete the Construction and successful Testing and Commissioning of the aforesaid Sub Station.

All Material required for the Civil and Construction / Installation Work shall be supplied by the Contractor. Rail for Road Cum Rail Track, Transformer Foundation, Cement and Steel is also covered in the Scope of the Contractor.

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5.3.2 SCOPE OF SERVICES

In addition to Scope of the Work specified in Volume – II, Sections – 1, Project of the Technical Specification, the following shall also be covered under the Bidder's Scope: -

a) Design, Manufacture, Shop Testing, Packing and Dispatch.

b) Transportation to Site and Insurance

c) Receiving, Unloading, Handling, Opening, Inspection, Reporting and Submitting Claim in case of Damages and Short Supplied Items

d) Arranging to Repair and / or Replace all damaged and Short Supplied Items

e) Storing at Site with suitable weather protection and Watch and Ward thereof

f) All Civil Works viz. Control Room and Other Buildings in Switchyard, Foundations, Cable Trenches etc

g) Complete Assembly and Erection at Site

h) Adjustments to rectify Misalignment and Defects, if any

i) Final Check Up, Testing and Commissioning

j) Obtaining Purchaser's written acceptance on satisfactory performance

k) Co-ordination through the Purchaser / Engineer and other Contract of HPPTCL

l) Operation and Maintenance of GIS Sub Station for atleast 1 (One) Year after final commissioning

5.3.3 Any other Item not specifically mentioned in the Document but which is required for Erection, Testing and successful Commissioning and Satisfactory Operation of the Sub Station shall be deemed to have been included in the Scope of the Tender Document unless specifically excluded.

5.3.4 Bidders are required to quote for the entire Scope of the Works as defined above. Offer for incomplete or part Scope of Works is not acceptable and shall be summarily rejected.

5.4 PRICES

5.4.1 The Items / Equipment / Systems / Works generally required for completion of the Scope of Work as per Technical Specifications (Volume – II) of the Bidding Documents are described and given in Schedule of Items and Prices (Price Schedules) forming Part of Bid Proposal Sheets of the Bidding Documents. However, the Brief Descriptions shall not be construed to limit the Scope of Work and the same shall be read in conjunction with corresponding Sections of Technical Specification including Amendments / Errata, if any, thereto.

5.4.2 There are broadly the following Categories of Items in the Price Schedule, against which the Bidders are required to quote their Prices: -

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a) Items for which quantity is specified in the Price Schedule of BPS and the Bidders are required to quote their Unit Rate and Total Amount for the same.

b) Items given in the Price Schedule of BPS for which the Bidders are required to assess / estimate the quantity and quote the Prices.

c) In addition to above, the Bidders may include other Items in the Price Schedules of BPS, *which they consider necessary for completion of the Works* and quote their Prices for the same by indicating the Assessed / Estimated Quantity of such Items. For the Items indicated by the Bidder, the Contractor shall be paid the Total Price quoted for these System in their Bid and incorporated in the Contract, irrespective of actual quantity of the existing Items, any addition of New Items or any deletion of the existing Items during actual execution of the Work, for completion of the Scope of Work as per Technical Specifications. Cost of any additional Items which may be required for successful completion of the Works as per Specifications, whether or not indicated separately by the Bidder in his Bid, shall be deemed to be included in the Bid Price, irrespective of quantity of such Items or components / parts / sub items thereof required during post award / execution stage.

5.4.3 Bidder shall quote their Prices on F. O. R. Site Basis. The Ex – Works Prices component, Transportation and Insurance, Unloading, Storage and Handling of Equipment at Site, Erection and Commissioning Charges shall be indicated separately in the manner stipulated in the Bid Price.

5.4.4 Excise Duty, Sales Tax, VAT, Local Taxes, Octroi / Entry Tax and other Levies, if any, in respect of direct transaction between Owner and the Contractor under the Contract, shall not be included in the Quoted Prices but shall be indicated separately, wherever applicable, in the BPS. For Items falling under Clauses 5.4.2 (c) above, the Bidder shall indicate separately in the relevant Price Schedule of BPS the Name of such Items / Components etc, which constitute such Items, if any, which are Bidder's Own Manufactured along with corresponding Excise Duty, Sales Tax, VAT, Octroi / Entry Tax and other Levies, payable as required for direct transaction between Owner and the Contractor. In case the same are not indicated by the Bidder in his Bid, it shall be deemed to be included in the Ex – Works Price.

5.4.5 Bidder shall quote separately, as per relevant Schedules of BPS, the Charges for Unloading, Handling, Storage, Insurance, Erection, Testing and Commissioning of All Items which are to be supplied and / or Erected at Site and Charges of Associated Civil Works as specified in the Technical Specifications, Volume – II of the Bidding Documents. These Charges together for All Equipment / Material / Spares, as applicable, shall be deemed to be included in the "Erection

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Charges" to be quoted against the Items indicated in relevant Schedule of BPS. In addition, the Cost of All Equipment / Materials required for successful Erection, Testing and Commissioning of the Sub Station / Sub Station Extensions including the Associated Civil Works, not indicated separately in the Schedule of Supply Items in the BPS but required as per Technical Specifications, Volume – II of the Bidding Documents shall be deemed to be included in the "Erection Charges". *Service Tax, if any, applicable on the Erection, Testing and Commissioning and payable by the Purchaser as per the provisions of the Bidding Documents shall not be included in the Quoted Prices but shall be indicated separately in the relevant Price Schedule of BPS.*

5.4.6 No Excise Duty, No Sales Tax in any form, on Bought - Out Equipment / Material shall be paid by the Purchaser. As such, the Prices of the Bought - Out Items quoted by the Bidder shall be inclusive of the same and the Sale to HPPTCL shall be made on Sale - in - Transit basis. However, Freight and Insurance Charges, Octroi / Entry Tax as applicable shall be paid as per actual on production of documentary proof.

5.4.7 Bidder shall quote Charges for Type Test and such other Charges required to be quoted as per BPS, separately, in the relevant Schedule of BPS. Bidders shall quote Type Test Charges as required for the Total Quantity offered. Service Tax, if any, applicable on the Type Testing and payable by the Purchaser as per the provision of the Bidding Documents shall not be included in Quoted Price but shall be indicated separately in the relevant Price schedule of BPS.

5.5 PRICE BASIS

5.5.1 The Bidder shall quote Base Price for the Ex – Works Price of the Equipment / Materials and Erection Price Components. These Price Components less Advance Amount Paid by the Owner for certain Equipment / Materials, as specified, shall be subject to Price Adjustment to reflect changes in the Cost of Labour and Material Components as per the Price Adjustment Formula submitted by the Bidder and approved by the Purchaser.

5.5.2 The Ex – Works Components of Erection Hardware, Control & Relay Panels, Bus Post Insulators, L. T. Switchgear, Batteries & Battery Charger, DG Set, PLCC Equipment, Illumination System, Air Conditioning System, Fire Protection System, Spare and Testing and Maintenance Equipment etc and other Items not specifically mentioned below shall remain FIRM and No Price Adjustment whatsoever shall be applicable for the Price Component of these Items.

5.5.3 The Prices of Bought Out Equipment / Materials shall remain Firm and No Price Adjustment, whatsoever shall be applicable for the Price Components of these Items. Further, Prices for Type Test, Freight and Insurance and other Charges, if any, shall be Firm and No Price Adjustment shall be applicable for these Price Components.

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5.5.4 FOR ERECTION (INCLUDING CIVIL WORKS) PRICE COMPONENTS

5.5.4.1 The Formula for Calculation of the Monthly Price Adjustment for Erection (Including Civil Works) Price Components shall as under: -

$$ER_1 = ER_0 \times \{0.25 + 0.75 \times (L_1 / L_0)\} - ER_0$$

Where,

ER_1 = Price Adjustments Amount for the Erection (including Civil Works) Price Component for each Billing.

ER_0 = Price for Erection (including Civil Works), done In Billing Period as established by the Contract, less Advance.

L = Indian Field Labour Index – namely All India Consumer Price Index for Industrial Workers as published by Labour Bureau, Shimla, Government of India.

a) Subscript '0' will correspond to THIRTY (30) days prior to Date of Opening of Bids.

b) Subscript '1' will correspond to the month of Billing.

c) For the purpose of this Clause, the Billing Period shall mean the Billing Period as per the Contract Time Schedule i.e., the Agreed Bar Chart / PERT Network or Actual Period, whichever is earlier.

d) The Billing Period for various Erection Activities will be as agreed Erection Bar Chart / PERT Network indicating Monthly Schedule of Erection Activities for completion of Works.

5.5.4.2 The above Price Adjustment provision shall be invoked by either Party subject to the following further conditions: -

a). For the purpose of Price Adjustment on Ex – Works Price Components of the Equipment, the Date of Shipment for Goods shall mean Scheduled Date of Shipment or Actual Date of Shipment, whichever is earlier. Scheduled Date of Shipment will be Ex – Works Date of Despatch, governed by the accepted PERT Network / Bar Chart. Similarly, for the purpose of Price Adjustment on Erection (including Civil Works) Price Component, the Billing Period shall mean the Billing Period as per Contract Time Schedule i.e., the agreed Bar Chart or Actual Period whichever is earlier. The Billing Period for various Erection Activities will be as per agreed Erection Bar Chart indicating Monthly Schedule of Erection Activities for completion of Works.

No Price increase shall be allowed beyond the Original Delivery / Erection Dates unless specifically stated in the Time Extension Letter, if any, issued by the Owner. The Owner will, however, be entitled to any decrease in the Contract Price which may be caused due to Lower

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Price Adjustment Amount in case of Delivery of Goods / Erection beyond the Original Delivery / Erection Dates. Therefore, in case of Delivery of Goods / Erection (including Civil Works) beyond the Original; Delivery / Erection Dated, the liability of the Owner shall be limited to the Lower of the price Adjustment Amount which may work out either on Schedule Date or Actual Date of despatch of Goods / Erection (including Civil Works).

b) In case IEEMA does not publish any of the Price Indices, as mentioned above, the Bidder shall indicate any nationally recognised published Index for respective Items and the Source of the same shall be furnished in the Bid.

c) In case of non – publication of applicable Indices on a particular Date, which happens to be the applicable Date for Price Adjustment purposes, the published Indices prevailing immediately prior to the particular Date shall be applicable.

d) No Price Adjustment shall be applicable on the portion of the Contract Price paid to the Contractor as an Advance Payment.

e) If the Price Adjustment Amount Works out to be Positive, the same is payable to the Contractor by the Owner and if it Works out to be Negative, the same is to be recovered by the Owner from the Contractor.

f) The Contract shall promptly submit Price Adjustment Invoices for the supplies Made / Work Done, positively within Three (3) Months from the Date of Shipment / Work Done, whether it is Positive or Negative.

5.6 BASIS OF EVALUATION

5.6.1 Bidders have to quote for the complete Scope of the Work as stated in Technical Specifications, Volume – II of the Bidding Documents. Bids for Individual Equipment or Incomplete Services shall be treated as incomplete and are liable to be REJECTED.

5.6.2 Bids shall be evaluated on the complete Bid Package Basis for the Entire Scope of the Work and Factor for Capitalisation of Losses of Power Transformer as under:

a) Ex – Works Price of the Equipment / Materials including Spares, Tools and Tackles etc

b) Charges for Inland Transportation and Insurance for delivery of the Equipment / Materials up to their final Destinations.

c) Item Wise Charges towards Unloading, Storage, Insurance, Erection, Testing and Commissioning.

d) Excise Duty, Sales Tax, VAT and any other Levies on Self Manufactured Items legally payable on the Transaction between the Purchase and the Bidder for the Equipment to be directly dispatched from the Bidder's Works to the Site.

e) Type Test Charges.

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f) Training Charges.

g) Any other Charges as per the requirement of Special Condition of the Contract / Technical Specifications.

5.6.3 Conditional Discount / Rebate, if any, offered by the Bidder shall not be taken into consideration for evaluation. It shall, however, be considered in case of Award.

5.6.4 The Bidder is required to assess the Quantities, based on the Scope of Work as per the Technical Specifications, Volume – II of the Bidding Documents and Design of the Bidder, for certain Items in the BPS and quote their Prices accordingly.

5.6.5 In case, in the opinion of the Bidder, based on the Design, *some Additional Items are required, the Bidder shall indicate the same* and include these Prices on Unit Rates and Tentative Quantity of the same in Bid Price of the Package. The Prices for these Additional Items shall be considered for Evaluation purpose.

5.6.6 The Prices of all such Item(s) against which the Bidder has not quoted Rates / Amount (viz., Items left blank or against which '-' is indicated) in the Schedules will be deemed to have been included in other Item(s).

5.6.7 Bid stipulating Commissioning Date beyond that specified will run the risk of REJECTION.

5.7 MANDATORY SPARES

5.7.1 The List of Mandatory Spares is given in the Technical Specification. The Price of the Mandatory Spares shall be indicated in the respective Schedules and these will be considered for the purpose of evaluation. The Price of these Mandatory Spares shall be FIRM and these shall be supplied along with the Main Equipment.

5.7.2 RECOMMENDED / OPTIONAL SPARES

In addition, the Bidder shall also recommend Optional Equipment Spares. The Bidder shall indicate his recommendations and Prices of the Various Optional spares in corresponding Schedules and they shall not be included in Total Bid Price. The Prices of these Optional Spares shall be FIRM and it shall be valid for 24 months from the date of Award of the Contract.

5.7.3 SPECIAL TOOL AND TACKLES

The Bidder shall include in his Bid any Special Tools and Tackles for Erection, Commissioning and Maintenance of the Equipment under the Package. The List of such Special Tools and Tackles shall be given in the Bid and Prices of these shall be deemed to be included in the Bid Price.

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5.8 CAPITALISATION OF LOSSES AND LIQUIDATED DAMAGES FOR PERFORMANCE

4.3.4 The No Load Losses in kilowatt at Rated Voltage and Rated Frequency Load Losses and Total Losses in kW at Rated Output, Rated Voltage and Rated Frequency shall be guaranteed under Penalty for each Power Transformer. For the Purpose of Penalty Computation the Test Figures of No Load Losses, Loads Losses, Auxiliary Losses and Total Losses shall be compared with the corresponding Guaranteed Figures. Any change in the figures assigned to the Transformer Losses will not be permitted after opening of the Bid and the Bid Evaluation will be carried out on the basis of Information made available at the Time of Bid Opening. The Penalties shall be separately Evaluated for : -

4.3.5 Excess of the Test Figures of the No Load Loss in kW over the corresponding Guaranteed Value.

4.3.6 Excess of the Difference between the Test Values of the Total Losses and No Load Losses in kW over the corresponding Guaranteed value

4.3.7 Excess of the Total Losses in kW over the corresponding Guaranteed Value.

4.3.8 The Penalties shall be calculated at the following Rates: -

4.3.9	FOR IRON LOSSES	4.3.10	Rs.2,54,212 (Rupees Two Lac Fifty Four Thousand and Two Hundred and Twelve) per kW
4.3.11	FOR LOAD LOSSES	4.3.12	Rs. 1,03,718 (Rupees One Lac Three Thousand Seven Hundred and Eighteen) per kW
4.3.13	FOR AUXILIARY LOSSES	4.3.14	Rs. 1,27,106 (Rupees One Lac Twenty Seven Thousand One Hundred and Six) per kW

4.3.15 For a Fraction of a kW, the Penalties shall be applied PRORATA.

5.8.1 The Losses shall be Guaranteed Maximum Figures. The Test Figure will be compared with corresponding Guaranteed Figures and the Liquidated Damages shall be calculated at the above rates for the excess of the Difference between the Test Figures over the Corresponding Guaranteed figure. No tolerance shall be permitted over the Test Figures of the Losses. For Fraction of kilowatt penalty shall be applied pro-rata.

5.9 POWER AND DUTIES OF ENGINEER (Clause 3.16)

The Engineer shall obtain the specific approval of the Purchaser in writing before the following action specified in General Conditions of Contract: -

a) Approving Sub - Letting of any part of the Works under Clause 3.40 of Section – 3 of this Volume

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b) Determining an extension of time under Clause 3.13 of Section - 3 of this Volume

c) Fixing Rates or Prices under Clause 3.23 of Section - 3 of this Volume.

d) Suspending Progress of Works or any part thereof under Clause 3.29 of Section - 3 of this Volume.

e) Certifying Additional Cost under Clause 4.28 of Section – 4.

f) Issuing Maintenance Certificate under Clause 4.30 of Section – 4.

g) Any other duty assigned by the Purchaser during the execution of Contract.

5.10 LAW (Clause 3.45)

The Law to which the Contract is to be subject and according to which the Contract is to be construed shall be the Laws for the time being in force in INDIA and to the jurisdiction of Shimla Court only.

5.11 CONTRACTOR'S GENERAL RESPONSIBILITY

The Contractor shall promptly inform the Purchaser and the respective Engineer in writing of Any Error, Omission, Fault and other defects in Foundation Drawings / Designs etc when reviewing the Contract documents or during the execution of the Works.

5.12 PROGRAMME

The Contractor shall submit two copies of the programme of Works within 30 days after being notified of the acceptance of his Bid. The programme shall be revised at an interval of three months and should include a chart of the principal activities of work forecast for execution on monthly basis and a schedule of payment excepted to be made to the Contractor by the Purchaser.

5.13 INSPECTION OF OPERATIONS

The Contractor shall provide necessary T and P required during Inspection / Measurements of Works to Engineer or his representatives at any time during execution of Works.

5.14 INSURANCE (Clause 3.18)

5.14.1 It shall be the responsibility of the Contractor to notify the insurer of any change in nature and extent of the Works and to insure the adequacy of the insurance cover at all times in accordance with the provisions of this Clause.

5.14.2 Insurance of Works shall provide for compensation payable in Indian Rupees needed to cover the loss or damage incurred.

5.14.3 Third Party Insurance shall be for an amount not less than Rs. 200,000 per occurrence, with the number of occurrences being unlimited.

5.14.4 Amount of liability for Fatal / Non Fatal Injury and Property Damaged shall be limited to Rs. 200,000 per occurrence with the number of occurrences being unlimited.

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5.15 LABOUR

The Contractor is encouraged, to the extent practicable and reasonable, to employ Staff and Labour with the required qualifications and experience from sources within H. P.

5.16 LIQUIDATED DAMAGES (Clause 3.47)

5.16.1 If the Contractor fails to complete the successful Commissioning of the GIS Sub Station within the time Stipulated under the Contract, the Contractor shall pay to the Purchaser as Liquidated Damages and not as a penalty, a sum of one half of one percent (0.5 %) of the Total Contract Price for each calendar week of delay or part thereof. However, the Total Amount of Liquidated Damages for delay under the Contract shall be limited to a Maximum of Ten (10) percent of the Total Contract Price.

5.16.2 Provided that in any case where under Sub - Clause 5.16.1 above, the Contractor makes itself liable to pay the maximum stipulated damages and fails to execute the Contract, the Purchaser shall have the power to adopt any or all the following recourses as may be deemed fit: -

a) Purchaser may rescind the Contract by giving one - month notice of recession, and may take steps to forfeit the Contractor's Security to fulfil the Contract as a part of compensation for the Losses caused by the Contractor to the Purchaser.

b) Purchaser may arrange to have the remaining Supply of Material / Execution of Work complied from other Sources, at the Contractor's Risk and Cost, and such Supply shall in no way be deemed to affect the Contractor's Guarantee for the Proper Performance of the Equipment / Material supplied by him.

c) Purchaser may take steps to recover all losses caused to him by the Non Execution of the Contract.

d) If on any occasion, the Purchaser abstains from exercising the Power given to him by these Clauses such abstention shall not prevent him from exercising such Power on subsequent occasion, and if the Contract again makes default, it shall be lawful for the Purchaser to re-impose the damages as stipulated in these Clauses.

5.16.3 An unexcused delay by the Contractor in the performance of the Contractual obligations shall render the Contractor to any or all the following sanctions, forfeiture of its performance security, imposition of Liquidated Damages, and / or termination of the Contract at the risk and cost of the Contractor.

5.16.4 INCENTIVE TO THE CONTRACTOR

As the Work is of urgent nature and its timely Commissioning is of utmost importance to evacuate the Power being generated by various IPPs, Advanced Commissioning of this Sub Station will be appreciated and an Incentive @ 0.25 % of the Contracted Amount per Week

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counted backward from the Contracted Completion Date shall be paid to the Contractor. It is clarified that Part of Week shall not be counted for any Incentive

5.17 PLANT, TEMPORARY WORKS, AND MATERIAL

5.17.1 With a view to securing in the event of a forfeiture under Clause 3.38 of Section - 3 to this Volume, the continued availability for the purpose of executing of Works of any Hired Equipment, the Contractor shall not bring on to the Site any hired equipment unless there is an agreement for the hire thereof, which contains a provision that the owner thereof will on request in writing made by the Purchaser within seven days after the date on which any forfeiture has become effective, and on the Purchaser under taking to pay all hire charges in respect thereof from such date, hire such equipment to the Purchaser on the same terms in all respect as the same was hired to the Contractor save that the Purchaser shall be entitled to permit the use thereof by any other Contractor employed by him for the purpose of completing and maintaining the Works under the terms of the said Clause 3.38 of Section – 3 to this Volume.

5.17.2 In the event of the Purchaser entering in to any agreement for the hire of equipment pursuant to Sub - Clause 5.17.1 of this Clause, all sum properly paid by the Purchaser under the provisions of any such agreement and all expenses incurred by him (including stamp duties) in entering in to such agreement shall be deemed for the purpose of Clause 3.38 to be part of the cost of completing and maintaining the Works.

5.17.3 For the purpose of Sub - Clause 5.17.1 and 5.17.2 of this Clause, the following expressions shall have the meanings hereby assigned to them: -

a) The expression "Equipment" shall mean any Constructional Plant, Equipment, Temporary Works and Materials For Temporary Works and includes Vehicles engaged in transporting these and Supervisory Staff and Materials for the permanent Works on the Site, but shall exclude any vehicle engaged in Transporting of any Constructional Plant, Equipment, Temporary Works and Materials for the permanent Works to or from the Site.

b) The expression "Agreement for Hire" shall be deemed not to include any agreement for Hire / Purchase.

5.18 CERTIFICATES AND PAYMENTS

5.18.1 PAYMENTS FOR MATERIALS & ACCESSORIES

i) Ninety percent (90 %) of the Ex - Works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within 30 days on receipt of the Material in the Contractor's Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract, Acceptance of Bank Guarantee by the Purchaser, whichever is later. The Payment shall be released by the Engineer

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or by the Central Payment Cell of the Purchaser upon submission of the documents specified below:

(a) Original and 4 copies of the Invoices showing Purchase Order number, Goods Description, Quantity, Unit Price and Total Amount

(b) Packing Lists (4 copies)

(c) Railway Receipt / Receipted L. R.

(d) Manufacturers / Contractors Guarantee Certificate of quality

(e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report, Transit Insurance Certificate and an Indemnity Bond as per Form – IX for full value of the Material valid till the taking over of the said Sub Station by the Purchaser.

(f) Taxes & Duties shall be paid against Documentary Evidence.

(g) The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the Purchaser.

(ii) The balance 10 % of the Ex - Works Price of each item as per Price Schedule shall be made within 30 days of the Issuance of the Certificate by the Purchaser's Engineer that the Item(s) have been received and provided and on submission of Bank Guarantee for 10 % of the Full Amount valid till completion of Testing and Issuance of Taking - Over Certificate by the Purchaser's Engineer.

(iii) However, in case the Payment is delayed beyond 30 days due to one or the other reason NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.

5.18.2 PAYMENTS FOR ERECTION

5.18.2.1 The Contractor shall submit an application for *Interim Payment* in quadruplicate to the Engineer at the end of each month in a Form approved by the Engineer. The application shall include the following items, as applicable, which shall be taken in to account in the sequence listed.

a) The Estimated Contract Value in Indian Rupees of the Permanent Works executed up to the end of the month in question, obtained by applying the Base Unit Rates and Prices to the quantities measured by the Engineer pursuant to Clause 4.28 of Part – 4.

b) The Estimated Contract Value of the Permanent Works obtained as above executed up to the end of the previous month.

c) The Estimated Contract Value at Base Unit Rates and Prices, expressed in Indian Rupees, of the Permanent Works for the month in question obtained by deducting b) from a).

d) Any amount reflecting any changes in cost and legislation pursuant to Clause 3.37 of Part - 3 to this Volume.

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e) Any amount to be deducted on account of the Advance Loan Repayment under the provisions set forth in Sub - Clause 5.21.4 and

f) Any other sum to which the Contractor may be entitled under the Contract.

5.18.2.2 Within 30 days of receipt of the said application for Interim Payment, it shall be approved or amended such that, in the Engineer's opinion, the certificate reflects the amount due to the Contractor in accordance with the Contract. In cases where there is a difference of opinion as to the value of any item, the Engineer's decision shall prevail. When the Engineer has determined the amount due to the Contractor, he shall issue to the Purchaser and the Contractor a certificate hereinafter called 'Interim Payment Certificate' certifying the amount due to the Contractor and this payment shall be released either by the Engineer or by the Central Payment Cell of the Purchaser. 100 % Payment towards Erection shall be released within 30 days after the Verification / Measurement of Works by the Engineers. However, in case the Payment is delayed beyond 30 days due to one or the other reason no interest for the delayed period shall be admissible.

5.18.2.3 No Interim Payment shall be issued for a sum less than 2 percent of the Estimated Contract Price.

5.18.2.4 No Idling Charges arising on whatsoever account, shall be payable by the Purchaser to the Contractor.

5.18.2.5 If the Contractor has received any Over Payments by mistake or if any amounts are due to the HPPTCL due to any other reason, when it is not possible to recover such amounts under the Contract resulting out of this Specification, the HPPTCL reserves the right to collect the same from any other amounts and / or Bank Guarantee given by the Company due to or with the HPPTCL.

5.18.2.6 When the Supplier does not at any time, fulfils his obligations in replacing / rectifying etc of the Damaged / Defective Materials in part or whole promptly to the satisfaction of the Engineer, the Engineer reserves the right not to accept the Bills against subsequent dispatches made by the Supplier and only the Supplier will be responsible for any Demurrages, Wharfages or Damages occurring to consignment so dispatched. The Supplier shall invariably submit a guarantee on the Bill itself to the effect that if the Test Certificates, wherever necessary for the Materials or Goods, are not approved before payment become due, such Test Certificates will be furnished in due course, and if they are not accepted or not satisfactory, all payments received for the Materials or Goods shall be refunded in full by the Supplier.

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5.19 CORRECTIONS

The Engineer may by any Interim Payment Certificate make any corrections or modifications in any previous certificate (other than one purporting to be Final Payment Certificate), which shall have been issued by him and shall have power to modify or withhold any Interim Payment Certificate, if the Works or any part thereof are not being carried out to his satisfaction.

5.20 MOBILISATION ADVANCE

5.20.1 On the request of the Contractor, the Purchaser will make Mobilisation Advance to the Contractor for the cost of mobilisation in respect of the Works in a lump sum equivalent to 10 % of the amount of Contract Price within 30 days in Indian Rupees as provided in the Contract. The interest @ 12 % per annum shall be charged on the Mobilisation Advance as per standard Terms and Conditions of the HPPTCL. The accrual of interest will start from the date of release of advance. Payment of the Mobilisation Advance will be due under separate certification by the Purchaser after fulfilment of following conditions: -

i) Execution of the Form of CONTRACT AGREEMENT by the PARTIES thereto,

ii) Provision by the Contractor of the Performance Security in accordance with Clause 3.5 of Section – 3 to this Volume,

iii) Provision by the Contractor of a Bank Guarantee by a Bank acceptable to the Purchaser of an amount equal to the Advance Loan, such Bank Guarantee to remain effective until the Advance Loan has been completely repaid by the Contractor out of current earnings under the Contract and certified accordingly by the Engineer. A Form of Bank Guarantee acceptable to the Purchaser is indicated in this section.

5.20.2 The Mobilisation Advance will be used by the Contractor exclusively for mobilisation expenditures, including the acquisition of Constructional Plant in connection with the Works. Should the Contractor misappropriate any portion of the Advance Loan, it shall become due and payable immediately, and no further loan will be made to the Contractor thereafter.

5.21 ADVANCE LOAN REPAYMENT

The Mobilisation Advance shall be repaid with percentage deductions from the Interim Payments Certified by the Engineer under the Contract. Deductions shall commence in the next Interim Payment Certificate, following that in which the total of all such payments to the Contractor has reached 20 % of the Contract Price and shall be recovered on Pro Rata basis to the Gross Value of the Work Billed beyond 20 % in such a way that the entire Advance is recovered by the Time 80 % of Gross Value of the Contract is executed and paid together with Interest due on entire outstanding Advance Amount up to the Date of Recovery of the instalment

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and its account shall be kept by Engineer In - Charge on Appendix – 47 contained in CPWD Manual Volume – II.

5.22 FINAL ACCOUNT

5.22.1 Not later than three months after the date of issue of the Maintenance Certificate, the Contractor shall submit a draft statement of Final Account and Supporting Documentation to the Engineer showing in detail Value of the Work done in accordance with the Contract, together with all further sums which the Contractor considers to be due to him under the Contract up to the date of the Maintenance Certificate (hereinafter called the "Contractor's Draft Final Account").

5.22.2 Within three months after receipt of the Contractor's Draft Final Account and of all information reasonably required for its verification, the Engineer shall determine the value of all matters to which the Contractor is entitled under the Contract. The Engineer shall then issue to the Purchaser and the Contractor a statement (hereinafter called the "Engineer's Draft Final Account") showing the Final Amount to which the Contractor is entitled under the Contract. The Purchaser and Contractor shall sign the Engineers Draft Final Account as an acknowledgement of the full and final value of the Work performed under the Contract and shall promptly submit a signed copy (hereinafter called Final Account) to the Engineer.

5.23 FINAL CERTIFICATE

On receipt of the Final Account, the Engineer shall promptly prepare and issue to the Purchaser and the Contractors Final Payment Certificate certifying that there are no further claims due to the Contractor in respect of this Contract.

5.24 NOTICES (CLAUSE 3.35)

4.3.16 5.24.1 The Purchaser's Address is as given below:

Dy. GENERAL MANAGER (CONTRACTS), HPPTCL,

BAROWALIAS HOUSE, KHALINI, SHIMLA (H. P.) – 171002

5.24.2 Unless notified otherwise in writing by the Purchaser, the Engineer's Address for Sub Station is as given below:

Sr. MANAGER, HPPTCL,

SARABAI, BHUNTER, DISTRICT KULLU – 175125 (H. P).

5.24.3 The Contractor's Address is as given below:

....

(To be filled in at the time of signing of Contract)

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5.25 TAXATION

5.25.1 LOCAL TAXATION: The Price Bid shall include all Custom Duties, Import Duties, Business Taxes, Income and Other Taxes etc that may be levied according to the Laws and Regulations being enforce as on the date thirty days prior to the closing date for submission of Bids on the Constructional Plant, Materials and Supplies (both Permanent, Temporary) and Consumable Acquired for the purpose of the Contract and on the Services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any Tax that may be levied in INDIA on profits made by him in respect of the Contract. However, Statutory Taxes / Levies shall be paid as per actual on production of Documentary Evidence, ion applicable as per Tender Specifications.

5.25.2 INCOME TAX ON STAFF: The Contractor's Staff, Personnel, and Labour will be liable to pay Personal Income Taxes in the INDIA in respect of such of their Salaries and Wages, as are chargeable under the Laws and Regulations for the time being in force. The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws and Regulations.

5.26 BRIBERY AND COLLUSION

5.26.1 The Purchaser shall be entitled to terminate the Contract and recover from the Contractor the amount of any loss resulting from such Termination if the Contractor shall have offered or given to any person any gift or consideration of any kind as an inducement or reward for doing, or for bearing to do any action in relation to obtaining or in the execution of the Contract or any other Contract with the Purchaser, or if any of the like Acts shall have been done by any person employed by the Contractor or acting on his behalf (whether with or without the knowledge of the Contract), or if the Contractor shall have come to any agreement with another Contractor or number of Contractors whereby an agreed quotation or estimate shall be offered as a Bid to the Purchaser by one or more Contractors.

5.26.2 In the event of such Termination, the Contractor shall: -

a) Proceed as provided in Sub - Clause 4:16 of Section - 4 to this Volume; and

b) Be paid by the Purchaser as provided in Sub - Clause 4.16.8 of Section - 4 to this Volume, provided that any loss referred to in Sub - Clause 5.26.1 of this Clause shall first be deducted.

5.27 TERMINATION FOR CONVENIENCE

5.27.1 The Purchaser shall be entitled to terminate this Contract, in whole or in part, at any time for the Purchaser's convenience after giving thirty days prior notice to the Contractor, with a copy to the Engineer.

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5.27.2 In the event of such Termination, the Contractor shall: -

a) Proceed as provided in Sub - Clause 4.16 of Section - 4 to this Volume; and

b) Be paid by the Purchaser as provided in Sub - Clause 4.16.8 of Section – 4 to this Volume.

5.28 RESTRICTIONS OF ELIGIBILITY

5.28.1 Any Equipment, Supplies or Materials, which will be incorporated in the Works, shall have its origin in eligible source country as defined in Clause 2.2 of Section - 2 to this Volume.

5.28.2 Carriers from such eligible source countries shall Transport such Equipment, Supplies or Materials, unless exempted by the Purchaser in writing on the basis of potential excessive costs or delays.

5.29 SOURCE OF INSURANCE

The Contractor shall be entitled to place all Insurance relating to the Contract (including, but not limited to, the Insurance referred to in Clauses 3.18 of Section – 3 and 4.52 of Section - 4 to this Volume with insurers from within INDIA.

5.30 JOINT VENTURES

5.30.1 If the Contract is Joint Venture, Partner - In - Charge shall be liable to the Purchaser for the execution of the entire Contract in accordance with its terms.

5.30.2 In case of Bids where Bidder has associated with Collaborator / Associate and has established satisfactory fulfilment of the qualifications requirements stipulated in the Bid Documents, Partner - In - Charge shall be responsible to the Purchaser for successful performance of the Contract and submit the desired document in terms of Clause 2.16.2(d) of this Specification. Such document shall be addressed to the Purchaser and shall be signed by Partner - In - Charge. The model format of the above document is enclosed in PART - BSF of this Section.

5.31 TYPE TEST CHARGES

The Bidder is required to quote Type Test Charges of various Sub Stations Equipment required by the Purchaser for completion of the Works. The Purchaser shall pay on successful completion of all Type Tests and on approval of Result the Type Test Charges for each type of Equipment.

5.32 INDEMNITY BOND

For the Equipment / Material to be provided by the Contractor, it will be the responsibility of the Contractor to take the Delivery, unload and Store the Equipment / Material at Site and execute an Indemnity Bond, Trust Receipt and obtain authorisation letter from Purchaser / Engineer as Performa given at Section 6 in favour of the Purchaser against loss, damage and any risk involved for the full value of the Equipment / Material. This Indemnity Bond shall be furnished

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by the Contractor before commencement of the supply and shall be valid till the schedule date of Testing, Commissioning and Handing Over of the Equipment / Material to the Purchaser.

5.33 STORAGE CUM ERECTION INSURANCE

5.33.1 All the Equipment and Material being supplied by the Contractor shall be kept completely insured by the Contractor at his own cost from the Time of Dispatch from the Contractor's Works, upto the Completion of Erection, Testing and Commissioning at Site and Taking Over of the Sub Station by the Purchaser.

5.33.2 Further, all the Equipment and Materials, if any, being supplied by the Purchaser for Erection, Testing and Commissioning shall be kept insured by the Contractor against any Loss, Damage, Pilferage, Theft, fire etc from the point of commencement of Unloading up to the Time of Taking Over by the Purchaser. The Premium paid to the Insurance Company by the Contractor for such Insurance shall be reimbursed by the Purchaser to the Contractor at actual against documentary proof to be furnished by the Contractor. The Contractor shall obtain competitive quotations for such Insurance. The Insurable Value of the Equipment being supplied by the Purchaser shall be intimated to the Contractor for arranging the Insurance.

5.33.3 It will be the responsibility of the Contractor to lodge, pursue and settle all Claims with the Insurance Company for all Equipment / Materials under the Package in case of any Damage, Loss, Theft, Pilferage or Fire during the execution of the Contract and HPPTCL shall be kept informed about it. The Contractor shall be responsible for Replacement of the Lost / Damaged Materials promptly irrespective of the settlement of the Claims by the underwriters and ensure that the Work Progress is as per agreed Schedules. The Losses, if any, in such replacement will have to be borne by the Contractor.

5.34 FAKE INSPECTION CALL

If the Contractor after giving Inspection Call do not put up Material / Equipment to Inspecting Officer for inspection due to one reason or the other, shall be required to remit the expenditure on TA & DA (including Hotel Charges on documentary evidence) of the Inspecting Officer(s) including Outturn Charges for HPPTCL Vehicle(s) / Taxi used during journey on prescribed Rates for private Journey. Besides this recovery against each such Fake Call, a letter of Warning shall be issued and it shall be counted towards their Performance for all intent and purpose.

5.35 CHANGE OF QUANTITY

5.35.1 The Purchaser reserves the right to increase or decrease up to 40 % (Forty percent) of the Contract Value, the Quantity of Goods and Services for the Items for which Quantities have been indicated by the Purchaser without any change in Unit Price or other Terms and Conditions

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during the execution of the Contract. The Quantities of Individual Items may vary up to any extent.

5.35.2 Further any Quantity Variations for Lump Sum Items for which Quantity has been indicated by the Contractor (for the purpose of on account payment) shall be to the account of the Contractor without any additional cost to the Purchaser except in case there is change in Quantity of these Items due to change in the Scope of Work by the Purchaser. In such case, the Purchaser reserves the right to increase or decrease up to 40 % (Forty percent) of the Contract Value on the same Terms and conditions during the execution of the Contract.

5.35.3 In case during Detailed Engineering, there is change in Quantity of some of the Items and Services for which Unit Rates have been asked for in the Bid Proposal Sheets, the Actual Quantity Supplied and Installed shall be payable. However, there shall be no variation in Price for the Items / Services for which Lump Sum Prices is payable. *No Additional Price shall be paid for the Items for which Unit Rates are not given in Bid Proposal Sheets but are required for completion of Job* and it will be the responsibility of the Bidder to access all such Items and clearly bring out the same in Bid Proposal Sheets along with their Prices.

After Detailed Engineering, the Bill of Quantities for which Unit Rates have been given in the Bid Proposal Sheets in the Contract, the Revised Bill of Quantities shall be prepared and got approved immediately from the Purchaser by the Contractor. The Payment shall be made for the Revised Quantities only.

END OF SECTION - 5

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SECTION - IV

Erection Conditions of Contract

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SECTION – 4

ERECTION CONDITIONS OF CONTRACT

E. C. C.

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ERECTION CONDITIONS OF CONTRACT

E. C. C.

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SECTION – 4

ERECTION CONDITIONS OF THE CONTRACT

E. C. C.

4.2 GENERAL

4.2.1 The follow +ing shall supplement the Conditions already contained in the other Parts of this Specification and Documents and shall govern the Portion of the Work of this Contract to be performed at Site.

4.2.2 The Contractor upon signing of the Contract shall, in addition to Project Coordinator, nominate another Responsible Officer as his representative at Site, suitably designated for the purpose of overall responsibility and coordination of the Works to be performed at Site. Such Officer shall function from the Site office of the Contractor during the pendency of the Contract.

4.3 REGULATION OF LOCAL AUTHORITIES AND STATUTES

4.3.1 The Contractor shall comply with all the Rules and Regulations of Local Authorities during the Performance of his field activities. He shall also comply with Minimum Wages Act, 1948 and the Payment of the Wages Act (both Government of India) and the Rules made there under in respect of any employee or workman employed or engaged by him or his Sub Contractor.

4.3.2 All Registration and Statutory Inspection Fees, if any, in respect of his work pursuant to this Contract shall be to the account of the Contractor. However, any Registration, Statutory Inspection Fee lawfully payable under any Statutory Law and its amendments from time to time during Erection in respect of the Equipment ultimately to be owned by the Purchaser, shall be to the account of the Purchaser. Should any such Inspection or Registration need to be re-arranged due to fault of Contractor or his Sub Contractor, the additional fees to such Inspection and / or Registration shall be borne by the Contractor.

4.3 LICENSE FOR CONSTRUCTION

The Contractor shall obtain license for Construction of 220 / 33 kV Sub Stations and Allied Works in Himachal Pradesh from the Chief Electrical Inspector to Govt. of Himachal Pradesh, as required under Indian Electricity Act / Rules.

4.4 PURCHASER'S LIEN OF EQUIPMENT

The Purchaser shall have lien on all of the Equipment including those of the Contractor brought to the Site for the purpose of Erection, Testing and Commissioning of the Equipment to be Supplied and Erected under the Contract. The Purchaser shall continue to hold the lien on all such Equipment through out the period of the Contract. The Contractor and / or his Sub

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Contractor without the prior written approval of the Purchaser / Engineer shall remove no Material brought to the Site from the Site.

4.5 ACCESS TO SITE AND WORKS ON SITE

4.5.1 The Purchaser shall afford suitable access to and possession of Site to the Contractor in reasonable time.

4.5.2 Any foundation if to be provided by the Purchaser, the Purchaser shall have the same ready, as per the agreed schedule for the execution of the individual phases of the Works.

4.5.3 The Work so far as, it is carried out on the Purchaser's premises shall be carried out at such time as the Purchaser may approve and the Purchaser shall give the Contractor reasonable facility for carrying out the Works.

4.5.4 In the execution of the Works, no person other than the Contractor or his duly appointed representative, Sub - Contractor and Workmen shall be allowed to do work on the Site, except by the special permission in writing of the Purchaser / Engineer.

4.6 CONTRACTOR'S SITE OFFICE ESTABLISHMENT

The Contractor shall establish a Site Office at the Site and keep posted an Authorised Representative for the purpose of the Contract. Any written order or instruction of the Purchaser / Engineer or his duly authorised representative shall be communicated to the said Authorised Resident Representative of the Contractor and the same shall be deemed to have been communicated to the Contractor at his legal address.

4.7 PROGRAMME

4.7.1 Within the limitations of Time Schedule stated in Schedule - I, the Contractor shall, after the acceptance of his Bid, submit to the Purchaser / Engineer for his approval, a programme within 45 days showing the order of procedure in which he proposes to carryout the Works in the shape of PERT Charts for each portion of the Works. The Contractor shall, whenever required by the Engineer or his representative, also provide in writing for his information a general description of the arrangements and methods, which the Contractor proposes to adopt for the execution of the Works.

4.7.2 If at any time it should appear to the Purchaser / Engineer that the actual progress of the Works does not conform to the approved programme referred to in Sub - Clause 4.7.1 hereof, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to the approved programme necessary to ensure completion of the Works within the time for completion as defined in Clause 3.13 of General Conditions of Contract (G. C. C.).

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4.7.3 The submission to and approval by the Purchaser / Engineer or his representative of such programmes or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

4.8 DISCIPLINE OF WORKMEN

The Contractor shall adhere to the Disciplinary procedure set by the Purchaser / Engineer in respect of his Employee or Workmen at Site. The Purchaser / Engineer shall be at liberty to object to the presence of any representative or employee of the Contractor at Site, if in his opinion such employee has misconducted himself or is incompetent or negligent or otherwise undesirable. The Contractor shall remove such a person objected to and provide in his place a competent replacement.

4.9 CONTRACTOR'S FIELD OPERATION

4.9.1 The Contractor shall keep the Purchaser / Engineer informed in advance regarding his Field Activity, Plans, and Schedules for carrying out each part of the Works. Any review of such Plan or Schedule or Method of Work by the Purchaser / Engineer shall not relieve the Contractor of any of his responsibility towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the Purchaser / Engineer or any of his representatives. No claim of the Contractor will be entertained because of failure or inefficiency of any such Plan or Schedule or Method of Work reviewed. The Contractor shall be solely responsible for the safety, adequacy and efficiency of Plant and Equipment and his Erection Methods.

4.9.2 The Contractor shall have the complete responsibility for the conditions of the Work Site including the Safety of all the persons employed by him or his Sub – Contractor and all the properties under his custody during the performance of the Work. This requirement shall apply continuously till the completion of the Contract and shall not be limited to the normal working hours. The construction review by the Purchaser / Engineer is not intended to include review of Contractor's safety measures in, on or near the Work Site, and their adequacy or otherwise.

4.10 CONTRACTOR'S EMPLOYEES

4.10.1 The Contractor shall provide and employ on the Site in connection with the Execution and Maintenance of the Works.

a) Only such Technical Assistants as are skilled and experienced in their respective callings and such Sub - Agents, Foremen and Leading Hands as are competent to give proper supervision to the Work they are required to supervise, and

b) Such Skilled, Semi - Skilled and Unskilled Labour as is necessary for the proper and timely execution and maintenance of the Works.

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4.10.2 The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Engineer, misconduct's himself, or is incompetent or negligent in the proper performance of his duties, or whose employment is otherwise considered by the Engineer to be undesirable and such person shall not be again employed upon the Works without the written permission of the Engineer. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer.

4.11 LABOUR

4.11.1 The Contractor shall make his own arrangements for the engagement of all Labour, local or otherwise, and, save insofar as the Contract otherwise provides for the Transport, Housing, Feeding and Payment thereof.

4.11.2 The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on Site, to the satisfaction of the Engineer or his representative, an adequate supply of drinking and other water for the use of the Contractor's staff and other work people.

4.11.3 The Contract shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose off any alcoholic liquor, or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Sub -Contractors, agents or employees.

4.11.4 The Contractor shall not give, barter or otherwise dispose off, to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

4.11.5 The Contractor shall, in all dealings with Labour in his employment, have due regard to all recognised festivals, days of rest and religious and other customs.

4.11.6 In the event of any out break of illness of an epidemic nature, the Contractor shall comply with and carryout such regulations, orders and requirements as may be made by the Government or the local Medical or Sanitary Authorities for the purpose of; dealing with and overcoming the same.

4.11.7 The Contractor shall at all times take all reasonable precautions to prevent any Unlawful, Riotous or Disorderly Conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

4.11.8 The Contractor shall at all times during execution of work ensure that no person employed by him is under the age of eighteen years.

4.11.9 The Contractor shall provide identification badges to the Labour employed by him for the execution of the Contract.

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4.11.10 The Contractor shall be responsible for observance by his Sub Contractors of the foregoing provisions.

4.11.11 The Contractor shall follow the minimum wages act of Central / State Govt. in respect of his Employees / Labour. The Contractor shall make regular payments to the Employee / Labour as per Labour Law. In case of default, the Purchaser may make payment to the Employee / Labour at the cost of Contractor to be deducted from any amount due to the Contract.

4.12 RETURNS OF LABOUR ETC

4.12.1 The Contractor shall, submit to the Engineer, on the first day of every month, a Man – Power Report of the previous month detailing the number of persons scheduled to have been employed and actually employed, skill – wise and the areas of employment of such labour.

4.12.2 The Contractor shall submit to the Engineer, on the First day of every month, a man-hours Schedule for the month, detailing the man-hours schedule for the month, skill wise and area wise.

4.13 PLANTS, TEMPORARY WORKS, AND MATERIALS

4.13.1 All Constructional Plant, Temporary Works, and Materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove the same or any part thereof except for the purpose of moving it from one part of the Site to another, without the consent, in writing, of the Engineer, which shall not be unreasonably withheld.

4.13.2 Upon completion of the Works, the Contractor shall remove from the Site all the said Construction Plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.

4.13.3 The Purchaser shall not at any time be liable for the loss or damage to any of the said Constructional Plant, Temporary Works or Materials.

4.13.4 In respect of any Construction Plant which the Contractor shall have imported for the purpose of the Works, the Purchaser will assist the Contractor, where required, in procuring any necessary Government consent to the re-export of such Constructional Plant by the Contractor upon the removal thereof as aforesaid.

4.13.5 The Purchaser will assist the Contractor, where required, in obtaining clearance through the customs of Constructional Plant, Materials and other things required for the Works.

4.13.6 The operation of Clause 4.13 hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

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4.14 ERECTION TOOLS AND PLANTS

The Contractor shall arrange at his own expenses all necessary Erection Tools and Plants, Ordinary or Special necessary for Excavation, Stub Setting, Erection, Testing and Commissioning of the SUBSTATION such as Surveying Instruments, Tackles, Spanners, Wrenches Pumps, Timbering Scaffolding, Jacks, Winches, Ropes and all Construction Machinery such as Tractors, Bulldozers, Hydraulic Compressors, Dies & Dynamometer, Come along Clamps, Tension Stringing Equipment, Camping Requisites etc

4.15 PROTECTION OF WORK

The Contractor shall have Total Responsibility for protecting his Works till it is finally Taken Over by the Purchaser / Engineer. The Purchaser / Engineer shall entertain no claim for any damage or loss to the Contractor's Works and the Contractor shall be responsible for complete restoration of the damaged Works to original conditions to comply with the Specification and Drawings. Should any such damage to the Contractor's Works occur because of any other Party not being under his supervision or control, the Contractor shall make his claim directly with the Party concerned.

If Disagreement or Conflict or Dispute develops between the Contractor and the other Party or Parties concerned regarding the responsibility for damage to the Contractor's Works, the same shall be resolved as per the provision of Clause 4.20 herein entitled "Co-operation with other Contractors". The Contractor shall not cause any delay in the repair of such damaged Works because of any delay in the resolution of such dispute. The Contractor shall proceed to repair the Works immediately and no cause thereof shall be assigned pending resolution of such disputes.

4.16 SPECIAL RISKS

4.16.1 The Contractor shall be under no liability, whatsoever whether by way of indemnity or otherwise, for or in respect of destruction of or damage to the Works, save to work condemned under the provisions of Clause - 3.29 of G. C. C., prior to the occurrence of any Special Risk hereinafter mentioned, or to property whether of the Purchaser or third parties, or for or in respect of injury or loss of life which is the consequence of any Special Risk as hereinafter defined. The Purchaser shall indemnify and save harmless the Contractor against and from the same and against and from all Claims, Proceedings, Damages, Costs, Charges and Expenses whatsoever arising there out or in connection therewith.

4.16.2 If the Works or any Materials on or near or in transit to the Site, or any other property of the Contractor used or intended to be used for the purposes of the Works, shall sustain destruction

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or damage by reason of any of the said Special Risks, the Contractor shall be entitled to payment for:

a) Any permanent Work and any Materials so destroyed or damaged, and, so far as may be required by the Engineer, or as may be necessary for the completion of the Works, on the basis of cost plus such profit as the Engineer may certify to be reasonable,

b) Replacing or making good any such destruction or damage to the Works,

c) Replacing or making good such materials or other property of the Contractor used or intended to be used for the purpose of the Works.

4.16.3 Destruction, Damage, Injury or Loss of Life caused by the explosion or impact whenever and wherever occurring of any Mine, Bomb, Shell, Grenade, or other Projectile, Missile, Ammunition Or Explosive Of War, shall be deemed to be a consequence of the said Special Risks.

4.16.4 The Purchaser shall repay to the Contractor any increased cost of or incidental to the execution of the Works, other than such as may be attributable to the cost of reconstructing Works condemned under the provisions of Clause 3.29 of General Conditions of Contract (G. C. C.) prior to the occurrence of any Special Risk, which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said Special Risks, subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war, but the Contractor shall, as soon as any such increase of cost shall come to his knowledge forthwith notify the Engineer thereof in writing.

4.16.5 The Excepted Risks are War (whether war be declared or not), Hostilities, Invasion, Act of Foreign Enemies, Rebellion, Revolution, Insurrection or Military or Usurped Power, Civil War or unless solely restricted to the employees of the Contractor or his Sub - Contractors and arising from the conduct of the Wars, Riot, Commotion or Disorder or Use or Occupation by the Purchaser of any part of the permanent Works or cause solely due to hazardous properties of any explosive or any such operation of the forces of nature or pressure waves caused by Aircraft or other aerial devices travelling at sonic or supersonic speeds.

4.16.6 If during the currency of the Contract, there shall be an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works.

Provided always that the Purchaser shall be entitled at any time after such outbreak of war to terminate the Contract by giving written notice to the Contractor and upon such notice being

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given, this Contract shall, except as to the rights of the PARTIES under this Clause and to the operation of Clause 3.36 of General Conditions of Contract (G. C. C.), terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

4.16.7 If the Contract shall be terminated under the provisions of the last preceding Sub - Clause, the Contractor shall with all reasonable dispatch / remove from the Site all Constructional Plant and shall give similar facilities to his Sub - Contractors to do so.

4.16.8 If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the Purchaser insofar as such amounts or items shall not have already been covered by payments of amount made to the Contractor, for all work executed prior to the date of termination at the Rates and Prices provided in the Contract and in addition:

a) The amounts payable in respect of any preliminary items, so far as the work or service comprised therein, has been carried out or performed, and a proper proportion as certified by the Engineer of any such items, the work or service comprised in which has been partially carried out or performed.

b) The cost of materials or goods reasonably ordered for the Works which shall have been delivered to the Contractor or which the Contractor is legally liable to accept delivery, such materials or goods becoming the property of the Purchaser upon such payments being made by him.

c) A sum to be certified by the Engineer, being the amount of any expenditure reasonably incurred for the whole of the Works insofar as such expenditure shall not have been covered by the payments in the Sub – Clause before mentioned.

d) Any additional sum payable under the provisions of Sub - Clause 4.16.1, 4.16.2 and 4.16.4 of this Clause.

e) The reasonable cost of removal of Constructional Plant under Sub - Clause 4.16.7 of this Clause and, if required by the Contractor, return thereof to the Contractors main Plant, Yard or to other destination.

f) The reasonable cost of repatriation of the entire Contractors' staff and workmen employed on or in connection with the Works at the time of such termination.

Provided always that against any payments due from the Purchaser under this Sub - Clause, the Purchaser shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Constructional Plant and Materials and any other sums which at the date of termination were recoverable by the Purchaser from the Contractor under the terms of the Contract.

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4.17 DAMAGE TO PERSONS AND PROPERTY

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Purchaser against all losses and claims in respect of injuries or damage to any person or material or physical damage to any property, whatsoever, which may arise out of or in consequence of the execution and maintenance of the Works and against all Claims, Proceedings, Damages, Costs, Charges and Expenses, whatsoever, in respect of or in relation thereto, except any compensation or damages for or with respect to :

a) The permanent use or occupation of land by the Works or any part thereof.

b) The right of the Purchaser to execute the Works or any parts thereof on, over, under, in or through the land.

c) Injuries or damage to persons or property, which are the unavoidable result of the execution or maintenance of the Works in accordance with the Contract.

d) Injuries or damage to persons or property resulting from any act or neglect of the Purchaser, his agents or other Contractors, not being employed by the Contractor, or for or in respect of any Claims, Proceedings, Damages, Costs, Charges and Expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the Purchaser, his agents or other Contractors for the damage or injury.

4.18 INSPECTION OF OPERATIONS AND TESTS

4.18.1 The Purchaser / Engineer or his authorised representative shall at all times have access to the Works and all places where work is being prepared or from where materials or machinery are being procured for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to access.

4.18.2 No foundation shall be covered up or put out of view without the approval of the Engineer or his authorised representative and the Contractor shall afford full opportunity to examine and measure any work, which is about to be covered up or put out of view and to examine foundations before erection work is taken up. The Contractor shall give due notice in writing whenever any such work or foundation is or are ready or about to be ready for examination, to the Engineer or his authorised representative to attend for the purpose of examining and measuring such work.

4.19 WORKS TO THE SATISFACTION OF ENGINEER

Save insofar as it is legally or physically impossible, the Contractor shall execute and maintain the Works strictly in accordance with the Contract to the satisfaction of the Engineer and shall

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comply with and adhere strictly to the Engineers instructions and directions on any matter whether mentioned in the Contract or not touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer or, subject to the limitations referred to in Sub - Clause 3.1.1 of General Conditions of Contract (G. C. C.), from the Engineer's authorised representative.

4.20 CO - OPERATION WITH OTHER CONTRACTORS

4.20.1 The Contractor shall co-operate with all other Contractors or Tradesmen of the Purchaser / Engineer, who may be performing other works on behalf-of the Purchaser / Engineer and the workmen who may be employed by the Purchaser / Engineer and doing work in the vicinity of the Works under the Contract. The Contractor shall also so arrange to perform his Work as to minimise, to maximum extent possible, interference with the work of other Contractors and their workmen. Any injury or damage that may be sustained by the employees of other Contractors and the Purchaser / Engineer, due to Contractor's Work shall promptly be made good at the Contractor's own expenses. The Purchaser / Engineer shall determine the resolution of the any difference or Conflict that may arise between the Contractor and other Contractors or between the Contractor and the Workmen of the Purchaser / Engineer in regard to their Work. If the Work of the Contractor is delayed because of any acts of omission of any other Contractor, the Contractor shall have no claim against the Purchaser on that account other than for an extension of time for completing his Works.

4.20.2 The Purchaser / Engineer shall be notified promptly by the Contractor of any defects in other Contractor's work that could affect the Contractor's Works. The Purchaser / Engineer shall determine the corrective measures if any, required to rectify this situation after the inspection of the Works and such decision(s) by the Purchaser / Engineer shall be binding on the Contractor.

4.21 NO NIGHT OR SUNDAY WORK

Subject to any provision to the contrary contained in the Contract, none of the permanent Works shall, save as hereinafter provided, be carried on during the night or on Sundays, if locally recognised as days of rest, or their locally recognised equivalent without the permission in writing of the Engineer, except when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer or his authorised representative. Provided always that the provisions of this Clause shall not be applicable in the case of any work, which it is customary to carryout by rotary or double shifts. No female Labour shall be employed by the Contractor during night shifts or on Sundays or locally recognised holidays, as stated above. The daily

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hours of work in normal routine shall be restricted to 8 hours and travelling allowance shall also be paid to the Labour as admissible under the Rules.

4.22 FOSSILS

All Fossils, Coins, Articles of Value or Antiquity and Structures and other Remains or Things of Geological or Archaeological Interests discovered on the Site of Work shall, as between Contractor and the Purchaser, be deemed to be the absolute property of the Purchaser. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and immediately upon discovery thereof and before removal acquaint the Engineer or his authorised representative of such discovery and carryout, at the expense of the Purchaser, the Engineer or his authorised representative's orders as to disposal of the same.

4.23 ELECTRICAL POWER FOR CONSTRUCTION PURPOSE

The Contractor shall make all necessary arrangements and provide all necessary Electric Power for construction purposes at his own cost.

4.24 INCIDENTAL SERVICE

4.24.1 As specified in the relevant Bid Documents the Contractor may be required to provide any or all of the following services:

(a) Performance or Supervision or Maintenance and / or Repair of the Supplied Goods, for a period of time agreed upon by the Parties, provided that this service shall not relieve the Contractor of any warranty obligations under this Contract.

(b) Conduct of Training of the Purchaser's Personnel, at the Contractor's Plant and / or on Site, in Assembly, Start - Up, Operation, Maintenance and / or Repair of the Supplied Goods.

4.24.2 Prices charged by the Contractor for the preceding incidental services should be included in the Contract Price.

4.25 INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES

4.25.1 All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permit, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Purchaser or of any other person. The Contractor shall save harmless and indemnify the Purchaser in respect of all Claims, Proceedings, Damages, Costs, Charges and Expenses whatsoever arising out of, or in relation to, any such matters in so far as the Contractor is responsible therefore.

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4.25.2 The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his Sub - Contractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extra ordinary traffic as will inevitably arise from moving of Plant and Material from and to the Site shall be limited, so far as reasonably possible and so that no un-necessary damage or injury may be occasioned to such highways and bridges.

4.26 PROGRESS

4.26.1 The Contractor shall submit monthly progress reports of Erection Work, in triplicate, in the first week of the month following the month under report to the respective Purchaser and Engineer.

4.26.2 The Contractor shall furnish THREE (3) Prints of each to the Purchaser / Engineer of the progress, photographs of the Work Done at Site. Photographs shall be taken as and when indicated by the Engineer or his representative. Photographs shall be of adequate size and numbered to indicate various stages of Erection. Each photograph shall contain the Date, Name of the Contractor and title of the Photograph.

4.26.3 The above Photographs shall accompany the Monthly Report detailing out the progress achieved on all erection activities as compared to the schedules.

4.26.4 If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works on any section is at any time, in the opinion of the Engineer, is too slow to ensure completion by the prescribed time or extended time for completion, the Engineer shall notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer may approve such steps taken by the Contractor to expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Engineer under this Clause, the Contractor shall seek the Engineers' permission to do any work at night or on Sundays, or locally recognised as days of rest or their locally recognised equivalent, such permission shall not be unreasonably refused.

4.27 CABLING

4.27.1 The Conduits shall support all Cables or Cable Trays run in Air or in Cable Trenches. These shall be installed in exposed runs parallel or perpendicular to dominant surface with right angled turn made of symmetrical bends for fittings. When the Cables are run on the Cable Trays, they shall be clamped at minimum intervals of 2000 mm or otherwise as directed by the Purchaser / Engineer.

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4.27.2 Each Cable whether Power or Control, shall be provided with a metallic or plastic tag of an approved type, bearing the Cable reference number indicated in the Cable and Conduit List (Prepared by the Contractor), at every five metre run or part thereof and at both ends of the Cable adjacent to the terminations. Cable Routing is to be done in such a way that the Cables are accessible for any maintenance and easy identification.

4.27.3 Sharp bending and kinking of the Cables shall be avoided. The Minimum Radius for PVC Insulated 1100 V grade Cable shall be 15 D, where D is the Overall diameter of the Cable. Installation of other Cables likes High Voltage, Coaxial, Screened, Compensating, Mineral Insulated shall be in accordance with the Cable Manufacturer's recommendations. Wherever Cable(s) crosses the Roads and Water, Oil, Sewage or Gas Lines, special care should be taken for protection of the Cables in Designing the Cable Trenches.

4.27.4 In each Cable Run, some extra length shall be kept at a suitable point to enable one or two straight through joints to be made, should the Cable develop a fault at a later date.

4.27.5 Control Cables Terminations shall be made in accordance with Wiring Diagram, using Identifying Codes, subject to Purchaser's approval. Multi Core Control Cable Jackets shall be removed as required to train and terminate the Conductor. The Cable Jacket shall be left on the Cable, as far as possible, to the point of the First Conductor Branch. The Insulated Conductor from which the Jacket is removed shall be neatly twinned in bundles and terminated. The Bundles shall be firmly but not tightly tied utilising plastic or nylon ties or specifically treated fungus-protected cord made for this purpose. Control Cable Conductor Insulation shall be secure and even.

4.27.6 The Connectors for the Control Cables shall be covered with Transparent Insulation Sleeve so as to prevent accidental contact with ground or adjacent terminals and shall preferably be terminated in Elmex Terminals and washers. The Insulating Sleeves shall be fire resistant and shall be long enough to over pass the conductor insulation. All Control Cables shall be fanned out, connection made to Terminal Blocks, and Test Equipment for proper operation before Cable is corded together.

4.27.7 Entry of all the Cables in the Equipment / Panels shall be through Cable Glands of suitable size.

4.28 **MEASUREMENT**

4.28.1 The Quantities set out in Volume - II are the Estimated Quantities of the Works, and they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligation under the Contract.

4.28.2 The Engineer or his authorised representative shall, except otherwise stated, ascertain and determine by measurement the values of Work done in accordance with the Contract. He shall,

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when he requires any part or parts of the Works to be measured, give notice to the Contractor's authorised representative, who shall forthwith attend or send a qualified agent to assist the Engineer or his representative in making such measurement and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or fail to send such agent, then the measurement made by the Engineer or approved by him shall be taken to be correct measurement of the Work or any part of the Work.

4.28.3 The Works shall be measured net; not withstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract.

4.29 CERTIFICATES AND PAYMENT

4.29.1 Unless otherwise provided, payment for the Execution of Work shall be made at monthly intervals and for Supply of Material and Accessories shall be in accordance with the conditions set out in Section - 5 of this Volume.

4.29.2 No Certificate other than the Maintenance Certificate referred to in Clause 4.30.3 hereof shall be deemed to constitute final approval of the Works.

4.29.3 The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer and delivered to the Purchaser stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer within thirty days after the expiration of the Period of Maintenance, or if different Periods of Maintenance shall become applicable to different sections or part of the Works, the expiration of the latest such period, or as soon thereafter as any Works ordered during such period pursuant to Clause 4.30 hereof, shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Clause notwithstanding any previous entry on the Works or the taking possession, working or using there of or any part thereof by the Purchaser.

4.29.4 The Purchaser shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause.

4.29.5 Notwithstanding the issue of Maintenance Certificate, the Contractor and, subject to Sub - Clause 4.30.4 thereof, the Purchaser shall remain liable for the fulfilment of any obligation incurred under the provision of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such certificate is issued and, for the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the PARTIES hereto.

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4.29.6 The Payment to the Contractor for various Items of Works shall be based on the Rates Quoted in the respective Schedules of Prices provided in all the Sections.

The Purchaser shall entertain no claim for idle period resulting from any Force Majeure Condition or Excepted Risks.

4.30 MAINTENANCE

4.30.1 The "Period of Maintenance" shall mean the Period of Testing, Commissioning, Routine Repair, Operation, Monitoring and Maintenance of the Works specified in the Tender Document, calculated from the Date of Completion of the Works to its Taking - Over by the Engineer in terms of Clause No. 4.35 of this document certified by the Engineer in accordance with Clause 4.33 hereof, or, in the event of more than one certificate having been issued by the Engineer under the said Clause, from the respective dates so certified and in relation to the period of maintenance the expression "The Works" shall be constructed accordingly. The Maintenance Period shall be ONE YEAR minimum, which can be extended up to a maximum of TWO year on the same Rates, Terms and Conditions, if required by the Engineer. During this Maintenance Period, *the Cost of Repair / Replacement of Equipment / Material and Maintenance Staff deputed for Operation, Monitoring and Maintenance of the GIS Sub Station shall be to the Contractor's account, hence Bidder should Quote accordingly.*

4.30.2 To the intent that the Works shall at or as soon as practicable after the expiration of the Period of Maintenance be handed over to the Engineer as per the Condition of the Contract. The Contractor shall finish the Work, if any outstanding at the date of completion, as certified under Clause 3.13 of General Conditions of Contract (G. C. C.), as soon as practicable after such date and shall execute all such Work of Repair, Amendment, Reconstruction, Rectification and making good Defects, Imperfections, Shrinkage's or other Faults as may be required of the Contractor in writing by the Engineer during the Period Of Maintenance, or within fourteen days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to its expiration.

4.30.3 All such Work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer, be due to the use of Materials or Workmanship not in accordance with the Contract, or to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied on the Contractors part under the Contract. If, in the opinion of the Engineer such necessity shall be due to any other cause, the value of such work shall be as ascertained and paid for as if it were additional work.

4.30.4 If the Contractor fails to do any such work required under the Contract, the Purchaser shall be entitled to employ and pay other persons to carry out the same and if such Works which the

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Contractor was liable to do at his own expense under the Contract, all expenses consequent there on or incidental there to, shall be recoverable from the Contractor by the Purchaser or may be deducted by the Purchaser from any claims due or which may become clue to the Contractor.

4.30.5 The Contractor shall, if required by the Engineer in writing, search under the directions of the Engineer for the cause of any defect, imperfection, or fault appearing during the progress of the Works or in the Period of Maintenance. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the Works carried out by the Contractor in searching as aforesaid shall be borne by the Purchaser. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the costs of the work carried out in searching as aforesaid shall be borne by the Contractor and the Contractor shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense or action will be taken in accordance with the provisions of Sub - Clause 4.30.4.

4.31 REMOVAL OF IMPROPER WORK AND MATERIALS

4.3.3 4.31.1 The Engineer shall during the progress of the Works have power to order in writing from time to time:

a) The Removal from the Site, within such time or times as may be specified in the order, of any Materials, which, in the opinion of the Engineer, are not in accordance with the Contract.

b) The substitution of proper and suitable Materials and.

c) The removal and proper re-execution, not withstanding any previous test thereof or interim payment therefore, of any Works which in respect of materials or workmanship is not in the opinion of the Engineer in accordance with the Contract.

4.31.2 In case of default on the part of the Contractor in carrying out such order, the Purchaser shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Purchaser or may be deducted by the Purchaser from any claims due or which may become due to the Contractor.

4.32 CLEARANCE OF SITE

4.32.1 During the progress of the Works, the Contractor shall keep the Site reasonably free from all un-necessary obstruction and shall store or dispose off any Constructional Plant and Surplus Materials and clear away and remove from the Site any rubbish or Temporary Works that are no longer required. However, stones significant in size and quantity excavated at the Site of Work during the execution shall not be disposed off by the Contractor without the prior approval of

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the Engineer but shall duly be notified in writing to the Engineer and the decision of the Engineer with regard to disposal / accountal of such material shall be binding on the Contractor.

4.32.2 On the completion of Works, the Contractor shall, clear way and remove from the Site of Work all Construction Plant, Surplus Material, Rubbish and Temporary Work of any kind and leave the whole Site and Work clean and in a workman like condition to the satisfaction of the Engineer.

4.33 CERTIFICATE OF COMPLETION OF WORKS

4.33.1 When the whole of the Works have been substantially completed and have satisfactorily passed final tests that may have been prescribed in the Contract, the Contractor may give a notice to that effect to Engineer, accompanied by an undertaking to finish any outstanding work during the Period of Maintenance. Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Engineer to issue a certificate of completion in respect of the Works. The Engineer shall, within twenty - one days of the date of delivery of such notice either issue to the Contractor, with a copy to the Purchaser, a certificate of completion stating the date on which, in his opinion the Works were substantially completed in accordance with the Contract or give instructions in writing to the Contractor before the issue of such certificate. The Engineer shall notify the Contractor of any defects in the Works affecting substantial completion that may appears after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such certificate of completion within twenty-one days of completion to the satisfaction of the Engineer of the Works so specified and making good any defects so notified.

4.33.2 Similarly, in accordance with the procedure set out in Sub - Clause 4.32.1 hereof, the Contractor may request and the Engineer shall issue a certificate of completion in respect of: -

a) Any section of the permanent Works, in respect of which a separate time for completion is provided in the Contract, and.

b) Any substantial part of the permanent Works, which has been both completed to the satisfaction of the Engineer and occupied or used by the Engineer.

4.33.3 If any part of the Permanent Works shall have been substantially completed and passed any test satisfactorily that may be prescribed by the Contract, the Engineer may issue a certificate of completion is respect of that part of the permanent Works before completion of the whole of the Works and upon the issue of such certificate, the Contractor shall be deemed to have undertaken to complete any outstanding Works in that part of the Works during the period of maintenance.

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4.33.4 Provided always that a certificate of completion given in respect of any section or part of the permanent Works before completion of the whole shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such certificate shall expressly so state.

4.33.5 The Contractor shall execute any Work, connected with the completion of the Sub Station, which may not have been specifically included in this Specification but considered necessary for the completion of the Sub Station, after obtaining prior approval of Purchaser. *The Bidder in the Bid shall quote for all such Work separately failing which such Work shall be deemed to have been included in the Contract.*

4.33.6 From the Commencement of Work until the date stated in the Certificate of Completion for the whole of the Works pursuant to the Contract, the Contractor shall take full responsibility for the care thereof. Provided further that if, Engineer shall issue a certificate of completion in respect of any part of the Permanent Works, the Contractor shall cease to be liable for the care of that part of the Permanent Works from the date stated in the certificate of completion in respect of that part and the responsibility shall pass to the Engineer provided further that the Contractor shall take full responsibility for the care of any outstanding Work which he shall have under taken to finish during the Period of Maintenance until such outstanding work is completed.

4.33.7 In case any loss, damage or injury shall happen to the Works or any part thereof, from any cause whatsoever, save and excepted risks as detailed in Clause 4.16 hereof, the Contractor shall at his own cost, repair and make good the same so that at completion, the Works shall be in good order and condition to the satisfaction of the Engineer. In the event of any loss, damage or injury happening from any excepted risks, the Contractor shall if and to the extent required by the Engineer, repair and make good for the same as aforesaid at the cost of the Contractor.

4.34 CHANGE ORDERS

4.34.1 The Purchaser may at any time, by a written order given to the Contractor, make changes within the General Scope of the Contract in any one or more of the following:

a) Drawings, Designs or Specifications, where Goods and Services to be furnished under the Contract are to be specifically provided for the Purchaser,

b) The method of shipment or packing

c) The Place of Delivery, or

d) The Services to be provided by the Contractor.

4.34.2 If any such change causes an increase or decrease in the cost of, or the time required for the Contractor's performance of any part of the work under the Contract, whether changed or not changed by the Order, an equitable adjustment shall be made in the Contract Price or Delivery Schedule, or both and the Contract shall accordingly be amended. Any claims by the

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Contractor for adjustment under this Clause must be assessed within thirty (30) days from the date of the Contractor's receipt of the Purchaser's change order.

4.35 TAKING OVER

Upon successful completion of all Tests to be performed at Site on the Equipment furnished and Erected by the Contractor, the Purchaser shall issue to the Contract a Taking - Over Certificate as a proof of the Final Acceptance of the Equipment. Such Certificate shall not unreasonably be withheld nor will the Purchaser delay the Issuance thereof on account of Minor Omissions or Defects, which do not affect the Commercial Operation and / or cause any serious risk to the Equipment. Such Certificate shall not relieve the Contract of any of his obligations which otherwise survive by the Terms and Conditions of the Contract after issue of such Certificate.

However, the Sub Station is to be Operated, Monitored and Maintained for a period of atleast ONE YEAR that can be extended to TWO Years, after commissioning of the same, by the Contractor and the Bidders are required to quote accordingly.

4.36 LIQUIDATED DAMAGES FOR DELAY

4.36.1 If the Contractor shall fail to achieve completion of the Works within the time prescribed by Sub - Clause 3.13.1 of General Conditions of Contract (G. C. C.), then the Contractor shall pay to the Purchaser the sum stated in the Contract as Liquidated Damages for such default and not as a penalty for every day or part of a day which shall elapse between the time prescribed by Sub - Clause 3.13.1 of General Conditions of Contract (G. C. C.) and the date of certified completion of the Works.

The Purchaser may, without prejudice to any other method of recovery, deduct the amount of such damages from any claims in his hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

4.36.2 If before the completion of the Whole of the Works, any part or section of the Works has been certified by the Engineer as completed, pursuant to Clause 4.32 hereof, and occupied or used by the Engineer, the Liquidated Damages for delay shall, for any period of delay after such certificate and in the absence of alternative provisions in the Contract be reduced in the proportion which the value of the part or section so certified bears to the value of the whole of the Works.

4.37 THIRD PARTY INSURANCE

4.37.1 Before commencing the Execution of the Works, the Contractor shall insure against his liabilities for any Material or physical damage, loss or injury which may occur to any property,

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including that of the Purchaser or to any person including any employee of the Purchaser, by or arising out of the execution of the Works or in carrying-out-of the Contract.

4.37.2 Such insurance shall be affected with an insurer and in terms approved by the Purchaser, approval of which shall not be unreasonably withheld, and for atleast the amount stated in the Special Conditions of the Contract. The Contractor shall whenever required, produce to the Engineer or his representative the policy or policies or insurance and the receipt for payment of the current premiums.

4.37.3 The Terms shall include a provision whereby, in the event or any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the Purchaser, the insurer will indemnify the Purchaser against such claims and any costs, charges and expenses in respect thereof.

4.38 COMPREHENSIVE AUTOMOBILE INSURANCE

4.38.1 Before commencing and execution of the Works, the Contractor shall insure all the automobiles under his control at the Site of Works against his liability for any Material or Physical Damage, Loss or Injury which may occur to any person or persons including any employee of the Purchaser arising out of execution of the Works or in carrying out of the Contract.

4.38.2 Such insurance shall be affected with an insurer and in terms approved by the Purchaser, approval of which shall not be unreasonably withheld, and for atleast the amount stated in the Special Conditions of the Contract. The Contractor shall whenever required, produce to the Engineer or his representative the policy or policies of insurance and the receipts for payment of the current premiums.

4.39 ACCIDENT OR INJURY TO WORKMEN

4.39.1 The Purchaser shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or any Sub - Contractor, save and except an accident or injury resulting from any act or default of the Purchaser or his representatives. The Contractor shall indemnify and keep indemnified the Purchaser against all such damages and compensation save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

4.39.2 The Contractor shall insure against such liability with an insurer approved by the Purchaser, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall, when required, produce to the Engineer or his representative such policy of insurance and the receipt for payment of the current premium. Provided always that in respect of any persons employed

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by any Sub - Contractor, the Contractor's obligation to Insure as aforesaid under this Sub - Clause shall be satisfied if the Sub - Contractors shall have insured against the liability in respect of such persons in such manner that the Purchaser is indemnified under the policy, but the Contractor shall require such Sub - Contractor to produce to the Engineer or his representative, when required, such policy of insurance and the receipt for the payment of the current premium.

4.39.3 If the Contractor shall fail to effect and keep in force the insurance referred in Clauses 4.16 hereof, or any other insurance which he may be required to effect under the terms of the Contract, then and in any such case the Purchaser may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Purchaser as aforesaid from any claims due or which may become due to the Contractor, or recover the same as a debt due from the Contractor.

4.40 NOTICES AND PAYMENT OF FEES

4.40.1 The Contractor shall give all Notices and pay all fees required to be given or paid by any National or State Statute, Ordinance or other Law, or any duly constituted authority in relation to the execution of the Works and by the Rules and Regulations of all Public Bodies and Companies whose property or rights are affected or may be affected in any way by the Works.

4.40.2 The Contractor shall conform in all respects with the provisions of any statutes, ordinance or law as aforesaid and the regulations or bye - laws of any local or any other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and keep the Purchaser indemnified against all penalties and liability of every kind for breach of any statute, ordinance or law regulation or bye law.

4.40.3 The Purchaser will repay or allow to the Contractor all such sums, as the Engineer shall certify to have been properly payable and paid by the Contractor in respect of all such fees.

4.41 ARBITRATION

4.41.1 If at any Time any question, difference or dispute what - so - ever shall arise between the Purchaser or the Corporation and the Contractor or Company, upon or in relation to or in connection with the Contract, either Party may forthwith give to the other notice in writing of the existence of such question, difference or dispute and the same shall be settled by an Arbitrator of the Rank of General Manager, HPPTCL, Shimla against Purchase Orders / Supplies made and shall be subject to the provisions of the Indian Arbitration and Conciliation Act – 1996 or any statutory modification or re - enactment thereof and the Rules framed there under and for the

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time being in force. The Award of Arbitrator shall be final and binding on both the parties to the Contract.

4.41.2 The objection (i) that the Arbitrator so appointed is a Government Servant (ii) that he had to deal with matters to which the Contract relates and (iii) that in the course of his Duties as Government Servant, he had expressed his views on all or any of the matters in dispute or difference, shall not be considered as a valid objection / bar to his acting as such in the Arbitration proceeding under this Clause.

4.41.3 All the disputes between the Contractor and the Purchaser upon or in relation to the Material supplied against the Award and the Contract shall be settled by an Arbitrator of the Rank of General Manager, HPPTCL, Shimla and only the legal dispute arising out of the Arbitration Award if any, shall be subject to the Jurisdiction of SHIMLA Court only.

4.41.4 The Work under the Contract shall, if reasonably possible, continue during the Arbitration proceedings and no payment due or payable by the Purchaser shall be withheld on account of such proceedings.

4.41.5 During the settlement of disputes and arbitration proceedings, both Purchaser and Contractor shall be obliged to carry out their respective obligations under the Contract.

4.42 FIRE PROTECTION

4.42.1 The Work procedures that are to be used during the Erection shall be those, which minimise Fire Hazards to the extent practicable. Combustible Materials, Combustible Waste and Rubbish shall be collected and removed from the Site atleast once each day.

Fuels, Oils and Volatile or Inflammable Materials shall be stored away from the Construction, Equipment, and Material Storage Areas in safe containers. Untreated Materials shall not at all be used at Site for any other purpose unless otherwise specified. If any such Materials are received with the Equipment at Site, the same shall be removed and replaced with acceptable Material before moving into the Construction or Storage Area.

4.42.2 Similarly, Corrugated Paper Fabricated Cartons etc will not be permitted in the Construction Area either for storage or for handling of Materials. All such Materials used shall be of Waterproof and Flame Resistance Type. All the other Materials such as Working Drawings, Plans etc that are Combustible but are essential for the Works to be executed shall be protected against Combustion resulting from Welding Sparks, Cutting Flames and other similar fire sources.

4.42.3 All the Contractor's Supervisory Personnel and sufficient number of Workers shall be trained for Fire Fighting and shall be assigned specific Fire Protection Duties. Enough of such Trained Personnel must be available at Site during the entire period of Contract.

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4.42.4 The Contract shall provide enough Fire Protection Equipment of the Types and Number for the Warehouses, Office, and Temporary Structures, Labour Colony etc. Access to such Fire Protection Equipment shall be easy and kept open at all time.

4.43 SECURITY

The Contractor shall have total responsibility for all Equipment and Material in his Custody / Stores, Loose, Semi Assembled and / or Erected by him at Site. The Contractor shall make suitable Security arrangements including employment of Security Personnel to ensure the protection of all the Materials, Equipment, and Works from theft, fire, pilferage and any other damages and loss. All Materials of the Contractor shall enter and leave the Project Site only with the written permission of the Engineer in the prescribed manner.

4.44 CONTRACTOR'S AREA LIMITS

The Engineer shall mark out the Boundary Limits of Access Roads, Parking Places, Storage and Construction Areas for the Contractor and Contractor shall not Trespass the areas not so marked out for him. The Contractor shall be responsible to ensure that none of his personnel move out of the Areas marked out for his operations. In case of such a need for the Contractor's personnel to workout of the Areas marked for him, the same shall be done only with the written permission of the Engineer.

4.45 PRE – COMMISSIONING TRIALS AND INITIAL OPERATIONS

The Pre – Commissioning Trials and Initial Operations of the Equipment furnished and Erected by the Contractor shall be the responsibility of the Contractor as detailed in relevant Clauses in Technical Specification, Section G. T. R. The Contractor shall provide, in addition, Test Instruments, Calibrating Devices etc, and Labour required for successful performance of these Trials. If it is anticipated that the above Test may prolong for a long time, Contractor's workmen required for the above test shall always be present at Site during such trails.

4.46 MATERIALS HANDLING AND STORAGE

4.46.1 All the Equipment furnished under the Contract and arriving at Site shall be promptly received, unloaded, transported and stored in the storage spaces by the Contractor.

4.46.2 Contractor shall be responsible for examining all the shipment and notify the Purchaser / Engineer immediately of any Damage, Shortage, and Discrepancy etc for the purpose of Purchaser / Engineer's information only. The Contractor shall submit to the Purchaser / Engineer every week a report detailing all the receipts during the week.

However, the Contractor shall be solely responsible for any Shortages or Damages in Transit, Handling and / or in Storage and Erection of the Equipment at Site. Any Demurrage, Wharfage

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and other such charges claimed by the Transporters, etc shall be to the account of the Contractor.

4.46.3 The Contractor shall maintain an accurate and exhaustive record detailing out the list of all Equipment received by him for the purpose of Erection and keep such record open for the inspection of the Purchaser / Engineer.

4.46.4 All Equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings, etc shall be used for unloading and / or handling of the Equipment without the specific written permission of the Engineer. The Equipment stored shall be properly protected to prevent damage either to the Equipment or to the floor where they are stored. The Equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such Equipment at Site.

4.46.5 All Electrical Panels, Control Gears, Motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture, ingress, and corrosion during storage and periodically inspected.

4.46.6 All the Electrical Equipment such as Motors, Generators, etc shall be tested for Insulation Resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values maintained by the Contractor. Such records shall be opened for inspection by the Engineer.

4.46.7 The Contractor shall ensure that all the Packing Materials and Protection Devices used for the various Equipment during transit and storage are removed before the Equipment are installed.

4.46.8 The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.

4.46.9 All the Materials stored in the open or dusty location must be covered with suitable weatherproof and flame proof covering Material wherever applicable.

4.46.10 If the Materials belonging to the Contractor are stored in areas other than those earmarked for him, the Engineer will have the right to get it moved to the area earmarked for the Contractor at the Contractors' cost.

4.46.11 The Contractor shall be responsible for making suitable indoor storage facilities to store all Equipment, which require indoor storage. Normally, all the Electrical Equipment such as Motors, Control Gear, Generators, Exciters and Consumables like Electrodes, Lubricants etc shall be stored in the closed storage space. The Engineer, in addition, may direct the Contractor

to move certain other Materials, which in his opinion will require indoor storage, to indoor storage areas, which the Contractor shall strictly comply with.

4.47 CONSTRUCTION MANAGEMENT

4.47.1 The Field Activities of the Contractors working at Site will be co-ordinated by the Purchaser / Engineer and the Purchaser's / Engineer's decision shall be final in resolving any disputes or conflicts between the Contractor and other Contractors and tradesmen of the Owner regarding scheduling and co-ordination of Work. Such decision by the Purchaser / Engineer shall not be a cause for extra compensation or extension of time for the Contractor.

4.47.2 The Engineer shall hold weekly meetings of all the Contractors working at Site, at a time and place to be designated by the Engineer. The Contractor shall attend such meetings and take notes of discussions during the meeting and the decision of the Engineer and shall strictly adhere to those decisions in performing his Works. In addition to the above weekly meeting, the Engineer may call for other meetings either with individual Contractors or with selected number of Contractors and in such a case the Contractors if called, will also attend such meetings.

4.47.3 Time is the essence of the Contract and the Contractor shall be responsible for performance of his Works in accordance with the specified Construction Schedule. If at any time, the Contractor is falling behind the Schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the Schedule and shall communicate such actions in writing to the Engineer, satisfying that his action will compensate for the delay. The Contractor shall not be allowed any extra compensation for such action.

4.47.4 The Engineer shall; however, not be responsible for provision of additional Labour and / or Materials or Supply or any other Services to the Contractor except for the co-ordination work between various Contractors as set out earlier.

4.48 FIELD OFFICE RECORDS

The Contractor shall maintain at his Site office upto date copies of all Drawings, Specifications and other Contract Documents and any other supplementary data complete with all the latest revisions thereto. The Contractor shall also maintain in addition the continuous record of all changes to the above Contract Documents, Drawings, Specifications, Supplementary Data, etc effected at the field and on completion of his total assignment under the Contract shall incorporate all such changes on the Drawings and Other Engineering Data to indicate 'as installed conditions' of the equipment furnished and erected under the Contract. Such Drawings and Engineering Data shall be submitted to the Engineer in required number of copies.

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4.49 CONTRACTOR'S MATERIALS BROUGHT ON TO SITE

4.49.1 The Contractor shall bring to Site all Equipment, Components, Parts, Materials, including Construction Equipment, Tools and Tackles for the purpose of the Works under intimation to the Engineer. All such goods shall, from the time of their being brought vest in the Purchaser, but may be used for the purpose of the Works only and shall not on any account be removed or taken away by the Contractor without the written permission of the Engineer. The Contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.

4.49.2 The Purchaser shall have a lien on such goods for any sum or sums, which may at any time, be due or owing to him by the Contractor, under, in respect of or by reasons of the Contract. After giving a fifteen (15) days notice in writing of his intention to do so, the Purchaser shall be at liberty to sell and dispose off any such goods, in such manner as he shall think fit including Public Auction or Private Treaty and to apply the proceeds in or towards the satisfaction of such sum or sum due as aforesaid.

4.49.3 After the completion of the Works, the Contractor shall remove from the Site under the direction of the Engineer the Materials such as Construction Equipment, Erection Tools and Tackles, Scaffolding etc, with the written permission of the Engineer. If the Contractor fails to remove such Materials, within fifteen (15) days of issue of a notice by the Engineer to do so, then the Engineer shall have the liberty to dispose off such Materials as detailed under Clause 4.49.2 above and credit the proceeds thereto to the account of the Contractor.

4.50 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY

4.50.1 The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the Purchaser and the employees of other Contractors and Sub - Contractors and all public and private property including Structures, Building, Other Plants, Equipment, and Utility either above or below the ground.

4.50.2 The Contractor will ensure provision of necessary Safety Equipment such as barriers, signboards, warning lights and alarms, etc to provide adequate protection to persons and property. The Contractor shall be responsible to give reasonable Notice to the Engineer and the Owner of Public or Private Property and Utilities when such property and utilities are likely to get damaged or injured during the performance of his Works and shall make all necessary arrangements with such Owners, related to removal and / or replacement or protection of such property and utilities.

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4.51 PAINTING

All exposed Metal Parts of the Equipment including piping, structures railing etc wherever applicable, after installation unless otherwise surface protected, shall be first painted with atleast one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, grease, oil and other foreign materials by wire brushing, scraping or sand blasting and the same being inspected and approved by the Engineer for painting. Afterwards, the above parts shall be finished painted with two coats of allowed resin machinery enamel paints. The quality of the finish paint shall be as per the standards of ISI or equivalent and shall be of the colour as approved by the Engineer.

4.52 INSURANCE

4.52.1 In addition to the conditions covered under the Clause entitled "INSURANCE" in General Terms and Conditions of Contract of this Volume - 1, the following provisions will also apply to the portion of Works to be done beyond the Contractor's own or his Sub - Contractor's Manufacturing Works.

4.52.2 WORKMEN'S COMPENSATION INSURANCE

This Insurance shall protect the Contractor against all claims applicable under the Workmen's Compensation Act, 1948 (Government of India). This policy shall also cover the Contractor against claims for injury, disability, disease or death of his or his Sub - Contractor's employee, which for any reason are not covered under the Workmen's Compensation Act, 1948. The liabilities shall not be less than:

Workmen's Compensation	*As per statutory Provisions*
Employee's Liability	*As per statutory Provisions*

4.52.3 COMPREHENSIVE AUTOMOBILE INSURANCE

This Insurance shall be in such a form to protect the Contractor against all claims for injuries, disability, disease and death to members of public including the Purchaser's / Engineer's men and damage to the property of other arising from the use of Motor Vehicles during, on or off the Site operations, irrespective of the ownership of such vehicles. The liability covered shall be as herein indicated:

Fatal Injury	*Rs. 1,00,000 each person*
	Rs. 2,00,000 each occurrence
Property Damage	*Rs. 1,00,00 each occurrence*

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4.52.4 COMPREHENSIVE GENERAL LIABILITY INSURANCE

4.52.4.1 The Insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members of Public or damage to property of others, due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and Sub - Contractors or from riots, strikes and civil commotion. This insurance shall also cover all the liabilities of the Contractor arising out of the Clause entitled DEFENCE OF SUITS under General Terms and Conditions of Contract of this Volume - 1.

4.52.4.2 The hazards to be covered will pertain to all the works and areas where the Contractor, his Sub - Contractors, his agents, and his employees have to perform Work pursuant to the Contract.

4.52.4.3 The above are only illustrative list of Insurance Covers normally required and it will be the responsibility of the Contractors to maintain all necessary Insurance Coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the Contract.

4.53 UNFAVOURABLE WORKING CONDITIONS

The Contractor shall confine all his field operations to those Works, which can be performed without subjecting the Equipment and Materials to adverse effects during inclement weather conditions, like monsoon, storms, etc, and during other unfavourable construction conditions. No field activities shall be performed by the Contractor under conditions, which might adversely affect the quality and efficiency thereof, unless the Contractor takes special precautions or measures in a proper and satisfactory manner in the performance of such Works and with the concurrence of the Engineer. Such unfavourable construction conditions will in no way relieve the Contractor of his responsibility to perform the Works as per the Schedule.

4.54 WORK AND SAFETY REGULATIONS

4.54.1 The Contractor shall ensure proper safety of all the Workmen, Materials, Plant, and Equipment belonging to him or to HPPTCL or to others working at the Site. The Contractor shall also be responsible for provision of all Safety Notices and Safety Equipment required both by the relevant Legislation and the Engineer, as he may deem necessary.

4.54.2 The Contractor will notify well in advance to the Purchaser / Engineer of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals, which may involve hazards. The Purchaser / Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled, and used during the performance of the Works and the Contractor shall strictly adhere to and comply with such instructions. The Purchaser / Engineer shall have the right at his sole discretion to inspect any such container or such Construction Plant / Equipment for which material in the container is

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required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Purchaser and the Purchaser shall not entertain any claim of the Contractor towards additional safety provisions / conditions to be provided for / constructed as per the Engineer's Instructions.

Further, any such decision of the Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site Area is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any cost implication to HPPTCL or extension of work schedule.

4.54.3 Where it is necessary to provide and / or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying out such provision and / or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948, and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Purchaser / Engineer. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

4.54.4 All Equipment used in construction and erection by Contractor shall meet Indian / International Standards and where such Standards do not exist, the Contractor shall ensure that these are absolutely safe. All Equipment shall be strictly operated and maintained by the Contractor in accordance with Manufacturer's Operation Manual and Safety Instructions and as per Guidelines / Rules of HPPTCL in this regard.

4.54.5 Periodical Examinations and all Tests for all lifting / hoisting Equipment & Tackles shall be carried - out in accordance with the relevant provisions of Factories Act, 1948, Indian Electricity Act, 1910 and associated Laws / Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by Purchaser / Engineer or by the person authorised by him.

4.54.6 The Contractor shall be fully responsible, for the safe storage of his and his Sub - Contractor's radioactive sources in accordance with BARC / DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC / DAE in connection with use, storage and handling of such material will be taken by Contractor.

4.54.7 The Contractor shall provide suitable Safety Equipment of prescribed standard to all employees and workmen according to the need, as may be directed by Engineer who will also have right to examine these Safety Equipment to determine their suitability, reliability, acceptability and adaptability.

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4.54.8 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified, and competent person strictly in accordance with the Code of Practices / Rules framed under Indian Explosives Act pertaining to Handling, Storage, and Use of explosives.

4.54.9 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For Erection, the Contractor shall use good and standard quality of Material only.

4.54.10 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Purchaser or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by HPPTCL to handle such fuses, wiring or electrical equipment.

4.54.11 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Purchaser, he shall :

a. Satisfy the Engineer that the appliance is in good working condition,

b. Inform the Engineer of the maximum Current Rating, Voltage and Phases of the appliances,

c. Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.

4.54.12 The Engineer will not grant permission to connect until he is satisfied that:

a. The appliance is in good condition and is fitted with suitable plug,

b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

4.54.13 No Electric Cable in use by the Contractor / Purchaser will be disturbed without prior permission. No weight of any description will be imposed on any Cable and no ladder or similar equipment will rest against or attached to it.

4.54.14 No repair work shall be carried out on any Live Equipment. The Engineer must declare the Equipment safe and a Permit to Work shall be issued by the Engineer before the Contractor carries out any repair work. While working on Electric Lines / Equipment whether live or dead, suitable type and sufficient quantity of tools will have to be provided by Contractor to Electricians / Workmen / Officers.

4.54.15 The Contractors shall employ necessary number of qualified, full time Electricians / Electrical Supervisors to maintain his temporary electrical installations.

4.54.16 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on Contract, shall employ at least one full time officer exclusively as

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SAFETY OFFICER to supervise safety aspects of the Equipment and Workmen, who will coordinate with the Project Safety Officer. In case of Work, being carried out through Sub - Contractors, the Sub - Contractor's Workmen / Employees will also be considered as the Contractor's Workmen / Employees for the above purpose.

The name and address of such Safety Officer of Contractor will be promptly informed in writing to Engineer with a copy to Safety Officer - In charge before he starts Works or immediately after any change of the incumbent is made during currency of the Contract.

4.54.17 In case any accident occurs during the Construction / Erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.

4.54.18 The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or Equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury / accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Engineer within 3 days of such stoppage of work and decision of the Engineer in this respect shall be conclusive and binding on the Contractor.

4.54.19 The Contractor shall not be entitled for any damages / compensation for stoppage of work due to safety reasons as provided in Para 4.54.18 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of Liquidated Damages.

4.54.20 It is mandatory for the Contractor to observe during the execution of the Works, requirements of Safety Rules which would generally include but not limited to following:

SAFETY RULES

a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.

b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.

LARSEN & TOUBRO LIMITED Construction Chennai

Commercial Turnkey

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial locations.

e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at Work.

f) There shall be a suitable arrangement at every Work Site for rendering prompt and sufficient first aid to the injured.

g) The staircases and passageways shall be adequately lighted.

h) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind Guard Rails or to clean around energised or moving Equipment.

i) The Employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.

j) Requirements of ventilation in underwater working to licensed and experienced divers, use of gumboots for working in slushy or inundated conditions are essential requirement to be fulfilled.

k) In cases of rock excavation, blasting shall invariably be done through licensed blaster and other precautions during blasting and storage / transport of charge material shall be observed strictly.

4.54.21 The Contractor shall follow and comply with all HPPTCL Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant, and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any discrepancy between statutory requirement and HPPTCL Safety Rules referred to above, the later shall be binding on the Contractor unless the statutory provisions are more stringent.

4.54.22 If the Contractor fails in providing safe working environment as per HPPTCL Safety Rules or continues the Work even after being instructed to stop work by the Engineer as provided in Clause 4.54.18 above, the Contractor shall promptly pay to HPPTCL, on demand by the Purchaser, compensation at the rate of Rs. 10,000 per day or part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place, causing injury to any individual, the provision contained in Clause 4.54.23 shall also apply in addition to compensation mentioned in this Para.

4.54.23 If the Contractor does not take all safety precautions and / or fails to comply with the Safety Rules as prescribed by HPPTCL or under the applicable law for the safety of the Equipment and

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Plant and for the safety of personnel and the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors, or HPPTCL employees or any other person who are at Site or adjacent thereto, the Contractors shall be responsible for payment of compensation to HPPTCL as per the following schedule :-

a.	Fatal injury or accident causing Death	Rs. 1,00,000 per person	These are applicable for death / injury to any person whosoever.
b.	Major injuries or accident causing 25 % or more Permanent Disablement to Workmen or Employees.	Rs. 20,000 per person	These are applicable for death / injury to any person whosoever.

Permanent Disablement shall have same meaning as indicated in Workmen's Compensation Act. The compensation mentioned above shall be in addition to the compensation payable to the Workmen / Employees under the relevant provisions of the Workmen's Compensation Act and Rules framed thereunder or any other applicable laws as applicable from time to time. In case the Purchaser is made to pay such compensation then the Contractor is liable to reimburse the Owner such amount in addition to the compensation indicated above.

4.55 FOUNDATION DRESSING & GROUTING

4.55.1 The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment / equipment bases on the foundations.

4.55.2 All the equipment bases and structural steel base plates shall be grouted and finished as per these specifications unless otherwise recommended by the Equipment Manufacturer.

4.55.3 The concrete foundation surfaces shall be properly prepared by chipping and / or grinding as required to bring the type of such foundation to the required level, to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned.

4.55.4 GROUTING MIX

The Grouting Mixture shall be composed of Portland Cement, Sand and Water. The Portland Cement to be used shall conform to ISI: 269 or equivalent. Sand shall conform to ISI: 383 / 2386 or equivalent. The grout proportions for flat bases where the grouting space does not exceed 35 mm shall be 50 kg bag of Cement to 75 kg of Sand. Only the required quantity of water shall be added so as to make the mix quaky and flowable and the mix shall not show excess water on top when it is being puddled in place.

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
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For thicker grout beds up to 65 mm, the amount of Sand shall be increased to 105 kg per bag of Cement. Bases which are hollow and are to be filled full of grouting shall be filled to a level of 25 mm above the outside rim with a mortar mix in the volumetric proportions of 1.0 part of Cement and 1.5 part Sand and 1.5 part 6 mm Granite Gravel. An acceptable plasticizer may be added to the grout mixes in a proportion recommended by the Plasticizer's Manufacturer. All such grouts shall be thoroughly mixed for not less than five minutes in an approved mechanical mixer and shall be used immediately after mixing.

4.55.5 PLACING OF GROUT

4.55.5.1 After the base has been prepared, its alignment and level has been checked and approved and before actually placing the grout a low dam shall be set around the base at a distance that will permit pouring and manipulation of the grout. The height of such dam shall be at least 25 mm above the bottom of the base. Suitable size and number of chains shall be introduced under the base before placing the grout, so that such chains can be moved back and forth to push the grout into every part of the space under the base.

4.55.5.2 The grout shall be poured either through grout holes provided or shall be poured at one side or at two adjacent sides giving it a pressure head to make the grout move in a solid mass under the base and out in the opposite side. Pouring shall be continued until the entire space below the base is thoroughly filled and the grout stands at least 25 mm higher all around than the bottom of the base. Enough care should be taken to avoid any air or water pockets beneath the bases.

4.55.6 FINISHING OF THE EDGES OF THE GROUT

The poured grout should be allowed to stand undisturbed until it is well set. Immediately thereafter, the dam shall be removed and grout, which extends beyond the edges of the Structural or Equipment base plates, shall be cut off, flushed and removed. The edges of the grout shall then be pointed and finished with 1: 2 Cement Mortar pressed firmly to bond with the body of the grouts and smoothened with a tool to present a smooth vertical surface. The Work shall be done in a clean and scientific manner and the adjacent floor spaces, exposed edges of the foundations, and Structural Steel and Equipment base plates shall be thoroughly cleaned of any spillage of the grout.

4.55.7 CHECKING OF EQUIPMENT AFTER GROUTING

After the grout is set and cured, the Contractor shall check and verify the aligned of Equipment, alignment of Shafts of Rotating Machinery, the slopes of all Bearings, Pedestals, Centering of Rotors with respect to their Sealing Bores, Couplings etc, as applicable and the like items to ensure that no displacement has taken place during grouting. The values recorded prior to

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

grouting shall be used during such post grouting checkup and verifications. The Contractor in a manner acceptable to the Engineer shall maintain such pre and post-grout records of alignment details.

4.56 CHECK OUT OF CONTROL SYSTEMS

After completion of Wiring, Cabling furnished under separate Specification and laid and terminated by the Purchaser, the Contractor shall check out the operation of all Control Systems for the Equipment furnished and installed under these Specifications and Documents.

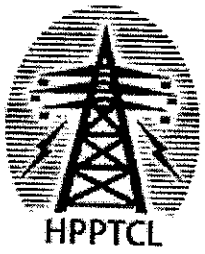
4.57 CODE REQUIREMENTS

The Erection requirements and procedures to be followed during the installation of the Equipment shall be in accordance with the relevant Codes and accepted good Engineering Practice, the Engineer's Drawings and other applicable Indian recognised Codes and Laws and Regulations of the Government of India.

END OF SECTION - 4

L&T TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2



CONTRACT AGREEMENT

FOR

CONSTRUCTION OF 220/33KV GIS SUBSTATION AT PHOJAL

BETWEEN

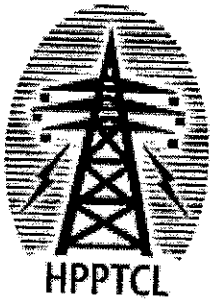
HP POWER TRANSMISSION CORPORATION LIMITED

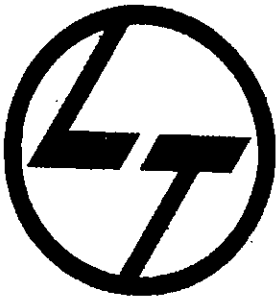
AND

LARSEN & TOUBRO LIMITED

VOLUME – 1A , 1B, 1C & 2

(BOOK- 1 OF 5, 2 OF 5, 3 OF 5 & 4 OF 5)





CONTRACT AGREEMENT

FOR

CONSTRUCTION OF 220/33KV GIS SUBSTATION AT PHOJAL

BETWEEN

HP POWER TRANSMISSION CORPORATION LIMITED

AND

LARSEN & TOUBRO LIMITED

VOLUME – 1A (BOOK- 1 OF 5)

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and Amendment dated 08-02-2011 **Pages 029 to 150**

Volume – 1B: Erection contract

Volume – 1C: CORRESPONDENCE AND CONDITIONS OF CONTRACT

Volume – 2: Proposal Submitted By The Bidder

Volume – 3: Technical Specifications

LARSEN & TOUBRO LIMITED Power Transmission Construction Division

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

H.P. POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIA HOUSE, KHALINI, SHIMLA-2
Ph:-0177-2626784, FAX:-0177-2626284 , 2620227

No. HPPTCL/ 33/220 kV Phojal /L&T / /2013 :- 330-37 **Dated :-** 16/4/13

To

M/S LARSEN & TOUBRO LIMITED,
Engineering Construction & Contract Division,
Mount Poonamallee Road Manapakkam,
PB. No. 979, Chennai -6000089.
Fax No. 044-22493317,22526345.

Subject: - Award No. HPPTCL /DGMC/L&T-Supply//2010-5107-12 dated 23.12.2010 and HPPTCL /DGMC/L&T-Erection //2010-5099-5104 dated 23.12.2010 *amended Vide* Award No. HPPTCL /DGMC/L&T-Supply//2013-6855-61 dated 08.03.2013 and HPPTCL /DGMC/L&T-Erection //2013-6862-68 dated 08.03.2013 and Tender Specification No. DGMC/PALCHAN SUB-STATION/2/2009.- **Amendments there of**

Reference:- Your letter No.s (1) LTCD/EIC/KRJ/HPPTCL/Phojal-SUPPLY/1403 dated 18.03.2013

(2) LTCD/EIC/KRJ/HPPTCL/Phojal-SUPPLY/1403 dated 18.03.2013.

Dear Sirs,

With reference to above, it is to inform that following amendment in the subject cited Tender specifications / awards are here by made and may be read as :-

Sr. No.	Existing Clause	As Amended
1	**Clause No. 3.12.6, Section-3 (GCC) of the Tender Documents / Clause No. 12 (Supply Award)/ Clause No. 8 (Erection Award) of the Original Awards** **STAGE PENALTY:** To ensure that the Contractor starts the Work immediately after signing of the Contract, the following Minimum progress of Work, both in respect of Supply of Equipment against Supply Contract and Physical Progress of Civil and Erection Activities at Site against Erection Contract separately, will have to be achieved by the Contractor in terms of Financial Values:-	**Clause No. 3.12.6, Section-3 (GCC) of the Tender Documents / Clause No. 12 (Supply Award)/ Clause No. 8 (Erection Award) of the Original Awards.** **STAGE PENALTY:** To ensure that the Contractor starts the Work immediately after signing of the Contract, the following Minimum progress of Work, both in respect of Supply of Equipment against Supply Contract and Physical Progress of Civil and Erection Activities at Site against Erection Contract separately, will have to be achieved by the Contractor in terms of Financial Values:-

PERIOD STARTING FROM SIGNING THE CONTRACT	FINANCIAL ACHIEVEMENT INCLUDING SUPPLY OF EQUIPMENT
Within 3 (Three) months	10 % of the Contract Value
Within 5 (Five) months	40 % of the Contract Value
Within 6 (Six) months	60 % of the Contract Value

The Contractor shall ensure the Completion of Supply and Erection Activities separately for the above values, failing which the Stage Penalty @ ½ % per week or part thereof for the amount equal to Short Fall in Progress achieved will be levied for the period starting from the Due Date of Achievement of above targets.

The Stage Penalty shall be calculated separately for Supply Contract and the Contract for Erection and Civil Works. The Stage Penalty shall be calculated in number of days of shortfall. The Achievement of Target will be the Date on which the Material Receipt or Erection Activity is completed by the Contractor at Site as indicated on the Bill / Invoice by the Engineer.

However, in any case, the Total Amount of Stage Penalty plus Liquidated Damages leviable for non completion of Sub-Station in time will not exceed 15 % of the Contract Value of the Sub-Station not commissioned in time.

The Stage Penalty levied shall be reviewed on completion of the Work to the extent that where the **Work as a Whole** is completed within the stipulated

PERIOD STARTING FROM SIGNING THE CONTRACT	FINANCIAL ACHIEVEMENT INCLUDING SUPPLY OF EQUIPMENT
Within 3 (Three) months	10 % of the Contract Value
Within 6 (Six) months	25% of the Contract Value
Within 9 (Nine) months	40 % of the Contract Value
Within 12 (Twelve) months	80 % of the Contract Value

The Contractor shall ensure the Completion of Supply and Erection Activities separately for the above values, failing which the Stage Penalty @ ½ % per week or part thereof for the amount equal to Short Fall in Progress achieved will be levied for the period starting from the Due Date of Achievement of above targets.

The Stage Penalty shall be calculated separately for Supply Contract and the Contract for Erection and Civil Works. The Stage Penalty shall be calculated in number of days of shortfall. The Achievement of Target will be the Date of which the Material Receipt of Erection Activity is completed by the Contractor at Site as indicated on the Bill / Invoice by the Engineer.

However, in any case, the Total Amount of Stage Penalty plus Liquidated Damages leviable for non completion of Sub-Station in time will not exceed 15 % of the Contract Value of the Sub-Station not commissioned in time.

The Stage Penalty levied shall be reviewed on completion of the Work to the extent that where the **Work as a Whole** is completed within the stipulated

	Completion Period or the Total Delay in Commissioning of the Sub-Station is less than 2 (Two) Weeks, **no Stage Penalty shall be chargeable** and the Stage Penalty already charged for the delay in completion of Individual Stage, if any shall be refundable to the Contractor through the Bill payable on completion of the Work.	Completion Period or the Total Delay in Commissioning of the Sub-Station is less than 2 (Two) Weeks, **no Stage Penalty shall be chargeable** and the Stage Penalty already charged for the delay in completion of Individual Stage, if any shall be refundable to the Contractor through the Bill payable on completion of the Work.
	The Stages of the Work will be identified and defined as per Approved PERT Chart. The Phasing of Execution of the Turnkey Project will be formulated in a way that appropriate linkage of expenditure would be made not only with Supply but also with the Physical Activities at Site. The construction of Major civil works including Control room building, GIS building , Out Switchgear Foundations, Cable Trenches etc. will be taken in hand within 2(Two) months form the award of the contract and shall be completed at lease 3 (Three) months before the scheduled completion date. The Contractor shall provide for proper checks and balances to ensure timely completion of Turnkey Contract.	The Stages of the Work will be identified and defined as per Approved PERT Chart. The Phasing of Execution of the Turnkey Project will be formulated in a way that appropriate linkage of expenditure would be made not only with Supply but also with the Physical Activities at Site. The construction of Major civil works including Control room building, GIS building , Out Switchgear Foundations, Cable Trenches etc. will be taken in hand within 2(Two) months form the award of the contract and shall be completed at lease 3 (Three) months before the scheduled completion date. The Contractor shall provide for proper checks and balances to ensure timely completion of Turnkey Contract.

Following clarifications are hereby made with reference to your letters under reference:-

Terms of Payment: Clause No. 8 (Supply Contract of the original Award):-

The said Clause already stands amended vide letter No. HPPTCL /L&T-Supply /2010-11-5845-50 dated 08.02.2011and shall be an integral part of the Contract Agreement.

Mandatory Spares: (Schedule PCPS):-

Acceptable subject to no Extra financial Implication

This letter of amendment shall form an integral part of the Contract Agreement .

Yours faithfully,

16/4/13

Dy. General Manager (Contracts)

Copy of the above is forwarded to the following for information please.

1. P.S to the Director (Planning & Contracts), HPPTCL, Shimla -2.
2. P.S to the Director (Projects), HPPTCL, Shimla -2.
3. The General Manager (Projects), HPPTCL, Shimla-2
4. The DGM & Head Transmission (Design), Anu, Hamirpur.
5. The DGM (Projects), HPPTCL, Shimla -2.
6. The DGM (Finance), HPPTCL Shimla-2
7. Sr. Manager Transmission Division, HPPTCL, Sarabai, Bhunter Distt. Kullu-175125 H.P.

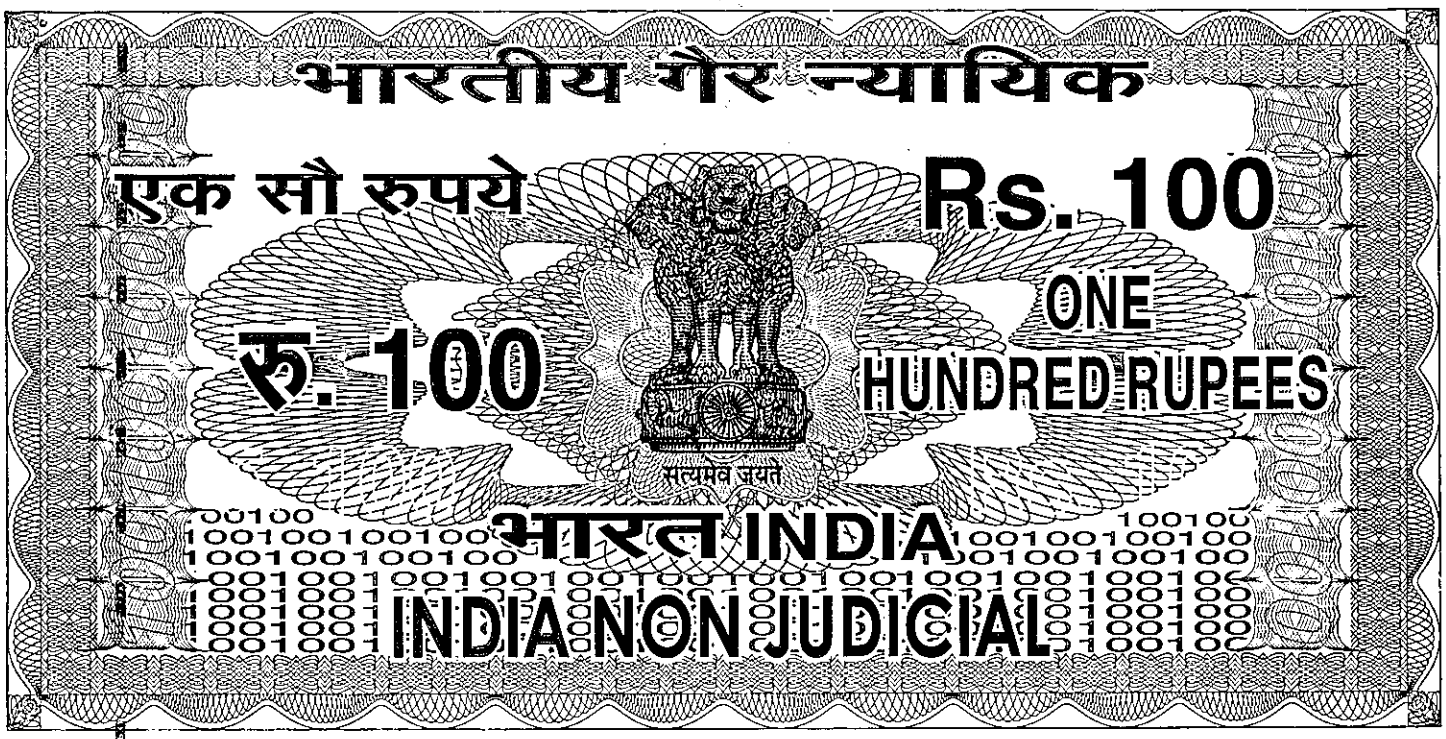
16/4/13

Dy. General Manager (Contracts)

SECTION – I

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2



हिमाचल प्रदेश HIMACHAL PRADESH 402472

(SUPPLY CONTRACT)

This agreement made on the 16th day of April 2013, between **H.P.POWER TRANSMISSION CORPORATION LIMITED**, (hereinafter referred to as "the Purchaser or HPPTCL" which expression shall unless repugnant to the context or meaning thereof, include its successors, Administrators & assigns) of the one part and **M/S LARSEN & TOUBRO LIMITED-ECC DIVISION, CHENNAI, INDIA** (hereinafter called "the Contractor" which expression shall unless repugnant to the context or meaning thereof,include its successors, Administrators & Assigns) of the other part.

WHEREAS the purchaser is desirous that the Contractor should provide certain goods viz Supply of Equipment/Materials against LOA No: HPPTCL/DGMC/L&T-SUPPLY/2010-5099-5104 Dated 23.12.2010 for construction of 220/33KV PALCHAN GIS substation now **Amended vide No. HPPTCL/DGMC/L&T-SUPPLY/2013-6855-61, Dated:08/03/2013** for **construction of 220/33KV GIS substation at Phojal, Distt.-Kullu** and has accepted a Bid by the Contractor for the supply of those goods in the sum of Rs Thirty One Crores Twenty Seven Lacs Twenty Seven Thousand Nine Hundred Fifty Four Only **(INR. 31,27,27,954/-)** (Hereinafter called "the Contract Price".)

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, Words & Expression shall have the same meaning as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to Form & be read and construed as part of this Agreement, viz.:

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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[redacted] Toulon, IL

[redacted] Toulon

[redacted] New Deal, Melvern Square

[redacted] Mag. Co.

[redacted] Oak Park,

[redacted]

01/04/13 100

B/3/13

a) The Bid Form and the Price Schedule submitted by the Bidder,
b) The Technical Specifications;
c) General Conditions of Contract;
d) Erection Conditions of Contract;
e) Special Conditions of Contract;
f) The Purchaser's Notification of Award and Amendments thereafter,
g) Correspondence/Clarifications.

3. In consideration of the payments to be made by the Purchaser to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the purchaser to provide the Goods to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Contractor in consideration of the provision of the Goods and the remedying of defects therein , the Contract price or such other sum as may become payable under the provisions of the Contract at the times & in the manner prescribed by the Contract.

IN WITNESS whereof the PARTIES hereto have caused this Agreement to be executed in accordance with their respective laws, the day & year first above written.

Signed, sealed & delivered by the said.

(For HPPTCL)

(Harish Kapoor)

DGM (Contracts)
Dy. General Manager (Contracts)
H. P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

In the presence of :-

16/04/2013
ER. Amar Singh Shandle
Senior Manager (Contracts)
H.P. Power Transmission Corpn. Ltd
Barowalia House, Khalini, Shimla-2

Signed, sealed & delivered by the said.

(For L&T Ltd)

(Amit Kumar Rajput)

Cluster Operation Head (Delhi)

Dibya Kanti Ghosh

In the presence of:-

SECTION -II

LARSEN & TOUBRO LIMITED
Construction Channel

By, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002
Ph:- 0177-2626784, (Telefax: 0177 - 2620227

Reference: **HPPTCL / DGMC / L & T - SUPPLY / 2013** 6855-66 **DATED:** 8/03/2013

From,

Dy. GENERAL MANAGER (CONTRACTS),
BAROWALIAS HOUSE, KHALINI,
SHIMLA – 171002

To,

M/S LARSEN & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P. B. No. 979, CHENNAI – 600089

FAX No.: 044 – 22493317; 044 – 22526345

Subject: LETTER OF AWARD (LOA) No.: HPPTCL / DGMC / L & T – SUPPLY / 2010 – 5107 – 12 DATED 23.12.2010 (FIRST CONTRACT) FOR SUPPLY OF EQUIPMENT / MATERIALS FOR CONSTRUCTION OF 220 / 33 kV GIS SUBSTATION AT PHOJAL (EARLIER PALCHAN) – **AMENDMENT THEREON**

Reference: This has reference to the following: -

1) *This office Letter of Award No.: HPPTCL / DGMC / L & T – Supply / 2010 – 5107 – 12 dated 23.12.2010*
2) *This office letter No.: HPPTCL / Palchan S / Stn. / 2011 – 12 – 6113 dated 03.12.2011*
3) *Minutes of Meeting held on 06.01.2012 in Shimla*
4) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2403 dated 21st April, 2012*
5) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2404 dated 24th April, 2012*
6) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2405 dated 10th May, 2012*
7) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2406 dated 18th May, 2012*
8) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2409 dated 11th June, 2012*
9) *This Office letter No.: HPPTCL / DGM& Head (T) / Phozal Sub Station – 12 – 516 – 17 dated 21.07.2012*

Received
LARSEN & TOUBRO LIMITED Construction Channai

005

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

10) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2410 dated 30th July, 2012*

11) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2411 dated 1st August, 2012*

12) *Your Letter No.: L&T / PT&D / SSBU / KULLU / HPPTCL / 220 kV SWYD / 2412 dated 6th August, 2012*

13) *This Office letter No.: HPPTCL / DGM& Head (T) / Phozal Sub Station – 12 – 573 – 74 dated 07.08.2012*

14) *This Office letter No.: HPPTCL / DGM& Head (T) / Phozal Sub Station – 12 – 834 – 35 dated 28.09.2012*

15) *This Office letter No.: HPPTCL / DGM& Head (T) / Phozal Sub Station – 12 – 884 – 85 dated 03.10.2012*

16) *Your Letter No.: LTCD / DLRO / HPTCL / PHOZAL / 002 dated 5th October, 2012*

Sir,

I have been directed to issue Amendment to this office Letter of Award (LOA) No.: HPPTCL / DGMC / L & T – Supply / 2010 – 5107 – 12 dated 23.12.2010 for Supply of Equipment / Material (also referred to as **'First Contract'**) required for Construction of 220 / 33 kV GIS Sub Station at Phojal (*earlier Palchan*) in Kullu District of Himachal Pradesh for Amount of **Rs. 31,27,27,954** (Rupees Thirty One Crores Twenty Seven Lakhs Twenty Seven Thousand Nine Hundred Fifty Four) only.

The Scope of Work under this Contract shall also include all such Items, Equipment, and Materials, which are not specifically mentioned in the Bill of Material, attached with this Amendment (Annexure – **SE** and **MS**) but are necessary for successful completion of the Scope of Work under the Contract.

Major terms and conditions of this amendment are as under:-

1. The detailed List of Equipment and Material along with their Tentative Quantities to be supplied and Unit Rates are given in Annexure – **SE** and Annexure – **MS** to this Letter of Award.
2. Payments shall be released for the Quantities as finalised during detailed engineering and approved Bill of Material / actually measured by HPPTCL's Engineer at Site, based on per Unit Rates as per Award.
3. Size of 33 kV XLPE Cable viz. 630 sq. mm. / 1000 sq. mm. shall be finalised during detailed engineering and payment of the same along with suitable Termination shall be released on the Unit Rates specified in this Award.
4. It is expressly understood by you that any breach under the contract for Civil works and Services (Second Contract) awarded, shall automatically be deemed as breach of this Contract and any such breach or occurrence giving us a right to terminate the 'Second Contract' and / or recover damages under that Contract shall give us right to terminate this Contract and / or recover damages under this Contract as well. However, such breach or occurrence in the 'Second Contract' shall not automatically relieve you of any of your obligations under this Contract. It is expressly understood and agreed by you that the Equipment / Materials supplied under this 'First Contract', when erected, tested and

Accepted

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commissioned under the 'Second Contract' shall give satisfactory performance in accordance with the Bidding Document.

5. CONTRACT PRICE:

5.1 The Contract Price for the complete Scope of Work under this amended LOA is as per the following break up: -

Sr. No.	PRICE COMPONENT	VALUE in Rupees
1	Supply of Equipment / Material as per Annexure – SE	29,78,99,188
2	Supply of Mandatory Spares as per Annexure - MS	1,48,28,766
3	**TOTAL CONTRACT PRICE**	**31,27,27,954**

Rupees Thirty One Crores Twenty Seven Lakhs Twenty Seven Thousand Nine Hundred Fifty Four only

5.2 Further breakup of the Contract Price for the purpose of payment is given at Annexure – SE and Annexure – MS of this amended LOA.

5.3 Notwithstanding the breakup of the Contract Price, the Contract shall at all times be construed as a 'Single Source Responsibility Contract' and any breach in any part of the Contract shall be treated as breach of the entire Contract.

5.4 The Ex – Works Price of Items indicated at Annexure – SE for which quantities are assessed by you and are on lump sum basis, shall remain constant irrespective of any increase or decrease in quantities of any Items for completion of Scope of Work as per Technical Specification unless there is any change of Scope of Work by the Purchaser / Owner.

In case, the actual requirement of quantity of such Items is more than the quantities identified in the LOA / Contract Agreement / approved BOQ / Billing break up or some additional Items are required for the successful completion of the Scope of Work as per the Technical Specification, such additional Items / quantities shall be supplied by you without any additional cost to HPPTCL. Further, in case actual requirement of quantities for successful completion of Scope of Work is less than the quantities identified in the LOA / Contract Agreement / approved BOQ / Billing break up or some existing Items are not required, the lump sum price for these Items shall remain unchanged and no deduction shall be made from the lump sum price due to such reduction of quantities.

In case quantities of these Items supplied at Site are in excess of that required for successful completion of Scope of Work as detailed in the Bidding Documents, such additional quantities shall be your property and you shall be allowed to take back the same from the Site for which no deduction from lump sum price shall be made. It shall, however, be your responsibility to pay all statutory taxes, duties, and levies to the concerned authorities for such surplus material, which would otherwise have been lawfully payable.

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You shall submit an indemnity bond to keep HPPTCL harmless from any such liability, before release of such material to you by HPPTCL.

5.5 No Payment for 220 kV Bus Duct for the length upto 85.5 metres shall be made by the Employer, however the Payments of 220 kV Bus Duct @ Rs. 1,36,153 per metre for the quantity in excess of 85.5 metres shall be made to the Contractor.

6. TAXES AND DUTIES:

6.1 The Contract Price is inclusive of all Taxes and Duties such as Excise Duty, Sales Tax / VAT etc for all Equipment and Materials to be supplied under the Contract. Further any such Taxes and Duties as aforesaid payable including statutory variation thereon will be to your account and no claim on this behalf will be entertained by HPPTCL.

6.2 Entry Tax, Octroi as applicable for destination Site on all Items of Supply, which shall be dispatched directly from Sub Vendors Works to HPPTCL's Site (*Sale - in - transit*) shall be reimbursed to you, subject to furnishing of documentary proof for payment made, at the applicable rate at the time of dispatch. This shall be applicable for the Delivery within the stipulated delivery period and in case of delayed delivery of the Material, the payment shall be made on the Rates prevailing at during the stipulated delivery or actual, whichever are lower.

6.3 The above Contract Price is inclusive of Service Tax and Surcharge / Cess etc on it and HPPTCL shall not entertain any claim whatsoever in this regard.

6.4 HPPTCL shall issue requisite Sales Tax Declaration Forms on receipt of your request for such Items identified in Price Schedule and dispatched directly to HPPTCL's Site from your Vendors' / Sub Vendors' Works (*Sales – in transit*).

6.5 HPPTCL shall be entitled to deduct Income Tax, Surcharge on Income Tax and other Corporate Taxes / other Taxes at source in accordance with the provisions of the Income Tax / other Laws as applicable from time to time. TDS so deducted shall be deposited with the relevant tax Authority and necessary TDS Certificate shall be issued to you by HPPTCL.

7. PRICE ADJUSTMENT:

All Price Components under this Letter of Award shall be FIRM during the entire execution of the Contract and no price variation whatsoever shall be applicable.

8. TIME SCHEDULE OF CONTRACT:

8.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Phojal Sub Station covered

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Barowalia House, Khalini, Shimla-2

under the subject Contract within **14 (fourteen) months** from the date of issue of this Amendment and the same shall be applicable for all contractual purposes.

8.2 The contractor shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating to Engineering, Procurement, Manufacturing and Ex – Works delivery for all the Equipment and Materials covered under this Contract within 15 days of this Amendment.

8.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction, testing and successful commissioning of 220 / 33 kV GIS Sub Station at Phojal shall be reckoned as 14 months from the date of this amended LOA.

9. LIQUIDATED DAMAGES (LD) FOR DELAY:

9.1 If you fail to successfully complete the Commissioning of the Sub Station within the Time Schedule stipulated (14 months) under the Contract, you shall pay to HPPTCL as Liquidated Damages and not as a penalty, a sum of one half of one percent (0.5 %) of the Contract Price for each calendar week or part thereof of delay.

9.2 Equipment and Materials shall be deemed to have been delivered only when all its Components, Parts, and Spares are also delivered. If certain Components, Parts, or Spares are not delivered in time, the Equipment and Materials will be considered as delayed until such time the same are also delivered.

9.3 The Total Amount of Liquidated Damages for delay under the Contract shall be subject to a Maximum of **10 %** of the Contract Price.

10. SIGNING OF CONTRACT:

You shall execute a Contract Agreement at the office of HPPTCL, on the Terms and Conditions envisaged in the Tender Documents and this detailed Letter of Award, **within 30 (Thirty) calendar days of the receipt of Notification of this amended LOA.** It is a legitimate obligation of you to execute and to stamp the Contract, in accordance with the Indian Stamp Act and to supply Six Copies of Contract Drawings, Technical Particulars as finally approved by HPPTCL and other Literature and Instruction Books regarding Handling, Use and Maintenance of Equipment / Material. The cost of all these and such other Items have been included in the Prices and you will not be entitled to any extra payment on these accounts. However, non - execution of the Contract Agreement by you shall not absolve you of the responsibility of the faithful execution of the Contract.

11. It is understood and agreed by both the parties to the contract that no claim, whatsoever, shall be raised by either of the parties on account of the period already lapsed under the contract.

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12. **All other Terms and Conditions shall be as per Original Letter of Award No.: HPPTCL / DGMC / L & T – Supply / 2010 – 5107 – 12 dated 23.12.2010 (FIRST CONTRACT) and Tender Document No. DGMC / PALCHAN SUBSTATION / 02 / 2009.**

Please acknowledge receipt of the Letter of Award and take necessary action to commence the work immediately.

Enclosure:

Annexure – **SE**

Annexure – **MS**

Yours faithfully,

Dy. General Manager (Contracts)

Reference: **HPPTCL / DGMC / L & T - SUPPLY / 2013 -** **DATED:**

Copy for information and necessary action to: -

1. P. S. to Director (Planning & Contracts), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
2. P. S. to Director (Projects), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
3. General Manager (Projects), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
4. DGM & Head Transmission, HPPTCL, Anu, Hamirpur.
5. DGM(Finance), HPPTCL, Sangla House, Khalini, Shimla – 171002.
6. Sr. Manager, HPPTCL, Sarabai, Bhunter, District Kullu – 175125 (H. P.)

Dy. General Manager (Contracts)

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

ANNEXURE - SE

NAME OF WORK : CONSTRUCTION OF 220 / 33 kV SUB STATION AT PHOZAL IN DISTRICT KULLU

SUPPLY PORTION

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
A	**POWER TRANSFORMER**				
1	26.66 / 33.33 MVA, 33 / 220 kV Single Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.		*To be Supplied by HPPTCL*	
2	Oil Storage Tank	Nos.			
3	Oil Sampling Bottle	Nos.			
4	Micro Gas Analyzer / On - Line DGA / PPM Meter	Nos.			
5	250 kVA; 33 / 0.433 kV Three Phase Transformer including Bushing, Accessories and First Filling of Oil	Nos.	1	3,77,674	3,77,674
	SUB TOTAL - A				**3,77,674**
B	**245 kV GIS EQUIPMENT**				
1	245 kV, 1600 A, 50 kA SF_6 Gas Insulated **Transformer Bay Module** each comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch Surge Arresters (198 kV), SF_6 Gas Monitoring System for complete Bay LCC, Three 1 - Phase SF_6 Ducts and SF_6 / Oil Bushing to connect to 33 / 220 kV, 26.66 / 33.33 MVA Transformers and Accessories with GIS etc to complete Transformer Bay Module	Nos.	1	4,20,67,623	4,20,67,623
2	245 kV, 2000 A, 50 kA SF_6 Gas Insulated **Feeder Bay Module** each comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnector with Grounding Switch, Line Disconnector with Safety Grounding Switch, High, Speed Fault Making Grounding Switch, SF_6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF_6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module	Nos.	2	4,02,02,813	8,04,05,626

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Dowalia House, Khalini, Shimla-2

DGM(Contracts)

L&T TOUBRO LIMITED Heavy Engineering Construction Division

SE / 1

01

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
3	245 kV, 4000 A, 50 kA, 3 Single Phase (Isolated) Units SF_6 Gas Insulated, Metal Enclosed **Bus Bars** each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each the Circuit Breaker Bay Modules Each Bus Bar Set shall be complete with Voltage Transformers complete with Safety Grounding Switch	Nos.	2	27,00,000	54,00,000
4	245 kV, 4000 A, 50 kA SF_6 Gas Insulated **Bus Coupler Bay Module** comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches, SF_6 Gas Monitoring System for complete Bay, LCC etc	Nos.	1	2,41,49,034	2,41,49,034
5	245 kV, CVT with Junction Box	Nos.	6	4,04,954	24,29,724
6	198 kV Lightning Arrester with Counter and Leakage Meter	Nos.	7	78,966	5,52,762
	SUB TOTAL - B				**15,50,04,769**
C	**36 kV, 2000 A, 40 kA for 3 sec., SF_6 Gas Insulated, Metal Enclosed BUS BARS each Unit enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Modules. Each Bus Bar Set shall be complete with Voltage Transformers complete with Safety Grounding Switch**				
1	36 kV, 1600 A SF_6 Gas Insulated **Feeder Bay Module** each comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch SF_6 Gas Monitoring System for complete Bay, LCC, Enclosure and Accessories with GIS etc to complete Feeder Bay Module	Nos.	6	36,45,891	2,18,75,346
2	36 kV, 2000 A SF_6 Gas Insulated **Bus Coupler Bay** comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, SF_6 Gas Monitoring System for complete Bus Coupler Panel	Nos.	1	31,15,105	31,15,105
3	36 kV, 1600 A SF_6 Gas Insulated **Power Transformer Panel** each comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch,	Nos.	1	31,48,162	31,48,162

LARSEN & TOUBRO LIMITED Construction Chennai

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By, General Manager (Contracts)
Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	Surge Arrester (30 kV), SF_6 Gas Monitoring System for complete Power Transformer Panel				
4	36 kV, 630 A SF_6 Gas Insulated 250 kVA, **LT Transformer Panel** each comprising of SF_6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Bus Bar Disconnectors with Earthing Switch, Surge Arrestor (30 kV), SF_6 Gas Monitoring System for complete LT Transformer Panel	Nos.	1	27,08,043	27,08,043
	SUB TOTAL - C				**3,08,46,656**
D	**SUBSTATION AUTOMATION SYSTEM complete including Hardware and Software for 9 Bays and Remote Control Station alongwith AssociatedEquipments**				**91,25,551**
	BAY CONTROL UNITS				
1	220 kV Bays	Nos.	3	INCLUDED ABOVE	
2	33 kV Bays	Nos.	6		
	SUB TOTAL - D				**91,25,551**
E1	**220 kV CONTROL AND RELAY PANEL**				
1	Circuit Breaker Control Panel				
a)	With Auto Reclose	Nos.	2	5,26,474	10,52,948
b)	With Out Auto Reclose	Nos.	3	5,01,403	15,04,209
2	Line Protection Panel (Main I + Main II)	Nos.	2	12,53,510	25,07,020
3	220 kV (Double Bus Bar Protection)	Set	1	24,31,808	24,31,808
4	Transformer Protection Panel - H. V. Side including one number for Spare Single Phase Transformer	Nos.	2	7,87,204	15,74,408
	SUB TOTAL - E1				**90,70,393**
E2	**33 kV CONTROL AND RELAY PANEL**				
1	Circuit Breaker Control Panel				
a)	With Auto Reclose	Nos.	6	4,76,334	28,58,004
b)	With Out Auto Rectose	Nos.	4	4,76,334	19,05,336
2	Line Protection Panel	Nos.	6		
3	Transformer Protection Panel - L. V. Side including one number for Spare Single Phase Transformer	Nos.	2	INCLUDED ABOVE	

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Heavy Civil Construction

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	SUB TOTAL - E2				**47,63,340**
F	**PLCC for 220 kV LINE FEEDER**				
1	2000 A, 0.5 mH /-1.0 mH, 50 kA Line Traps	Nos.	4	4,43,136	17,72,544
2	Coupling Device (Phase to Phase)	Nos.	4	74,024	2,96,096
3	HF Cable	Ls	2	12,337	24,674
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos.	6	3,14,727	18,88,362
5	Protection Coupler	Nos.	4	1,34,477	5,37,908
6	Print Testing Kit	Set	1	1,07,007	1,07,007
7	EPBAX (24 / 8) with Telephone Sets	Set	1	2,76,356	2,76,356
	SUB TOTAL - F				**49,02,947**
F.1	**FOTE Equipment**	Set	1	96,30,660	96,30,660
	SUB TOTAL - F1				**96,30,660**
G	**AIR CONDITIONER AND VENTILATION SYSTEM**				
1	Split AC (Capacity - 2T)	Nos.	10	30,213	3,02,130
2	Ventilation System for 220 kV & 33 kV GIS Hall	LS	1	20,56,591	20,56,591
	SUB TOTAL - G				**23,58,721**
H	**LT SWITCHBOARD**				
1	415 V Main Switchboard	Nos.	1	31,47,275	31,47,275
2	415 V A C Distribution Board	Nos.	1	14,49,200	14,49,200
3	220 V DCDB	Nos.	2	5,64,356	11,28,712
4	48 V, DC DB	Nos.	2	3,59,973	7,19,946
	SUB TOTAL - H				**64,45,133**
I.	**BATTERIES**				
1	220 V, 400 AH	Set	2	6,48,087	12,96,174
2	48 V, 400 AH	Set	2	1,41,401	2,82,802

LARSEN & TOUBRO LIMITED Construction Group

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

014

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Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	SUB TOTAL - I				**15,78,976**
J	**BATTERY CHARGER SYSTEM**				
1	220 V	Set	2	4,87,198	9,74,396
2	48 V	Set	2	3,62,566	7,25,132
	SUB TOTAL - J				**16,99,528**
K	**DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)**		1	18,88,365	18,88,365
	SUB TOTAL - K				**18,88,365**
L	**FIRE PREVENTION AND EXTINGUISHING SYSTEM**				
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	4	6,23,161	24,92,644
2	Fire Protection for GIS cum Control Room Building, etc. (Portable type the Extinguishers)	Lot	1	6,89,574	6,89,574
	SUB TOTAL - L				**31,82,218**
M	**ILLUMINATION SYSTEM**				
1.0	MLDB	Nos.	1	15,55,720	15,55,720
2.0	ELDB	Nos.	1	7,28,643	7,28,643
3.0	**GIS cum Control Room Building Illumination with CFL / Metal Hallide Lamps**				
a	*2 x 36 Watts Fluorescent Lamp in Industrial Reflector type Fixtures suitable for surface / pendent mounting CGL Cat Ref. IBA1424EB*	Nos.	37	1,782	65,934
b	*230 V, 5 / 15 A, Indoor Receptacle 3 Pin type - R1*	Nos.	20	477	9,540
c	*15 A, 1 - Ph, 3 Pin Industrial Type Switch Socket Outlet*	Nos.	4	2,146	8,584
d	*32 A, SPN MCB in 2 mm thick Sheet Steel Enclosure with 3 Pin Socket for A.C (indoor)*	Nos.	3	1,348	4,044
e	*32 A, SPN MCB in 2 mm thick Sheet Steel Enclosure with 3 Pin Socket for A.C (outdoor)*	Nos.	3	2,696	8,088
f	*450 mm Exhaust Fan*	Nos.	2	2,385	4,770
g	*450 mm Acid Proof Exhaust Fan (for Battery Room)*	Nos.	1	9,539	9,539
h	*1400 mm Ceiling Fans with Electronic Regulator*	Nos.	6	2,981	17,886
i	*Point Wiring*	Nos.	72	708	50,982
j	*Indoor Lighting Panel (ACP - 1 type) as per Technical Specification*	Nos.	2	32,199	64,397

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T-TOUBRO LIMITED Heavy Engineering Construction Chennai

DGM(Contracts)

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Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	k *DC Lighting Panel (DCP type) as per Technical Specification*	Nos.	1	46,509	46,509
4.0	**220 / 33 kV GIS Building Illumination**				
	a *1 x 250 W - Industrial Metal Halide Luminaire CGL. Cat ref. No. FAD 1314*	Nos.	14	1,864	26,099
	b *1 x 60 W GLS Bulk Head Light Fixture of CGL tupe 1BH 1110 BC or equivalent*	Nos.	8	226	1,811
	c *230 V, 5 / 15 A, Indoor Receptacle 3 Pin type - R1*	Nos.	9	477	4,297
	d *32 A, SPN MCB in 2 mm thick Sheet Steel Enclosure with 3 Pin Socket for A.C (indoor)*	Nos.	4	1,014	4,054
	e *32 A SPN MCB in 2 mm thick Sheet Steel Enclosure with 3 Pin Socket (outdoor)*	Nos.	4	2,027	8,109
	f *1 x 11 W Portable Battery operated (3 hrs. Backup) CFL Emergency Lamp (M/S BPL make)*	Nos.	4	3,578	14,311
	g *Point Wiring*	Nos.	43	566	24,358
	h *Indoor Lighting Panel (ACP-1 type) as per Technical Specification*	Nos.	2	32,199	64,397
	i *DC Lighting Panel (DCP type) as per Technical Specification*	Nos.	2	46,509	93,018
	j *32 A, TPN MCB in 2 mm thick Sheet Steel Enclosure with 3 Pin Socket (indoor)*	Nos.	2	2,027	4,054
5.0	**Switchyard Lightning**				
	a *Flood Light Luminaire with 2 x 400 W HPSV / T+ Lamp - Bajaj cat. BJEF22 CA - R0*	Nos.	4	7,909	31,635
	b *Lighting JB with 5 no's of Terminal Blocks*	Nos.	4	775	3,099
	c *250 A Oil Filtration Socket*	Nos.	1	2,981	2,981
6.0	**Street Lighting (Solar lighting system)**				
	a *120 W Solar Lighting System for Street Lighting with 9 m height Pole, Inbuilt in long life maintenance free Batteries (Capacity is 12 V, 120 AH)*	Nos.	8	1,19,254	9,54,031
7.0	**Transformer Area Lighting as per specification**				
	1 x 70 W, HPSV 240 V, AC Industrial Wall Glass Fixture for pendant mounting with Control Gear Box G(BJDWI - 70SV)	Nos.	2	1,370	2,740
	Lighting JB	Nos.	2	775	1,550
	SUB TOTAL - M				**38,15,180**
N	**Power Cables and Copper Conductor Armoured Control Cables alongwith Lugs, Glands and Straight Joints**				
	XLPE POWER CABLE				
	1 C X 630 sq.mm.	km	0.75	10,78,001	8,08,501
	Terminations for the above				

LARSEN & TOUBRO LIMITED Construction Chennai

By General Manager (Contracts)
For Power Transmission Corp., Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	1 C X 630 sq.mm.	Nos.	12	2,103	25,236
	3.5 C X 300 sq.mm.	Nos.	36	3,114	1,12,104
	PVC POWER CABLE (Other than those available in the Contract)				
	4 C X 6 sq.mm.	km	0.33	96,369	31,802
	2 C X 6 sq.mm.	km	3.15	76,601	2,41,293
	1 C X 150 sq.mm.	km	0.6	3,01,864	1,81,118
	Terminations for the above				
	3.5 C X 90 sq.mm.	Nos.	24	1,584	38,016
	3.5 C X 70 sq.mm.	Nos.	24	1,107	26,568
	3.5 C X 35 sq.mm.	Nos.	63	642	40,446
	4C X 16 sq.mm.	Nos.	21	560	11,750
	4 C X 6 sq.mm.	Nos.	81	395	31,955
	2 C X 6 sq.mm.	Nos.	354	269	95,049
	1 C X 150 sq.mm.	Nos.	60	653	39,150
	HR - FRLS CONTROL CABLE				
	5 C X 2.5 sq.mm	km	3	1,05,698	3,17,094
	27 C X 2.5 sq.mm.	km	0.75	9,98,720	7,49,040
	4P,0.75	km	0.3	1,38,087	41,426
	Terminations for the above				
	2 C X 2.5 sq.mm.	Nos.	84	295	24,819
	4 C X 2.5 sq.mm.	Nos.	249	423	1,05,437
	5 C X 2.5 sq.mm.	Nos.	516	455	2,34,801
	7 C X 2.5 sq.mm.	Nos.	429	479	2,05,379
	10 C X 2.5 sq.mm.	Nos.	555	542	3,00,777
	12 C X 2.5 sq.mm.	Nos.	93	668	62,156
	14 C X 2.5 sq.mm.	Nos.	60	724	43,418
	16 C X 2.5 sq.mm.	Nos.	78	757	59,032
	19 C X 2.5 sq.mm.	Nos.	78	779	60,757
	27 C X 2.5 sq.mm.	Nos.	48	946	45,428
	4P,0.75	Nos.	3	333	1,000

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
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DGM(Contracts)

SE/7

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	2 C X 4 sq.mm.	Nos.	81	479	38,778
	4 C X 4 sq.mm.	Nos.	63	720	45,390
	7 C X 4 sq.mm.	Nos.	54	943	50,936
	SUB TOTAL - N				**40,68,655**
O	**33kV XLPE POWER CABLE AND ACCESSORIES**				
	1 XLPE POWER CABLE				
	3.5 C x 300 sq.mm.	km	0.75	6,20,643	4,65,482
	2 PVC POWER CABLE				
	3.5 C x 90 sq. mm.	km	0.3	3,06,494	91,948
	3.5 C x 70 sq. mm.	km	0.75	2,48,634	1,86,476
	3.5 C x 35 sq. mm.	km	0.3	1,43,643	43,093
	4 C x 16 sq. mm.	km	0.75	99,202	74,402
	4 C x 4 sq. mm.	km	1.5	49,098	73,647
	3 HR FRLS CONTROL CABLE				
	2 C X 2.5 sq.mm.	km	1.5	45,913	68,870
	4 C X 2.5 sq.mm.	km	3	78,317	2,34,951
	7 C X 2.5 sq.mm.	km	1.5	1,30,260	1,95,390
	10 C X 2.5 sq.mm.	km	1.125	1,82,480	2,05,290
	12 C X 2.5 sq.mm.	km	0.75	2,16,847	1,62,635
	16 C X 2.5 sq.mm.	km	0.75	2,86,187	2,14,640
	19 C X 2.5 sq.mm.	km	0.3	3,36,506	1,00,952
	2 C X 4 sq.mm.	km	1.5	61,862	92,793
	4 C X 4 sq.mm.	km	1.5	1,13,214	1,69,821
	7 C X 4 sq.mm.	km	1.5	2,01,841	3,02,762
4	**36 kV XLPE CABLE**				

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL		UNIT	QTY	UNIT PRICE	TOTAL PRICE
a)	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)		km	1	9,13,822	9,13,822
b)	33 kV Indoor Termination Suitable for above Cable		Nos	4	4,909	19,636
c)	33 kV Outdoor Termination Suitable for above Cable		Nos	4	3,096	12,384
		SUB TOTAL - O				**36,28,993**
P	**GROUNDING / EARTHING SYSTEM**					
a)	40 mm MS Rod for Earthmat (*)					
	40 mm MS Rod for Earthing		km	4.797	4,95,112	23,75,053
	75 x 12 G. S. Flat		km	0.364	4,30,707	1,56,777
	50 x 6 G. S. Flat		km	0.091	1,43,569	13,065
	50 x 6 M. S. Flat		km	0.208	1,09,565	22,790
	Cleat type Clamp to suit 75 x 12 G. S. Flat		Nos	79.3	192	15,257
	3 Mtr long, 40 mm dia M. S. Pipe Earth Electrode with Test Link and without Pit		Nos	22.1	2,406	53,179
	3 Mtr. long, 40 mm dia Earth Rod Electrode with untreated Pit		Nos	29.9	1,925	57,566
	3 Mtr. long, 20 mm dia Earth Rod Electrode without Pit		Nos	10.4	2,406	25,026
	3 Mtr. long, 40 mm dia GI Pipe Earth Electrode		Nos	3.9	2,413	9,410
	Lightning Protection					
	7 / 3.66 mm GS Earth Wire		km	0.299	45,000	13,455
	Cleat Clamp on Structure to suit 7 / 3.66 mm GS Earth Wire		No	59.8	193	11,565
	Pad Clamp on Structure to suit 7 / 3.66 mm Earth Wire and 75 x 12 GS Flat		No	5.2	1,845	9,592
	25 x 3 GI Flat		km	0.598	35,893	21,464
	1.5 Mtr. long GI Spike		Nos	10.4	723	7,514
	Test Links		Nos	10.4	241	2,501
		SUB TOTAL - P				**27,94,215**
Q	**STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT**					
	Tower and Beams					
	220 kV Tower					
		CA Type	kgs.	7,650	89.95	6,88,079

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Heavy Construction Group

DGM(Contracts)

019

019

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	BG1 (WITH DEV) - 16 m	kgs.	3,232	89.95	2,90,702
	Lighting - cum - Lightining Mast	kgs.	4,750	89.95	4,27,261
	33 kV Tower				
	Tower - 3T	kgs.	4,599	89.95	4,13,657
	Girder - 3G	kgs.	1,374	89.95	1,23,584
	Equipments				
	Standard Structures for 220 kV Equipments				
	CVT	kgs.	990	89.95	89,046
	WT	kgs.	2,200	89.95	1,97,879
	SA	kgs.	942	89.95	84,728
	BPI	kgs.	960	89.95	86,347
	SUB TOTAL - Q				**24,01,284**
R	**EOT CRANE**				
a.	3.5 T for 220 kV GIS ROOM	Set	1	6,76,024	6,76,024
b.	2.5 T for 33 kV GIS ROOM	Set	1	4,53,777	4,53,777
c.	Moveable Ladder of suitable Capacity for 220 kV & 33 kV GIS Room	Nos	2	1,25,892	2,51,784
	SUB TOTAL - R				**13,81,585**
S	**Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, including Equipment Connectors, Pipes for Equipments and Lighting, all Accessories etc**				
	220kV CLAMPS & CONNECTORS				
	Terminal Connector on 26.66 / 33.33 MVA Transformer SF_6 to Oil bushing to suit GIS Bus Duct	Nos.	4	4,458	17,832
	Terminal Connector on 198 kV LA to suit 1 or 2 x MOOSE / ZEBRA ACSR	Nos.	6	3,450	20,700
	Terminal Connector on 245 kV CVT to suit 1 or 2 x MOOSE / ZEBRA ACSR	Nos.	6	2,962	17,772
	Terminal Connector on Wave Trap to suit 1 or 2 x MOOSE / ZEBRA ACSR	Nos.	8	2,709	21,672
	Terminal Connector on 220 kV BPI to suit 1 or 2 x MOOSE / ZEBRA ACSR	Nos.	6	3,208	19,248
	Tee Connectors to suit 1 or 2 x MOOSE / ZEBRA ACSR on both ways	Nos.	12	3,413	40,956

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	Suspension Hardware Assembly along with Insulators (220 / 33 kV side)	Lot	2	55,512	1,11,024
	33 kV CLAMPS & CONNECTORS				
	Terminal Connector on 30 kV Lightning Arrestor, to suit 1 or 2 X MOOSE / WOLF ACSR Conductor	Nos.	18	2,818	50,724
	Terminal Connector on 26.66 / 33.33 MVA Transformer LV Bushing to suit 1 x MOOSE ACSR Conductor	Nos.	4	2,562	10,248
	Terminal Connector on Cable Sealing End to suit 2 x MOOSE ACSR Conductor	Nos.	4	1,552	6,208
	Terminal Connector to suit 1 C x 630 sq. mm. XLPE Cable sealing ends	Nos.	6	2,962	17,772
	BUS BAR MATERIALS				
	MOOSE / ZEBRA / WOLF ACSR Conductor	km	0.1	5,56,568	55,657
	CABLE TRAYS				
	600 mm Wide Perforated Tray	km	0.8	13,82,167	11,05,734
	300 mm Wide Perforated Tray	km	0.12	6,04,698	72,564
	150 mm Wide Perforated Tray	km	0.12	43,193	5,183
	Structural Steel for above	MT	3	65,653	1,96,959
	PVC Pipes:				
	50 mm dia	km	0.4	4,31,927	1,72,771
	Sump Pumps				
	5 HP	Nos.	1	2,48,820	2,48,820
	0.5 HP	Nos.	4	43,194	1,72,776
	220 kV Bus Post Insulators	Nos.	6	38,010	2,28,060
	SUB TOTAL - S				**25,92,679**
T	**TESTING AND MAINTENANCE EQUIPMENT**				
1	Meggar 5 kV (Motorized)	Nos.	1	68,786	68,786
2	Meggar 1 kV (Motorized)	Nos.	1	6,995	6,995
3	Digital Multimeter	Nos.	2	9,911	19,822
4	D - Spanner Set (Insulated)	Nos.	2	670	1,340
5	Ring - Spanner Set (Insulated)	Nos.	2	699	1,398
6	Torque Wrench Set	Nos.	2	11,659	23,318

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

LARSEN & TOUBRO LIMITED Construction Group

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Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
7	Insulating Gloves	Set	5	1,457	7,285
8	Helmets	Set	5	526	2,630
9	Gas Evacuating and Refilling Device	Set	1	33,34,384	33,34,384
10	Gas Leakage Monitor	Nos.	2	69,952	1,39,904
11	Relay Test Kit	Nos.	1	25,64,911	25,64,911
12	Synchronizing Trolley	Set	1	1,44,774	1,44,774
13	Time Synchronisation Equipment	Lot	1	INCLUDED	
	SUB TOTAL - T				**63,15,547**
	TOTAL - 1 = *SUB TOTAL A to T*				**26,78,73,068**
	NEW ITEMS				
A-1	220 kV Single Phase Breaker Bay Module for Spare Transformer	Set	1	1,83,08,548	1,83,08,548
A-2	For Additional Bays - 245 kV, 4000 A, 50 kA, 3 Single Phase (Isolated) Units SF_6 Gas Insulated, Metal Enclosed **Bus Bars** each Unit, enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of the Circuit Breaker Bay Module complete with Voltage Transformer and Safety Grounding Switch etc	Set	1	8,10,000	8,10,000
A-3	1 - Phase SF_6 Duct to connect to 220 / 33 kV, 26.66 / 33.33 MVA Transformer / Lines with GIS etc (only the Additional quantity over and above 85.5 to be paid).	Mtr.	Unit Rate	1,36,153	
B-1	33 kV Single Phase Breaker Bay Module for Spare Transformer	Set	1	15,71,576	15,71,576
	36 kV OUTDOOR EQUIPMENT				
C-1	30 kV, Single Phase, Surge Arrestors with Surge Counter, Leakage Meter and Junction Box	Nos.	19	16,223	3,08,237
C-2	36 kV, Line Isolator Switch with Earth Switch	Set	6	1,87,917	11,27,502
D	**SUB STATION AUTOMATION SYSTEM** complete including Hardware and Software for **7 Bays** and Remote Control Station alongwith Associated Equipments	Lot	1	70,97,760	70,97,760
E	**For Additional Feeder** - 220 kV C & R Panel for Bus Bar Protection Panel		1	8,02,497	8,02,497
F	**36 kV XLPE CABLE**				
i	33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 1000 sq.mm Aluminium	Mtr.	Unit Rate	2,905	

LARSEN & TOUBRO LIMITED Construction Division

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

DGM(Contracts)

Sr. No.	DESCRIPTION OF MATERIAL	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	Conductor				
ii	33 kV Indoor Termination Suitable for above Cable suitable at GIS conforming to IEC: 60859	Nos	Unit Rate	75,000	
iii	33 kV Outdoor Termination Suitable for above Cable	Nos	Unit Rate	8,000	
	TOTAL OF NEW ITEMS				**3,00,26,120**

GRAND TOTAL FOR SUPPLY = *TOTAL 1 + NEW ITEMS* **29,78,99,188**

NOTE:

1. The above quantities are TENTATIVE which shall be finalised during detailed engineering to complete the Scope of Work and successful commissioning of the Sub Station.
2. The Payment shall be made on Unit Rates for the quantities actually measured at Site and as per approved Bill of Material.
3. Size of 33 kV XLPE Cable alongwith Terminations shall be finalised during detailed engineering and the payment thereof shall be made on the Unit Rates specfied above for the same.

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T-TOUSRO LIMITED Construction Group

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DGM(Contracts)

ANNEXURE - MS

QUANTITY AND COST OF MANDATORY SPARES

Sr. No.	DESCRIPTION	UNIT	QTY.	TOTAL F. O. R. COST
1	2	3	4	5
1	**MANDATORY SPARES**			
a)	**220 kV GIS Circuit Breaker**			
(i)	245 kV, 3 Phase Circuit Breaker with Interrupting Chamber complete with all necessary Apparatus (1 no. of each Rating)	No.	1	45,92,127
(ii)	Rubber Gasket, 'O' Rings and Seal	Set	1	28,916
(iii)	Trip Coil with Resistor	No.	3	28,914
(iv)	Closing Coil with Resistor	No.	3	28,914
(v)	Molecular Filter	Set	3	86,748
(vi)	Density / Pressure Monitoring System	No.	1	48,193
(vii)	Relays, Power Contactors, Push Buttons, Timers & MCB etc	Set	1	1,15,664
(viii)	Pressure Switches	Set	1	48,193
(ix)	Auxiliary Switch Assembly	No.	1	47,229
(x)	Operation Counter	No.	1	38,555
(xi)	Rupture Disc / Diaphram	No.	1	1,15,664
(xii)	245 kV, 3 Phase Circuit Breaker Operating Mechanism complete with all necessary connecting Apparatus Each Rating	No.	1	Included in A(i)
(xiii)	All type of Coupling for SF6) (1 no. of each type	Set	1	57,832
b)	**220 kV Current Transformer**			
(i)	Multi Ratio Single Phase Current Transformers of each Rating (3 Nos. of each Rating)	Set	1	21,29,834
c)	**220 kV Potential Transformer**			
(i)	Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware	Set	1	10,70,579
d)	**198 kV Surge Arrestor**			
(i)	Complete Surge Arrestor (for 1 Phase) GIS Type	No.	1	85,102
(ii)	Surge Counter / Monitor	No.	1	570
e)	**245 kV Isolators & Earth Switch**			
(i)	245 kV, Single Phase Disconnecting Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	10,75,742

LARSEN & TOUBRO LIMITED Construction Chennai

DGM(Contracts)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	DESCRIPTION	UNIT	QTY.	TOTAL F. O. R. COST
1	2	3	4	5
	(ii) 245 kV, Single Phase Grounding Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	8,91,576
	(iii) 245 kV, Single Phase High Speed Fault Making Grounding Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	10,75,742
f)	**33 kV GIS Circuit Breaker**			
	(i) Rubber Gasket 'O' Rings and Seal	Set	1	21,330
	(ii) Trip Coils	No.	3	25,138
	(iii) Closing Coils	No.	3	25,138
	(iv) Molecular Filter	Set	3	9,141
	(v) Density / Pressure Monitoring System	No.	1	22,853
	(vi) Relays, Power Contactors, Push Buttons, Timers & MCB etc.	Set	1	4,57,065
	(vii) Closing Assembly / Valve	No.	1	2,285
	(viii) Pressure Switches	Set	1	2,285
	(ix) Auxiliary Switch Assembly (for CB)	No.	1	29,710
	(x) Rupture Disc / Diaphram	No.	1	15,997
	(xi) 36 kV, 3 Phase Circuit Breaker Operating Mechanism complete with all necessary connecting Apparatus (each Rating)	No.	1	7,45,015
g)	**33 kV Current Transformer**			
	(i) Multi Ratio Single Phase Current Transformers of each rating (3 nos. of each rating)	Set	1	2,52,528
h)	**33 kV Potential Transformer**			
	(i) Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware	Set	1	1,89,682
i)	**30 kV Surge Arrestor**			
	(i) Complete Surge Arrestor including Base with Surge Counter & Accessories: AIS Type	No.	1	15,700
	(ii) Surge Counter / Monitor	No.	1	8,722
j)	**33 kV Isolators & Earth Switch**			
	(i) 36 kV, 3 Phase, 1250 Amperes Disconnecting Switch Operating Mechanism complete with all necessary Connecting Apparatus	Set	1	92,175
	(ii) 36 kV, 3 Phase, 1250 Amperes Grounding Switch Operating Mechanism complete with all	Set	1	Part of Three Position Switch

LARSEN & TOUBRO LIMITED Construction Chennai

DGM(Contracts)

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

MS2

Sr. No.	DESCRIPTION	UNIT	QTY.	TOTAL F. O. R. COST
1	2	3	4	5
	necessary Connecting Apparatus			
k)	**Battery**			
	220 Volt / 48 Volt Batteries			
	(i) Spare Battery Cell without Electrolyte	No.	10	2,83,679
	(ii) Terminal Connectors with Bolts & Nuts (each type)	No.	10	43,640
	(iii) Float Level Indicators (each type)	No.	10	13,627
	(iv) Vent Plugs (each type)	No.	10	16,358
l)	**Battery Charger**			
	220 Volt / 48 Volt Batteries			
	(i) Set of Control Cards (of each type)	Set	1	69,904
	(ii) Set of Relays	Set	1	8,389
	(iii) Set of Contactor	Set	1	25,166
	(iv) Filter Capacitors	Set	1	8,389
	(v) Thyristor / Diode	Set	1	11,185
	(vi) Set of Switches	Set	1	22,930
	(vii) Set of Wound Resistors	Set	1	4,193
	(viii) Potentiometers	Set	1	4,193
	(ix) Fuses of Thyristor with Indicators	Set	6	21,807
m)	**LT Switchgear**			
	(i) Relays (Auxiliary)	Set	1	95,375
	(ii) CTs and PTs	Set	1	8,227
	(iii) Switches / Push Buttons and Meters	Set	1	27,501
	(iv) TPN Switches / MCB	Set	1	93,997
	(v) LT Breaker Spares			
	Spring Charging Motor	No.	1	27,504
	Auxiliary Contacts Sets	Set	2	2,521
	Busbar Seal off Insulators	No.	5	2,292
	Arc Chutes	Set	2	7,563
	Moving Contacts	Set	1	3,209
	Arcing Contacts (Fixed / Moving)	Set	1	3,209
	Springs (Closing / Opening)	No.	1	573
	Closing Coil	No.	1	1,718
	Tripping Coil	No.	1	1,260
	Auxiliary Finger Contact	Set	1	1,203
	Limit Switches	Set	1	5,156
	Jaw Contacts	Set	1	372
	(vi) BUSBAR			
	Busbar Insulators	No.	5	716
	Interphase Barrier	No.	2	1,432
	Busbar Strip 1 mm (Aluminium)	metres	5	5,371
n)	**DG Set**			
	(i) Set of Filters 1 set (Lubeoil / Fuel / Air Circuit)	Set	1	6,603
	(ii) Solenoid Coil Assembly	No.	1	2,934
	(iii) Self Starter Assembly	No.	1	54,930
	(iv) Lub - Oil Pressure Safety Control	No.	1	13,882

LARSEN & TOUBRO LIMITED Construction Chennai

DGM(Contracts)

MS 3

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Dy. General Manager (Contracts
Power Transmission Corpn.
Barowalia House, Khalini, Shimla

Sr. No.	DESCRIPTION	UNIT	QTY.	TOTAL F. O. R. COST
1	2	3	4	5
	(v) High Water Temperature Safety Control	No.	1	2,197
	(vi) Diode	No.	2	1,505
o)	**Optic Fibre Cable**	metres	500	47,746
p)	**220 kV CVT**	No.	1	3,95,452
	TOTAL OF MANDATORY SPARES			**1,48,28,766**

NOTE:

i) *The above Prices are FIRM and NO Price Variations shall be paid.*

ii) *Freight & Insurance Charges, Excise Duty, C. S. T. / VAT are included in above Prices.*

DGM(Contracts)

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SECTION -III

LARSEN & TOUBRO Limited Construction Chennai

Dy. General Manager (Contracts)
T.H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
(A State Government Undertaking)
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002
(Telefax: 0177 - 2626284)

REFERENCE: HPPTCL / DGMC / L & T - SUPPLY / 2010 -5107-12 DATED: 23-12-10

TO,

M/S LARSEN & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACTS DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P. B. No. 979, CHENNAI – 600089
FAX No.: 044 – 22493317; 044 – 22526345

SUBJECT: LETTER OF AWARD (LOA) FOR SUPPLY OF EQUIPMENT / MATERIALS FOR CONSTRUCTION OF 220 / 33 kV PALCHAN GIS SUBSTATION AGAINST TENDER DOCUMENT No.: DGMC / PALCHAN SUBSTATION / 2 / 2009 (FIRST CONTRACT)

REFERENCE: This has reference to the following: -

1) This office Tender Document No.: DGMC / PALCHAN SUBSTATION / 2 / 2009
2) Your Offer No.: LTCD / EI&C / HPPTCL PALCHAN / NJ / BID / 01 dated 18.12.2009
3) Your Price Letter No.: LTCD / EI&C / HPPTCL PALCHAN / NJ / BID / 04 dated 18.12.2009
4) Your Letter No.: LTCD / EIC / HPPTCL / NJ / PALCHAN / 1603 dated 16th March, 2010
5) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID04 dated 14th April, 2010
6) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID05 dated 12th July, 2010
7) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ dated 29th July, 2010
8) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID06 dated 17th August, 2010
9) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / NJ / BID07 dated 30th August, 2010
10) Your Letter No.: LTCD / EIC / HPPTCL / PALCHAN / KRJ / 2109 dated 21st September, 2010
11) This Office Letter of Intent (LOI) No.: HPPTCL / DGMC / L & T - SUPPLY / 2010 4414 17 dated: 19.10.2010
12) Your Letter No.: LTCD / EI&C / KRJ / PALCHAN / 01 dated 22nd October, 2010

LARSEN & TOUBRO LIMITED Construction Chennai

029

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sir,

I have been directed to place Letter of Award (LOA) on you for Supply of Equipment / Material (also referred to as 'First Contract') required for Construction of 220 / 33 kV GIS Sub Station at Palchan in Kullu District of Himachal Pradesh amounting to Rs. 21,78,88,606.00 (Rupees Twenty One Crore Seventy Eight Lac Eighty Eight Thousand Six Hundred Six) only. The Scope of Work under this Contract shall also include all such Items, Equipment, and Materials, which are not specifically mentioned in the Bidding Documents and / or the Bid Proposal but are necessary for successful completion of the Scope of Work under the Contract unless otherwise specifically excluded in the Bidding Documents and / or this Letter of Award.

This 'First Contract' is being awarded on you as per the Bid Proposal submitted and the Terms and Conditions of the Tender Document No.: DGMC / PALCHAN SUBSTATION / 2 / 2009 accepted by you. This Contract is for design, engineering, manufacture, testing at manufacturer's works, transportation, and insurance, delivery on F. O. R. Destination Site(s) basis, handling, storage of all Equipment and Materials including Mandatory Spares and all such Items which are not specifically mentioned but are incidental and necessary for successful completion and commissioning of 220 / 33 kV GIS Sub Station at Palchan in Kullu District of Himachal Pradesh.

1. The detailed List of Equipment and Material alongwith their tentative quantities to be supplied and Unit Rates under the subject LOA are given in Annexure -- 1 and Annexure -- MS to this Letter of Award.

2. The Scope of Work under this Contract shall also include all such Items, Equipment, and Materials, which are not specifically mentioned in the Bidding Documents and / or the Bid Proposal but are necessary for successful completion of the Scope of Work under the Contract, unless otherwise specifically excluded in the Bidding Documents and / or this Letter of Intent.

3. The Work under this LOA shall be performed by you strictly in line with the Bidding Documents except as agreed vide correspondence under reference and as specifically amended / modified in this LOA and mentioned herein below and in Annexure - 1 and Annexure - MS to this LOA.

4. It is expressly understood by you that any breach under the 'Second Contract' shall automatically be deemed as breach of this Contract and any such breach or occurrence giving us a right to terminate the 'Second Contract' and / or recover damages under that Contract shall give us right to terminate this Contract and / or recover damages under this Contract as well. However, such breach or occurrence in the 'Second Contract' shall not automatically relieve you of any of your obligations under this Contract. It is expressly understood and agreed by you that the Equipment / Materials supplied by under this 'First Contract', when erected, tested and commissioned under the 'Second Contract' shall give satisfactory performance in accordance with the Bidding Document.

5. The transfer of title in respect of the Equipment / Materials to be supplied by you, pursuant to terms of this Contract shall pass on to HPPTCL on its actual delivery at site Stores. This transfer of title shall however not relieve you from the liability and responsibility under the Contract including that of (i) all risks and loss or damage to the Equipment and Materials as specified in the Contract and (ii) quality and performance of goods for their compliance with the specification until taking over / final acceptance fulfilment of warranty provisions and latent defect obligations.

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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6. CONTRACT PRICE:

6.1 The Contract Price for the complete Scope of Work under this LOA is as per the following break up:

Sr. No.	PRICE COMPONENT	VALUE in Rupees
1	Supply of Equipment / Material as per Annexure – 1	20,30,59,840
2	Supply of Mandatory Spares as per Annexure - MS	1,48,28,766
3	TOTAL CONTRACT PRICE	21,78,88,606

Rupees Twenty One Crore Seventy Eight Lac Eighty Eight Thousand Six Hundred and Six only

6.2 Further breakup of the Contract Price for the purpose of on account payment is given at Annexure – 1 and Annexure – MS of this LOA.

6.3 Notwithstanding the breakup of the Contract Price, the Contract shall at all times be construed as a single source responsibility Contract and any breach in any part of the Contract shall be treated as breach of the entire Contract.

6.4 The Ex – Works Price of Items indicated at Annexure – 1 for, which quantities are assessed by you and are on lump sum basis, shall remain constant irrespective of any increase or decrease in quantities of any Items for completion of Scope of Work as per Technical Specification unless there is any change of Scope of Work by the Purchaser / Owner.

In case, the actual requirement of quantity of such Items is more than the quantities identified in the LOA / Contract Agreement / approved BOQ / Billing break up or some additional Items are required for the successful completion of the Scope of Work as per the Technical Specification, such additional Items / quantities shall be supplied by you without any additional cost to HPPTCL. Further, in case actual requirement of quantities for successful completion of Scope of Work is less than the quantities identified in the LOA / Contract Agreement / approved BOQ / Billing break up or some existing Items are not required, the lump sum price for these Items shall remain unchanged and no deduction shall be made from the lump sum price due to such reduction of quantities.

In case quantities of these Items supplied at Site are in excess of that required for successful completion of Scope of Work as detailed in the Bidding Documents, such additional quantities shall be your property and you shall be allowed to take back the same from the Site for which no deduction from lump sum price shall be made. It shall, however, be your responsibility to pay all statutory taxes, duties, and levies to the concerned authorities for such surplus material, which would otherwise have been lawfully payable. You shall submit an indemnity bond to keep HPPTCL harmless from any such liability, before release of such material to you by HPPTCL.

7. TAXES AND DUTIES:

7.1 The Contract Price is inclusive of all taxes and duties such as Excise Duty, Sales Tax / VAT for all Equipment and Materials to be supplied under the Contract and no claim on this behalf will be entertained by HPPTCL. Further any such taxes and duties as aforesaid payable including statutory variation thereon will be to your account and no claim on this behalf will be entertained by HPPTCL.

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

7.2 Entry Tax, Octroi as applicable for destination Site on all Items of Supply, which shall be dispatched directly from Sub Vendors Works to HPPTCL's Site (Sale - in - transit) shall be reimbursed to you, subject to furnishing of documentary proof for payment made, at the applicable rate at the time of dispatch, scheduled or actual, whichever is lower in line with the provisions of Bidding Documents.

7.3 The above Contract Price is inclusive of Service Tax and Surcharge / Cess etc on it and HPPTCL shall not entertain any claim whatsoever in this regard.

7.4 HPPTCL shall issue requisite Sales Tax Declaration Forms on receipt of your request for such Items identified in Price Schedule and dispatched directly to HPPTCL's Site from your Vendors' / Sub Vendors' Works (Sales - in transit).

7.5 HPPTCL shall be entitled to deduct Income Tax, Surcharge on Income Tax and other Corporate Taxes / other Taxes at source in accordance with the provisions of the Income Tax / other Laws as applicable from time to time. TDS so deducted shall be deposited with the relevant tax Authority and necessary TDS Certificate shall be issued to you by HPPTCL.

8. TERMS OF PAYMENT:

i) Ninety percent (90 %) of the Ex - Works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within 45 days on receipt of the Material in your Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract, Acceptance of Bank Guarantee by the Purchaser, whichever is later. The Payment shall be released by the Engineer or by the Central Payment Cell of the HPPTCL upon submission of the documents specified below:

(a) Original and 4 copies of the Invoices showing Purchase Order number, Goods Description, Quantity, Unit Price and Total Amount

(b) Packing Lists (4 copies).

(c) Railway Receipt / Receipted L. R.

(d) Manufacturers / Contractors Guarantee Certificate of quality

(e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report, Transit Insurance Certificate and an Indemnity Bond as per Form - IX for full value of the Material valid till the taking over of the said Sub Station by the Purchaser

(f) Taxes & Duties shall be paid against Documentary Evidence

(g) The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL.

(ii) The balance 10 % of the Ex - Works Price of each item as per Price Schedule shall be made within 45 days of the Issuance of Taking Over Certificate by the Purchaser's Engineers

(iii) However, in case the Payment is delayed beyond 45 days due to one or the other reason, NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE

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Dy. General Manager (Contracts)
... Power Transmission Corp. L...
Barowalia House, Khalini, Shim...

9. QUANTITY VARIATION:

9.1 The quantity variation shall be applicable in line with the provision of Clause No.: 2.39 (Purchaser's Right to Vary Quantities at Time of Award), Section - 2, ITB and Clause No.: 3.23 (Variation), Section - 3, GCC of Volume - I of the Bidding Documents.

9.2 Any variation in the quantity of the Items for which quantities have been assessed and indicated by you and the quantities subsequently arrived at while approving the Bill of Quantities / Billing break up of lump sum / lot / set of quantities as specified in Annexure - 1 of this Letter of Award shall be to your account, unless there is change in the Scope of Work by us.

9.3 HPPTCL reserves the right to increase or decrease upto 20 % (twenty percent) of the Contract Value, the quantity of different Items by way of suitable amendments to the Contract, without any change in Unit Price and / or other terms and conditions during the execution of the Contract. However, the quantities of the individual Item may vary up to any extent without any change in Unit Price or other Conditions.

10. PRICE ADJUSTMENT:

All Price Components under this Letter of Award shall be FIRM during the entire execution of the Contract and no price variation whatsoever shall be applicable.

11. TIME SCHEDULE OF CONTRACT:

11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub Station covered under the subject Contract within 8 (eight) months from the date of issue of this Contract and the same shall be applicable for all contractual purposes.

11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex - Works delivery for all the Equipment and Materials covered under this Contract within 15 days of this Letter of Award.

11.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction, testing and successful commissioning of 220 / 33 kV GIS Sub Station at Palchan shall be reckoned as 8 months from the date of LOA.

12. STAGE PENALTY:

To ensure that you start the Work immediately after signing of the Contract, the following Minimum Progress of Work, in respect of Supply of Equipment against Supply Contract will have to be achieved by you in terms of Financial Values:-

PERIOD STARTING FROM SIGNING THE CONTRACT	FINANCIAL ACHIEVEMENT INCLUDING SUPPLY OF EQUIPMENT
Within 3 (Three) months	10 % of the Contract Value
Within 5 (Five) months	40 % of the Contract Value
Within 6 (Six) months	60 % of the Contract Value

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Bowalia House, Khalini, Shimla-2

You shall ensure the completion of Supply for the above values, failing which the Stage Penalty @ ½ % per week or part thereof for the amount equal to shortfall in progress achieved will be levied for the period starting from the due date of achievement of above targets.

The Stage Penalty shall be calculated in number of days of shortfall.

The achievement of target will be the date on which the delivery of equipment and material at Site as indicated on the Bill / Invoice is completed by you.

However, the Total Amount of Stage Penalty plus Liquidated Damages leviable for non - completion of Sub Station in time will not exceed 15 % of the Contract Value of the Sub Station not commissioned in time in any case.

The Stage Penalty levied shall be reviewed on completion of the Work to the extent that where the Work as a whole is completed within the stipulated Completion Period or the Total Delay in Commissioning of the Substation is less than 2 (Two) Weeks, no Stage Penalty shall be chargeable and the Stage Penalty already charged for the delay in completion of Individual Stage, if any shall be refundable to you through the Bill payable on completion of the Work.

13. INCENTIVE:

As the Work is of urgent nature and its timely commissioning is of utmost importance to evacuate the power being generated by various IPPs, advanced commissioning of this 220 kV GIS Palchan Sub Station will be appreciated and an Incentive @ 0.25 % of the Contracted Amount per week counted backward from the Contracted Completion Date shall be paid to you. It is clarified that Part of Week shall not be counted for any incentive.

14. LIQUIDATED DAMAGES (LD) FOR DELAY:

14.1 If you fail to successfully complete the Commissioning of the Sub Station within the Time Schedule stipulated (8 months) under the Contract, you shall pay to HPPTCL as Liquidated Damages and not as a penalty, a sum of one half of one percent (0.5 %) of the Contract Price for each calendar week or part thereof of delay.

14.2 Equipment and Materials shall be deemed to have been delivered only when all its Components, Parts, and Spares are also delivered. If certain Components, Parts, or Spares are not delivered in time; the Equipment and Materials will be considered as delayed until such time the same are also delivered.

14.3 The Total Amount of Liquidated Damages for delay under the Contract shall be subject to a Maximum of 10 % of the Contract Price.

15. MOBILISATION ADVANCE:

On your request, HPPTCL will make Mobilisation Advance to you for the cost of mobilisation in respect of the Works in a lump sum equivalent to 10 % of the amount of Contract Price within 30 days in Indian Rupees as provided in the Contract. The interest @ 12 % per annum shall be charged on the Mobilisation Advance as per standard Terms and Conditions of the HPPTCL. The accrual of interest will start from the date of release of advance. Payment of the Mobilisation Advance will be due under separate certification by HPPTCL after fulfilment of following conditions:

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

i) Execution of CONTRACT AGREEMENT,

ii) Submission of the Performance Security;

iii) Submission of a Bank Guarantee by a Scheduled / Nationalised Bank of an amount equal to the Advance Loan, such Bank Guarantee shall remain effective until the Advance Loan has been completely repaid by you out of current earnings under the Contract and certified accordingly by the Engineer.

You will use the Mobilisation Advance exclusively for mobilisation expenditures, including the acquisition of Constructional Plant in connection with the Works. Should you misappropriate any portion of the Advance Loan, it shall become due and payable immediately, and no further loan will be made to you thereafter.

16. SIGNING OF CONTRACT:

You shall execute a Contract Agreement at the office HPPTCL, on the Terms and Conditions envisaged in the Tender Documents and this detailed Letter of Award, within 30 (Thirty) calendar days of the receipt of Notification of this LOA. It is a legitimate obligation of you to execute and to stamp the Contract, in accordance with the Indian Stamp Act and to supply Six Copies of Contract Drawings, Technical Particulars as finally approved by HPPTCL and other Literature and Instruction Books regarding Handling, Use and Maintenance of Equipment / Material. The cost of all these and such other Items have been included in the Prices and you will not be entitled to any extra payment on these accounts. However, non - execution of the Contract Agreement by you shall not absolve you of the responsibility of the faithful execution of the Contract

17. PERFORMANCE SECURITY:

17.1 Within 30 (Thirty) days of the receipt of this LOA, you are required to furnish the Contract Performance Security, in the Performance Security Form provided in the Bidding Documents or any other Form acceptable to HPPTCL. The Performance Security amount shall be equal to 10 % of the Total Contract Price, it shall guarantee the faithful performance of the Contract in accordance with the Terms, and Conditions specified in Tender Documents. The Guarantee shall be valid up to 120 days after the end of Warranty Period.

17.2 In the event of any change in the Contract Price, the Performance Security shall be adjusted only against specific advice from HPPTCL. The Performance Security shall be paid to HPPTCL on first demand without conditions or proof.

18. GUARANTEE:

You shall Warrant that the Equipment shall be New, Unused and in accordance with the Contract documents and free from defects in Material and Workmanship for a period of 18 months from the date of Taking Over by HPPTCL or 24 months from the date of commissioning, whichever is earlier. Your liability shall be limited to replacement of any defective part in the Equipment, under normal use and arising solely from faulty design, Material and / or Workmanship, provided always that such defective parts are repairable at Site, and are not in the mean time essential in the Commercial use of the Equipment. Such replacement / defective parts shall be returned to you unless otherwise arranged. HPPTCL shall normally carry out no repair or replacement when the Equipment is under your supervision.

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

If during the Period of Guarantee, any of the Materials, is found defective and / or fail in Test or Operation, such Materials shall be repaired or replaced by you free of cost to the HPPTCL irrespective of the reimbursements from the insurance company within reasonable time which shall in no circumstance be more than 15 days or such other reasonable time as the HPPTCL may deem proper to afford, failing which the cost of the failed Material will be deducted from the subsequent Bills / Bank Guarantee.

You shall bear all the expenses incurred in connection with the repair or replacement against such defective goods inclusive of all Freight (both inland overseas), Insurance, Customs, Levies, Forwarding and Clearing and Demurrage and Other Incidental Charges involved in delivering the said goods to HPPTCL specified destination. The decision whether correction of the defects should be by the repair or replacement shall be the sole discretion of HPPTCL.

19. APPLICABLE LAW:

The Contract shall be interpreted in accordance with the Laws of India and shall be subject to the jurisdiction of Shimla Court irrespective of the place of the Works, the place of performance or the place of payments under the Contract.

20. FORCE MAJEURE:

21.1 Force Majeure is herein defined as any cause, which is beyond your and HPPTCL's control as the case may be, which could not be foreseen or with a reasonable amount of diligence could not have foreseen and which substantially affects the Performance of the Contract, such as:

Natural Phenomena, including but not limited to Floods, Drought, Earthquakes and Epidemics, Acts of any Government, Domestic or Foreign, including but not limited to War, Declared or undeclared, Priorities, Guaranties, Embargoes

21.2 Provided either Party shall within 15 days from the occurrence of such a cause notify the other in writing of such cause.

21.3 You shall not be liable for Loss or Damage due to delay in Manufacture and Delivery resulting from any causes beyond your reasonable control including but not limited to compliance with the regulations, orders or instructions of any federal state or municipal, government or agency thereof, acts of god, acts of omission of the purchaser, acts of civil and military authority, fires, strikes, factory shutdowns or altercations, embargoes, war, riots.

21. All other Terms and Conditions shall be as per Tender Document No.: DGMC / PALCHAN SUBSTATION / 02 / 2009.

Please acknowledge receipt of the Letter of Award.

Enclosure: Annexure – 1
Annexure MS
Schedule PCPS
Data Requirement Sheets A to P

Yours faithfully,

Dy. GENERAL MANAGER (CONTRACTS)

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

036

REFERENCE: HPPTCL / DGMC / L & T - SUPPLY / 2010 - DATED:

Copy for information and necessary action to: -

1. P. S. to Director (Planning & Contracts), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
2. P. A. to Director (Projects), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
3. Dy. General Manager (Projects), HPPTCL, Barowalias House, Khalini, Shimla – 171002.
4. Sr. Manager, HPPTCL, Sarabai, Bhunter, District Kullu – 175125 (H. P.)
5. Sr. Accounts Officer, HPPTCL, Sangla House, Khalini, Shimla – 171002.

Dy. GENERAL MANAGER (CONTRACTS)

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

PRICE SCHEDULE SUPPLY
PRICE BREAK UP

Sr. No.	DESCRIPTION	UNIT	QTY.	UNIT						TOTAL F. O. R. COST
				EX - WORKS PRICE	EXCISE DUTY & CESS	SALES TAX / VAT	FREIGHT	INSURANCE	F. O. R. COST	
1	2	3	4	5	6	7	8	9	10	11
A	250 kVA, 33 / 0.433 kV Three Phase Transformer including Bushings, Accessories and First Filling of Oil	No.	1	385,790	Included		5,114	6,480	397,384	397,384
B	245 kV GIS EQUIPMENT									
1	245 kV, 1,600 A, 50 kA SF6 Gas Insulated Transformer Bay Module comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Surge Arrestors, SF6 Gas Monitoring System for complete Bay, LCC, Three 1 - Phase SF6 Ducts and SF6 / Oil Bushing to connect to 220 / 33 kV, 25 / 31.5 MVA Transformer and Accessories with GIS etc to complete Transformer Bay Module	No.	1	40,737,899	Included		2,840,909	684,263	44,263,071	44,263,071

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

038

1	2	3	4	5	6	7	8	9	10	11
2	245 kV, 2000 A, 50 kA SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Bus Bar Disconnectors with Grounding Switch, Line Disconnector with Safety Grounding Switch, High Speed Fault Making Grounding Switch SF6 Gas Monitoring System for complete Bay, LCC, GIS Duct and Air / SF6 Bushing Termination Enclosure and Accessories with GIS etc to complete Feeder Bay Module.	No.	1 2	38,808,181	Included	2,840,909	651,850	42,300,940	42,300,940
3	245 kV, 4000 A, 50 kA, 3 Single Phase (Isolated) Units SF6 Gas Insulated, Metal Enclosed BUSBAR, each Unit enclosed in Bus Enclosure running along the length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Busbar Set shall be complete with Voltage Transformer complete with Safety Grounding Switch.	No.	2	Included in Items B -1, 2 & 4		2,840,909		2,840,909	5,681,818
4	245 kV, 4000 A, 50 kA SF6 Gas Insulated Bus Coupler Bay Module comprising of SF6 Gas Insulated	No.	1	22,195,614	Included	2,840,909	372,814	25,409,337	25,409,337

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

TOUBRO LIMITED Industrial Construction Group

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1	2	3	4	5	6	7	8	9	10	11
	Circuit Breaker, Current Transformers, Two Disconnectors with Safety Grounding Switches, SF6 Gas Monitoring System for complete Bay LCC etc.									
5	245 kV CVT with Junction Box	No.	3	405,079	Included		14,205	6,804	426,088	1,278,264
6	198 kV Lightning Arrestor with Counter and Leakage Meter	No.	3	81,016	Included		710	1,361	83,087	249,261
C	36 kV, 2000 A, 40 kA for 3 sec SF6 Gas Insulated, Metal Enclosed BUSBARs each Unit enclosed in Bus Enclosures running along the Length of the Switchgear to interconnect each of Circuit Breaker Bay Module. Each Busbar.Set shall be complete with Voltage Transformers complete with Safety Grounding Switch									
1	36 kV, 1600 A SF6 Gas Insulated Feeder Bay Module each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two Busbar Disconnectors with Grounding Switch Line Disconnector with Safety Grounding Switch, High Speed Fault	No.	3	3,758,824	Included		14,205	63,136	3,836,165	11,508,495

LARSEN & TOUBRO LIMITED Construction Capital

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

1	2	3	4	5	6	7	8	9	10	11
	Making Grounding Switch, SF6 Gas Monitoring System for complete Bay LCC Enclosure and Accessories with with GIS etc to complete Feeder Bay Module.									
2	36 kV, 2000 A SF6 Gas Insulated Bus Coupler Bay comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Busbar Disconnectors with Earthing Switch, SF6 Gas Monitoring System for complete Bus Coupler Panel — line panel.	No.	1	3,209,563	Included	14,205	53,910	3,277,678	3,277,678
3	36 kV, 1600 A SF6 Gas Insulated Power Transformer Panel each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Busbar Disconnectors with Earthing Switch, Surge Arrestor (30 kV), SF6 Gas Monitoring System for complete Power Transformer Panel	No.	1	3,243,770	Included	14,205	54,485	3,312,460	3,312,460
4	36 kV, 630 A SF6 Gas Insulated 250 kVA L. T. Transformer Panel each comprising of SF6 Gas Insulated Circuit Breaker, Current Transformers, Two numbers of Busbar Disconnectors with Earthing	No.	1	2,788,332	Included	14,205	46,835	2,849,372	2,849,372

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction

1	2	3	4	5	6	7	8	9	10	11
	Switch Surge Arrestor (30 kV) SF6 Gas Monitoring System for complete L. T. Transformer Panel									
D	SUBSTATION AUTOMATION SYSTEM									
	Complete Sub Station Automation System including Hardware & Software for the Sub Station and Remote Control Station alongwith Associated Equipment as per Technical Specification	LOT	1	9,361,825	Included		82,727	157,248	9,601,800	9,601,800
	BAY CONTROL UNITS									
1	220 kV Bays	Nos.	3				*Included above in D*			
2	33 kV Bays	Nos.	6				*Included above in D*			
E1	220 kV CONTROL AND RELAY PANEL									
1	Circuit Breaker Control Panel									
a)	With Auto Reclose	Nos.	1	540,105	Included		4,773	9,072	553,950	553,950
b)	With out Auto Reclose	Nos.	2	514,386	Included		4,545	8,640	527,571	1,055,142
2	Line Protection Panel (Main - I + Main - II)	Nos.	1	1,285,965	Included		11,364	21,600	1,318,929	1,318,929
3	Bus Bar Protection Panel 220 kV (Double Bus Bar Protection)	Set	1	2,494,772	Included		22,045	41,904	2,558,721	2,558,721
4	Transformer Protection Panel H. V. Side	Nos.	1	807,586	Included		7,136	13,565	828,287	828,287

LARSEN & TOUBRO LIMITED Construction Division

Dy. General Manager (Contracts)
Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

1	2	3	4	5	6	7	8	9	10	11
E2	33 kV CONTROL AND RELAY PANEL									
1	Circuit Breaker Control Panel									
a)	With Auto Reclose	Nos.	3	488,667	Included		4,318	8,208	501,193	1,503,579
b)	With out Auto Reclose	Nos.	3	488,667	Included		4,318	8,208	501,193	1,503,579
2	Line Protection Panel	Nos.	3			*Included above in Item E2 - 1*				
3	Transformer Protection Panel - L. V. Side	Nos.	1			*Included above in Item E2 - 1*				
4	Transformer Protection Panel - Station	Nos.	1			*Included above in Item E2 - 1*				
5	Bus Coupler Protection Panel	Nos.	1			*Included above in Item E2 - 1*				
6	DR Evaluation Unit	Nos.	1			*Included above in Item E2 - 1*				
F	PLCC for 220 kV LINE FEEDER									
1	2000 A, 0.5 mH / 1.0 mH, 50 kA Line Traps	Nos.	2	452,660	Included		6,000	7,603	466,263	932,526
2	Coupling Device (Phase to Phase)	Nos.	2	75,615	Included		1,002	1,270	77,887	155,774
3	HF Cable	LS	1	12,602	Included		167	212	12,981	12,981
4	Carrier Equipment (for Speech + Protection and for Speech + Data)	Nos.	3	321,491	Included		4,261	5,400	331,152	993,456
5	Protection Coupler	Nos.	2	137,367	Included		1,821	2,307	141,495	282,990
6	Print Testing Kit	Set	1	109,307	Included		1,449	1,836	112,592	112,592
7	EPBAX (24 / 8) with Telephone Sets	Set	1	282,295	Included		3,742	4,742	290,779	290,779
F.1	FOTE Equipment	Set	1	9,837,632	Included		130,398	165,240	10,133,270	10,133,270

not included.

By: General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T TOUBRO LIMITED Jewan Construction Division

1	2	3	4	5	6	7	8	9	10	11
G	AIR CONDITIONER AND VENTILATION SYSTEM									
1	Split AC (Capacity - 2T)	Nos.	10	30,863	Included		409	518	31,790	317,900
2	Ventillation System for 220 kV & 33 kV GIS Hall	LS	1	2,095,752	Included		30,068	38,102	2,163,922	2,163,922
H	LT SWITCHBOARD									
1	415 V Main Switchboard	Nos.	1	3,214,913	Included		42,614	54,000	3,311,527	3,311,527
2	415 V A. C. Distribution Board	Nos.	1	1,480,345	Included		19,622	24,865	1,524,832	1,524,832
3	220 V, DCDB	Nos.	2	576,485	Included		7,641	9,683	593,809	1,187,618
4	48 V, DCDB	Nos.	2	367,709	Included		4,874	6,176	378,759	757,518
I	BATTERIES									
1	220 V, 400 AH	Set	2	662,015	Included		8,775	11,120	681,910	1,363,820
2	48 V, 400 AH	Set	2	144,440	Included		1,915	2,426	148,781	297,562
J	BATTERY CHARGER SYSTEM									
1	220 V	Set	2	497,668	Included		6,597	8,359	512,624	1,025,248
2	48 V	Set	2	370,358	Included		4,909	6,221	381,488	762,976
K	DG SET ALONGWITH CONTROL PANEL (100 kVA, 440 V for 220 kV Sub Station)	Set	1	1,928,948	Included		25,568	32,400	1,986,916	1,986,916

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
Power Transmission Corpn. Ltd,
Barowalia House, Khalini, Shimla-2

044

1	2	3	4	5	6	7	8	9	10	11
L	FIRE PREVENTION AND EXTINGUISHING SYSTEM									
1	Nitrogen Injection Fire Prevention & Extinguishing System for Transformer	Set	1	636,553	Included		8,438	10,692	655,683	655,683
2	Fire Protection for GIS cum Control Room Building etc (Portable type the Extinguishers System)	Lot	1	702,704	Included		10,082	12,776	725,562	725,562
M	ILLUMINATION SYSTEM	Lot	1	3,897,186	Included		51,657	65,460	4,014,303	4,014,303
1	Control Room / GIS Building	LS	1				*Included in Item - M*			
2	Switchyard Lighting	LS	1				*Included in Item - M*			
3	Solar Light System for Street Light	LS	1				*Included in Item - M*			
N	Power Cables and Copper Conductor Armoured Control Cables alongwith Lugs, Glands and straight Joints.	LS	1	2,770,729	Included		36,726	46,539	2,853,994	2,853,994
O	33 kV XLPE POWER CABLE AND ACCESSORIES									
1	XLPE POWER CABLE									
	3.5 c X 300 sq. mm	km	0.50	633,981	Included		8,403	10,649	653,033	326,517
2	PVC POWER CABLE									
	3.5 c X 90 sq. mm	km	0.20	313,081	Included		4,150	5,259	322,490	64,498
	3.5 c X 70 sq. mm	km	0.50	253,978	Included		3,366	4,266	261,610	130,805
	3.5 c X 35 sq. mm	km	0.20	146,729	Included		1,945	2,465	151,139	30,228
	4 c X 16 sq. mm	km	0.50	101,334	Included		1,343	1,702	104,379	52,190
	4 c X 4 sq. mm	km	1.00	50,153	Included		665	842	51,660	51,660

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T-TOUBRO LIMITED Larsen & Toubro Construction

045

1	2	3	4	5	6	7	8	9	10	11
3	HR - FRLS CONTROL CABLE									
	2 c X 2.5 sq. mm	km	1.00	46,899	Included		622	788	48,309	48,309
	4 c X 2.5 sq. mm	km	2.00	80,000	Included		1,060	1,344	82,404	164,808
	7 c X 2.5 sq. mm	km	1.00	133,059	Included		1,764	2,235	137,058	137,058
	10 c X 2.5 sq. mm	km	0.75	186,401	Included		2,471	3,131	192,003	144,002
	12 c X 2.5 sq. mm	km	0.50	221,507	Included		2,936	3,721	228,164	114,082
	16 c X 2.5 sq. mm	km	0.50	292,338	Included		3,875	4,910	301,123	150,562
	19 c X 2.5 sq. mm	km	0.20	343,738	Included		4,556	5,774	354,068	70,814
	2 c X 4 sq. mm	km	1.00	63,192	Included		838	1,061	65,091	65,091
	4 c X 4 sq. mm	km	1.00	115,647	Included		1,533	1,942	119,122	119,122
	7 c X 4 sq. mm	km	1.00	206,179	Included		2,733	3,463	212,375	212,375
4	36 kV XLPE CABLE									
	a) 33 kV XLPE Cable for connecting Transformer to 33 kV GIS of size 1 x 630 sq.mm. (Three Cables with one Spare Cable in each Circuit)	km	1.00	932,917	Included		12,613	15,983	961,513	961,513
	b) 33 kV Indoor Termination suitable for above Cable	Nos.	3.00	5,015	Included		66	84	5,165	15,495
	c) 33 kV Outdoor Termination suitable for above Cable	Nos.	3.00	3,163	Included		42	53	3,258	9,774
P	GROUNDING / EARTHING SYSTEM									
	a) 40 mm MS Rod for Earthmat	LS	1	2,149,489	Included		75,977	36,104	2,261,570	2,261,570

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

1	2	3	4	5	6	7	8	9	10	11
b)	GS / MS Flats	LS	1				Included in Item P - a)			
c)	Electrodes	LS	1				Included in Item P - a)			
d)	Lightning Mast / GS Shield Wire	LS	1				Included in Item P - a)			
Q	STEEL STRUCTURES FOR TOWERS, BEAMS AND EQUIPMENT	LS	1	1,545,592		Included	68,289	25,961	1,639,842	1,639,842
R	EOT CRANE									
a	3.5 T for 220 kV GIS ROOM	Set	1	690,553		Included	9,153	11,599	711,305	711,305
b	2.5 T for 33 kV GIS ROOM	Set	1	463,529		Included	6,144	7,786	477,459	477,459
c	Moveable Ladder of suitable Capacity for 220 kV & 33 kV GIS Room	Nos.	2	128,597		Included	1,705	2,160	132,462	264,924
S	Insulator Strings / Disc Insulators, Hardware, Conductor, Bus Bar Material, Cable Trays, Clamps, Connectors, including Equipment Connectors, Pipes for Equipment & Lighting, all Accessories etc	LS	1	1,296,736		Included	17,188	21,781	1,335,705	1,335,705
t	TESTING AND MAINTENANCE EQUIPMENT									
1	Meggar 5 kV (Motorized)	No	1	70,096		Included	1,006	1,274	72,376	72,376
2	Meggar 1 kV (Motorized)	No	1	7,128		Included	102	130	7,360	7,360

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

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1	2	3	4	5	6	7	8	9	10	11
3	Digital Multimeter	Nos.	2	10,099	Included	145	184	10,428	20,856
4	D - Spanner Set (Insulated)	Nos.	2	683	Included	10	12	705	1,410
5	Ring - Spanner Set (Insulated)	Nos.	2	713	Included	10	13	736	1,472
6	Torque Wrench Set	Nos.	2	11,881	Included	170	216	12,267	24,534
7	Insulating Gloves	Set	5	1,485	Included	21	27	1,533	7,665
8	Helmets	Set	5	535	Included	8	10	553	2,765
9	Gas Evacuating and Refilling Device	Set	1	3,397,875	Included	48,750	61,776	3,508,401	3,508,401
10	Gas Leakage Monitor	Nos.	2	71,284	Included	1,023	1,296	73,603	147,206
11	Relay Test Kit	Nos.	1	2,613,750	Included	37,500	47,520	2,698,770	2,698,770
12	Synchronizing Trolley	Set	1	147,886	Included	1,960	2,484	152,330	152,330
13	Time Synchronisation Equipment	Lot	1		Included in Sub Station Automation System				
14	TOTAL								211,520,667
15	Discount offered @ 4 %								8,460,827
16	GRAND TOTAL FOR SUPPLY PORTION								203,059,840

NOTE:

a) *The above Prices are FIRM and NO Price Variations shall be paid.*

b) *Excise Duty, C. S. T. / VAT are included in above Prices.*

c) *Above Quantities are Tentative and may change after detailed Engineering.*

d) *Payment to the Contractor shall be made on actual quantity supplied.*

Dy. GENERAL MANAGER

Dy. General Manager (Contracts)
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Dowelia House, Khalini, Shimla-2

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ANNEXURE - MS

QUANTITY AND COST OF MANDATORY SPARES

Sr. No.	DESCRIPTION	UNIT	QTY.	TOTAL F. O. R. COST
1	2	3	4	5
1	MANDATORY SPARES			
a)	220 kV GIS Circuit Breaker			
(i)	245 kV, 3 Phase Circuit Breaker with Interrupting Chamber complete with all necessary Apparatus (1 no. of each Rating)	No.	1	4,592,127
(ii)	Rubber Gasket, 'O' Rings and Seal	Set	1	28,916
(iii)	Trip Coil with Resistor	No.	3	28,914
(iv)	Closing Coil with Resistor	No.	3	28,914
(v)	Molecular Filter	Set	3	86,748
(vi)	Density / Pressure Monitoring System	No.	1	48,193
(vii)	Relays, Power Contactors, Push Buttons, Timers & MCB etc	Set	1	115,664
(viii)	Pressure Switches	Set	1	48,193
(ix)	Auxiliary Switch Assembly	No.	1	47,229
(x)	Operation Counter	No.	1	38,555
(xi)	Rupture Disc / Diaphram	No.	1	115,664
(xii)	245 kV, 3 Phase Circuit Breaker Operating Mechanism complete with all necessary connecting Apparatus Each Rating	No.	1	Included in A(i)
(xiii)	All type of Coupling for SF6) (1 no. of each type	Set	1	57,832
b)	220 kV Current Transformer			
(i)	Multi Ratio Single Phase Current Transformers of each Rating (3 Nos. of each Rating)	Set	1	2,129,834

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
[illegible] Power Transmission Corp., Ltd.
Barowalia House, Khalini, Shimla-1

Sr.	DESCRIPTION	UNIT	QTY.	TOTAL
c)	220 kV Potential Transformer			
	(i) Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware	Set	1	1,070,579
d)	198 kV Surge Arrestor			
	(i) Complete Surge Arrestor (for 1 Phase) GIS Type	No.	1	85,102
	(ii) Surge Counter / Monitor	No.	1	570
e)	245 kV Isolators & Earth Switch			
	(i) 245 kV, Single Phase Disconnecting Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	1,075,742
	(ii) 245 kV, Single Phase Grounding Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	891,576
	(iii) 245 kV, Single Phase High Speed Fault Making Grounding Switch Internal Parts complete with all necessary Gaskets, Mounting Hardware etc.	Set	1	1,075,742
f)	33 kV GIS Circuit Breaker			
	(i) Rubber Gasket 'O' Rings and Seal	Set	1	21,330
	(ii) Trip Coils	No.	3	25,138
	(iii) Closing Coils	No.	3	25,138
	(iv) Molecular Filter	Set	3	9,141
	(v) Density / Pressure Monitoring System	No.	1	22,853
	(vi) Relays, Power Contactors, Push Buttons, Timers & MCB etc.	Set	1	457,065
	(vii) Closing Assembly / Valve	No.	1	2,285
	(viii) Pressure Switches	Set	1	2,285
	(ix) Auxiliary Switch Assembly (for CB)	No.	1	29,710
	(x) Rupture Disc / Diaphram	No.	1	15,997

LARSEN & TOUBRO LIMITED Construction Chennai

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MS 2

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr.	DESCRIPTION	UNIT	QTY.	TOTAL
	(xi) 36 kV, 3 Phase Circuit Breaker Operating Mechanism complete with all necessary connecting Apparatus (each Rating)	No.	1	745,015
g)	33 kV Current Transformer			
	(i) Multi Ratio Single Phase Current Transformers of each rating (3 nos. of each rating)	Set	1	252,528
h)	33 kV Potential Transformer			
	(i) Single Phase Potential Transformer complete with all Gaskets and Mounting Hardware	Set	1	189,682
i)	30 kV Surge Arrestor			
	(i) Complete Surge Arrestor including Base with Surge Counter & Accessories: AIS Type	No.	1	15,700
	(ii) Surge Counter / Monitor	No.	1	8,722
j)	33 kV Isolators & Earth Switch			
	(i) 36 kV, 3 Phase, 1250 Amperes Disconnecting Switch Operating Mechanism complete with all necessary Connecting Apparatus	Set	1	92,175
	(ii) 36 kV, 3 Phase, 1250 Amperes Grounding Switch Operating Mechanism complete with all necessary Connecting Apparatus	Set	1	Part of Three Position Switch
k)	Battery			
	220 Volt / 48 Volt Batteries			
	(i) Spare Battery Cell without Electrolyte	No.	10	283,679
	(ii) Terminal Connectors with Bolts & Nuts (each type)	No.	10	43,640
	(iii) Float Level Indicators (each type)	No.	10	13,627
	(iv) Vent Plugs (each type)	No.	10	16,358

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)MS 3
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr.	DESCRIPTION	UNIT	QTY.	TOTAL
l)	Battery Charger			
	220 Volt / 48 Volt Batteries			
	(i) Set of Control Cards (of each type)	Set	1	69,904
	(ii) Set of Relays	Set	1	8,389
	(iii) Set of Contactor	Set	1	25,166
	(iv) Filter Capacitors	Set	1	8,389
	(v) Thyristor / Diode	Set	1	11,185
	(vi) Set of Switches	Set	1	22,930
	(vii) Set of Wound Resistors	Set	1	4,193
	(viii) Potentiometers	Set	1	4,193
	(ix) Fuses of Thyristor with Indicators	Set	6	21,807
m)	LT Switchgear			
	(i) Relays (Auxiliary)	Set	1	95,375
	(ii) CTs and PTs	Set	1	8,227
	(iii) Switches / Push Buttons and Meters	Set	1	27,501
	(iv) TPN Switches / MCB	Set	1	93,997
	(v) LT Breaker Spares			
	Spring Charging Motor	No.	1	27,504
	Auxiliary Contacts Sets	Set	2	2,521
	Busbar Seal off Insulators	No.	5	2,292
	Arc Chutes	Set	2	7,563
	Moving Contacts	Set	1	3,209
	Arcing Contacts (Fixed / Moving)	Set	1	3,209
	Springs (Closing / Opening)	No.	1	573
	Closing Coil	No.	1	1,718
	Tripping Coil	No.	1	1,260
	Auxiliary Finger Contact	Set	1	1,203
	Limit Switches	Set	1	5,156
	Jaw Contacts	Set	1	372
	(vi) BUSBAR			
	Busbar Insulators	No.	5	716
	Interphase Barrier	No.	2	1,432
	Busbar Strip 1 mm (Aluminium)	metres	5	5,371
n)	DG Set			
	(i) Set of Filters 1 set (Lubeoil / Fuel / Air Circuit)	Set	1	6,603

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

MS 4

Sr.	DESCRIPTION	UNIT	QTY.	TOTAL
	(ii) Solenoid Coil Assembly	No.	1	2,934
	(iii) Self Starter Assembly	No.	1	54,930
	(iv) Lub - Oil Pressure Safety Control	No.	1	13,882
	(v) High Water Temperature Safety Control	No.	1	2,197
	(vi) Diode	No.	2	1,505
o)	Optic Fibre Cable	metres	500	47,746
p)	220 kV CVT	No.	1	395,452
	TOTAL OF MANDATORY			14,828,766

NOTE:

i) *The above Prices are FIRM and NO Price Variations shall be paid.*

ii) *Freight & Insurance Charges, Excise Duty, C. S. T. / VAT are included in above Prices.*

Dy. GENERAL MANAGER

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SCHEDULE PCPS

LIST OF PROTECTION AND CONTROL PANEL SPARES ALONGWITH MAIN EQUIPMENT

Sr. No.	TYPE	QTY	DESCRIPTION
1	DC Module	1	Power Supply Module for Circuit Breaker Protection Relay
2	CPU Module	1	CPU Module for Circuit Breaker Protection Relay
3	DC Module	1	Power Supply Module for Line Protection Relay
4	CPU Module	1	CPU Module for Line Protection Relay
5	DC Module	1	Power Supply Module for Transformer Differential Protection Relay
6	CPU Module	1	CPU Module for Transformer Differential Protection Relay
7	DC Module	1	Power Supply Module for Transformer Backup Protection Relay
8	CPU Module	1	CPU Module for Transformer Backup Protection Relay
9	DC Module	1	Power Supply Module for Bus Bar Protection Relay
10	CPU Module	1	CPU Module for Bus Bar Protection Relay
11	DC Module	1	Power Supply Module for RCS - 9600 Series Protection Device
12	CPU Module	1	CPU Module for RCS - 9600 series Protection Device
13	DC Module	1	Power Supply Module for Bay Control Unit
14	CPU Module	1	CPU Module for Bay Control Unit.
15		1	ABB Make Numerical Relay for Transformer Differential Protection Type RET 670
16		1	ABB Make Numerical Relay for Distance Protection Type REL 670
17		1	ABB Make Numerical Relay for O / C & E / F Protection Type REF 615
18		1	ABB Make Numerical Relay for REF Protection Type REF 615
19		1	ABB Make Numerical Relay for Bus Bar Protection Type REB 670
20		1	ABB Make Fuse Failure Relay Type FFR

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

Sr. No.	TYPE	QTY	DESCRIPTION
21		1	ABB Make Auxiliary Relay Type FFR
22		1	ABB Make Flag Relay Type RXSF
23		1	ABB Make D. C. Supply Supervision Relay Type TSR
24		1	ABB Make High Speed Tripping Relay Type RXMVB4 + RXTMA + TSR + PB MODULE
25		1	ABB Make Trip Circuit Supervision Relay Type TSR
26		1	ABB Make Under Voltage Relay Type RXEG
27		1	Areva Make Power Supply Module for Bus Bar Protection
28		1 Set	Areva Make Bay Control IED of each Type
29		1 Set	Areva Make Ethernet Switch of each Type
30		1 Set	Areva Make longest Optical Cable with end Equipment

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LARSEN & TOUBRO LIMITED Construction Group

By, General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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DATA

REQUIREMENT

SHEETS

LARSEN & TOUBRO LIMITED
Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – A1

CIRCUIT BREAKER

220 kV

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - A1

CIRCUIT BREAKER 220 kV

Sr. No.	PARAMETER	UNIT	
1	Make		AREVA T&D INDIA
2	Manufacturer's Type, Designation		B105
3	Applicable Technical Standards		IEC
4	Rated Voltage	kV	245
5	Rated Frequency	Hz	50
6	Number of Poles	No.	3
7	Class (Outdoor / Indoor)		Indoor
8	Rated Normal Current		
	a) at 50 °C Ambient Temperature,	Amperes	4000 (For BB,BC) & 2000 (For Line), 1600 (For Trafo)
	b) at reference Ambient Temperature of 40 °C	Amperes	4000 (For BB,BC) & 2000 (For Line), 1600 (For Trafo)
9	Rated Short Circuit Breaking Current		
	a) rms Value of A. C. Component	kA rms	50
	b) Percentage D. C. Component	%	45
	c) Asymmetrical Breaking Current (including D. C. Component)	kA rms at	125
	d) Is it possible to increase the Rupturing Capacity at a later date	Yes / No	No
10	Rated Operating Duty Cycle		O - 0.3s - CO - 3min - CO
11	Rated Short Circuit Making Current	kA (Peak)	125
12	First Pole to Clear Factor		1.3

LARSEN & TOUBRO LIMITED Construction Channel

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Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
13	Rated Transient Recovery Voltage for Terminal Faults		As per IEC
14	Rated Characteristics for Short Line Faults		L90 = 45 kA, L75=37.5 kA
15	Maximum Line Charging Current Breaking Capacity and corresponding Over Voltage recorded during Test	kA	As per IEC
a)	on Line Side	kV	
b)	on Supply Side	kV	
16	Maximum Breaking Capacity under Phase Opposition Conditions	kA	10
17	Rated Small Inductive Breaking Current with corresponding Switching Surge Over Voltage	kA - P. U.	I = 108 A, Uc = 475 kV
18	Reactor Loaded Transformer Interrupting Capacity and corresponding Switching Surge Over Voltage	kA - P. U.	<2.5 P.U
19	Capacity for Interrupting Inrush Current of Transformers and the Corresponding Over Voltage	Amp. - P. U	As per IEC
20	Maximum Cable, Charging Breaking Current and Over Voltages recorded during Test	kA	As per IEC
a)	on Line Side	kV	
b)	on Supply Side	kV	
21	Maximum (Single) Capacitor Bank Breaking Current and corresponding Over Voltages recorded, during Test	kA	As per IEC
a)	on Line Side	kV	
b)	on Supply Side	kV	
22	Data on Re - Striking Voltage Capacity		
a)	Amplitude Factor		As per IEC
b)	Phase Factor		
c)	Natural Frequency		
d)	Rate of Rise of Re - Striking Voltage		
23 a)	Is Current Breaker Re - Strike Free	YES / NO	Yes
b)	Means adopted if any to Check for Voltage Rise		-

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
24	Rated Duration of Short Circuit	secs.	3
25	Short Time Current Rating for the following Duration		
a)	for one second	kA (rms)	50
b)	for three seconds	kA (rms)	50
26	Maximum Arching Time under any Duty Condition with Limiting Conditions of Voltage and Pressure	ms	At Detailed Engineering Stage
27	Maximum Break Time, ms		
a)	at 100 % Rated Breaking Current	ms	50
b)	at 50 % Rated Breaking Current	ms	50
c)	at 25 % Rated Breaking Current	ms	50
d)	at 10 % Rated Breaking Current	ms	50
e)	at Lowest Fault Current	ms	50
28	Maximum Closing Time	ms	70
29	Total Make Break Time	ms	
30	Minimum Re - Closing Time at Rated Interrupting Capacity fromthe instant of Trip Coil Energisation	ms	
31	Minimum Dead Time for		To be furnished during Detailed Engineering Stage
a)	Three Phase Re - Closing		
b)	One Phase Re - Closing		
c)	Limits of Adjustment of Dead Time for three Phase Re - Closing		
d)	Limits of Adjustment of Dead Time for one Phase Re - Closing		
32	Pre - Insertion Resistance		NO
a)	Resistance Value	Ohm	
b)	Duration of Insertion	ms	
c)	Thermal Capability	kA	
d)	Duty Cycle for Closing against Terminal Fault		
e)	Duty Cycle for Closing under Phase Opposition		
f)	Duty Cycle for Closing against Trapped Charge Fault		
33	Latching Current	Amperes	To be furnished during Detailed Engineering Stage

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
34	Number of Breaks in Series per Pole		1
35	Length of Contact Travel	mm	To be furnished during Detailed Engineering Stage
36	Total Length of Break per Pole	mm	
37	Speed of Contact Travel		
a)	At Tripping	mts / sec.	
b)	At Closing	mts / sec.	
38	Type of Device - if any, used to obtain Uniform Voltage Distribution between Breakers (where Number of Breakers are more than one)		NA (One break per pole)
39	Recovery Voltage Distribution between Breaks in Percentage of Rated Voltage for		NA
a)	Single Line to Ground Fault		
b)	Interruption of Short Lines		
c)	Switching Off an Unloaded Transformer		
40	Type of Main Contacts		Tulip
41	Type of Arcing Contacts and / or Arc Control Contacts		Finger Rod
42	Material of		
a)	Main Contacts		Copper
b)	Arcing Contacts		Copper
c)	Whether Contacts are Silver Plated		Yes
d)	Whether Contacts are Silver Plated		To be furnished during Detailed Engineering Stage
e)	Contact Pressure	kg / sq. mm.	
f)	Terminals		
43	Difference in the Instant of Closing Opening of Contacts		
a)	Within a Pole,	ms	<3
b)	Between Poles	ms	<3
44 a)	Corona Inception Voltage	kV rms	NA
b)	Corona Extinction Voltage	kV rms	NA
45	Maximum Temperature Rise for		
a)	Main Contacts over Ambient Temperature of 50 °C		As per IEC

LARSEN & TOUBRO Construction Chennai

Dealapur

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
	b) Terminal to be connected to the External Conductors, 40 °C		As per IEC
46	Dry One Minute Power Frequency Withstand Test Voltage for complete Circuit Breaker		
	a) Between Line Terminal & Ground Objects (Breaker Closed)	kV rms	460
	b) Between Terminals with Breaker Contacts Open	kV rms	460
47	1.2 / 50 microsecond Wave Impulse Withstand Test Voltage for complete Circuit Breaker		
	a) Between Line Terminal & Ground (Breaker Closed)	kV (Peak)	1050
	b) Across Terminals with Circuit Breaker Contacts Open		1200
	i. One Terminal Lightning Impulse	kV (Peak)	
	ii. Opposite Terminal Power Frequency	kV (Peak)	
48	Dry & Wet 250 / 2500 micro second Voltage		NA
	a) Between Line Terminal & Ground Objects (Breaker Closed)	kV (Peak)	
	b) Between Terminals with Circuit Breaker Contacts Open		
	i. One Terminal Lightning Impulse	kV (Peak)	
	ii. Opposite Terminal Power Frequency	kV (Peak)	
49	Radio Interference Voltage for Circuit Breaker with a Voltage of 266 kV :		NA
	a) 0.5 MHz		
	b) 1.0 MHz		
	c) 1.5 MHz		
	d) 2.0 MHz		
50	CLEARANCES		NA
	a) Between Phase (Live Parts)	mm	
	b) Between Live Parts & Earth	mm	
	c) Live Parts to Ground Level (Section Clearance)	mm	

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
51	Whether the Circuit Breaker is Fixed Trip or Trip Free		Trip Free
52 a)	Normal Voltage of Closing Coil	Volts	220 V DC
b)	Pick Up Range	Volts	85 - 110 %
53 a)	Rated Voltage of Tripping Coil and Range of Pick Up Value	Volts	70 - 110 %
b)	Number of Tripping Coil provided		
54	Normal Power Consumption at Rated Voltage for		
a)	Trip Coil	Watts	400 W per Coil
b)	Closing Coil	Watts	400 W per Coil
55	Number of Auxiliary Contacts per Pole provided for Purchaser's use		
a)	NO		6
b)	NC		5
c)	Adjustable		1 (Wiping Contact)
56	Rated Voltage of Auxiliary Contacts	Volts	220 V DC
57	Current Capacity of Auxiliary Contacts		
a)	Continuous	Amperes	15
b)	Breaking	Amperes	2
58	Whether Auxiliary Contacts Silver Plated	Yes / No	Yes
59 a)	Breaking Capacity at the Rate of 50% of Rated Supply Voltage of Closing / Opening Device		To be furnished during Detailed Engineering Stage
b)	50 % of Rated Pressure of Operating Mechanism		
60	Quantity of SF6 Gas required for each Pole of CB	kgs	
61	Limits of Pressure of SF6 at which Breaker Operates correctly	kg. / sq. cm.	5.5
62	Number of Operations after which SF6 Gas replacement is necessary		To be furnished during Detailed Engineering Stage
a)	At Full Rupturing Capacity		
b)	At 50 % of Rated Rrupturing Capacity		
c)	At 10 % of Rated Rupturing Capacity		
d)	At Rated Current		

LARSEN & TOUBRO LIMITED Construction Chennai

Deputy General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
63	Number of Operations after which Main and Auxiliary Contacts replacement is necessary		
a)	At Full Rupturing Capacity		
b)	At 50 % of Rated Rrupturing Capacity		
c)	At 10 % of Rated Rupturing Capacity		
d)	At Rated Current		To be furnished during Detailed Engineering Stage
64	Number of Operations at Rated Current after which Routine Inspection of Breaker is necessary		
65	Number of Operations at Full Rupturing Capacity after which Routine Inspection of Breaker is necessary		
66	Supporting Insulation Column / Units (Data for one Unit and Complete Column to be furnished)	one Unit	NA
a)	Make & Type		
b)	Numbers per Pole		
c)	Descriptive Pamphlet No.		
d)	Weight	kg	
e)	Transport Dimensions	mm	
f)	One Minute Dry Power Frequency Withstand	kV (rms)	
g)	Flash Over Voltage	kV	
h)	Full Wave Impulse Withstand Voltage	kV(Peak)	
i)	Switching Surge Withstand Voltage	kV(Peak)	
j)	Corona Extinction Voltage	kV	
k)	Creepage Distance, Total & Protected	mm	
l)	Permissible Safe Cantilever Strength	kg	
67	Type of Operating Mechanism for		
a)	Closing		Spring
b)	Opening		Spring
68	Rated Pressure and Limits of Pressure of Operating Mechanism	kg / cm. sq	To be furnished during Detailed Engineering Stage
69	Spring Charged Mechanism		
a)	Rating of Motor, Volts, Amperes, H. P.		220 V DC
b)	Time required for Charging the Closing Spring	secs.	7

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
	c) Number of CO Operations possible after Failure of Auxiliary Supply		0 - CO
	d) Whether Indication for Spring Charged Condition provided in Central Control Cabinet	Yes / No	Yes
70	Overall Dimensions		
	a) Height	mts	1.705 (Apprx.)
	b) Width	mts	1.500 (Apprx.)
	c) Length	mts	2.158 (Apprx.)
71	Weight of		
	a) each Pole	kg	
	b) complete Breaker	kg	
72	Impact Loading for Foundation Design		
	a) Static		
	b) Dynamic		
73	Noise Level	db	
	a) At Breaker Location		
	b) At 8 Metres		
	c) At 10 Metres		
	d) At 40 Metres		
74 a)	Details of Supporting Structures		
	b) State whether Hot Dip Galvanized or Painted		
75 a)	Details of Central Control Cabinet		NA
	b) Whether Cabinet is hot Dip Galvanized or Painted		
76	SF6 Gas Density Monitor whether provided	Yes / No	Density Switch is provided in each gas compartment.
77 a)	Seismic Withstand Level		As per Specification
	b) Special Arrangements, if any made to take care of Seismic Force		
78	Portable SF6 Gas Evacuation and Filling System with necessary Gas Valves, Safety Devices, Gas Purity Monitoring Devices Regulators, Vacuum Pump, Pressure Gauges / Switches, Hose Pipes, etc. whether provided ?	Yes / No	Yes

To be furnished during Detailed Engineering Stage

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
79	If Yes, furnish Details of the same		
	a) Make		DILO / Equivalent
	b) Manufactured in India / Imported		Imported
	c) Capacity of Device		Economy Series

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – A3

CIRCUIT BREAKER

33 kV

LARSEN & TOUBRO LIMITED
Construction Group

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - A3

CIRCUIT BREAKER 33 kV

Sr. No.	PARAMETER	UNIT	
1	Make		ABB
2	Manufacturer's Type, Designation		VD4X
3	Applicable Technical Standards		IEC
4	Rated Voltage	kV	33
5	Rated Frequency	Hz	50
6	Number of Poles	No.	3
7	Class (Outdoor / Indoor)		Indoor
8	Rated Normal Current		
	a) at 50 °C Ambient Temperature,	Amperes	1472
	b) at reference Ambient Temperature of 40 °C	Amperes	1600
9	Rated Short Circuit Breaking Current		
	a) rms Value of A. C. Component	kA rms	40
	b) Percentage D. C. Component	%	35
	c) Asymmetrical Breaking Current (including D. C. Component)	kA rms at	43.7
	d) Is it possible to increase the Rupturing Capacity at a later date	Yes / No	NO
10	Rated Operating Duty Cycle		O - 0.3s - CO - 3min - CO
11	Rated Short Circuit Making Current	kA (Peak)	40
12	First Pole to Clear Factor		1.5
13	Rated Transient Recovery Voltage for Terminal Faults		62
14	Rated Characteristics for Short Line Faults		As per IEC

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

15	Maximum Line Charging Current Breaking Capacity and corresponding Over Voltage recorded during Test	kA	NA
a)	on Line Side	kV	
b)	on Supply Side	kV	
16	Maximum Breaking Capacity under Phase Opposition Conditions	kA	
17	Rated Small Inductive Breaking Current with corresponding Switching Surge Over Voltage	kA - P. U.	As per IEC 62271-110: Inductive Load Switching, Para 6.1 b) : "for Shunt Reactor Switching at Rated Voltage below 52 kV, No Type Testing is required and reference should be made to the Guide [2]".
18	Reactor Loaded Transformer Interrupting Capacity and corresponding Switching Surge Over Voltage	kA - P. U.	
19	Capacity for Interrupting Inrush Current of Transformers and the Corresponding Over Voltage	Amp. - P. U	As per IEC
20	Maximum Cable, Charging Breaking Current and Over Voltages recorded during Test	kA	50
a)	on Line Side	kV	
b)	on Supply Side	kV	
21	Maximum (Single) Capacitor Bank Breaking Current and corresponding Over Voltages recorded, during Test	kA	NA as there is no Capacitor Feeder offered
a)	on Line Side	kV	
b)	on Supply Side	kV	
22	Data on Re - Striking Voltage Capacity		
a)	Amplitude Factor		
b)	Phase Factor		
c)	Natural Frequency		
d)	Rate of Rise of Re - Striking Voltage		
23 a)	Is Current Breaker Re - Strike Free	YES / NO	YES
b)	Means adopted if any to Check for Voltage Rise		NA

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

24	Rated Duration of Short Circuit		secs.	3
25	Short Time Current Rating for the following Duration			
	a)	for one second	kA (rms)	40
	b)	for three seconds	kA (rms)	40
26	Maximum Arching Time under any Duty Condition with Limiting Conditions of Voltage and Pressure		ms	15
27	Maximum Break Time, ms			
	a)	at 100 % Rated Breaking Current	ms	≤ 60
	b)	at 50 % Rated Breaking Current	ms	
	c)	at 25 % Rated Breaking Current	ms	
	d)	at 10 % Rated Breaking Current	ms	
	e)	at Lowest Fault Current	ms	
28	Maximum Closing Time		ms	60
29	Total Make Break Time		ms	55
30	Minimum Re - Closing Time at Rated Interrupting Capacity fromthe instant of Trip Coil Energisation		ms	300
31	Minimum Dead Time for			
	a)	Three Phase Re - Closing		285
	b)	One Phase Re - Closing		
	c)	Limits of Adjustment of Dead Time for three Phase Re - Closing		
	d)	Limits of Adjustment of Dead Time for one Phase Re - Closing		
32	Pre - Insertion Resistance			NA
	a)	Resistance Value	Ohm	
	b)	Duration of Insertion	ms	
	c)	Thermal Capability	kA	
	d)	Duty Cycle for Closing against Terminal Fault		
	e)	Duty Cycle for Closing under Phase Opposition		
	f)	Duty Cycle for Closing against Trapped Charge Fault		
33	Latching Current		Amperes	
34	Number of Breaks in Series per Pole			1
35	Length of Contact Travel		mm	NA

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

36	Total Length of Break per Pole		mm	NA
37	Speed of Contact Travel			
	a)	At Tripping	mts / sec.	0.9 - 1.5
	b)	At Closing	mts / sec.	1.2 - 2.0
38	Type of Device - if any, used to obtain Uniform Voltage Distribution between Breakers (where Number of Breakers are more than one)			NA
39	Recovery Voltage Distribution between Breaks in Percentage of Rated Voltage for			NA
	a)	Single Line to Ground Fault		
	b)	Interruption of Short Lines		
	c)	Switching Off an Unloaded Transformer		
40	Type of Main Contacts			BUTT
41	Type of Arcing Contacts and / or Arc Control Contacts			NA
42	Material of			
	a)	Main Contacts		Copper Chromium
	b)	Arcing Contacts		NA
	c)	Whether Contacts are Silver Plated		NA
	d)	Whether Contacts are Silver Plated		NA
	e)	Contact Pressure	kg / sq. mm.	min 2500 N
	f)	Terminals		
43	Difference in the Instant of Closing Opening of Contacts			NA
	a)	Within a Pole,	ms	
	b)	Between Poles	ms	
44 a)	Corona Inception Voltage		kV rms	
b)	Corona Extinction Voltage		kV rms	
45	Maximum Temperature Rise for			
	a) Main Contacts over Ambient Temperature of 50 °C			8%
	b) Terminal to be connected to the External Conductors, 40 °C			NA
46	Dry One Minute Power Frequency Withstand Test Voltage for complete Circuit Breaker			

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

	a) Between Line Terminal & Ground Objects (Breaker Closed)	kV rms	80
	b) Between Terminals with Breaker Contacts Open	kV rms	80
47	1.2 / 50 microsecond Wave Impulse Withstand Test Voltage for complete Circuit Breaker		
	a) Between Line Terminal & Ground (Breaker Closed)	kV (Peak)	170
	b) Across Terminals with Circuit Breaker Contacts Open		170
	i. One Terminal Lightning Impulse	kV (Peak)	
	ii. Opposite Terminal Power Frequency	kV (Peak)	
48	Dry & Wet 250 / 2500 micro second Voltage		NA
	a) Between Line Terminal & Ground Objects (Breaker Closed)	kV (Peak)	
	b) Between Terminals with Circuit Breaker Contacts Open		
	i. One Terminal Lightning Impulse	kV (Peak)	
	ii. Opposite Terminal Power Frequency	kV (Peak)	
49	Radio Interference Voltage for Circuit Breaker with a Voltage of 266 kV :		NA
	a) 0.5 MHz		
	b) 1.0 MHz		
	c) 1.5 MHz		
	d) 2.0 MHz		
50	CLEARANCES		Not required
	a) Between Phase (Live Parts)	mm	
	b) Between Live Parts & Earth	mm	
	c) Live Parts to Ground Level (Section Clearance)	mm	
51	Whether the Circuit Breaker is Fixed Trip or Trip Free		Fixed
52 a)	Normal Voltage of Closing Coil	Volts	220
	b) Pick Up Range	Volts	85 - 110 %
53 a)	Rated Voltage of Tripping Coil and Range of Pick Up Value	Volts	220 85 - 110 %
	b) Number of Tripping Coil provided		

LARSEN & TOUBRO LIMITED Construction Group

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

54	Normal Power Consumption at Rated Voltage for			
	a)	Trip Coil	Watts	250 - 310
	b)	Closing Coil	Watts	250 - 311
55	Number of Auxiliary Contacts per Pole provided for Purchaser's use			
	a)	NO		3
	b)	NC		4
	c)	Adjustable		NIL
56	Rated Voltage of Auxiliary Contacts		Volts	at 220 V DC , Cos Ø 0.7 = 2.5 A
57	Current Capacity of Auxiliary Contacts			
	a)	Continuous	Amperes	
	b)	Breaking	Amperes	
58	Whether Auxiliary Contacts Silver Plated		Yes / No	NO
59 a)	Breaking Capacity at the Rate of 50% of Rated Supply Voltage of Closing / Opening Device			
	b) 50 % of Rated Pressure of Operating Mechanism			
60	Quantity of SF6 Gas required for each Pole of CB		kgs	6 kg In CB Compartment
61	Limits of Pressure of SF6 at which Breaker Operates correctly		kg. / sq. cm.	Trouble free opertion of Breaker can be done even at Atmospheric Pressure as SF6 is used only for insulation
62	Number of Operations after which SF6 Gas replacement is necessary			NA as operations takes place inside in Vacuum Interupter. Gas is only used for insulation
	a)	At Full Rupturing Capacity		
	b)	At 50 % of Rated Rrupturing Capacity		
	c)	At 10 % of Rated Rupturing Capacity		
	d)	At Rated Current		
63	Number of Operations after which Main and Auxiliary Contacts replacement is necessary			
	a)	At Full Rupturing Capacity		
	b)	At 50 % of Rated Rrupturing Capacity		
	c)	At 10 % of Rated Rupturing Capacity		
	d)	At Rated Current		

LARSEN & TOUBRO LIMITED Construction Chennai

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

64	Number of Operations at Rated Current after which Routine Inspection of Breaker is necessary		10,000
65	Number of Operations at Full Rupturing Capacity after which Routine Inspection of Breaker is necessary		
66	Supporting Insulation Column / Units (Data for one Unit and Complete Column to be furnished)	one Unit	NA
	a) Make & Type		
	b) Numbers per Pole		
	c) Descriptive Pamphlet No.		
	d) Weight	kg	
	e) Transport Dimensions	mm	
	f) One Minute Dry Power Frequency Withstand	kV (rms)	
	g) Flash Over Voltage	kV	
	h) Full Wave Impulse Withstand Voltage	kV(Peak)	
	i) Switching Surge Withstand Voltage	kV(Peak)	
	j) Corona Extinction Voltage	kV	
	k) Creepage Distance, Total & Protected	mm	
	l) Permissible Safe Cantilever Strength	kg	
67	Type of Operating Mechanism for		Spring Charged
	a) Closing		
	b) Opening		
68	Rated Pressure and Limits of Pressure of Operating Mechanism	kg / cm. sq	SF6 Pressure inside Gas Tank : 130 kPA
69	Spring Charged Mechanism		
	a) Rating of Motor, Volts, Amperes, H. P.		110 V, 250 W
	b) Time required for Charging the Closing Spring	secs.	45 ms
	c) Number of CO Operations possible after Failure of Auxiliary Supply		ONE
	d) Whether Indication for Spring Charged Condition provided in Central Control Cabinet	Yes / No	YES
70	Overall Dimensions		
	a) Height	mm	2,270
	b) Width	mm	800
	c) Length	mm	1,900

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

Larsen - A3 - 7

71	Weight of			
	a)	each Pole	kg	NA
	b)	complete Breaker	kg	Max 450
72	Impact Loading for Foundation Design			
	a)	Static		700 - 1000 kg
	b)	Dynamic		40%
73	Noise Level		db	1,150
	a)	At Breaker Location		2.0 Metres
	b)	At 8 Metres		
	c)	At 10 Metres		
	d)	At 40 Metres		
74 a)	Details of Supporting Structures			NA
	b) State whether Hot Dip Galvanized or Painted			
75 a)	Details of Central Control Cabinet			
	b) Whether Cabinet is hot Dip Galvanized or Painted			
76	SF6 Gas Density Monitor whether provided		Yes / No	YES
77 a)	Seismic Withstand Level			Tested for 0.5 g
	b) Special Arrangements, if any made to take care of Seismic Force			No, Not Required
78	Portable SF6 Gas Evacuation and Filling System with necessary Gas Valves, Safety Devices, Gas Purity Monitoring Devices Regulators, Vacuum Pump, Pressure Gauges / Switches, Hose Pipes, etc. whether provided ?		Yes / No	No, Not Required
79	If Yes, furnish Details of the same			NA
	a) Make			
	b) Manufactured in India / Imported			
	c) Capacity of Device			

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

(33)

SHEET – B1

ISOLATOR

220 kV

Deekayfeet

LARSEN & TOUBRO LIMITED
Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - B1

ISOLATOR 220 kV

Sr. No.		PARAMETER	UNIT	
1		Manufacturer's Name		AREVA T&D
2		Manufacturer's Equipment Designation /		B105
3		Reference Standard		IEC
4		Type		B105
5		Service (INDOOR / OUTDOOR)		Indoor
6		Poles	No.	Three Pole Gang Operated
7		Rated Frequency	Hz	50
8		Rated Voltage	kV	245
9		Current Capacity		
	9.1	Rated Normal Current	Ampere	4000 (For BB,BC) & 2000 (For Line), 1600 (For Trafo)
	9.2	Derated due to Ambient Temperature of 50 °C		-
	9.3	Rated Short Time Withstand Current for 3 secs.	kArms	50
	9.4	Peak Withstand Current	kApeak	125
10		Temperature Rise above 50 °C Ambient		As per IEC
	10.1	At Rated Normal Current		
	10.2	At Rated Short Time Withstand Current		
11		Current Density at Minimum Cross - Section of Disconecting Switch Blade		Shall be furnished during Detailed Engineering
12		Maximum Current the Isolator can safely Interrupt		
	12.1	Bus / Line Charging Current	Ampere	0.25

LARSEN & TOUBRO LIMITED

Dy. General Manager (Contracts)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

077

12.2	Potential Transformer Magnetizing Current	Ampere	At Engineering Stage	
13	CLEARANCES		NA to GIS	
13.1	Live Parts to Ground			
13.2	Phase to Phase			
13.3	Fixed Contact to Blade in Open Position			
14	INSULATION LEVEL			
14.1	Rated Lightning Impulse Withstand Voltage Positive and Negative Polarity			
	a) Across the Isolating Distance	kVpeak	1200	
	b) To Earth & between Poles	kVpeak	1050	
14.2	Rated One Minute Power Frequency Withstand Voltage			
	a) Across the Isolating Distance	kVrms	530	
	b) To Earth & between Poles	kVrms	460	
14.3	Rated Switching Impulse Withstand Voltage		NA	
	a) Across the Isolating Distance			
	b) To Earth			
15	Maximum Radio Interference Voltage for 0.5 MHZ and 2 MHZ all Positions		NA	
16	Operating Mechanism			
16.1	Type		DC Motor	
16.2	Motor Rating			
	a) Output	kW	0.13 (Rated Power)	
	b) Voltage	Volt	220	
16.3	Range of Operating Voltage		85 % - 110 %	
16.4	Control Voltage with Range		85 % - 110 %	
16.5	Torque required to operate the Gang Operated Disconnecting Switch		At Engineering Stage	
17	Rated Mechanical Terminal Load		At Engineering Stage	
18	Main Contacts			
18.1	Type		Rod and Multi	
18.2	Material		Silvered Copper	
18.3	Contact Pressure	kg / sq. cm.	At Engineering Stage	
18.4	Contact Area	sq. mm.	At Engineering Stage	
18.5	Whether Silver Plated ?	YES / NO	Yes	
18.6	Thickness of Silver Plating	mm	At Engineering Stage	

LARSEN & TOUBRO LIMITED Construction Chennai

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

19		Auxiliary Contacts			
	19.1	Spare Contacts furnished			
		a)	Normally Open	No.	4
		b)	Normally Close	No.	4
	19.2	Type (Convertible or Fixed)			NA
	19.3	Contact Rating at			220 V, D. C.
		a)	Make and Continuous	Ampere	15
		b)	Break (Inductive)	Ampere	2
20		Operating Time of Motor Operated Mechanism			
	20.1	Opening		sec.	< 6
	20.2	Closing		sec.	< 6
21		Rotating Blade Feature at the end of Travel provided (Turn & Twist Type)			NA
22		Number of Operations that Disconnecting Switch can Withstand without Deterioration of Contacts			At Engineering Stage
23		Type of Interlocks furnished			Electrical Interlocking
24		Accessories furnished as specified in Annexure			At Engineering Stage
25		INSULATORS			Support Insulator of GIS
	25.1	Make			AREVA T&D
	25.2	Type			Support Insulator
	25.3	Reference Standard			IEC
	25.4	Number of Units per Stack			NA
	25.5	Rated Voltage			245
	25.6	One (1) Minute Power Frequency Withstand Voltage :			
		a)	Dry	kV	460
		b)	Wet	kV	NA
	25.7	Switching Surge Withstand Voltage			NA
	25.8	Lihtning Impulse Withstand Voltage		kVp	1050
		a)	Positive Polarity		
		b)	Negative Polarity		
	25.9	Creepage Distance in Air		mm	NA
	25.10	Tensile Strength		kg	NA
	25.11	Cantilever Strength (Upright)		kg	NA
	25.12	Compression Strength		kg	NA

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Cont ract)
H.P. Power Transmission C rp . L:
Baiowalia House, Khalini, Shimla-

	25.13	Torsional Strength	kg	NA
	25.14	Weight of the Unit	kg	NA
26		Dimension of Disconnecting Switch (L x B x H)	mm	At Engineering Stage
27		Weight of the Disconnecting Switch	kg	At Engineering Stage

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – B3

ISOLATOR

33 kV

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - B3

ISOLATOR 33 kV

Sr. No.	PARAMETER	UNIT	
1	Manufacturer's Name		ABB, GERMANY
2	Manufacturer's Equipment Designation /		UX2TE
3	Reference Standard		IEC
4	Type		
5	Service (INDOOR / OUTDOOR)		Indoor
6	Poles	No.	
7	Rated Frequency	Hz	50
8	Rated Voltage	kV	33
9	Current Capacity		
9.1	Rated Normal Current	Ampere	
9.2	Derated due to Ambient Temperature of 50 °C		8 % OF RATED CURRENT
9.3	Rated Short Time Withstand Current for 3 secs.	kArms	40
9.4	Peak Withstand Current	kApeak	100
10	Temperature Rise above 50 °C Ambient		As per IEC
10.1	At Rated Normal Current		
10.2	At Rated Short Time Withstand Current		
11	Current Density at Minimum Cross - Section of Disconecting Switch Blade		Shall be furnished during Detailed Engineering
12	Maximum Current the Isolator can safely Interrupt		
12.1	Bus / Line Charging Current	Ampere	
12.2	Potential Transformer Magnetizing Current	Ampere	

LARSEN & TOUBRO LIMITED Construction Chennai

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
13	CLEARANCES		NA to GIS
13.1	Live Parts to Ground		
13.2	Phase to Phase		
13.3	Fixed Contact to Blade in Open Position		
14	INSULATION LEVEL		
14.1	Rated Lightning Impulse Withstand Voltage Positive and Negative Polarity		
	a) Across the Isolating Distance	kVpeak	195
	b) To Earth & between Poles	kVpeak	170
14.2	Rated One Minute Power Frequency Withstand Voltage		
	a) Across the Isolating Distance	kVrms	80
	b) To Earth & between Poles	kVrms	70
14.3	Rated Switching Impulse Withstand Voltage		NA
	a) Across the Isolating Distance		
	b) To Earth		
15	Maximum Radio Interference Voltage for 0.5 MHZ and 2 MHZ all Positions		NA
16	Operating Mechanism		
16.1	Type		ROD TYPE
16.2	Motor Rating		
	a) Output	kW	
	b) Voltage	Volt	110
16.3	Range of Operating Voltage		85 % - 110 %
16.4	Control Voltage with Range		85 % - 110 %
16.5	Torque required to operate the Gang Operated Disconnecting Switch		NA
17	Rated Mechanical Terminal Load		NA
18	Main Contacts		
18.1	Type		Rod Type
18.2	Material		Silvered Plated Copper
18.3	Contact Pressure	kg / sq. cm.	NA
18.4	Contact Area	sq. mm.	NA
18.5	Whether Silver Plated ?	YES / NO	NO
18.6	Thickness of Silver Plating	mm	

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
19	Auxiliary Contacts		
19.1	Spare Contacts furnished		
a)	Normally Open	No.	5
b)	Normally Close	No.	5
19.2	Type (Convertible or Fixed)		FIXED
19.3	Contact Rating at		220 V, D. C.
a)	Make and Continuous	Ampere	
b)	Break (Inductive)	Ampere	
20	Operating Time of Motor Operated Mechanism		
20.1	Opening	sec.	Approx. 18
20.2	Closing	sec.	Approx. 18
21	Rotating Blade Feature at the end of Travel provided (Turn & Twist Type)		NA
22	Number of Operations that Disconnecting Switch can Withstand without Deterioration of Contacts		5,000
23	Type of Interlocks furnished		Electrical + Mechanical
24	Accessories furnished as specified in Annexure		
25	INSULATORS		NA
25.1	Make		
25.2	Type		
25.3	Reference Standard		
25.4	Number of Units per Stack		
25.5	Rated Voltage		
25.6	One (1) Minute Power Frequency Withstand Voltage :		
a)	Dry	kV	
b)	Wet	kV	
25.7	Switching Surge Withstand Voltage		
25.8	Impulse Withstand Voltage		
a)	Positive Polarity		
b)	Negative Polarity		
25.9	Creepage Distance in Air	mm	NA
25.10	Tensile Strength	kg	

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contract)
H.P. Power Transmission Corp. Ltd
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
25.11	Cantilever Strength (Upright)	kg	
25.12	Compression Strength	kg	
25.13	Torsional Strength	kg	
25.14	Weight of the Unit	kg	
26	Dimension of Disconnecting Switch (L x B x H)	mm	It is inside the Gas Tank
27	Weight of the Disconnecting Switch	kg	Max. 200

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – B4

EARTHING SWITCH

220 kV

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - B4

EARTHING SWITCH 220 kV

Sr. No.	PARAMETER	UNIT	
1	Type		AREVA T&D
2	Reference Standard		IEC
3	Service		Indoor
4	Poles		Three Pole Gang Operated
5	RATING		
5.1	Rated Short Circuit Current for 3 sec	kArms	50
5.2	Peak Short Circuit Current	kApeak	125
6	Operating Mechanism		MOTORISED
7	Mounting		HORIZONTAL / VERTICAL
8	Torque required to operate the Gang Operated Earthing Switch	kg.m	At Engineering Stage
9	AUXILIARY CONTACTS		
9.1	Number of Contacts furnished		
a)	Normally Open	No.	4
b)	Normally Closed	No.	4
9.2	Convertible or Fixed		FIXED
9.3	Contact rating at		220 V, D. C.
a)	Make and Continuous	Ampere	15
b)	Break (Inductive)	Ampere	2
10	Type of Interlock furnished		At Engineering Stage
11	Weight of the Earthing Switch		

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – B6

EARTHING SWITCH

33 kV

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HIMACHAL PRADESH POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - B6

EARTHING SWITCH 33 kV

Sr. No.	PARAMETER	UNIT	
1	Type		UX2TE (*Part of Isolator*)
2	Reference Standard		IEC
3	Service		Indoor
4	Poles		Three Pole Gang Operated
5	RATING		
5.1	Rated Short Circuit Current for 3 sec	kArms	40
5.2	Peak Short Circuit Current	kApeak	100
6	Operating Mechanism		Motor Drive with Manual Emergency Operation
7	Mounting		In Bus Bar Compartment
8	Torque required to operate the Gang Operated Earthing Switch	kg.m	
9	AUXILIARY CONTACTS		
9.1	Number of Contacts furnished		
	a) Normally Open	No.	5
	b) Normally Closed	No.	5
9.2	Convertible or Fixed		FIXED
9.3	Contact rating at		220 V, D. C.
	a) Make and Continuous	Ampere	NA
	b) Break (Inductive)	Ampere	NA
10	Type of Interlock furnished		Electrical & Mechanical
11	Weight of the Earthing Switch		NA

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – C1

CURRENT TRANSFORMER

220 kV

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Cont. ...
H.P. Power Transmission C...
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HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

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DATA REQUIREMENT SHEET - C1

CURRENT TRANSFORMER 220 kV

Sr. No.	PARAMETER	UNIT	
1	Make		AREVA T & D INDIA LTD.
2	Type		B105
3	Reference Standard		IEC
4	Service		
5	Rated Frequency	Hz	50
6	Rated Voltage Class	kV	245
7	INSULATION LEVEL		
7.1	1 Minute 50 Hz Withstand Voltage	kVrms	460
7.2	Lightning Impulse Withstand Voltage	kVpeak	1050
8	SHORT TIME CURRENNT		
8.1	1 second Current	kArms	50
8.2	Dynamic Current	kApeak	125
9	Insulation Class		At Engineering Stage
10	Maximum Temperature Rise over 50 ° C	° C	As per IEC
11	Creepage Distance	mm	NA
12	Approximate Dimension (L x B x H)	mm	At Engineering Stage
13	Approximate Weight	kg	At Engineering Stage

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – C3

CURRENT TRANSFORMER

33 kV

LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HO POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK : CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - C3

CURRENT TRANSFORMER 33 kV

Sr. No.	PARAMETER	UNIT	
1	Make		RITZ
2	Type		ASG
3	Reference Standard		IEC
4	Service		
5	Rated Frequency	Hz	50
6	Rated Voltage Class	kV	36
7	INSULATION LEVEL		
7.1	1 Minute 50 Hz Withstand Voltage	kVrms	36
7.2	Lightning Impulse Withstand Voltage	kVpeak	170
8	SHORT TIME CURRENNT		
8.1	1 second Current	kArms	40
8.2	Dynamic Current	kApeak	100
9	Insulation Class		E or Better
10	Maximum Temperature Rise over 50 ° C	° C	NA
11	Creepage Distance	mm	
12	Approximate Dimension (L x B x H)	mm	At Engineering Stage
13	Approximate Weight	kg	Max. 55

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – D1

CAPACITOR VOLTAGE

TRANSFORMER

220 kV

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LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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HO POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - D1

CAPACITOR VOLTAGE TRANSFORMER 220 kV

Sr. No.	PARAMETER	UNIT	
1.1	Make		AREVA T & D INDIA LTD
1.2	Type		CCV - 245
1.3	Reference Standard		IEC - 60358 / 60044 - 5
1.4	Nominal / Highest System Voltage	kV	220 / 245
1.5	Number of Secondaries	No.	3
1.6	Rated Frequency	Hz.	50
1.7	Rated Power Factor		0.8
1.8	Class of Winding Insulation		A
1.9	Maximum Winding Temperature over Ambient of 50 °C at 110 % Excitation and Rated Burden		within Limits as per IEC - 60044 - 5
1.10	Rated Capacitance	PF	8800, + 10 %; - 5 %
1.11	High Frequency Range		- 20 % to + 50 % of 8800 PF
1.12	Rated Output of each Secondary Winding	VA	50
1.13	Accuracy Class		0.2 / 3P / 3P
1.14	Rated Thermal Burden	VA	500
1.15	Rated Voltage Factor		
a)	Continuous		1.2
b)	5 seconds		NA
c)	30 seconds		1.5

LARSEN & TOUBRO LTD. Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
1.16	Capacitance		
a)	of High Voltage Capacitor	PF	9670, + 10 %; - 5 %
b)	of Intermediate Voltage Capacitor		105540, + 10 %; - 5 %
c)	for Carrier Frequency Coupling		8800, + 10 %; - 5 %
1.17	Natural Frequency of Coupling	kHz	> 500
	Self Tuning Frequency of CVT (Capacitor Part only)	kHz	> 500
1.18	Band Width	kHz	40 - 500
1.19	One Minute Power Frequency Test Voltage of		
a)	Secondary Winding	kVrms	3
b)	H. F. Terminal	kVrms	4
c)	Capacitor (Dry & Wet)	kVrms	460
1.20	1.2 / 50 micro sec Impulse Voltage Withstand	kVpeak	1050
1.21	Corona Extinction Voltage		> 156
1.22	Radio Interference Voltage at		
a)	0.5 MHz	μV	≤ 2,500
b)	1.0 MHz	μV	≤ 2,500
c)	1.5 MHz	μV	≤ 2,500
d)	2.0 MHz	μV	≤ 2,500

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – E1

LIGHTNING ARRESTOR

220 kV

LARSEN & TOUBRO Limited Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - E1

LIGHTNING ARRESTOR 220 kV

Sr. No.		PARAMETER	UNIT	
1	A	**LIGHTNING ARRESTOR**		
	1.1	Make		TOSHIBA
	1.2	Type		PSB 216
	1.3	Reference Standard		IEC
	1.4	Rated Arrestor Voltage	kV	216
	1.5	Arrestor Class		4
	1.6	Rated Frequency	Hz.	50
	1.7	Maximum Continuous Operating Voltage (MCOV)	kV	172
	1.8	MCOV including Harmonics / Commutation Overshoots		At Engineering Stage
	1.9	Maximum Leakage Current		
		1) At MCOV		
		2) At 110 % MCOV		
		3) At 150 % MCOV		
	1.10	Reference Voltage of the Arrestor at specified Ambient Temperature of 50 °C	kV	216
	1.11	Reference Current at which above Reference Voltage is defined	kA	20

LARSEN & TOUBRO Limited Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
1.12	Temporary Power Frequency Over Voltage (TOV) is defined		At Engineering Stage
	1) for 0.06 secs		
	2) for 0.10 secs		
	3) for 1.0 secs		
	4) for 10.0 secs		
1.13	Graphs enclosed for TOV Withstand Capability		At Engineering Stage
1.14	Nominal Discharge Current (8 / 20 µs Wave Shape)	kA	20
1.15	Power Frequency Over Voltage Withstand Capability	kV	460
1.16	Maximum Front of Wave Protective Level at 20 kAp Impulse Current of 0.5 / 1.5 µs Wave Shape)	kV	568 (Steep Current Impulse at 20 kA, Front Time 1 / 2 μs)
1.17	Maximum Lightning Impulse Protective Level at 8 / 20 µs Wave Shape for following Currents		
	1) 5 kAp	kV	499
	2) 10 kAp	kV	525
	3) 20 kAp	kV	
1.18	Graphs for Discharge Characteristics		At Engineering Stage
1.19	Maximum Energy as per Long Duration Discharge Class of IEC (cumulative of 3 successive Operation)		At Engineering Stage
1.20	Maximum Energy Dissipation Capability in Single Discharge of complete Arrestor	kJ / kV	9.6 (Min. Discharge Capability)
1.21	Number of Series Units in complete Arrestor		At Engineering Stage
1.22	Number of Parallel Units in complete Arrestor		
1.23	Number of Parallel Columns in complete Arrestor		
1.24	Method of Sealing the complete Arrestor Unit		
1.25	Pressure Relief Device provided		

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T Larsen & Toubro Limited Construction Channel

Sr. No.		PARAMETER	UNIT	
	1.26	High Current Pressure Relief Current	kAp	NA
	1.27	Prospective Symmetrical Fault Current employed for Pressure Relief Test	kA	NA
	1.28	Duration of Flow of Fault Current during Pressure Relief Test	sec	
	1.29	Maximum Radio Interference at 50 Hz.		NA
		a) At 1.05 Times MCOV		
		b) At 1.25 Times MCOV		
	1.30	Minimum Recommended Spacing between Arrestor Phase to Phase	mm	NA
	1.31	Minimum Recommended Spacing of the Arrestor from the Earthed Object	mm	NA
	1.32	Surge Counter's Minimum Counting Current at 8 / 20 µs Wave Shape Current		At Engineering Stage
	1.33	Degree of Protection for Discharge Counter / Leakage Current Meter		
	1.34	Maximum Permissible Distance for Installation of Surge Counter from LA		
	1.35	Whether Corona Ring provided		NA
2	B	ARRESTOR HOUSING		
	2.1	Impulse Withstand Voltage (1.2 / 50 µs Wave)	kVpeak	As per IEC
	2.2	Switching Impulse Withstand Voltage	kVpeak	NA
	2.3	Power Frequency Withstand Voltage		
		1) One Minute Dry	kVpeak	460
		2) One Minute Wet	kVpeak	
	2.4	Total Creepage Distance	mm	NA
	2.5	Maximum Cantilever Strength of complete Arrestor		NA
	2.6	Total Height of Arrestor	mm	At Engineering Stage
	2.7	Weight of complete Arrestor	kg	At Engineering Stage

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Larsen - E1 - 3

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SHEET – E3

LIGHTNING ARRESTOR

33 kV

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - E3

LIGHTNING ARRESTOR 33 kV

Sr. No.	PARAMETER	UNIT	
1 A	**LIGHTNING ARRESTOR**		
1.1	Make		ABB LIMITED
1.2	Type		POLIM D 26 PI 2
1.3	Reference Standard		IEC
1.4	Rated Arrestor Voltage	kV	32
1.5	Arrestor Class		1
1.6	Rated Frequency	Hz.	50
1.7	Maximum Continuous Operating Voltage (MCOV)	kV	26 at 40 degree Centigarde
1.8	MCOV including Harmonics / Commutation Overshoots		26 at 40 degree Centigarde
1.9	Maximum Leakage Current		NA
	1) At MCOV		
	2) At 110 % MCOV		
	3) At 150 % MCOV		
1.10	Reference Voltage of the Arrestor at specified Ambient Temperature of 50 °C	kV	NA
1.11	Reference Current at which above Reference Voltage is defined	kA	NA
1.12	Temporary Power Frequency Over Voltage (TOV) is defined		At Engineering Stage
	1) for 0.06 secs		

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LARSEN & TOUBRO Construction Chennai OE1E

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd
Barowalia House, Khalini, Shimla-2 Larsen - E3 - 1

Sr. No.	PARAMETER	UNIT	
	2) for 0.10 secs		
	3) for 1.0 secs		
	4) for 10.0 secs		
1.13	Graphs enclosed for TOV Withstand Capability		At Engineering Stage
1.14	Nominal Discharge Current (8 / 20 µs Wave Shape)	kA	10
1.15	Power Frequency Over Voltage Withstand Capability	kV	NA
1.16	Maximum Front of Wave Protective Level at 20 kAp Impulse Current of 0.5 / 1.5 µs Wave Shape)	kV	
1.17	Maximum Lightning Impulse Protective Level at 8 / 20 µs Wave Shape for following Currents		
	1) 2.5 kAp	kV	80.3
	2) 10 kAp	kV	93
	3) 20 kAp	kV	103.1
1.18	Graphs for Discharge Characteristics		At Engineering Stage
1.19	Maximum Energy as per Long Duration Discharge Class of IEC (cumulative of 3 successive Operation)		CLASS - 1
1.20	Maximum Energy Dissipation Capability in Single Discharge of complete Arrestor	kJ / kV	2.6 for One Current Impulse of 65 kA
1.21	Number of Series Units in complete Arrestor		One
1.22	Number of Parallel Units in complete Arrestor		One
1.23	Number of Parallel Columns in complete Arrestor		One
1.24	Method of Sealing the complete Arrestor Unit		As per ABB Standard
1.25	Pressure Relief Device provided		NA
1.26	High Current Pressure Relief Current	kAp	16 / 0.2 sec
1.27	Prospective Symmetrical Fault Current employed for Pressure Relief Test	kA	NA

LARSEN & TOUBRO LIMITED Construction Channel

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
1.28	Duration of Flow of Fault Current during Pressure Relief Test	sec	NA
1.29	Maximum Radio Interference at 50 Hz.		NA
	a) At 1.05 Times MCOV		
	b) At 1.25 Times MCOV		
1.30	Minimum Recommended Spacing between Arrestor Phase to Phase	mm	As per IE Rule
1.31	Minimum Recommended Spacing of the Arrestor from the Earthed Object	mm	As per IE Rule
1.32	Surge Counter's Minimum Counting Current at 8 / 20 µs Wave Shape Current		NA
1.33	Degree of Protection for Discharge Counter / Leakage Current Meter		NA
1.34	Maximum Permissible Distance for Installation of Surge Counter from LA		NA
1.35	Whether Corona Ring provided		NA
2 B	ARRESTOR HOUSING		
2.1	Impulse Withstand Voltage (1.2 / 50 µs Wave)	kVpeak	NA
2.2	Switching Impulse Withstand Voltage	kVpeak	NA
2.3	Power Frequency Withstand Voltage		
	1) One Minute Dry	kVpeak	NA
	2) One Minute Wet	kVpeak	
2.4	Total Creepage Distance	mm	NA
2.5	Maximum Cantilever Strength of complete Arrestor		NA
2.6	Total Height of Arrestor	mm	633
2.7	Weight of complete Arrestor	kg	6.5

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

(55)

SHEET – F1

PLCC EQUIPMENT AND

WAVE TRAP

220 kV

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - F1

PLCC EQUIPMENT AND WAVE TRAP 220 kV

Sr. No.	PARAMETER	UNIT	
1 A	**COUPLING DEVICE**		
1.1	Make		ABB LIMITED
1.2	Type, Model		MCD 80
1.3	Suitable Matching Transformer provided		Yes
1.4	Nominal Primary Side Impedance	ohms	180 - 300 for Bundle Conductor 240 - 400 for Single Conductor (Typically Set at 320 ohm)
1.5	Nominal Secondary Side Impedance	ohms	75 /125 Unbalanced
1.6	Rated Current at Carrier Frequency	Amp. rms	1.5
1.7	Rate Voltage at Carrier Frequency		Impulse (1.2 / 50 microsec) Withstand Level between Primary Terminal and Secondary Terminals of Coupling Device = 10 kVpeak
1.8	Range of Capacitance of the Coupling Capacitor to which Line Matching Units are suitable	pF	1,500 to 13,000
1.9	Frequency Response of the Unit		72 - 500 kHZ for CC value of 6,600 pF
1.10	Operating Attenuation	mm	< 2 dB (including CC)

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Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
1.11	Whether Impedance Matching Units have provision for matching either Phase to Phase or Phase to Earth Coupling	YES / NO	YES
1.12	Pass Band Range	kHz	Depends on Carrier Frequency approval Typical Band is 128 - 500 kHz
1.13	Insertion Loss in Pass Band Range		
	1) Coupling Unit	dB	2 dB Max (incl. matching Transformer)
	2) Matching Transformer	dB	1 maximum
1.14	Frequency Range		Depends on Capacitance value of CC
1.15	Maximum Composite Loss	dB	2 dB (inclusive CC)
1.16	Return Loss	dB	Not less than 12 dB
1.17	Test Voltage of Transformer	kVrms	10
1.18	Withstand Voltage between Primary & Secondary Winding or Ground Terminal	kVrms	10
1.19	Discharge Voltage and Protection Device		50 Hz Spark - Over Voltage: 1.3kV
1.20	Details of Mounting of the Units		Coupling Devices housed in Lockable Polyester Box reinforced with Glass Fibre Mats which is mounted on Pedestal for CC
1.21	1 Minute Power Frequency Insulation Level Primary & Secondary Terminal Coupling Device	kVrms	10
1.22	Impulse (1.2 / 50 µs Wave) Withstand Level & Secondary Terminals of Coupling Device		10 kV peak
1.23	Drainage Coil		
	a) Inductance		0.7 mH ± 30 % (Depending upon Capacitance value of CC)
	b) Rated Current	Ampere	1.5
	c) Maximum Current	Ampere	≤ 50 for 0.2 sec

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Sr. No.	PARAMETER	UNIT	
	1.24 Lightning Arrester		
	1) on Primary Side of Coupling Device		
	a) Type		RV 0.66 ABB Make
	b) Power Frequency Spark Over Voltage	Vrms	1,300
	c) Maximum Permissible Arrester Discharge Current with 8 / 20 micro sec Impulse Discharge	kA	5
	d) Maximum Permissible Short Time Current (2.2 micro sec)	kApeak	30
	2) on Secondary Side of the Coupling Device		
	a)		Voltage Arrestor is not used in Secondary side, as use of Voltage Arrestor in Secondary side of Coupling Device is not recommended
	b) Power Frequency Spark Over		NA.
	1.25 Ground Switch Rated Voltage	kV	10
2	B HF COAXIAL CABLE		
	2.1 Type		HF Co - axial Cable
	2.2 Characteristic Impedance to match Carrier Terminal Output Impedance	ohm	75 Unbalanced
	2.3 Capacitance	pF / m	53
	2.4 Attenuation of Cable at various Carrier Frequencies: -		
	a) At 10 kHz	dB / km	0.8
	b) At 60 kHz	dB / km	1.8
	c) At 300 kHz	dB / km	3.3
	d) At 500 kHz	dB / km	4.7
	2.5 Conductor Diameter	mm	5.30
	2.6 Dielectric Material		Polythene String & extruded with Polythene Tube
	2.7 Shielding		Braid of tinned Copper (Electrolytic Grade) Wire of 0.20 mm diameter with 980 % coverage

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Sr. No.	PARAMETER	UNIT	
2.8	Details of Protective Armouring		Single Braid of 0.30 mm G. I. Wire with 70 % coverage
2.9	Test Voltage (Center Core to Shielding)	kVrms	4.5
2.10	Withstand Voltage	kV	4
2.11	Detail of construction of Cable		Center Conductor wrapped with Polythene String & extruded over with Polythene Tube. Radial Thickness: 1.00 mm
2.12	Loop Resistance at 20 ° C	ohm / km	30
2.13	Overall Diameter of the Cable	mm	13.00
2.14	Number & Diameter of Standard Conductor		1 / 1.22 mm ± 0.03 mm
2.15	Minimum Bending Radius	mm	150.00
3	LINE TRAP - 3150 A / 1.0 mH		
3.1	Type		Air Cooled Epoxy Impregnated
3.2	System Voltage Rating	kV	220
3.3	Continuous Current Rating at Ambient Temperature of 50 ° C	Ampere	3,150
3.4	Whether Tuning Devices provided	YES / NO	YES
3.5	Rated Short Time Current for 1.0 sec	kA	50
3.6	Asymmetrical Peak Value of first half Wave of Rated Short Time Current	kApeak	127.5
3.7	Minimum Guaranteed Resistive Component over Blocking Range	ohm	570
3.8	Continuous Current Rating at Line Trap Temperature of 65 ° C	Ampere	2,750
3.9	Rated Inductance	mH	1.0
3.10	Blocking Range		50 - 90 kHz 90 - 500 kHz
3.11	Type of Tuning		Broad Band
3.12	Variation in 50 Hz Impedance per Degree Centigrade variation in Ambient Temperature		Negligible
3.13	Variation in Resonant Frequwncy Band per Degree Centigrade variation in Ambient Temperature		Negligible

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Larsen - F1 - 4

Sr. No.	PARAMETER	UNIT	
3.14	Detail of Protection of Capacitors and Coils against Voltage Surges. Type of Protective Device		Lightning Arrestor provided Non Linear Resistor Type Raychem Make HAD 15 NFF
3.15	Basic Insulation Level	kV	70
3.16	Standard Nominal Discharge Current of Protective Device for 8 / 20 micosec Wave Impulse	kA	10
3.17	Rated Voltage of Arrestor (Protective Device)	kVrms	18
3.18	Maximum Residual Discharge Voltage for 8 / 20 microsec Wave		
a)	At 5,000 Amperes	kV	40
b)	At 10,000 Amperes	kV	50
3.19	Class of Insulation of Line Trap under Rated Continuous Current		F
3.20	Temperature Rise in Line Trap under Rated Continuous Current		Within 115 ° C
3.21	Visual Corona Extinction Voltage	Volt	> 580
3.22	Radio Interference Voltage		< 500 Micro Volt at 510 kV
3.23	Type of Incoming & Outgoing Terminals		Aluminium Flat Pad
3.24	Visual Corona Extinction Voltage for Terminal Connector		> 580
3.25	Radio Interference Voltage for Terminal Connector		< 500 Micro Volt at 510 kV
3.26	Temperature Rise in Terminal Connector at 50 ° C Ambient	° C	35
3.27	Type of Mounting		Pedestal
3.28	Ultimate Tensile Strength	N	> Twice the Weight of Line Trap + 5,000 N
3.29	Material of Main Coil		Aluminium
3.30	Material of Terminal Connector		Aluminium Alloy
3.31	Material of Pedestal		Aluminium
3.32	Material of Mounting Hardware		Aluminium, Non Magnetic Stainless Steel & MCI
3.33	Net weight	kg	2,000
3.34	Whether Corona Rings provided	YES / NO	Corona Bells provided
3.35	whether Bird Barrier provided	YES / NO	YES

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Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
3.36	Overall Dimension provided		
	a) Diameter	mm	2,218
	b) Height	mm	1,655
3.37	Number of Turns in Line Trap Main Coil		First Winding: 37.5 Second Winding: 30 Third Winding: 26.5 Fourth Winding: 25.5
3.38	Overall Conductor Size		1. WI: 61 Strands each of 3.31 mm Diameter 2. WII - IV: 37 Strands each of 2.43 mm Diameter
3.39	Type of Construction (No. of Coils & whether Open Type or Covered with insulating Material)		Four Layer Winding Air Cooled / Epoxy impregnated Fibreglass encapsulated design

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
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Barowalia House, Khalini, Shimla-2

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SHEET – H

BATTERY & BATTERY

CHARGER

LARSEN & TOUBRO LIMITED Construction Chennai

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - H

BATTERY & BATTERY CHARGER

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
A.	BATTERY			
1	GENERAL			
1.1	Make		HBL / Amararaja / Exide	
1.2	Catalogue Number		As per Manufacturer Standard	
1.3	Type		Tubular Low Maintenance Lead Acid	
1.4	Reference Standard		IS 1651:1991	
2	RATING			
2.1	Rated Voltage	Volt	48	220
2.2	5 hour Rating at 27 °C to 1.1 Volt per Cell	AH	As per Technical Specification	
2.3	1 hour Discharge Rate to 1.1 Volt per Cell	Amp	325 A to 1.75 ECV	225 A to 1.75 ECV
2.4	1 minute Discharge Rate to 1.1 Volt per Cell	Amp	928 A to 1.7 ECV	642 A to 1.7 ECV
3	PERFORMANCE			
3.1	Required Duty Cycle		During Detailed Engineering	
3.2	Is the Battery furnished meets Duty Cycle	Yes / No	Yes	
3.3	Cell Voltage Characteristics during Duty furnished ?	Yes / No	No	

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
3.4	Minimum Cell Voltage during Duty Cycle	Volt	1.85 / Cell	
3.5	AH Efficiency at 5 hour Discharge Rate	%	> 90 %	
3.6	Expected Life of Battery	hr.	15 years in Float applications at 27 degree Centigrade	
4	BATTERY CHARACTERSTICS			
4.1	Recommended Charging Rate for		Volt / Cell	Ampere
	a. Float Charging		2.15 to 2.20 Volts per Cell at 27 ° C	
	b. Equalizing Charge		During Detailed Engineering	
	c. Boost Charging in 10 hrs. Start		40 Amperes till Cell Voltage reaches 2.4 Volt / Cell.	
	Finish		20 Amperes till Cell Voltage reaches 2.60 - 2.75 Volt / Cell.	
4.2	Recommend Specific Gravity at 27 °C			
	a) For First Filling		1.18 ± 0.005	
	b) At Full Charge		1.20 ± 0.005	
	c) At end of 5 hour Discharge		1.12 (approx)	
4.3	Short Circuit Current for a Dead - Short across BatteryTerminals when:			
	a) Float Charge at Rated Volt / Cell		2.41 kA	1.67 kA
	b) Boost Charge at Rated Volt / Cell		2.92 kA	2.02 kA
4.4	Battery Internal Resistance	ohm		220 V : 0.138
5	CELLS			
5.1	Number of Cells per Battery		24	110
5.2	Type of the Cell		Tubular Lead Acid NDP type	
5.3	Cell Designation as per I.S.		T 400 P	
5.4	Material of the Battery Container		Poly Propylene	
5.5	Overall Dimension of each Cell (L x W x H)	mm	252 ± 10 x 173 ± 10 x 467 ± 10	

Recommended

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
5.6	Weight of Complete Cell			
a)	Without Electrolyte	kg	18.6 ± 5 %	
b)	With Electrolyte	kg	32 ± 5 %	
5.7	Internal Resistance of Cell	ohm	0.00083	0.0012
6	INTER CELL CONNECTOR			
6.1	Inter Cell Connector furnished ?		Yes	
6.2	Type of Inter Cell Connector Bolted / Burned		Bolted	
6.3	Material of Inter Cell Connector		Lead Plated Copper	
7	PLATES			
7.1	Number of Positive Plates per Cell		During Detailed Engineering	
7.2	Type of Positive Plate		Tubular	
7.3	Type of Negative Plate		Flat Pasted	
8	SEPARATOR			
8.1	Type		Envelope	
8.2	Material		Sintered micro Porous Poly ethylene ribbed separator	
8.3	Thickness	mm	1.25	
9	ELECTROLYTE			
9.1	Amount of Electrolyte for First Filling			
a)	Per Cell	Litre	20.4	10.8
b)	Per Set	Litre	489.6 (appox)	1188 (approx)
9.2	First Filling with 10 % extra furnished ?		Yes	
9.3	Electrolyte conform to		IS: 266	
10	RACKS			
10.1	Number of Racks per Battery		2	4
10.2	Number of Cells per Rack		12	14
10.3	Type of Racks	Rows / Tiers	Single Tier	Double Row Double Tire
10.4	Material of Rack		Wooden rack	

LARSEN & TOUBRO LIMITED Construction Channel

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
10.5	Racks provided with			
	a) Numbering Tags for Cells		Cell stickers shall be provided	
	b) Teakwood Clamps for Cables		No	
10.6	Insulator with 5 % extra furnished for			
	a) Cell	Yes / No	YES	
	b) Stand	Yes / No	YES	
10.7	Inter Row, Inter Tier Connectors and End Take - Off furnished ?	Yes / No	YES	
10.8	Connection Hardware with 5 % extra furnished	Yes / No	YES	
11	DIMENSIONS AND WEIGHTS			
11.1	Overall Dimension (L x B x H)	mm	During Detailed Engineering	
11.2	Approximate Weight	kg	During Detailed Engineering	
11.3	Battery Layout Drawing furnished ?		YES	
12	Ventilation requirements		As per BS: 6133	
13	Accessories furnished with each Battery			
B.				
1	BATTERY CHARGER			
1.1	GENERAL			
1.2	Make			
1.3	Catalogue Number			
1.4	Type		DU: FC: FCBC 48 V 60 + 60 A	DU: FC: FCBC 220 V 60 + 60 A
2	Reference Standard			
	a) A. C. INPUT VOLTAGE	Volt	415	
	b) Voltage % Variation		± 10	
	c) Number of Phase	Hz	3	
2.2	Frequency % Variation		± 3	
			Float Charger	Float Cum Boost Charger
	D. C. OUTPUT			
	a) Voltage	Volt / Cell	2	
	b) Current	Ampere	60	60
2.3	Type of Cooling		Natual Air Cooling	

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
2.4	Maximum Temperature within Cubicle above 45 °C Ambient			
	a) Rectifier Transformer	°C	95	
	b) SCR	°C	95	
3	PERFORMANCE			
3.1	Regulation for 0-100 % Rated Load with 10 % Input Voltage and 5 % Input Frequency Variation	%	plus or minus 1%	
3.2	Ripple Content in D. C. Output			
	a) With Battery	%	< 1 rms	
	b) Without Battery	%	< 2 rms	
3.3	Guaranteed Efficiency at Rated Load	%	75	
3.4	Power Factor at Rated Load	%	0.8	
4	MISCELLANOUS			
4.1	CHARGER provided with following			
	a) Automatic Voltage Regulation		Provided	
	b) Current Limiting Circuitry		Provided	
	c) Smoothing Filter Circuit		Provided	
	d) Soft - Start Feature		Provided	
	e) Is Manual Operation Permissible		YES	
4.2	SCR Elements provided with			
	a) Surge Protection		Provided	
	b) Fast acting HRC Fuse		Provided	
5	A. C. SWITCH			
5.1	Make		During Detailed Engineering	
5.2	Type / Catalogue Number			
5.3	Reference Standard			
5.4	Rated Current	Ampere		
6	A. C. FUSE			
6.1	Make		During Detailed Engineering	
6.2	Type / Catalogue Number			
6.3	Reference Standard			
6.4	Current Rating			
	a) Continuous	Ampere		
	b) Interrupting	kA		

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Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
7	A. C. CONTACTOR			
7.1	Make		Reputed Make	
7.2	Type / Catalogue Number			
7.3	Reference Standard			
7.4	Rated Current	Ampere	60	85
7.5	Utilization Category		AC3 Duty	
7.6	Thermal Overload with in - built Single Phase Preventor provided ?		YES	
8	RECTIFIER TRANSFORMER			
8.1	Make		During Detailed Engineering	
8.2	Type / Catalogue Number			
8.3	Reference Standard			
8.4	Ratings			
a)	kVA			
b)	Voltage			
c)	% Reactance			
8.5	Class of Insulation			
8.6	Method of Cooling			
9	CONTROLLED RECTIFIER (SCR)			
9.1	Make		Reputed Make	
9.2	Type / Catalogue Number			
9.3	Reference Standard			
9.4	rms Current Rating	Ampere		
9.5	Surge Current			
a)	One - Cycle	Ampere	81	100
b)	Repetitive Cycle	Ampere	81	100
9.6	Peak Inverse Voltage			
a)	Continuous	Volt	600	
b)	Surge	Volt	600	
10	D. C. FUSE			
10.1	Make		Reputed Make	
10.2	Type / Catalogue Number			
10.3	Reference Standard			
10.4	Current Rating			
a)	Continuous	Ampere	80	100
b)	Interrupting	kA	10 kA	

LARSEN & TOUBRO LIMITED Construction Chennai

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
11	**D. C. CONTACTOR**			
11.1	Make		Reputed Make	
11.2	Type / Catalogue Number			
11.3	Reference Standard			
11.4	Current rating	Ampere	80	100
11.5	Utilization category		DC3 Duty	
12	**BLOCKING DIODE**			
12.1	Make		Reputed Make	
12.2	Type / Catalogue Number			
12.3	Reference Standard			
12.4	Current Rating			
a)	One Minute	Ampere	80	100
b)	One Hour	Ampere	80	100
12.5	Peak Inverse Voltage	Volt	600	
13	**INDICATION LIGHTS**			
13.1	Make		Reputed Make	
13.2	Type / Catalogue Number		Cluster	
13.3	Reference Standard			
13.4	Wattage	Watt	2	
13.5	Series resistor	Ohm	10 k	
14	**METERS**			
14.1	Make		Reputed Make	
14.2	Type / Catalogue Number		Analog	
14.3	Reference Standard			
14.4	Size		96 x 96	
14.5	Accuracy		1.5	
15	**ALARM FACIA**			
15.1	Make		Reputed Make	
15.2	Type / Catalogue Number		Electronic Static Card	
15.3	Reference Standard			
15.4	Number of Window per Facia	No.	12	
16	**CHANGE OVER SWITCH**			
16.1	Make		Reputed Make	
16.2	Type / Catalogue Number			
16.3	Reference Standard			
16.4	Rating	Ampere		
16.5	Number of Poles			
16.6	Key Interlock furnished ?			

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Barowalia House, Khalini, Shimla-2

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Sr. No.	PARAMETER	UNIT	48 V; 400 AH	220 V; 400 AH
17	D. C. SWITCH		Reputed Make	
17.1	Make		During Detailed	
17.2	Type / Catalogue Number			
17.3	Reference Standard			
17.4	Rating	Ampere		
17.5	Number of Poles			
17.6	Key Interlock furnished ?			
18	CHARGER PANEL			
18.1	Make		Reputed Make	
18.2	Type			
18.3	Reference Standard			
18.4	Enclosure			
	a) Degree of Protection		IP 42	
	b) Sheet Steel Thickness	mm	2 mm for Front & Rear , 1.6 mm for all Sides	
18.5	Panel provided with			
	a) Internal Lamp with Door - Switch		YES	
	b) Space Heater with Thermostat		YES	
	c) 5A, 3 Pin Receptacle		YES	
18.6	Internal Wiring			
	a) Insulation		PVC	
	b) Voltage Grade	Volt	1,100	
	c) Minimum Conductor Size		25 x 6	
18.7	Power Terminals			
	a) Make		Reputed Make	
	b) Size / Catalogue Number		M 10 x 70 L	
18.8	Control Terminals			
	a) Make		Reputed Make	
	b) Size / Catalogue Number		M 10 x 70 L	
	c) 20 % Spare Terminal furnished ?		YES	
18.9	Ground Terminal furnished ?		YES	
18.10	Overall Dimension (L x B x H)	mm	During Detailed Engineering	
18.11	Approximate Weight	kg		
18.12	General Arrangement drawings			
18.13	Accessories as specified furnished			

LARSEN & TOUBRO LIMITED Construction Channel

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H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-Parsen - H - 8

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SHEET – 11

33 kV XLPE CABLE

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - I1

33 kV XLPE CABLE

Sr. No.	PARAMETER	UNIT	1C x 185	1C x 240	1C x 630
1	System Voltage	kV		33 kV	
2	Make			KRISHNA / MPCAB	
3	Type of Cable		A2XFaY	A2XWaY	A2XWaY
4	Standard to which Cable is manufactured			IS: 7098	
5	Conductor Material and its Grade			Aluminium Conductor & H2 / H4 Grade IS: 8130	
6	Minimum Number of Wires in each Core	No.	30	30	57
7	Nominal Diameter of Wire (before Stranding)	mm			3.75
8	Number of Cores and Nominal Cross Section	No. x sq. mm.	1C x 185	1C x 240	1C x 630
9	Shape of Conductor			Compacted Circular	
10	Material used for Insulation			XLPE	
11	Nominal Thickness of Insulation	mm		8.8	
12	Specific Insulation resistance of dielectric at 27 °C	ohm - cm	1 x 10 ^ 14		1 10 ^ 12
13	Type and Thickness of Screen				
	a) Conductor Screen			Extruded Layer of Semi Conducting Compound of 0.3 mm	
	b) Insulation Screen				
	i) Non Metallic Part			- do -	
	ii) Metallic Part			Copper Tape of 0.045 mm	
14	Type of Extrusion / Curing Process			Dry Cure Sioplas Process	
15	Minimum Thickness of Inner Sheath	mm		0.5	
16	Material used for Inner Sheath			PVC Type ST - 2 of IS: 5831	
17	Minimum Thickness of Outer Sheath	mm	1.72	1.88	
18	Material used for Outer Sheath			PVC (ST - 2) with FR Property	

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	1C x 185	1C x 240	1C x 630
19	Type & Size of Armour Strip			Hard Drawn Aluminium	
20	Approximate Total Cross Sectional Area of armouring	sq. mm	96	188.4	
21	Approximate Overall Diameter of Cable	mm	47	51	64
22	a) Total Length of Cable for each Drum	mts.		500 ± 5 %	
	b) Non Standard Length			5 % of Ordered Quantity No Length Less than 100 mts.	
23	Approximate Total Weight of each Drum Length of Cable	kg	1,400	1,600	4,920
24	Size (Diameter) of Drum	mm		1,600	
25	Continuous Safe Current Carrying Capacity laid in Ground for				
	a) Ambient Temperature of 40 °C Thermal Resistivity of Soil 120 °C Depth of Laying 900 mm	Ampere	250	285	550
26	Continuous Current rating in Air at 40 °C	Ampere	390	460	840
27	Maximum Permissible Temperature Rise of Conductor for Continuous Capacity Ground / Air	°C		45 / 50	
28	Current Density under Conditions stipulated above (Ground / Air)	Ampere / sq. mm	1.35 / 2.11	1.19 / 1.92	
29	Insulation Resistance of Finished Cable at 20 °C	mega ohm km		367	
30	Conductor Resistance per 1000 metres of finished Cable at 20 °C	ohm / km	0.164	0.125	0.0627
31	Conductor Reactance per 1000 metres of finished Cable at 20 °C	ohm / km	0.147	0.141	0.106
32	Impulse Voltage Withstand Capacity	kV		170	
33	Power Frequency Voltage Withstand Capacity	kV		48	
34	Maximum Allowable Symmetrical Short Circuit Current for duration of one second	kA	17.4	22.6	59.54

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contract.)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

SHEET – 12

1.1 kV XLPE POWER

CABLE

Jeerapur

LARSEN & TOUBRO Construction Channel

By. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - I2

1.1 kV XLPE POWER CABLE

Sr. No.	PARAMETER	3.5C x 300	1C x 630	1C x 300
1	Manufacturer Name & Address	M/S Krishna Electrical Industries Ltd., Gwalior		
2	Manufacturer's Type & Designation	A2XWY	A2XWaY	A2XWaY
3	Applicable Standard	IS: 7098, IS: 5831, IS: 8130		
4	Rated Voltage, Volts	Upto and including 1,100		
5	Suitable for Earthed or Unearthed System	Both Systems		
6	Continuous Current Rating when laid in Air in an ambient temperature of 50 ° C and for maximum Conductor temperature of 90 ° C for XLPE	430 Amp	809 Amp	519 Amp
7	Short Circuit Capacity			
	a) Conductor Temperature allowed for Short Circuit in °C		250	
	b) Short Circuit Current for 3 seconds	56.98 kA	34.19 kA	16.28 kA
8	Conductor			
	a) Material	Stranded Aluminium as per IS: 8130		
	b) Grade		H2 / H4	
	c) Nominal Cross Sectional Area, sq. mm Main / Neutral	300 / 150	630	300
	d) Minimum Number of Wires, Nos. Main / Neutral	30 / 15	53	30

LARSEN & TOUBRO Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	3.5C x 300	1C x 630	1C x 300
9	Insulation			
	a) Composition of Insulation	XLPE Compound Type - A as per IS: 5831		
	b) Nominal Thickness of Insulation, mm Main / Neutral	1.80 / 1.40	2.80	2.10
10	Inner Sheath			
	a) Material	PVC Compound Type ST - 2 as per IS: 5831		
	b) Calculated Diameter over the laid up Cores, mm	48.74	NA	NA
	c) Minimum Thickness of Sheath, mm	0.6	NA	NA
11	Armour			
	a) Type & Material of Armour	GI Wire	Aluminium Wire	
	b) Calculated Diameter under Armour	50 mm	36.1 mm	25.4 mm
	c) Nominal Diameter / Dimension of Armouring Wire / Strip, mm	2.50	2.00	3.15
	d) Short Circuit Capacity of Armour, kA	13.99	15.74	16.78
	e) Maximum DC Resistance of Armour at 20 ° C, ohm / km	1.44	0.385	0.484
12	Outer Sheath			
	a) Material	PVC Compound Type ST - 2 having FR Properties as per IS: 5831		
	b) Calculated Diameter under the Outer Sheath, mm	51.6	37.7	27
13	Safe Pulling Force when pulled by Pulling Eye on the Conductor, kg	30 x Total Area of Conductor		
14	Test Voltage			
	a) High Voltage Test, kV	3 for 5 minutes for each connection		
	b) Water Immersion Test, kV	3 (AC) to 6 (AC) for 5 minutes & 1.2 (DC) for 240 hours		
15	Minimum Bending Radius permissible	12 x Outer Diameter of Cable		
16	Standard Drum Length in metres	250 / 500 ± 5 %		

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – 13

1.1 kV CONTROL

CABLE

LARSEN & TOUBRO Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK : CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - I3

1.1 kV CONTROL CABLE

Sr. No.	PARAMETER	2C x 2.5	3C x 2.5	5C x 2.5	7C x 2.5	10C x 2.5	14C x 2.5	19C x 2.5	27C x 2.5
1	Manufacturer Name & Address	M/S KRISHNA ELECTRICAL INDUSTRIES LIMITED, GWALIOR							
2	Manufacturer's Type & Designation	YWY							
3	Applicable Standards	IS: 1554, IS: 8130 , IS: 5831, IS: 3975							
4	Rated Voltage, Volts	Upto and included 1,100							
5	Suitable for Earthed or Unearthed System	Both the Systems							
6	Continuous Current Rating when laid in Air in an ambient temperature of 50 ° C and for maximum Conductor temperature of 90 ° C for PVC Cable	27	24	24	17	15	13	12	10

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	2C x 2.5	3C x 2.5	5C x 2.5	7C x 2.5	10C x 2.5	14C x 2.5	19C x 2.5	27C x 2.5
7	Short Circuit Capacity								
	a) Conductor Temperature allowed for Short Circuit in °C					70			
	b) Short Circuit Current for 3 seconds	0.33 kA	0.50 kA	0.83 kA	1.16 kA	1.66 kA	2.32 kA	3.15 kA	4.48 kA
8	Conductor								
	a) Material					Copper conforing to IS: 8130			
	b) Grade					Plain Annealed High Conductivity			
	c) Nominal Cross Sectional Area,					2.5 sq. mm			
	d) Minimum Number of Wires, Nos.					7			
	e) Minimum Diameter of Wires, mm					0.67			
9	Insulation								
	a) Composition of Insulation					PVC Type - A as per IS: 5831			
	b) Nominal Thickness of Insulation					0.9 mm			
10	Inner Sheath								
	a) Material					PVC Type ST - 1 as per IS: 5831			
	b) Calculated Diameter over the laid up Cores, mm	7.2	7.8	9.7	10.8	14.4	15.9	18.0	22.1
	c) Minimum Thickness of Sheath, mm					0.3			
11	Armour								
	a) Type & Material of Armour					Galvanised Steel Round Wire as per IS: 3975			
	b) Calculated Diameter under Armour	7.8 mm	8.4 mm	10.3 mm	11.4 mm	15.0 mm	16.5 mm	18.6 mm	22.7 mm
	c) Nominal Diameter / Dimension of Armouring Wire / Strip, mm	1.4	1.4	1.4	1.4	1.6	1.6	1.6	1.6
	d) Short Circuit Capacity of Armour, kA	1.33	1.46	1.78	1.93	2.84	3.1	3.44	4.23
	e) Maximum DC Resistance of Armour at 20 °C, ohm / km	5.52	5.18	4.34	3.97	2.68	2.48	2.19	1.83

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

L&T-HOUBRO LIMITED Heavy Engineering LARSEN & TOUBRO Construction Group

Sr. No.	PARAMETER	2C x 2.5	3C x 2.5	5C x 2.5	7C x 2.5	10C x 2.5	14C x 2.5	19C x 2.5	27C x 2.5
12	Outer Sheath								
	a) Material	PVC Type ST - 1 having FR Properties as per IS: 5831							
	b) Calculated Diameter under the Outer Sheath, mm	10.6	11.2	13.1	14.2	18.2	19.7	21.8	25.9
13	Safe Pulling Force when pulled by Pulling Eye on the Conductor, kg	50 N x Total Area of Conductor							
14	Test Voltage								
	a) High Voltage Test, kV	3 (AC) for 5 minutes for each connection							
	b) Water Immersion Test, kV	3 to 6 (AC) for 5 minutes and 1.2 (DC) for 240 hours							
15	Minimum Bending Radius permissible	12 x Outer Diameter of Cable							
16	Standard Drum Length in metres	500 / 1,000 ± 5 %							

LARSEN & TOUBRO LIMITED Construction Machinery

Dy. General Manager (Contracts)
[illegible] Power Transmission Corpn. Ltd.
Baroda House, Khalini, Shimla-2

SHEET – 14

1.1 kV POWER

CABLE

LARSEN & TOUBRO LIMITED Construction Chennai

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2



HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK : CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - I4

1.1 kV PVC POWER CABLE

Sr. No.	PARAMETER	3.5C x 70	3.5C x 35	4C x 16	4C x 6	2C x 6	1C x 150	2C x 50
1	Manufacturer Name & Address	M/S KRISHNA ELECTRICAL INDUSTRIES LIMITED, GWALIOR						
2	Manufacturer's Type & Designation	AYFY	AYFY	AYFY	AYWY	AYWY	AYFaY	AYFY
3	Applicable Standards	IS: 1554, IS: 8130 , IS: 5831, IS: 3975						
4	Rated Voltage, Volts	Upto and included 1,100						
5	Suitable for Earthed or Unearthed System	Both the Systems						
6	Continuous Current Rating when laid in Air in an ambient temperature of 50 ° C and for maximum Conductor temperature of 90 ° C for PVC Cable	130	86	51	30	35	275	125

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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Sr. No.	PARAMETER	3.5C x 70	3.5C x 35	4C x 16	4C x 6	2C x 6	1C x 150	2C x 50
7	Short Circuit Capacity							
	a) Conductor Temperature allowed for Short Circuit in °C				160			
	b) Short Circuit Current for 3 seconds	10.7 kA	5.30 kA	2.80 kA	1.05 kA	0.52 kA	6.5 kA	4.39 kA
8	Conductor							
	a) Material				Stranded Aluminium as per IS: 8130			
	b) Grade				H2 / H4			
	c) Nominal Cross Sectional Area, Main / Neutral , sq. mm	70 / 35	35 / 16	16	6	6	150	50
	d) Minimum Number of Wires, Nos. Main / Neutral	12 / 6	6 / 6	6	3	3	15	6
9	Insulation							
	a) Composition of Insulation				PVC Compound Type - A as per IS: 5831			
	b) Nominal Thickness of Insulation Main / Neutral, mm	1.4 / 1.2	1.2 / 1.0	1	1	1	2.1	1.4
10	Inner Sheath							
	a) Material				PVC Compound Type ST - 1 as per IS: 5831			
	b) Calculated Diameter over the laid up Cores, mm	27.6	20.4	15.73	11.6	9.6	NA	21.6
	c) Minimum Thickness of Sheath, mm			0.3			NA	0.3
11	Armour							
	a) Type & Material of Armour		GI Strip		GI Wire		Aluminium Strip	
	b) Calculated Diameter under Armour	28.4 mm	21 mm	16.33 mm	12.2 mm	10.2 mm	18 mm	22.2 mm
	c) Nominal Diameter / Dimension of Armouring Wire / Strip, mm		4.0 x 0.8		1.4		4.0 x 0.8	

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction

Sr. No.	PARAMETER	3.5C x 70	3.5C x 35	4C x 16	4C x 6	2C x 6	1C x 150	2C x 50
	d) Short Circuit Capacity of Armour, kA	2.79	2.06	1.76	1.91	1.55	0.478	1.78
	e) Maximum DC Resistance of Armour at 20 ° C, ohm / km	2.57	3.38	3.99	3.76	4.4	0.718	3.73
12	Outer Sheath							
	a) Material	PVC Compound Type ST - 1 having FR Properties as per IS: 5831						
	b) Calculated Diameter under the Outer Sheath, mm	30	22.6	17.93	15	13	19.6	23.8
13	Safe Pulling Force when pulled by Pulling Eye on the Conductor, kg	30 x Total Area of Conductor						
14	Test Voltage							
	a) High Voltage Test, kV	3 (AC) for 5 minutes for each connection						
	b) Water Immersion Test, kV	3 to 6 (AC) for 5 minutes and 1.2 (DC) for 240 hours						
15	Minimum Bending Radius permissible	12 x Outer Diameter of Cable					15 x Outer Diameter	
16.	Standard Drum Length in metres	500 / 1,000 ± 5 %						

LARSEN & TOUBRO Construction Heavy Engineering

Deputy General Manager (Contracts)
Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – K

PROTECTION PANEL

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - K

PROTECTION PANEL

Sr. No.	PARAMETER	UNIT	
1	GENERAL		
1.1	Make		ABB LIMITED
1.2	Type		VSG
1.3	Reference Standard		IS: 2147
1.4	CONSTRUCTION		Simplex
	a) Degree of Protection		IP31
	b) Sheet Metal Thickness		Front < 3 mm; Back < 2 mm Side < 2 mm
1.5	EQUIPMENT MOUNTING		
	a) All Relays & Switches mounted	YES / NO	YES
1.6	NAME PLATE		
	a) Material		Black Plastic
	b) Thickness	mm	3
	c) Size for		
	Equipment	mm	40 x 200
	Panels	mm	
1.7	INTERNAL ILLUMINATION		
	a) Volt	V	230
	b) Watt	W	10
	c) Door Switch Controlled	YES / NO	YES
1.8	SPACE HEATER		
	a) Volt	V	230
	b) Watt	W	50
	c) Thermostat Controlled	YES / NO	YES

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
1.9	PLUG SOCKET		
	a) Type		Universal Socket
	b) Rating		5 / 15 A; 230 V AC
1.10	Panel Illumination, Space Heater & Plug Socket Circuits provided with individual Switch Fuse Units	YES / NO	YES
1.11	A. C. / D. C. SUPPLY		
	Type & Rating of Isolating Fuse Units for		As per Specification
	a) Incoming A. C. Supply		
	b) Incoming D. C. Supply		
1.12	INTERNAL WIRING		
	a) Wire Type		PVC Untinned Copper Wires
	b) Voltage Grade	Volt	1,100
	c) Conductor Material		Untinned Copper
	d) Conductor Size for		
	i) Current Control Circuit	sq. mm	2.5
	ii) Voltage Circuit	sq. mm	1.5
	e) Wires identified at both ends with Ferrules	YES / NO	YES
1.13	TERMINAL BLOCK		
	a) Make		Connectwell / Elmex
	b) Type		Stud
	c) 20 % Spare Terminals furnished		As per Specification
1.14	GROUND BUS		
	a) Material		Copper
	b) Size	mm	25 x 6
1.15	PAINTING		
	a) Type of Finish		As per Specification
	b) Colour Shade - Inside / Outside		Interior: Stove Enamel White Exterior: Stove Enamel Light Grey
2	PUSH BUTTON		
2.1	Make		TEKNIC
2.2	Type		Flush
2.3	Contact Rating	A. C.	240 Volt
		D. C.	220 Volt
2.4	Number & Type of Contacts provided per Button		2 N. O. + 2 N. C.

By. General Manager (Contracts)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2 Larsen - K - 2

LARSEN & TOUBRO LIMITED Construction Chennai

Sr. No.	PARAMETER	UNIT	
3	LAMPS		
3.1	Make		TEKNIC
3.2	Type		Cluster LED
3.3	Rating		
	a) Volt	D. C.	110 V
	b) Watt	W	2.6
3.4	10 % Extra Lamps furnished	YES / NO	YES
3.5	Size of Lens	mm	22.5
4	RELAYS		
4.1	220 kV SIDE TRANSFORMER RELAY		ABB Limited
	a) Local Breaker Back Up (LBB) Protection		Part of Bus Bar Protection
	b) Directional O / C IDMT		Numerical REF 615
	c) Directional E / F IDMT		Inbuilt in REF 615
	d) Transformer Differential		Numerical Type RET 670
	e) Transformer Over Fluxing		Inbuilt in RET 670
	f) IDMT O / C (Connected to Neutral side CT)		Inbuilt in RET 670
	g) Restricted Earth Fault		Numerical Type REF 615
	h) Auxiliary Relays for Transformer Protection (viz Buchholz, Winding / Oil Temperature Oil Level, Fire Protection relay etc)		ABB Make Type RXSF
4.2	33 kV SIDE TRANSFORMER RELAY		
	a) Local Breaker Back Up (LBB) Protection		
	b) Directional O / C IDMT		Inbuilt in REC 670
	c) Directional E / F IDMT		
	d) Transformer Differential		shall be part of HV Side
	e) Transformer Over Fluxing		Differential Relay
	f) Auxiliary Relays for Transformer Protection (viz Buchholz, Winding / Oil Temperature Oil Level, Fire Protection relay etc)		ABB Make Type RXSF
4.3	220 kV LINE PROTECTION RELAY		
	a) MAIN - I: Protection Scheme (Composite Numerical Distance Relay with Auto Re - Closing & Check Synchronising Facility)		ABB Make Type REL 670

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
	b) MAIN - II: Protection Scheme (Composite Numerical Distance Relay Phase with Phase Comparison and Auto Re - Closing & Check Synchronising Facility) Facility)		Siemens Make Type 7SAS / Areva Make Type MiCOM
	c) Numerical Directional Over Current and Earth Fault		ABB Make Type REF 615
	d) Over Voltage / Under Voltage Protection e) Disturbance Recorder f) Distance to Fault Locator for Phase to Earth Fault		Inbuilt Function of Main - I & Main - II Protection Relay
	g) CVT Selecting Relays or Switches		ABB Make Type RXPSU14
	h) Auxiliary Relays for Carrier Supervision of Main - I & Main - II Protection Relays		ABB Make Type RXSF
	i) Carrier Receive Lock Out Relay		ABB Make Type RXMV
	j) Breaker Failure Protection Relay		As part of Bus Bar Protection
	k) Trip Circuit Pre and Post Supervision Relays for Trip - I & Trip - II		ABB Make Type TSR
	l) Flag Relays for Circuit Breaker Trouble Shooting		ABB Make Type RXSF
	m) Over Frequency / Under Frequency Relay		As part of Main Protection
	n) df / dt and dv / dt Relay		Inbuilt in Main Protection
4.4	33 kV LINE PROTECTION RELAY		
	a) Numerical Directional Over Current and Earth Fault b) Over Voltage / Under Voltage Protection c) Disturbance Recorder d) Breaker Failure Protection Relay		Inbuilt Function of BCU mounted in CB Relay Panel
	f) Trip Circuit Pre and Post Supervision Relays for Trip - I & Trip - II		ABB Make Type TSR
	g) Flag Relays for Circuit Breaker Trouble Shooting		ABB Make Type RXSF
4.5	220 kV BUS BAR PROTECTION RELAY		
	a) Bus Bar Differential Protection for Bus - I b) Bus Bar Differential Protection for Bus - II		ABB Make Numerical Type REB 670

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	

4.6 220 kV BUS COUPLER PROTECTION RELAY

a) Numerical Directional Over Current and Earth Fault — ABB Make Type REF615

b) Breaker Failure Protection Relay — As part of Bus Bar Protection

4.7 220 kV TRANSFER CUM COUPLER RELAY PANEL

a) Numerical Directional Over Current and Earth Fault — ABB Make Type REF615

b) Breaker Failure Protection Relay — As part of Bus Bar Protection

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – 0

33 / 0.440 kV, 250 kVA

LT TRANSFORMER

LARSEN & TOUBRO LIMITED Construction Channai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - 0

33 / 0.440 kV, 250 kVA LT TRANSFORMER

Sr. No.	PARAMETER	UNIT	
1	Name & Address of Manufacturer		
2	Voltage Ratio	Volts	33000 / 433
3	Rating	kVA	250
4	Standards Applicable		IS: 2026; IS: 335
5	Rated Frequency	Hz	50
6	Number of Phases		3
7	Vector Group		Dyn 11
8	Type of Cooling		ONAN
9	Tap Changing Equipment		
i)	Type		Off Circuit
ii)	Number of Steps & Tap Range		4 Steps, 5 Positions
10	Positive Sequence Impedance at 75 °C with with 100% rating at		
a)	Principal Tap		5
b)	Maximum Tap		5.25
c)	Minimum Tap		4.75
11	Temperature Rise over an Ambient of 40 degree Centigrade		
a)	Top Oil Degree Centigrade		35
b)	Windings (by Resistance Measurement Method) degree Centigrade		45

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Cont...)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	UNIT	
12	GUARANTEED LOSSES		
a)	Maximum No Load Loss on Principal Tap at Rated Voltage and Frequency	kW	550
b)	Maximum Load Loss at Rated Current at Principal Tap at 75 degree Centigrade	kW	3,500
13	Withstand Time for Three Phase Short Circuit at Terminals	msec	270
14	INSULATION LEVEL		
	Full Wave Lightning Impulse Withstanding		
i)	HV Winding	kVp	75
ii)	LV Winding	kVp	

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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SHEET – P

EOT CRANE

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contract.)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

HP POWER TRANSMISSION CORPORATION LIMITED
BAROWALIAS HOUSE, KHALINI, SHIMLA - 171002

AWARD No.: HPPTCL / DGMC / L & T SUPPLY / 2010 -
DATED:

NAME OF WORK: CONSTRUCTION OF 33 / 220 kV SUB STATION AT PALCHAN IN KULLU DISTRICT

DATA REQUIREMENT SHEET - P

EOT CRANE

Sr. No.	PARAMETER	
1	Design	Single Girder Electrically Operated Travelling confirming to IS: 807; IS: 3177 & IS: 3938 Class - II, Medium Duty, Indoor, suitable for operation at 415 ± 10 % Volts, 3 Phase, 50 Hz A. C. Supply and Tested to 25 % Overload
2	Type od Crane	Single Girder
3	Capacity	3.5 Tonne
4	Span	11.0 metres
5	Clear Lift	6.0 metres
6	Side Clearance	250 mm
7	Bay Length	22.0 metres
8	L. T. Wheel Load	3.3 Tonne
9	Weight of Crane	3.5 Tonne
10	SPEEDS	
	a) Hoist - Main	3.0 metres / minute
	b) C. T.	10.0 metres / minute
	c) L. T. Wheel Load	20 metres / minute
11	Operation	Electrically operated by means of Pendant Push Button Station
12	Size of Gantry Rail	40 mm sq. bar
13	Bridge Girder	Single Girder RSJ / Plate Box from Steel Section as per IS: 2062

Dy. General Manager (Contract)
H.P. Power Transmission Corp. Ltd.
Barowalia House, Khalini, Shimla-2

LARSEN & TOUBRO LIMITED Construction Chennai

Sr. No.	PARAMETER	
14	End Carriage	Fabricated from Mild Steel Plates / Channels
15	Hoisting Mechanism	By means of Wire Rope confirming to IS: 3938
15	Cross Travel Mechanism	By means of Motorised Travelling Trolley running along the Lower Flange of the Bridge Girder
16	Long Travel Mechanism	By means of Electric Motors fitted one number each on both end Carriages
17	L. T. WHEELS	
	a) Type	Double Flanged Geared Wheel mounted in fixed Axles on self aligned anti friction type Bearings
	b) Tread Diameter	200 mm
	c) Lubrication	Grease packed with Grease Nipples
18	WIRE ROPE	
	a) Type of Construction	6 x 36 Construction, Hemp Core as per IS: 2266
	b) Rope Diameter	10 mm
	c) Number of Rope Falls	4
	d) Factor of Safety	5
19	Rope Drum Material	M. S. Fabricated / Seamless as per IS: 2062
20	GEAR BOX	
	a) Type & Material of Gear Box	
	Hoist	Cast Steel
	C. T.	Cast Steel
	L. T. WHEELS	Cast Steel
	b) Lubrication	
	Hoist	Splash Oil Lubrication with Oil Level Sight Glass Indication, Drain Plug and Inspection Covers etc
	c) C. T. & L. T.	Grease packed Lubrication with necessary Seals and grease Nipples
21	GEAR & PINION	Spur / Helical as per IS: 4460
	a) Material - Gear	SAE: 8620
	b) Pinion	20 Mn Cr 5
22	BEARINGS	
	a) Type	Needle / Ball / Roller Anti Friction Bearings
	b) Lubrication	Grease
23	LIFTING HOOK	
	a) Type	C' Shank
	b) Material	En - 3A as per IS: 1875
24	Buffers Carriage	4 numbers Rubber Type Buffers will be mounted on each end to absorb shock during Normal Operation of L. T. Drive

LARSEN & TOUBRO LIMITED Construction Chennai

By, General Manager (Contracts)
L.T. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

Sr. No.	PARAMETER	

25	Brake		FAIL TO SAFE Action type electro megnetic disc type Brake
26	MOTORS		
	a) Type		Totally enclosed Squiral Cage Induction Motor
	b) Rating		
		Hoist	3.0 H. P.
		C. T.	0.5 H. P.
		L. T.	2 x 0.5 H. P.
	c) Class of Insulation		F'
27	LIMIT SWITCHES		
	a) Type		
		L. T. & C. T.	Roller Lever Type
		Hoisting	Snap Action Type
	b) Quantity		
		C. T.	1 number of Two Way Type
		L. T.	2 numbers of One Way Type
		Hoisting	2 numbers of Snap action Type
28	Power Supply		415 Volts ± 10 %, 50 Hz, 3 Phase A. C.
29	Control Voltage		110 Volt
30	Pendany Push Button		shall consist of Push Buttons having provision for Emergency OFF, ON, HOISTING, LOWERING, LEFT, RIGHT, FORWARD, REVERSE
31	Painting		The Structure shall be painted with 2 coats of Synthetic Enamel Paint of Golden Yellow Colour with Black Bands after applying Red Oxide Primer

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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H.P. Power Transmission Corporation Limited

HPPTCL

(A State Govt. Undertaking)
Barowalias House, Khalini, Shimla-171002
(Telefax: 0177-2626284)

No.HPPTCL/L&T-SUPPLY/2010-11-5845-52 Dated : 8/2/11

To

M/S LARSON & TOUBRO LIMITED,
ENGINEERING CONSTRUCTION & CONTRACT DIVISION,
MOUNT POONAMALLEE ROAD, MANAPAKKAM,
P.B.NO. 979, CHENNAI – 6000089.

FAX NO. 044-22493317, 22526345

Sub :- **Letter of Award (LOA) for supply of Equipment / Material for Construction of 220/33 kV PALCHAN GIS Sub-Station against Tender Document No. DGMC/ PALCHAN SUB-STATION/2/2009 (FIRST CONTRACT) .**

Sir,

Following amendments in Award No. HPPTCL/L&T-SUPPLY/2010-5107-12 Dated 23.12.2010 are hereby made :-

AMENDMENTS.

Ref./ Clause No.	Existing	Amended
8	**Terms of Payment.** i) Ninety percent (90%) of the Ex works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within 45 days on receipt of the Material in your Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract , Acceptance of Bank Guarantee by the Purchaser **whichever is later** . The payment shall be released by the Engineer or by the Central Payment Cell of the HPPTCL upon submission of the documents specified below . a) Original and 4 copies of the Invoices showing Purchase Order number,	**Terms of Payment.** i) Ninety percent (90%) of the Ex works Price and 100 % Freight & Insurance Charges and Taxes shall be paid within **30 days** on receipt of the Material in your Stores in full and good condition duly verified by the Engineer or his authorised representative or after completion of Contractual Formalities i.e. Execution of Legal Contract , Acceptance of Bank Guarantee by the Purchaser **whichever is later** . The payment shall be released by the Engineer or by the Central Payment Cell of the HPPTCL upon submission of the documents specified below : a) Original and 4 copies of the Invoices showing Purchase Order number, Goods Description, Quantity, Unit Price and

LARSEN & TOUBRO LIMITED Construction Channel

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Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

	Goods Description, Quantity, Unit Price and Total Amount. b) Packing List (4 copies) c) Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g) The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within 45 days of the issuance of Taking over Certificate by the Purchaser's Engineers. iii) However, in case the Payment is delayed beyond 45 days due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.	Total Amount. b) Packing List (4 copies) c)Railway Receipt/ Receipted L.R d) Manufacturers/ Contractors Guarantee Certificate of quality. e) Material Inspection Clearance Certificate for dispatch issued by the Purchaser's representative. and the Contractor's Factory Inspection Report , Transit Insurance Certificate and an Indemnity Bond as per Form-IX for full value of the Material valid till the taking over of the said Sub-Station by the Purchaser. f) Taxes & Duties shall be paid against Documentary Evidence. g)The Type Test Charges shall be paid on successful completion of the Type Test / Proto Type Test specified and on approval of the Test Results by the HPPTCL. ii) The balance 10% of the Ex-Works Price of each item as per Price Schedule shall be made within **30 days** of the issuance of Taking over Certificate by the Purchaser's Engineers. iii) However, in case the Payment is delayed beyond **30 days** due to one or the other reason. NO INTEREST FOR THE DELAYED PERIOD SHALL BE ADMISSIBLE.
11	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date of issue of this Contract and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex-works delivery for all the equipment and Materials covered under this Contract within 15 days of the Letter of Award.	**TIME SCHEDULE OF CONTRACT.** 11.1 The basic consideration and the essence of the Contract is strict adherence to the Time Schedule of the Contract. You shall so organise your resources and perform your work as to complete successful testing and commissioning of the GIS Palchan Sub-Station covered under the subject Contract within 8 (eight) months from the date of receipt of this Contract by the Contractor and the same shall be applicable for all contractual purposes. 11.2 You shall develop and furnish a detailed Schedule in the form of a Bar Chart indicating relating to Engineering, Procurement, Manufacturing and Ex- works delivery for all the equipment and Materials covered under this Contract within 15 days of the receipt of Letter of Award by the Contractor.

LARSEN & TOUBRO LIMITED Construction Chennai

Dy. General Manager (Contracts)
H.P. Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2

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	11.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction , testing and successful commissioning of 220/ 33 kV GIS Sub-Station at Palchan shall be reckoned as 8 months from the date of LOA.	11.3 For the purpose of levy of Liquidated Damages for delay, the time for completion of work of construction , testing and successful commissioning of 220/ 33 kV GIS Sub-Station at Palchan shall be reckoned as 8 months from the date of receipt of LOA by the Contractor.

Yours faithfully,

8.2.11

Dy.General Manager (Contracts),

Copy forwarded to the following for information please :

1. P.S. to Director (P&C), HPPTCl, Shimla-171002.
2. P.A. to Director (Projects), HPPTCl, Shimla-171002.
3. The Dy. General Manager (Projects), HPPTCl, Shimla-171002.
4. The Sr. Manager, HPPTCL, Sarabai Bhunter, Distt. Kullu (HP).
5. Sr. Accounts Officer, HPPTCL, Shimla-2.

8.2.11

Dy.General Manager (Contracts),

Jeetayan

LARSEN & TOUBRO LIMITED Construction Channel

Dy. General Manager (Contracts)
... Power Transmission Corpn. Ltd.
Barowalia House, Khalini, Shimla-2