

# **STANDARD BIDDING DOCUMENT**

**(PARTIAL TURNKEY CONTRACT)**

**FOR**

**RURAL/URBAN ELECTRIFICATION WORKS OF XXXX  
(NAME OF DISTRICT) DISTRICT OF XXXX (NAME OF  
STATE) UNDER DEENDAYAL UPADHYAYA GRAM  
JYOTI YOJANA/INTEGRATED POWER DEVELOPMENT  
SCHEME**

## **VOLUME-I**

### **(CONTRACT CONDITIONS & SCOPE OF WORKS)**

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**SPECIFICATION No.:.....**

**DOCUMENT NO.:.....**

VOLUME-I: SECTION – I  
INVITATION FOR BIDS (IFB)

## INVITATION FOR BIDS (IFB)

Package-XXXX for Electrification works of XXXXX district in XXXXX(State name) under Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)/Integrated Power Development Scheme (IPDS)

(DOMESTIC COMPETITIVE BIDDING)

(SINGLE STAGE TWO ENVELOPE BIDDING)

DATE OF ISSUANCE OF IFB: DD.MM.YYYY

SPECIFICATION NO. : XXXX/@@@@/\$\$\$\$

FUNDING : DOMESTIC

- 1.0 This invitation for bids follows the procurement notice (Invitation for Bids) for the subject package(s) which appeared in National and Regional Newspapers on DD.MM.YYYY. This shall also be available on XXXXXX (EMPLOYER's Name) website given at para 11.0 from DD.MM.YYYY.
- 2.0 XXXXX(Name of Employer) (hereinafter referred to as 'XXXXX' (Short Name of Employer) have been entrusted to execute the Project i.e. Electrification works of XXXXX district in XXXXX(State name) under Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)/Integrated Power Development Scheme (IPDS) on behalf of XXXX(DISCOM Name)/Government of XXXX(State Name). The execution of the project shall be funded out of the proceeds of financial assistance to be received by Government of XXXX(State Name)/(DISCOM Name) from Rural Electrification Corporation Limited (REC)/Power Finance Corporation Ltd (PFC) and the ownership of the project shall remain vested with Government of XXXX(State Name). The project shall be executed by XXXX(Short Name of Employer) on partial turnkey basis and all eligible payment under the project shall be made from the proceeds of financial assistance to be received by Government of XXXX(State Name)/(DISCOM Name). For the purpose of all procurement activities related to the aforesaid project, XXXX(Short Name of Employer) shall be referred to as 'Employer' and Government of XXXX(State Name)/(DISCOM Name) "the Owner"
- 3.0 (XXXX) (Short Name of Employer), therefore, invites sealed bids from eligible bidders for the following package(s) for aforesaid project on Domestic Competitive Bidding basis:

Sl. No.	Package
1	Package-XXXX for Electrification works of XXXX(District Name) district in XXXX (State Name) [Spec. No.: XXXX/@@@@/\$\$\$\$]

This Invitation for Bids extended through media, website or written communication or by any other means, and issuance of Bidding Documents as per para 7.0 below shall not be construed to mean that the prospective bidders to whom the Invitation for Bids has been extended and/or Bidding Documents have been issued is deemed to be an eligible bidder. The eligibility of the bidders shall be determined as per the provisions of Bidding Documents.

- 3.1 This Specification covers the following scope of works:

The scope of work under the subject package includes site survey, planning, design, engineering, assembly manufacturing, testing, supply, loading, transportation, unloading, insurance, delivery at site, handling, storage, installation, testing, commissioning and documentation of all items/material required to complete the Electrification works in XXXXX district which inter-alia include construction of New 66/11 kV Substation, New 33/11 kV Substation, 33 kV bay extension, construction of 33 kV lines, 11 kV & LT line, Installation of distribution transformer and providing service connection to BPL consumer spread all over the district. (to be amended by Employer as per scope of their bid)

The above scope of work is indicative and the detailed scope of work is given in the Bidding Documents.

- 3.2 The completion period for Package-XXXX for Electrification works of XXXXX district in XXXXX(State name) under Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)/Integrated Power Development Scheme (IPDS) shall be the period as specified in ITB Sub-Clause 24.1(c).
- 3.3 Bidding will be conducted through the domestic competitive bidding procedures as per the provisions of ITB/BDS and the contract shall be executed as per the provisions of the Contract.
- 4.0 The detailed Qualifying Requirements (QR) are given in the Bidding Document.
- 5.0 The complete Bidding Documents including tender drawings and technical specifications are available at XXXX(Short Name of Employer) website [http://www.\\*\\*\\*\\*\\*.com](http://www.*****.com)(Name of Website address) Interested bidders can download the Bidding Documents and commence preparation of bids to gain time.
- 6.0 Interested eligible bidders may obtain further information from and inspect the Bidding Documents at the office of XXXX, (Designation of Officer of Employer) at the address given at para 11.0 below from XXXX hours (IST) to XXXX hours (IST) on all working days till the sale of Bidding Documents is open as per para 7.0 below.
- 7.0 Interested Bidders will be required to download the Bidding Documents from E-Portal XXXXX (website address of e-procurement portal) (for submission of bid).  
  
Bid documents can be downloaded by payment of Rs 25,000/- online or by providing DD details in the web documents. The acceptance of price bid/commercial bid shall be subjected to acceptance of documents fee.  
  
In case of any discrepancy between the documents downloaded by the prospective bidder and the Bidding Documents (hard copy) issued by EMPLOYER official, the latter shall prevail.  
  
The Bidding Documents are meant for the exclusive purpose of bidding against this specification and shall not be transferred to any other party or reproduced or used otherwise for any purpose other than for which they are specifically issued.
- 8.0 A pre-bid meeting will be held at the office of the Employer at XXXXX (Location of meeting), India on DD.MM.YYYY at XXXX hrs to clarify the bidders various issues raised in accordance with clause 6.4 of ITB.
- 9.0 A Single Stage Bid Envelope Bidding Procedure followed by e-bidding for price bids will be adopted and will proceed as detailed in the Bidding Documents.
- 9.1 Bids must be delivered in single sealed envelopes to the address below at or before XXXX hours (IST) on DD.MM.YYYY. Price breakup shall be submitted electronically.Late bids will be rejected. Bid Envelope i.e. Techno Commercial Part shall be opened on the same day i.e. DD.MM.YYYYin the presence of the bidders' representatives who choose to attend in person at the address below at 1130 hours (IST).Price Bids shall be opened in the presence of the bidders' representatives who choose to attend at the time and date at the address given in the intimation for opening of Price bids in accordance with Clause 25 of ITB.  
  
All bids must be accompanied by a bid security of Rs. XXXXXXX/- (2% of tender value or Rs 5 (five) crore, whichever is lower).
- 10.0 EMPLOYER reserves the right to cancel/withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.
- 11.0 All correspondence with regard to the above shall be to the following address.

(By Post/In Person)

Name of bid documentation issuance official:

Designation of the officer:

Complete postal Address with Telephone Nos & FAX.

Telephone Nos.:- (Direct) 0091-(0)XXX-XXXXXXX

(Thru Board) 0091-(0)XXX-XXXXXX

Fax No(s).:- 0091-(0)XXX-XXXXXXX.

For more information, visit our site at [http://www.\\*\\*\\*\\*\\*.com](http://www.*****.com)

----- End of Section-I (IFB) ----

# VOLUME-I: SECTION – II INSTRUCTION TO BIDDERS (ITB)

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Volume-I: Section – II  
INSTRUCTION TO BIDDERS (ITB)

Preamble:

This part, Instruction to Bidders (ITB), Section II of the Bidding Documents provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Employer. It also provides information on bid submission, opening and evaluation and on contract award. ITB Section II contains provisions that are to be used unchanged unless part Special Condition of Contract, Section V, which consists of provisions that supplement, amend, or specify in detail, information or requirements included in ITB Section II and that are specific to each procurement, states otherwise. If there is a conflict between the provisions of ITB Section – II & Special Condition of Contract Section – V, the provisions of Special Condition of Contract, Section – V shall prevail.

However, provisions governing the performance of the Contractor, payments under the contract or matters affecting the risks, rights and obligations of the parties under the contract are not included in this section but instead under Section – IV: General Conditions of Contract and/or Section – V: Special Conditions of Contract.

Further in all matters arising out of the provisions of this Section – II and the Section–III of the Bidding Documents, the laws of the Union of India shall be the governing laws and courts of XXXXXXXX (name of city is to be mentioned by Employer) shall have exclusive jurisdiction.

Ministry of Power (MoP) vide their OM No. 44/30/2015-RE dated 14.08.2015 has formulated two committees to facilitate and handhold States for mobilizing major material/equipment with Standard Technical Specification at competitive rates through a transparent bidding process under DDUGJY & IPDS. The major high value materials selected under Material Mobilisation are Power Transformer, Distribution Transformer, Conductor, AB Cable& Meters. Committee-A has also finalised Technical Specification of these materials, which are provided in these bidding documents for reference.

The State shall place the orders for supply of high value major materials as per rate, terms & conditions and allocated quantities as finalized by committee 'B'. These major materials shall be issued by the DISCOM/Power Deptt. free of cost to the partial turnkey contractor. Partial turnkey contractor shall be responsible for taking delivery of these high value major materials from the DISCOM/Power Deptt stores on submission of Indemnity Bond and Insurance cover starting from loading at stores to commissioning & handing over. Partial turnkey contractor shall also be responsible for safe and secure loading of equipment/materials from DISCOM/Power Deptt Stores, shifting to site, reroute storage, erection, testing and commissioning.

The subject tender for DDUGJY & IPDS works is invited on partial turnkey basis. The supply of high value major materials namely Power transformers, Distribution Transformer, all type of Conductor, AB cable and Energy Meter has not been kept under the scope of contract. Materials other than these high value major materials shall be kept in the scope of this partial turnkey contract.

(A) Introduction

1.0 General Instructions

1.1 The \_\_\_\_\*\*\*/\_\_\_\_\*\*, (implementer of the project on behalf of \_\_\_\_\*\*/State Govt.) hereinafter called 'Employer' will receive bids in respect of equipment to be furnished and erected as set forth in the accompanying Specifications. All bids shall be prepared and submitted by bidders in accordance with these instructions.

1.2 Source of funds: The Owner named in the Bidding Documents intends to use the capital subsidy {60% (85% in case of special category states) of cost of the infrastructures in the project} under Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)/Integrated Power Development Scheme (IPDS), a Government of India flagship program for Separation of agriculture and non-agriculture feeders and/or Strengthening and augmentation of sub-transmission & distribution, 30% (10% in case of special category states) to be procured through loan from FIs/Bank and balance 10% (5% in case of special category states) shall be contributed by Utility for this project.

- 1.2.1 All the payments under the contract for the package for which this invitation for Bids is issued shall be made by the Employer {who is also named as Project Implementing Agency (PIA) by Ministry of Power/Gol} named in Bidding Documents.
- 1.3 For the purpose of implementation of subject package, Project Implementation Agency (Central CPSUs/DISCOM/Power Deptt) shall be referred as Employer and the State Government of concerned state where the works are to be executed shall be referred as "The Owner".
- 2.0 Eligibility of Bidder:
  - 2.1 This Invitation for Bids, issued by Employer is open to all firms including company(ies), Government Owned Enterprises registered and incorporated in India as per Company Act, 1956/2013 (with amendment from time to time) barring Government department as well as foreign bidders/MNCs not registered and incorporated in India and those bidders with whom business is banned by the Employer.
  - 2.2 A Bidder shall not have a conflict of interest. Any Bidders found to be have a conflict of interest shall be disqualified. The bidder may be considered to have conflict of interest with one or more parties in this bidding process, if:
    - 2.2.1 They have a controlling partner in common,
    - 2.2.2 They receive or have received any direct or indirect subsidy from any of them; or
    - 2.2.3 They have the same legal representative for purpose of this bid; or
    - 2.2.4 They have a relationship with each other, directly or through common third parties, that puts them in position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
    - 2.2.5 A bidder submits more than one bid in the bidding process, either individually [including bid submitted as agent /authorised representative on behalf of one or more manufacturer(s) or through Licensee – Licensors route, wherever permitted as per the provision of Qualification requirement for Bidders] or as partner in a joint venture, except for alternative offers permitted under Invitation to Bid. This results in disqualification of all such bids. However, this does not limit the participation of a Bidder as a sub-contractor in another Bid, or of a firm as a sub-contractor in more than one bid; or
    - 2.2.6 A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specification of the materials and services/works that are subject of the bid, or
    - 2.2.7 The Bidder, directly or indirectly shall not be a dependent agency of the Employer.
    - 2.2.8 A prequalification process will be conducted prior to the bidding process, or conducted during process of the bidding, this bidding is open only to prequalified Bidders.
  - 2.3 This bidding is open to any manufacturer or erector who provides satisfactory evidence concerning the following that he:
    - 2.3.1 is a qualified manufacturer or erector who supply, erect, testing and commission of the type specified and has adequate technical knowledge and practical experience;
    - 2.3.2 does not anticipate change in the ownership during the proposed period of work (if such a change is anticipated, the scope and effect thereof shall be defined);
    - 2.3.3 has adequate financial stability and status to meet the financial obligation pursuant to the scope of the works (the Bidders should submit at least 2 copies of their audited profit and loss account and balance sheet for the last five years);
    - 2.3.4 has adequate field services organisation 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; and

2.3.5 has established quality assurance systems and organisation designed to achieve high levels of equipment reliability, both during his manufacturing and field installation activities.

2.4 The above stated requirements are a minimum and Employer reserves the right to request for any additional information and also reserves the right to reject the Proposal of any Bidder, if in the opinion of Employer, the qualification data is incomplete or the Bidder is found not qualified to satisfactorily perform the Contract.

### 3.0 Eligible Plant: Equipment and Services

3.1 For the purposes of these Bidding Documents, the words "facilities," "plant and equipment," "installation services," etc., shall be construed in accordance with the respective definitions given to them in the General Conditions of Contract.

3.2 All plant and equipment to be supplied and installed and services carried out under the contract shall have their origin in our country only.

### 4.0 Cost Of Bidding

4.1 The Bidder shall bear all costs and expenses associated with preparation and submission of its bid including post-bid discussions, technical and other presentations etc, and Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

## (B) The Bidding Documents

5.0 Contents of bidding documents:

5.1 The goods and services required, bidding procedures and Contract terms are prescribed in the Bidding Document. The Bidding Document is a compilation of the following and shall include amendments, if any, thereto:

#### VOLUME – I: Condition of contract:

- |              |   |
|--------------|---|
| Section I:   | Invitation for Bid (Section - IFB)      |
| Section II:  | Instructions to Bidders (Section – ITB) |
| Section III: | Bid Data sheets (BDS)                   |
| Section IV:  | General Conditions of Contract (GCC)    |
| Section V:   | Special Conditions of Contract (SCC)    |
| Section VI:  | Sample Forms and Procedures (FP)        |
1. Bid Form & Price Schedule
    - 1.1 Bid Form
    - 1.2 Price Schedule
  2. Bid Security Form
  3. Form of Notification by the Employer to the Bank
    - 3.a Applicable for forfeiture of Bank Guarantee
    - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
  4. Form of 'Notification of Award of Contract'
    - 4(a) Form of 'Notification of Award of Contract' for Supply of Plant and equipment
    - 4(b) Form of 'Notification of Award of Contract' for Installation of Plant and equipment
  5. Form of Contract Agreement
    - Alternative A
    - Alternative B
  - 5.1 Appendix-1: Terms and Procedures of Payment:
    - Grid/Power Substation, and
    - 11KV, Distribution Transformer, LT and Service connection
  - 5.2 Appendix-2: Price Adjustment
  - 5.3 Appendix-3: Insurance Requirements

- 5.4 Appendix-4: Time Schedule
- 5.5 Appendix-5: List of Approved Subcontractors
- 5.6 Appendix-6: Scope of Works and Supply by the Employer
- 5.7 Appendix-7: List of Document for Approval or Review
- 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
6. Performance Security Form
7. Bank Guarantee Form for Advance Payment
8. Form of Taking over Certificate
9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract.
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in instalment by Employer for performance of its contract.
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture
15. Form of Undertaking by the Joint Venture Partners
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
20. Form of Certificate of Financial Parameters for QR

Section VII: Scope of Works

VOLUME-II: PMS, QUALITY ASSURANCE & EVALUATION MECHANISM, BID FORMS AND PRICE SCHEDULES

Section-I: PMS, Quality Assurance & Evaluation Mechanism (QAM), Documentation & PMA  
 Section-II: Bid Forms  
 Section-III: Price Schedules

Volume-III: TECHNICAL SPECIFICATONS & DRAWINGS

Section-I: Technical Specifications  
 Section-II: Tender Drawings

5.2 Understanding of bid documents: A prospective Bidder is expected to examine all instructions, forms, terms, technical specifications, tender drawings and scope of works in the Bid documents and fully inform himself as to all the conditions and matters which may in any way affect the scope of work or the cost thereof. Failure to furnish all information required in the Bid document or submission of a Bid not substantially responsive to the Bid document in every respect will be at the Bidder's risk and may result in the rejection of its bid.

6.0 Clarifications on Bid Documents; and Pre-Bid Meeting:

6.1 If the prospective Bidder finds discrepancies or omissions, in specifications and document or is in doubt as to the true meaning of any part, he shall at once make a request, in writing, for an interpretation/clarification, to Employer at his mailing address indicated in Bidding Documents. Similarly, if a Bidder feels that any important provisions in the documents, such as Governing laws, Taxes and Duties, Defect Liability, Limitation of Liability, Settlement of Disputes, Arbitration, Form of Contact Agreement, Price Adjustment, Bid Guarantees, Contract Performance Guarantee, Compensation for Delay, Payments Terms, Schedule of Execution/Completion of works, will be unacceptable, such an issue should be raised as above. Employer, then, will issue interpretation(s) and clarification(s) as he may think fit in writing or modification of the Bidding Documents that it receives no later than twenty-eight (28) days prior to original deadlines prescribed for submission of bids by Employer. The Employer shall not be obliged to respond to any request for clarification received later than the above period. Further, mere request for clarification received from the Bidder shall not

be a ground for seeking extension in the deadline for submission of bids. Written copies of Employer's response (including an explanation of the query but not identification of its source) will be sent to all prospective bidders that have received the Bidding Documents / uploaded to the e-portal under amendment or addendum.

- 6.2 Verbal clarification and information given by Employer or his employee(s) or his representative(s) shall not in any way be binding on Employer.
- 6.3 LOCAL CONDITIONS: It will be imperative on each Bidder to fully inform himself of all local conditions and factors, which may have any effect on the execution of the Contract covered under these documents and specifications. Employer shall not entertain any request for clarifications from the Bidders, regarding such local conditions. It must be understood and agreed that such factors have properly been investigated and considered while submitting the Proposals. No claim for financial adjustment to the Contract, awarded under these specifications and documents, will be entertained by Employer. Neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Employer, which are based on the lack of such clear information or its effect on the cost of the Works to the Bidder.
- 6.4 The bidder's designated representative(s) is/are invited to attend a pre-bid meeting, which, if convened, will take place at the venue and time specified in the Bidding Documents. The purpose of the meeting shall be to clarify any issue regarding the Bidding Documents in general and the Technical Specifications in particular. The Bidder is requested, as far as possible to submit any question in writing, to reach the Employer not later than one week before the meeting. Minutes of the Meeting, including the text of the questions raised (without identifying the name of the bidders) and the responses given, together with any responses prepared after the meeting, will be transmitted without any delay to all the purchasers of the Bidding Documents.
- 6.5 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.
- 7.0 Amendment to Bidding Document
- 7.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Document by amendment (s).
- 7.2 The amendment will be uploaded in e-portal (where tender is already uploaded) or notified by email to all prospective Bidders. Bidders are required to regularly check / visit the web-portal for e-procurement and to immediately acknowledge receipt of any such amendments, and it will be assumed that the information contained therein will have been taken into account by the Bidder in its bid. The Employer will bear no responsibility or liability arising out of non-receipt of the same in time or otherwise.
- 7.3 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bid, in such cases, the Employer shall notify / upload amended / extended deadline on web-portal for e-procurement and website of the employer.
- 7.4 All notifications and clarifications also be uploaded by Employer on his web portal / tender portal.
- 7.5 Such amendments, clarifications, etc, shall be binding on the Bidders and will be given due consideration by the Bidders while they submit their bids and invariably enclose such documents as a part of the bid.

(C) Preparation of Bids

8.0 Language of Bid

The bid prepared by the Bidder and all correspondences and documents relating to the bid, exchanged by the Bidder and Employer shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its pertinent passages. Failure to comply with this may disqualify a bid. For purposes of interpretation of the bid, the English translation shall govern.

9.0 Documents Comprising The Bid

- 9.1 The bidding shall be e-tendering basis. On due date of submission of bids, bids shall be submitted by the Bidder under "Single Stage – Bid Envelope" procedure of bidding. Under this procedure, the bid submitted by the Bidder in one envelope – Bid Envelope (also referred to as Techno - Commercial Part). The Bid envelop shall be submitted by bidders at notified date and time in hard copies. Price bid in form of Price schedule shall be uploaded by bidder on schedule date and time of submission of bids. It shall be opened, in presence of eligible bidders on notified date, time and venue.

The price schedule shall be uploaded by the bidder on web portal on which the NIT is floated on due date and time for submission of bids. The locked price bid shall be opened on notified date and time in presence of participating bidders who have qualified technically and commercially. The price breakup shall be uploaded by bidders on-line on web portal on due date of submission of bids. The price bids shall be locked and opened on notified date and time pertains to technically and commercially cleared bidders only in presence of participating bidders. Due intimation shall be given to technically and commercially cleared bidders about date and time of opening of on-line bids. The bids shall comprise of the following documents:

Bid Envelope:

- (a) Bid Form (Bid Envelope) duly completed and signed by the Bidder, together with all Attachments (available in Volume-II). All Attachments have been identified in ITB Sub-Clause 9.3 below.
- (b) Technical Data Sheets (available in Volume-II), if any, duly completed by the Bidder.

9.2 Alternative bids shall not be accepted,

9.3 Each Bidder shall submit with its Techno - Commercial Part (Bid Envelope) the following attachments:

- a. Attachment 1: Bid Security (If required): A bid security in sealed separate Packet shall be furnished in accordance with ITB Clause 13 & ITB Clause 16.
- b. Attachment 2: Power of Attorney: A power of attorney, duly notarized, indicating that the person(s) signing the bid has (ve) the authority to sign the bid and thus that the bid is binding upon the Bidder during full period of its validity, in accordance with ITB Clause 14.
- c. Attachment 3: Bidder's Eligibility and Qualifications: In the absence of prequalification, documentary evidence establishing that the Bidder is eligible to bid in accordance with ITB Clause 2 and is qualified to perform the contract in accordance with Annexure – A (BDS), if its bid is accepted.

The documentary evidence of the Bidder's eligibility to bid shall establish to the Employer's satisfaction that the Bidder, at the time of submission of its bid, is eligible as defined in ITB Clause 2.

The documentary evidence of the Bidder's qualifications to perform the contract, if its bid is accepted, shall establish to the Employer's satisfaction that the Bidder has the financial, technical, production, procurement, shipping, installation and other capabilities necessary to perform the contract, and, in particular, meets the experience and other criteria outlined in the Qualification Requirement for the Bidders in Annexure – A (BDS) and shall also include the complete annual reports together with Audited statement of accounts of the company for last five years of its own (separate) immediately preceding the date of submission of bid.

[Note I. In the event the Bidder is not able to furnish the above information of its own (i.e., separate), being a subsidiary company and its accounts are being consolidated with its Group/ Holding/ Parent company, the Bidder should submit the audited balance sheet, income statement, other information pertaining to it only (not of its Group/Holding/Parent company) duly certified by any one of the authority [(i) Statutory Auditor of the Bidder/(ii) Company Secretary of the Bidder a (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.

Note II. Similarly, if the Bidder happens to be a Group/Holding/ Parent company, the Bidder should submit the above documents/information of its own (i.e., exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note I above certifying that these information/documents are based on audited accounts, as the case may be.]

Unless otherwise mentioned in BDS, bids submitted by a joint venture having not more than three partners with one partner as lead partner, if allowed as per stipulated Qualification Requirements in Annexure-A (BDS), shall comply with the following requirements:

- i. The bid shall include all the information required for Attachment 3 as described above for each joint venture partner.
- ii. The bid shall be signed so as to be legally binding on all partners.
- iii. One of the partners responsible for performing a key component of the contract shall be designated as leader; this authorization shall be evidenced by submitting with the bid a power of attorney signed by legally authorized signatories as per Form-14 of Volume-I : Section-VI (Sample Forms and Procedures).
- iv. The leader shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture, and the entire execution of the contract, including payment, shall be done exclusively with the leader, provided otherwise requested by the joint venture and agreed between the Employer and the leader.
- v. All partners of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms.
- vi. A copy of the agreement entered into by the joint venture partners shall be submitted with the bid as per Form-15 of Volume-I : Section-VI (Sample Forms and Procedures), including interalia delineation of responsibilities and obligations of each partners appended thereto, notwithstanding the joint and several liability.
- vii. The joint venture agreement should indicate precisely the responsibility of all members of JV in respect of planning, design, manufacturing, supply, installation, commissioning and training.
- viii. All members of JV should have active participation in execution during the currency of the contract. This should not be varied/modified subsequently without prior approval of the Employer; and
- ix. In order for a joint venture to qualify, each of its partners or combination of partners must meet the minimum criteria listed in the Qualification Requirement for the Bidder in enclosed Annexure-A (BDS) for an individual Bidder for the component of the contract they are designated to perform. Failure to comply with this requirement will result in rejection of the joint venture bid.

- x. A firm can be a partner in only one joint venture; bids submitted by joint ventures or consortia including the same firm as partner will be rejected.
- xi. In the case of a Bidder who offers to supply and/or install plant and equipment under the contract that the Bidder did not manufacture or otherwise produce and/or install, the Bidder shall (i) have the financial and other capabilities necessary to perform the contract; (ii) have been duly authorized by the manufacturer or producer of the related plant and equipment or component as per proforma in attachment 8 to supply and/or install that item in the Employer's country; and (iii) be responsible for ensuring that the manufacturer or producer complies with the requirements of ITB Sub-Clause 3.2 and meets the minimum criteria listed for an individual Bidder for that item.

- d. Attachment 4: Eligibility and Conformity of the Facilities- Documentary evidence established in accordance with ITB Clause 3 that the facilities offered by the Bidder in its bid are eligible and conform to the Bidding Documents.

The documentary evidence of the eligibility of the facilities shall consist of a statement on the country of origin of the plant and equipment offered, which shall be confirmed by a certificate of origin issued at the time of shipment.

- e. Attachment 5: Subcontractors Proposed by the Bidder: The Bidder shall include in its bid details of all major items of supply or services that it proposes to purchase or sublet, and shall give details of the name and nationality of the proposed Subcontractor, including vendors, for each of those items. Bidders are free to list more than one Subcontractor against each item of the facilities. Their participation should be confirmed with a letter of intent between the parties, as needed, in Attachment 8. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.

The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB Clause 2, and that any plant, equipment or services to be provided by the Subcontractor comply with the requirements of ITB Clause 3 and Qualification Requirement for the Bidder, enclosed as Annexure-A(BDS).

The Employer reserves the right to delete any proposed Subcontractor from the list prior to award of contract, and after discussion between the Employer and the Contractor, the Appendix-5 of Volume-I:Section VI - Form of Contract Agreement shall be completed, listing the approved Subcontractors for each item concerned.

- f. Attachment 6: Deviations: In order to facilitate evaluation of bids, deviations, if any, from the terms and conditions or Technical Specifications shall be listed in Attachment 6 to the bid. The Bidder is required to provide the cost of withdrawal for such deviations. However, the attention of the bidders is drawn to the provisions of ITB Sub-Clause 22.3 regarding the rejection of bids that are not substantially responsive to the requirements of the Bidding Documents.

Bidder's attention is also drawn to the provisions of ITB Sub-Clause 22.3.1.

- g. Attachment 8: Manufacturer's Authorisation Form
- h. Attachment 9: Work Completion Schedule.
- i. Attachment 10: Guarantee Declaration.
- j. Attachment 11: Information regarding ex-employees of Employer in Bidder's firm.
- k. Attachment 12: Price Adjustment Data

- I. Attachment 14: Integrity Pact: The Bidder shall complete the accompanying Integrity Pact, which shall be applicable for bidding as well as contract execution, duly signed on each page by the person signing the bid and shall be returned by the Bidder in two (2) originals alongwith the Techno - Commercial Part in a separate packet, duly superscripted with 'Integrity Pact'. The Bidder shall submit the Integrity Pact on a non-judicial stamp paper of Rs. 100/-.

If the Bidder is a joint venture, the Integrity Pact shall be signed by all the partners or consortium members.

Bidder's failure to submit the Integrity Pact duly signed in Original alongwith the Bid or subsequently pursuant to ITB Sub-Clause 21 .1 shall lead to outright rejection of the Bid.

- m. Attachment 15: Option for Initial Advance (either Interest Bearing Initial Advance or No Initial Advance) and Information for E-payment, PF details and declaration regarding Micro/Small & Medium Enterprises

In this Attachment, the Bidder is required to clearly mention whether the Bidder would opt for Interest bearing initial advance in addition to providing the other information as above.

- n. Attachment 16: Additional Information:
  - i. Certificate from their Banker(s) (as per prescribed formats in Form 16, Volume-I : Section-VI (Sample Forms and Procedures)) indicating various fund based/non fund based limits sanctioned to the Bidder and the extent of utilization as on date. Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary the Employer may make queries with the Bidders' Bankers.
  - ii. Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.
  - iii. Any other information which the Bidder intends to furnish.
- o. Attachment 17: Declaration for tax exemptions, reductions, allowances or benefits
- p. Attachment 18: Declaration
- q. Attachment 19: Bank Guarantee verification checklist

#### 10.0 Bid Form and Price Schedules:

The Bidder shall complete the Bid Form(s) and submit it in hard copy on due date and time of submission of bid. The appropriate Price Schedules furnished in the Bidding Documents as indicated therein, shall be uploaded on web portal on due date and time of submission of bids.

#### 11.0 Bid Prices:

- 11.1 Unless otherwise specified in the Technical Specifications, bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding Documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing, precommissioning and commissioning of the facilities and, where so required by the Bidding Documents, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the

Bidding Documents, all in accordance with the requirements of the General Conditions of Contract. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.

- 11.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Documents. If a Bidder wishes to make a deviation, such deviation shall be listed in Attachment 6 of its bid. The Bidder is required to provide the cost of withdrawal for such deviations.
- 11.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules. Where no Price Schedules are included in the Bidding Documents, Bidders shall present their prices in the following manner:

Separate numbered Schedules shall be up-loaded for each of the following elements. The total amount from each Schedule 1 to 4 shall be summarized in a grand summary of Price Proposal (Schedule 5) giving the total bid price(s) to be entered in the Bid Form.

Schedule 1	Plant and Equipment to be supplied
Schedule 2:	Transportation, Insurance and other incidental services applicable for supply of Plant & Equipment
Schedule 3:	Installation Services for Erection, Testing and Commissioning including Local Transportation,
Schedule 4:	Taxes and Duties not included in Schedule 1 to 3
Schedule 5:	Grand Summaries (Schedule Nos. 1 to 4)

Bidders shall note that the plant and equipment included in Schedule No. 1 above exclude materials used for civil, building and few other construction/erection works. All such materials shall be included and priced under Schedule No. 3, Installation Services.

- 11.3.1 It shall be the responsibility of the bidders to pay all statutory taxes, duties and levies to the concerned authorities for such surplus material, which would otherwise have been, lawfully payable. The bidders shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the bidder by Employer.
- 11.3.2 Set/Lot/Lumpsum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications.
- 11.4 In the schedules, Bidder shall give the required details and a break -own of their price as follows:

- a. Plant and equipment shall be quoted on an EXW (ex-factory, ex-works, ex-warehouse or off-the-self, as applicable) basis and to be quoted in Schedule 1.

In respect of direct transaction between the Employer and the Contractor, EXW price shall be exclusive of all cost as well as duties and taxes (viz., customs duties & levies, duties, sales tax/VAT etc.) paid or payable on components, raw materials and any other items used for their consumption incorporated or to be incorporated in the Plant & Equipment.

Sales tax/VAT, excise duty, local tax and other levies for equipment/items under direct transaction including octroi/entry tax as applicable for destination site/state shall not be included in the EXW price but shall be indicated wherever applicable in respective column of Schedule 4.

Whenever EXW price is quoted exclusive of excise duty and/or VAT, then the due credit under the CENVAT (Central Value Added Tax)/VAT scheme as per the relevant Government policies wherever applicable shall be taken into account by the Bidder while quoting bid price.

In respect of bought-out finished items, which shall be dispatched directly from the sub-vendor's works to the Employer's site (sale-in-transit), EXW price shall be inclusive of all cost as well as duties and tax (viz., custom duties & levies, duties, sales tax/VAT etc.) paid or payable. While quoting the EXW price, inclusive of excise duty and/or VAT, the due credit under the CENVAT (Central Value Added Tax)/VAT scheme as per the relevant Government policies wherever applicable shall be taken into account by the Bidder.

Imported goods shall not be acceptable. Only indigenous goods shall be acceptable in the contract.

However, octroi/entry tax as applicable for destination site/state shall not be included in the EXW price but shall be indicated separately in respective column of Schedule 4.

Requisite Sales Tax Declaration forms for all the equipments/items to be supplied from within India shall be furnished by the Employer.

- b. Local transportation, insurance and other Services incidental to delivery of the Plant and Equipment to be supplied shall be quoted separately in Schedule 2.
- c. Installation Charges shall be quoted separately (Schedule 3) and shall include rates and prices for all labour, Contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, provision of operations and maintenance manuals, etc. wherever identified in the Bidding Documents as necessary for the proper execution of all installation services except those priced in other Schedules.
- ~~d. The break-up of Training Charges shall be furnished separately in Schedule 4 for the training. Similarly, the break-up of Type test charges shall be furnished separately in Schedule 7. – Not Applicable~~
- e. The bidder shall include the Sales Tax/VAT on Works Contract, Turnover Tax or any other similar taxes under the Sales Tax/VAT Act for services to be performed, as applicable in their quoted bid price and Employer would not bear any liability on this account. Employer on behalf of the Owner shall, however, deduct such taxes at source as per the rules and issue Tax Deducted at Source (TDS) Certificate to the bidder.
- f. The Bidder shall include Service Tax and surcharge/cess etc. on it as applicable in their quoted bid price and Employer would not bear any liability whatsoever on this account. Employer (or the Employer on behalf of the Owner) shall, however, deduct such tax at source as per the rules and issue necessary Certificate to the Contractor.
- g. The Bidder shall include insurance charges in its bid prices as per insurance requirement mentioned in Section – IV: General Conditions of Contract (GCC) and Appendix-3: Insurance Requirements to Form of Contract Agreement as contained in Volume-I : Section VI (Sample Forms and Procedures) of the Bidding Documents. Bidder shall further note that the Employer shall not be liable to make any payment/ reimbursement to the Contractor whatsoever for insurance of Contractor's Plant and Machinery.

Discount(s)/rebate(s) offered by the bidder shall be indicated as a percentage of price component(s). Bidder shall also indicate in his bid, the price component(s) on which the discount is to be applied.

11.5 The prices shall be in accordance with the following:

The prices shall be in accordance with Appendix-2 of section-VI: Sample forms and procedures

12.0 Bid Currencies

12.1 Prices shall be quoted in Indian Rupees Only.

13.0 BID security:

- 13.1 The Bidder shall furnish, as part of its bid, a bid security in the amount and currency as stipulated in the Bid Documents. The bid security must be submitted in the form provided in the Bidding Documents.
- 13.2 The bid security shall, at the bidder's option, be in the form of a crossed bank draft/pay orders/bank guarantee in favour of Employer from a reputed (i) Public Sector Bank located in India; or (ii) Scheduled Commercial Indian Private Bank as per the attached list only [List is placed at Annexure-I to Section-III (BDS)]. Bid security shall remain valid for a period of thirty (30) days beyond the original bid validity period, and beyond any extension subsequently requested under ITB Sub-Clause 14.2. In case of submission of the Bid Security in form of Bank Guarantee, bid security shall be submitted in standard format (Bid security form) provided at Volume-I:Section-VI "Sample forms and procedures".
- The Bid Security shall be in favour of XXXXX (Name of Employer) payable at XXXX (Location/City of payment).
- 13.3 Any bid not accompanied by a bid security or an acceptable bid security shall be rejected by the Employer as being nonresponsive, pursuant to ITB Sub-Clause 22.4. The bid security of a joint venture must be in the name of all the partners/lead partner in the joint venture submitting the bid.
- 13.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, but not later than twenty-eight (28) days after the expiration of the bid validity period.
- 13.5 The successful Bidder shall be required to keep its bid security valid for a sufficient period till the performance security(ies) pursuant to ITB Clause 34 are furnished to the satisfaction of the Employer. The bid security of the successful Bidder will be returned when the Bidder has signed the Contract Agreement, pursuant to ITB Clause 33, and has furnished the required performance security, pursuant to ITB Clause 34.
- 13.6 The bid security may be forfeited
- (a) If the Bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or
  - (b) In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid and/or accept the withdrawals/rectifications pursuant to the declaration/confirmation made by him in Attachment – Declaration of the Bid; or
  - (c) If a Bidder does not accept the corrections to arithmetical errors identified during preliminary evaluation of his bid pursuant to ITB Sub-Clause 27.2; or
  - (d) If, as per the requirement of Qualification Requirements the Bidder is required to submit a Deed of Joint Undertaking and he fails to submit the same, duly attested by Notary Public of the place(s) of the respective executant(s), within ten days from the date of intimation of post – bid discussion; or
  - (e) In the case of a successful Bidder, if the Bidder fails within the specified time limit
    - (i) to sign the Contract Agreement, in accordance with ITB Clause 33, or
    - (ii) to furnish the required performance security(ies), in accordance with ITB Clause 34 and/or to keep the bid security valid as per the requirement of ITB Sub-Clause 13.5.
- 13.7 No interest shall be payable by the Employer on the above Bid Security.
- 14.0 Period of Validity of Bid
- 14.1 Bids shall remain valid for the period of six months after the date of opening of Techno - Commercial Part i.e. Bid Envelope, prescribed by the Employer, pursuant to ITB Sub-Clause 20.1. A bid valid for a shorter period shall be rejected by the Employer as being non-responsive.

14.2 In exceptional circumstance, the Employer may solicit the Bidder's consent to an extension of the bid validity period. The request and responses thereto shall be made in writing or by e-mail. If a Bidder accepts to prolong the period of validity, the bid security shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required or permitted to modify its bid.

#### 15.0 Format and Signing of Bid

15.1 The Bidder shall prepare an original and two number of copies of the bid, clearly marking each one as "Original Bid", "Copy No. 1", "Copy No. 2", as appropriate. In the event of any discrepancy between them, the original shall govern.

15.2 The original and both the copies of the bid, each consisting of the documents listed in ITB Clause 9, shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the contract. The latter authorization shall be indicated by written power of attorney accompanying the bid and submitted as Attachment 2 to the Bid under ITB Sub-Clause 9.3. All pages of the bid, except for unamended printed literature, shall be initialed by the person or persons signing the bid and shall be serially numbered.

15.3 The bid shall contain no alterations, omissions or additions, unless such corrections are initialed by the person or persons signing the bid.

#### (D) Submission of Bids

#### 16.0 Sealing and Marking of Bids

16.1 The Bidder shall seal the original and each copy of the bid in separate envelopes, duly marking the envelopes as "Original Bid" and "Copy No. [number]" and each containing two inner separately sealed envelopes marked Bid Envelope (Techno – Commercial Part) containing the documents mentioned at ITB Clause 9 in the following manner. These envelopes shall then be sealed in an outer envelope.

Bid Envelope (Techno – Commercial Part) consisting two inner envelopes with following Packets:

Inner Envelope-1:

- a) Packet No.-I mentioning on the envelope the following: "Packet No.-I: Integrity Pact (Part of Bid Envelope Bid)"
- b) Packet No.-II : Bid Price (Cost of bid document, if not paid ON-LINE or proof of cost of bid document paid).
- c) Packet No.-III : Bid Security

Inner Envelope-2:

- a) Packet No.-I: Bid Form (Containing Pre-Qualification Requirements' documents as per 16 Nos. attachments as Attachment -7 and Attachment 13 of Bid forms not required)
- b) Packet No.-II : Techno-commercial offers (copy of entire bid document duly signed and stamped as token of unconditional acceptance to the terms and conditions of the contracts, technical specification, scope of contract, tender drawings, etc as per bid documents)

Inner Envelope-1 and Inner Envelope-2 duly sealed and stamped shall be sealed in an outer envelope named as Bid Envelope.

16.2 The inner and outer envelopes shall

- (a) be addressed to the Employer at the address given in the BDS, and
  - (b) bear the contract name indicated in the BDS, the Invitation for Bids title and number indicated in the BDS, and the statement "Do Not Open Before [date]," to be completed with the time and date specified in the BDS, pursuant to ITB Sub-Clause 20.1.
- 16.3 All the inner envelopes shall also indicate the name and address of the Bidder so that the bid can be returned unopened in case it is declared "late."
- 16.4 If the outer envelope is not sealed and marked as required by ITB Sub-Clause 16.2 above, the Employer will assume no responsibility for the bid's misplacement or premature opening. If the outer envelope discloses the Bidder's identity, the Employer will not guarantee the anonymity of the bid submission, but this disclosure will not constitute grounds for bid rejection.
- 17.0 **Deadline for Submission of Bids**
- 17.1 Bids must be received by the Employer at the address specified under ITB Sub-Clause 16.2 no later than the time and date stated in the BDS. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received upto the appointed time on the next working day. Bids once received by the Employer shall not be returned except otherwise provided in the Bidding Documents.
- 17.2 The Employer may, at its discretion, extend this deadline for submission of bids by amending the Bidding Documents in accordance with ITB Sub-Clause 7.3 for the reasons specified therein at any time prior to opening of bids by the Employer pursuant to ITB Clause 20, in which case all rights and obligations of Employer and bidders will thereafter be subject to the deadline as extended.
- 18.0 **Late Bids**
- 18.1 Any bid received by the Employer after the bid submission deadline prescribed by the Employer, pursuant to ITB Clause 17, will be rejected and returned unopened to the Bidder.
- 19.0 **Modification and Withdrawal of Bids**
- 19.1 The Bidder may modify or withdraw its bid after submission, provided that modification or written notice of withdrawal is received by the Employer prior to the deadline prescribed for bid submission.
- 19.2 The Bidder's modifications shall be prepared, sealed, marked and dispatched as follows:
  - (a) The Bidders shall provide an original and two number of copies of any modifications to its bid, clearly identified as such, in two inner envelopes duly marked "Bid Modifications ..... Envelope —Original" and "Bid Modifications ..... Envelope —Copies." The inner envelopes shall be sealed in an outer envelope, which shall be duly marked "Bid Modifications."
  - (b) Other provisions concerning the marking and dispatch of bid modifications shall be in accordance with ITB Sub-Clauses 16.2, 16.3 and 16.4.
- 19.3 A Bidder wishing to withdraw its bid shall notify the Employer prior to the deadline prescribed for bid submission through withdrawal option on web portal for e-procurement. The notice of withdrawal shall
  - (a) be addressed to the Employer at the address named in the BDS, and
  - (b) bear the contract name, the IFB number, and the words "Bid Withdrawal Notice." Bid withdrawal notices received after the bid submission deadline will be ignored, and the submitted bid will be deemed to be a validly submitted bid.

- 19.4 No bid may be withdrawn in the interval between the bid submission deadline and the expiration of the bid validity period specified in ITB Clause 14. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its bid security, pursuant to ITB Sub-Clause 13.6.

(E). Bid Opening and Evaluation

20.0 Opening of Bid Envelope by Employer

- 20.1 The Employer will open the Bid Envelope i.e. Techno – Commercial Part in public, including withdrawals and modifications made pursuant to ITB Clause 19, in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the BPS. The bidders' representatives who are present shall sign a register evidencing their attendance. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received upto the appointed time on the next working day.

- 20.2 Envelopes marked "Withdrawal" shall be opened first and the name of the Bidder shall be read out. Bids for which an acceptable notice of withdrawal has been submitted pursuant to ITB Clause 19 shall be returned unopened.

- 20.3 For all other Bids, the bidders' names, deviation having cost of withdrawal, if any, the presence of bid security, Integrity Pact and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Subsequently, all envelopes marked "Modification" shall be opened and the submissions therein read out in appropriate detail. No bid shall be rejected at bid opening except for late bids pursuant to ITB Clause 18. Such bids shall be returned to the Bidder unopened. However, opening of bid, whether or not accompanied with the bid security and/or Integrity Pact, shall not be construed to imply its acceptability which shall be examined in detail pursuant to the provisions contained in this Section-II.

On behalf of Employer, the Integrity Pact will be signed by its representative at the time of Bid Opening. One original of the Integrity Pact will be retained by Employer and the other original will be returned to the representative of the bidders present during bid opening. If the Bidder's representative is not present during the Bid Opening, the other original shall be sent to the bidder by post/courier.

- 20.4 The Employer shall prepare minutes of the bid opening in the form of Bid Opening Statement, including the information disclosed to those present in accordance with ITB Sub-Clause 20.3.

- 20.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances and shall be returned to the Bidder unopened.

21.0 Clarification of Bids

- 21.1 During bid evaluation, the Employer may, at its discretion, ask the Bidder for a clarification of its bid. In case of erroneous/non submission of documents related to/identified in ITB Sub-Clause 9.3 (b), (n) and (r) or Deed of Joint Undertaking pursuant to ITB Sub-Clause 9.3 (c) & (e), required to be submitted by the Bidder as per the provisions of the Bidding Documents, the Employer may give the Bidder not more than 7 working days notice to rectify/furnish such documents, failing which the bid shall be rejected. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered or permitted.

22.0 Preliminary Examination of Bid Envelope

- 22.1 The Employer will examine the bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

- 22.2 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, whether or not identified by the Bidder in Attachment 6 to its bid, and

that does not prejudice or affect the relative ranking of any Bidder as a result of the technical and commercial evaluation, pursuant to ITB Clause 24.

22.3 Prior to the detailed evaluation, the Employer will determine whether each bid is of acceptable quality, is complete and is substantially responsive to the Bidding Documents. Any deviations, conditionality or reservation introduced in Attachment-6 and/or in the Bid Form, Technical Data Sheets and covering letter, or in any other part of the bid will be reviewed to conduct a determination of the substantial responsiveness of the bidder's bid. For purposes of this determination, a substantially responsive bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations, objections, conditionalities or reservations. A material deviation, objection, conditionality or reservation is one (i) that affects in any substantial way the scope, quality or performance of the contract; (ii) that limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the successful Bidder's obligations under the contract; or (iii) whose rectification would unfairly affect the competitive position of other bidders who are presenting substantially responsive bids.

22.3.1 Bids containing deviations from critical provisions relating to GCC Clauses 2.14 (Governing Law), 8 (Terms of Payment), 9.3 (Performance Security), 10 (Taxes and duties), 21.2 (Completion Time Guarantee), 22 (Defect Liability), 23 (Functional Guarantee), 25 (Patent Indemnity), 26 (Limitation of Liability), 38 (Settlement of Disputes), 39 (Arbitration) and Appendix 2 to the Form of Contract Agreement (Price Adjustment) will be considered as non-responsive.

22.3.2 Regarding deviations, conditionality or reservations introduced in the bid, which will be reviewed to conduct a determination of substantial responsiveness of the Bidder's bid as stated in ITB Sub-Clause 22.3, the order of precedence of these documents to address contradictions, if any, in the contents of the bid, shall be as follows:

- I. Covering Letter
- II. Bid Form
- III. Attachment-6: Deviations
- IV. Technical Data Sheet

Contents of the document at Sr. No. I above will have overriding precedence over other documents (Sr. No. II to V above). Similarly, contents of document at Sr. No. II above will have overriding precedence over other documents (Sr. No. III to IV above), and so on.

22.4 If a bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by the Bidder by correction of the nonconformity. The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

## 23.0 Qualification

23.1 The Employer will ascertain to its satisfaction whether Bidders determined having submitted substantially responsive bids are qualified, as per the Qualification Requirement specified in Annexure – A (BDS) to satisfactorily perform the contract. The Employer shall be the sole judge in this regard and the Employer's interpretation of the Qualification Requirement shall be final and binding.

23.2 The determination will take into account the Bidder's financial, technical capabilities including production capabilities, in particular the Bidder's contract work in hand, future commitments & current litigation and past performance during execution of contracts that have been awarded by the Employer on the Bidder. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder in Attachment 3 to the bid, as well as such other information as the Employer deems necessary and appropriate. This shall, however, be subject to assessment that may be carried out, if required, by the Employer as per the provisions of Annexure -A (BDS).

23.3 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, affecting the capability of the Bidder to perform the Contract.

23.4 An affirmative determination will be a prerequisite for the Employer to evaluate the Techno - Commercial Part and to intimate successful bidders to be present on new date, time & location to open the online price schedules of the Bidder. A negative determination will result in rejection of the Bidder's bid.

23.5 The bid from those bidders shall not be accepted who failed to submit Performance Security on issue of Letter of Intent (LoI)/Letter of Award (LoA) for any other contract of Employer in past 3 years.

#### 24.0 Evaluation of Techno - Commercial Part (Bid envelop)

24.1 The Employer will carry out a detailed evaluation of the bids of the qualified bidders in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents. In order to reach such a determination, the Employer will examine the information supplied by the bidders, pursuant to ITB Clause 9, and other requirements in the Bidding Documents, taking into account the following factors:

- (a) overall completeness and compliance with the Technical Specifications and Drawings; deviations from the Technical Specifications as identified in Attachment 6 to the bid and those deviations not so identified; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the bid. The bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected for non-responsiveness.
- (b) Achievement of specified performance criteria by the facilities
- (c) Compliance with the time schedule called for in the corresponding Appendix to the Form of Contract Agreement and evidenced as needed in a milestone schedule provided in the bid;

##### Time schedule (program of performance)

The plant and equipment covered by this bidding shall have the 'Taking Over' by the Employer after successful Completion within the period specified in BDS. Bidders are required to base their prices on the time schedule given in Appendix 4 [Volume-I : Section-VI (Sample Forms and Procedures)] to the Form of Contract Agreement (Time Schedule) or, where no time schedule is given in Appendix 4, on the Completion date(s) given above. No credit will be given to earlier completion. Bids offering completion beyond the specified period are liable to be rejected.

- (d) Type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services
- (e) Any other relevant technical factors that the Employer deems necessary or prudent to take into consideration.
- (f) Any deviations to the commercial and contractual provisions stipulated in the Bidding Documents.
- (g) Details furnished by the bidder in response to the requirements specified in Volume-II of the Bidding Documents.
- (h) The acceptability of the vendors and subcontractors proposed in Attachment 5 to be used by the Bidder will be evaluated. Should a vendor or subcontractor, for the items other than those covered under Annexure-A (BDS), be determined to be unacceptable, the bid will not be rejected, but the Bidder will be required to substitute an acceptable vendor or subcontractor without any change to the bid price.
- (i) The no load and load losses of transformer shall not exceed the values given in IS 1180 (Part-I):2014 & IS 2026 (with up-to-date amendments, if any). In case, Technical Losses found to be more than specified values, transformers shall be rejected.

- (j) Bank Guarantee submitted against Bid Security shall be verified independently from issuing bank. On receipt of certification from issuing bank, eligibility of bidder shall be decided for opening of price bid.

25.0 Opening of Price Schedules (ON-LINE) by Employer

- 25.1 Price Part of only those Bidders shall be opened on-line who are determined as having submitted substantially responsive bids and are ascertained to be qualified to satisfactorily perform the Contract, pursuant to ITB Clause 23 and 24. Such Bidders shall be intimated about the date and time for opening of Price Part by the Employer. A negative determination of the bids pursuant to ITB Clause 23 and 24, shall be notified by the Employer to such Bidders and the price bid uploaded by them shall not be opened.
- 25.2 The Employer will on-line open Price Bid at the specified time and date in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the intimation for opening of price bid. The bidders' representatives who are present shall sign a register evidencing their attendance.
- 25.3 The bidders' names, the Bid Prices or any discounts, and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. The prices and details as may be read out during the bid opening and recorded in the Bid Opening Statement would not be construed to determine the relative ranking amongst the Bidders, or the successful Bidder, and would not confer any right or claim whatsoever on any Bidder. The successful Bidder (also referred to as the L<sub>1</sub> Bidder) shall be determined as per the provisions of this Section – II and considered for award of contract as provided in ITB Clause 30.
- 25.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with ITB Sub-Clause 25.3.
- 25.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

26.0 Conversion to Single Currency

- 26.1 This shall not be applicable as domestic firms are required to quote the prices in Indian Rupees only.

27.0 Evaluation of Price Bids

- 27.1 The Employer will examine the Price Bids to determine whether they are complete, whether any computational errors have been made and whether the bids are generally in order.

The Price Bids containing any deviations and omissions from the contractual and commercial conditions and the Technical Specifications which have not been identified in the Bid Envelope are liable to be rejected.

- 27.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity specified by the Employer, the unit price shall prevail, and the total price shall be corrected. However, in case of items quoted without indicating any quantity or the items for which the quantities are to be estimated by the Bidder, the total price quoted against such items shall prevail. If there is a discrepancy between words and figures, the amount in words will prevail.

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 Price Schedules will be deemed to have been included in other item(s).

If the discount(s)/rebate(s) offered by the Bidder is a percentage discount and the price component(s) on which the said discount is not indicated in the bid, the same shall be considered on the total bid price [i.e. proportionately on each price component], in the event of award. However, if lump-sum discount is offered, the same shall be considered in full on the Ex-works price component (by proportionately reducing Ex-works price of individual items), in case of award. Further, Conditional discounts/rebates, if any, offered by the bidder shall not be taken into consideration for evaluation. It shall, however, be considered in case of award.

In respect of taxes, duties and other levies indicated by the Bidder in the Bid, which are reimbursable in line with the provisions of the Bidding Documents, the applicable rate and amount thereof shall be ascertained by the Employer based on which, if required, necessary rectification and arithmetical correction shall be carried out by the Employer. The rate and amount so ascertained by the Employer shall prevail.

The subtotal, total price or the total bid price to be identified in Bid Form for this purpose, irrespective of the discrepancy between the amount for the same indicated in words or figures shall be rectified in line with the procedure explained above.

If the Bidder does not accept the correction of errors as per this clause, its bid will be rejected and the amount of Bid Security forfeited.

The Bidder should ensure that the prices furnished in various price schedules are consistent with each other. In case of any inconsistency in the prices furnished in the specified price schedules to be identified in Bid Form for this purpose, the Employer shall be entitled to consider the highest price for the purpose of evaluation and for the purpose of award of the Contract use the lowest of the prices in these schedules.

- 27.3 The comparison shall be on the total price in Price Schedule No. 5 Grand Summary (Total of Schedule Nos. 1 to 4).

The comparison shall also include the applicable taxes, duties and other levies, which are reimbursable in line with the provisions of the Bidding Documents.

The Employer's comparison will also include the costs resulting from application of the evaluation procedures described in ITB Sub-Clause 27.4 & 27.5.

- 27.4 The Employer's evaluation of a bid will take into account, in addition to the bid prices indicated in Price Schedule Nos. 1 through 4 (online price schedules), the following costs and factors that will be added to each Bidder's bid price in the evaluation using pricing information available to the Employer, in the manner and to the extent indicated in ITB Sub-Clause 27.5 and in the Technical Specifications:

- (a) the cost of all quantifiable deviations and omissions from the contractual and commercial conditions and the Technical Specifications as identified in the evaluation of Bid Envelope, and other deviations and omissions not so identified;
- (b) ~~the functional guarantees of the facilities offered~~ - deleted
- (c) the performance of the equipment offered;

Bidder shall state the guaranteed performance or efficiency of the Equipment, named in the BPS, in response to the Technical Specifications. Equipment offered shall have a minimum (or a maximum, as the case may be) level of guarantees specified in the Technical Specifications to be considered responsive. Bids offering plant and equipment with guarantees less (or more) than the minimum (or maximum) specified shall be rejected.

- (d) the extra cost of work, services, facilities, etc., required to be provided by the Employer or third parties;
- (e) any other relevant factors listed in BPS.

The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the contract, shall not be taken into account in bid evaluation.

27.5 Pursuant to ITB Sub-Clause 27.4, the following evaluation methods will be followed:

(a) Contractual and commercial deviations

The evaluation shall be based on the evaluated cost of fulfilling the contract in compliance with all commercial, contractual and technical obligations under this Bidding Documents. In arriving at the evaluated cost, towards deviations identified in the evaluation of bid, the cost of withdrawal indicated by the bidder in Attachment-6 of the Bid Form will be used. If such a price is not given, the Employer will make its own assessment of the cost of such a deviation for the purpose of ensuring fair comparison of bids.

(b) Functional Guarantees of the facilities

For the purposes of evaluation, the adjustment specified in the Technical Specifications will be added to the bid price for each drop (or excess) in the responsive functional guarantees offered by the Bidder, below (or above) either a norm of one hundred (100) or the value committed in the responsive bid with the most performing functional guarantees, as specified in the Technical Specifications.

(c) Performance Guarantees of the Equipments

For the purposes of evaluation, the adjustment specified in the BDS will be added to the bid price.

(d) Work, services, facilities, etc., to be provided by the Employer

Where bids include the undertaking of work or the provision of services or facilities by the Employer in excess of the provisions allowed for in the Bidding Documents, the Employer shall assess the costs of such additional work, services and/or facilities during the duration of the contract. Such costs shall be added to the bid price for evaluation.

27.6 Any adjustments in price that result from the above procedures shall be added, for purposes of comparative evaluation only, to arrive at an "Evaluated Bid Price." Bid prices quoted by bidders and rectified as per ITB Sub Clause 27.2 shall remain unaltered.

28.0 Purchase/ Domestic preference:

No preference shall be given to any bidder

29.0 Confidentiality and Contacting the Employer

29.1 After the public opening of bids, information relating to the examination, clarification, and evaluation of bids and recommendations concerning awards shall not be disclosed to Bidders or other persons not officially concerned with this process until the publication of contract award. From the time of bid opening to the time of contract award, if any Bidder wishes to contact the Employer on any matter related to its bid, it should do so in writing.

29.2 Any effort by a Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in rejection of the Bidder's bid. The Employer shall be the sole judge in this regard.

(F). Award of Contract

30.0 Award Criteria

30.1 Subject to ITB Clause 31, the Employer will award the contract to the successful Bidder (also referred to as the L<sub>1</sub> Bidder) whose bid has been determined to be substantially responsive and to be the lowest

evaluated bid, further provided that the Bidder is determined to be qualified, as per the Qualification Requirement specified in Annexure-A (BDS) to perform the contract satisfactorily.

- 30.2 The Employer may request the Bidder to withdraw any of the deviations listed in the winning bid.

At the time of Award of Contract, if so desired by the Employer, the bidder shall withdraw the deviations listed in Attachment 6 to the Bid Form at the cost of withdrawal stated by him in the bid. In case the bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, his bid will be rejected and his bid security forfeited.

Bidder would be required to comply with all other requirements of the Bidding Documents except for those deviations which are accepted by the Employer.

- 30.3 The Employer reserves the right to vary the quantity of any of the spares and/or delete any items of spares altogether at the time of Award of Contract.

- 30.4 The mode of contracting with the successful bidder will be as per stipulation outlined in GCC Sub-Clause 2.1 and briefly indicated below:

- 30.4.1 The award shall be made as follows:

- (i) First Contract: For supply of all equipment and materials including applicable taxes and duties.
- (ii) Second Contract: For providing all services i.e. inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipment supplied under the "First Contract" and any other services specified in the Contract Documents.

Both contracts will contain a cross fall breach clause specifying that breach of one will constitute breach of the other.

- 30.5 Contract Agreement Documentation: The sequence of contract agreement documentation is given here under:

- a. Issuance of Letter of Intent (LoI) by owner and its unconditional acceptance by the bidder within two weeks from date of issuance of LoI
- b. Mutual agreement on PERT chart / Project Execution Plan duly signed and accepted by turnkey contractor and Employer within two weeks from date of acceptance of LoI
- c. Submission of Contract Performance Security, within 28 days from date of LoI, against supply & erection contract as per clause 9.3.1 of GCC
- d. Letter of Award by owner and its unconditional acceptance by the bidder. Letter of Award shall be issued only after mutual agreement & acceptance on PERT chart/Project execution plan (as per 30.5 (b) above) and on timely submission of Contract Performance Security against supply & erection contracts. The acceptance of LoA should be provided with 2 weeks from date of issue of LoA. LoA shall include details of
  - i. Pre-bid discussion
  - ii. Post-bid negotiation/discussions
  - iii. PERT chart
  - iv. Contract Performance Guarantee
- e. Contract Agreement shall be signed, on unconditional acceptance of Letter of Award by turnkey contractor, within 14 days from date of issue of Letter of Award and submission and acceptance of contract performance guarantees (against supply as well as erection contracts).

- 31.0 Employer's Right to Accept any Bid and to Reject any or all Bids

- 31.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action.

### 32.0 Notification of Award

32.1 Prior to the expiration of the period of bid validity, the Employer will notify the successful Bidder in writing through Letter of Intent (LoI), that its bid has been technically and commercially accepted. The bidder shall provide unconditional acceptance of LoI within 2 weeks. Bidder will also submit PERT Chart/Project Execution Plan within 2 weeks from date of LoI. PERT Chart/Project Execution Plan shall be signed, accepted and mutually agreed by successful bidder and owner within 2 weeks from date of acceptance by LoI. Contract Performance Security shall be submitted by the successful bidder within 28 days from date of LoI. Thereafter, detailed letter of award shall be issued by owner. On unconditional acceptance of Letter of Award, contract agreement shall be signed on submission and acceptance of contract performance security. The notification of award (Letter of Intent) will constitute the formation of the contract.

32.2 The Employer shall publish the results on its website, identifying the bid and Specification numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at bid opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with above, requests in writing the grounds on which its bid was not selected.

32.3 Upon the successful Bidder's furnishing of the performance security pursuant to ITB Clause 34 and their independent verification from issuing bank and acceptance thereof, the Employer will promptly discharge the bid securities, pursuant to ITB Sub-Clause 13.4 & 13.5.

### 33.0 Signing the Contract Agreement

33.1 At the same time as the Employer notifies the successful Bidder that its bid has been accepted through Letter of Award, the Employer in consultation with the Bidder will prepare the Contract Agreement provided in the Bidding Documents, incorporating all agreements between the parties.

33.2 On unconditional acceptance of Letter of Award, contract agreement shall be signed on submission and acceptance of contract performance security within 2 weeks from date of issue of Letter of Award.

### 34.0 Performance Security

34.1 Within twenty-eight (28) days after receipt of the Notification of Award through LoI, the successful Bidder shall furnish the performance security for 10% (Tenpercent) of the contract price in line with the requirement of Qualification Requirements, in the amount given in the BDS and in the form provided in Volume-I : Section VI, Sample Forms and Procedures, of the Bidding Documents. The performance security of a joint venture shall be in the name of joint venture.

34.2 Failure of the successful Bidder to comply with the requirements of ITB Clause 33 or Clause 34.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the Employer may make the award to the next lowest evaluated Bidder or call for new bids.

34.3 Till receipt and acceptance of contract performance securities of successful bidder, validity of all bids shall be kept valid to facilitate action as per clause 34.2 above.

### 35.0 Fraud and Corruption

It is the Employer's policy that requires the Bidders, suppliers and contractors and their subcontractors under the contracts to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Employer:

(a) defines, for the purpose of this provision, the terms set forth below as follows:

(i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

- (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
  - (iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
  - (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
  - (v) "obstructive practice" is
    - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Employer's investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation;
    - or
    - (bb) acts intended to materially impede the exercise of the Employer's inspection and audit rights.
- (b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;
  - (c) will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract; and
  - (d) will have the right to require that the provision be included in Bidding Documents and in contracts, requiring Bidders, suppliers, and contractors and their sub-contractors to permit the Employer to inspect their accounts and records and other documents relating to bid submission and contract performance and to have them audited by auditors appointed by the Employer.

----- End of Section-II (ITB) -----

# VOLUME-I: SECTION – III

## BID DATA SHEETS (BDS)

BID DATA SHEETS (BDS)

The following bid specific data for the Plant and Equipment to be procured shall amend and/or supplement the provisions in the Instruction to Bidders (ITB)

Sl. No.	ITB Clause Ref. No.	Bid Data Details
1.	ITB 1.1	The Owner is: XXXXX (Name and Address of Owner)
2.	ITB 1.1	The Employer is: XXXXX (Name and Address of Employer)  Kind Attn.: Telephone Nos.: Mobile: Fax No.:
3.	ITB 1.1	Supplementing ITB 1.1 with the following: For the purpose of execution of the contract, the contractual activities shall be performed by the Employer "for and on behalf of the Owner" except in cases where the Owner itself is statutorily required to do so.
4.	ITB 2.1, 2.2, 2.3 & 3.2	Replace the word "Employer" with "Employer/Owner".
5.	ITB 6.1	Address of the Employer: Kind Attn.: Telephone Nos.: Mobile: Fax No.: Email Address:
6.	ITB 6.4	<u>Venue, date and time for Pre-bid Meeting:</u>  The Bidder's designated representative is invited to attend a pre-bid meeting, which will take place at the venue and time as given below:  Venue: XXXXX (Name and Address of Employer)  Kind Attn.: Telephone Nos.: Mobile: Fax No.: Email Address: Date: Time:
7.	ITB 9.2	Alternative bids shall not be permitted
8.	ITB 9.3 (n)	Supplementing ITB clause 9.3(n) with the following:  (iv) Bidder shall also furnish information/documentation in support that the Bidder have adequate design infrastructure and erection facilities and capacity and procedures including quality control related to the work.  (v) The Bidder shall furnish the CV and experience details of a project manager with 15

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		years' experience in executing such contract of comparable nature including not less than five years as manager
9.	ITB 13.1	Amount of Bid Security:  (2% of tender value or Rs 5 (five) crore, whichever is lower)
10.	ITB 16.2(a), ITB 16.2(b), ITB 17.1, ITB 19.3 (a) and ITB 20.1	Address for submission of Bids and its modification and withdrawal, if any;  Address in Person or by Post:  XXXXX (Name of Employer's representative along with full address)  Deadline for submission of Bids and its modification and withdrawal, if any  Upto ..... (time of submission) on ..... (Date of submission) (Indian Standard Time)  Address for Bid Opening:  XXXXX (Name of Employer with address) Time and date for Bid Opening – Bid Envelope: Date : Time: (Indian Standard Time)  (a) Bid Title:  ..... (insert Name of the Package & Specification No.) .....  <u>BID ENVELOPE</u>  (b) Do not open before ..... hours (Indian Standard Time) on ____/____/20____.
11.	ITB 16.3	Supplementing ITB clause 16.3 with the following:  In case, pursuant to Ministry of Finance, GOI's Circular dated 17th July, 2012, the Bank Guarantee is issued using SFMS Platform by the bank's located in India, the copy of such Bank Guarantee shall be submitted by the bidder along with the Bid Envelope.
12.	ITB 24.1 (c)	The Time for Completion for all the Packages shall be 24 (Twenty Four) months from the date of Notification of Award.
13.	ITB 27.2	Supplementing ITB clause 27.2 with the following: The total charges for Supply, F&I, Erection, Testing & Commissioning for BPL service connection including Taxes & Duties should not be more than Rs. 3000/- per connection. Since, the meter shall be procured centrally, the State may provide suitable estimate for F&I, Erection, Testing & Commissioning so as to ensure total cost does not exceed Rs 3000/- per connection including the cost of meter procured centrally. In case, the charges quoted for the above exceed Rs. 3000/- per service connection then payment shall be restricted to Rs. 3000/-, which shall also be considered in evaluation.
14.	ITB 27.4 (b)	Deleted as Functional Guarantees are not applicable.

Sl. No.	ITB Clause Ref. No.	Bid Data Details
15.	ITB 27.4(c)	Deleted.
16.	ITB 27.5 (b)	Deleted.
17.	ITB 27.5 (c)	Deleted.
18.	ITB 34.1	In addition to the Performance Security of 10% of the Contract Price, the successful bidder is required to furnish additional performance security(ies), if applicable, as per Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 19 of Section – VI : Sample Forms and Procedures.

----- End of Section-III (BDS) --

QUALIFICATION OF THE BIDDER for Electrification works of XXXXX district in XXXXX (State name) under Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)/Integrated Power Development Scheme (IPDS)

Qualification of bidder will be based on meeting the minimum pass/fail criteria specified in 1.0 Pre-qualifying criteria Part-A and 2.0 Pre-qualifying criteria Part-B as demonstrated by the Bidder's responses in the corresponding Bid Schedules. The bidder shall also be required.

Subcontractors' technical experience and financial resources shall not be taken into account in determining the Bidder's compliance with the qualifying criteria. The bid can be submitted by an Indian individual firm only or by Joint Venture firm having Indian partner firms only.

Notwithstanding anything stated herein above, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.

1.0 Pre-qualification criteria – Part A:

1.01 Technical:

(I) Part I: Supply, Erection, Testing & Commissioning of New/Augmentation of existing 33/11KV or 66/11 KV power substation<sup>1</sup> and new/Augmentation of its associated 33 or 66 KV Lines

- i. The bidder must have successfully erected, tested and commissioned substation of 33 KV/11 KV or 66/11KV voltage class and its associated 33 KV/66 KV lines(as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 50% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers proposed in the present bid) and 50% of length of 33 KV lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Or

- ii. The bidder must have successfully erected, tested and commissioned substation of 33 KV/11 KV or 66/11KV voltage class and its associated 33 KV/66 KV lines (as the case may be in bid) in TWO turnkey contracts in last 7 years as on the date of bid opening, each having installation of at least 40% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers proposed in the present bid) and 40% of length of 33 KV lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Or

- iii. The bidder must have successfully erected, tested and commissioned substation of 33 KV/11 KV or 66/11KV voltage class and its associated 33 KV/66 KV lines (as the case may be in bid) in THREE turnkey contracts in last 7 years as on the date of bid opening, each having installation of at least 30% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers proposed in the present bid) and 30% of length of 33 KV lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

<sup>1</sup> Depending on the state practice to use 66 KV or 33 KV as sub-transmission voltage gradient

iv. Bids may also be submitted by joint venture firms (having not more than three partners with one partner as lead partner) wherein

- a) All the partners should jointly meet qualification requirements set forth in para I(i) or I(ii) or I (iii) above,

AND

- b) The lead partner should have successfully erected, tested and commissioned electrical works of 33 KV/11 KV or 66 KV/11 KV substation and its associated 33 KV/ 66 KV lines (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 40% of the transformation capacity considered in proposed bid for 33/11 KV or 66/11KV substation (i.e. Sum of KVA ratings of Power transformers proposed in the present bid) and 40% of length of 33 KV lines / 66 KV lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

AND

- c) Each of the other partners should have successfully erected, tested and commissioned electrical works of 33 KV / 11 KV or 66 KV / 11 KV substation and its associated 33 KV / 66 KV lines (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 25% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers proposed in the present bid) and 25% of length of 33 KV lines / 66 KV lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Bidder's experience in higher voltage capacity substation or line will also be considered fit for above calculation. That means, if a Bidder is having experience of erection, testing and commissioning, through turnkey contract in past 7 years of 200 Kms 132 KV lines and 50 MVA capacity EHT substation, he shall be eligible for 33/11 KV or 66/11 KV substation part of up-to 100 MVA capacity and lines up-to 400 kms length.

(II) Part II: Supply, Erection, Testing and Commissioning of New/Augmentation of existing 22 KV or 11 KV & LT Lines, New/Augmentation of existing 11/0.4 KV Distribution Transformer substation and Single Phase Electricity Connections including Service Line & Internal House wiring for BPL Households and HT/LT metering

- i. The bidder must have successfully erected, tested & commissioned transmission lines/feeders 22 KV or 11 KV voltage class (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 50% of the Distribution Transformer Capacity considered in proposed bid (i.e. Sum of KVA ratings of Distribution transformers proposed in the present bid) and 50% of length of lines considered in proposed bid (i.e. sum of 22 / 11 KV and LT lines proposed in the bid), and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Or

- ii. The bidder must have successfully erected, tested & commissioned transmission lines/feeders 22 KV or 11 KV voltage class (as the case may be in bid) in TWO turnkey contracts in last 7 years as on the date of bid opening, each having installation of at least 40% of the Distribution Transformer Capacity considered in proposed bid (i.e. Sum of KVA ratings of Distribution transformers proposed in the present bid) and 40% of length of lines considered in proposed bid (i.e. sum of 22 / 11 KV and LT lines proposed in the bid), and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

OR

- iii. The bidder must have successfully erected, tested & commissioned transmission lines/feeders 22 KV or 11 KV voltage class (as the case may be in bid) in THREE turnkey contract in last 7 years as on the date of bid opening, each having installation of at least 30% of the Distribution Transformer Capacity considered in proposed bid (i.e. Sum of KVA ratings of Distribution transformers proposed in the present bid) and 30% of length of lines considered in proposed bid (i.e. sum of 22 / 11 KV and LT lines proposed in the bid), and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,
- iv. Bids may also be submitted by joint venture firms (having not more than three partners with one partner as lead partner) wherein
  - a) All the partners should jointly meet qualification requirements set forth in para II (i) or II (ii) or II (iii) above,

AND

- b) The lead partner should have successfully erected, tested & commissioned transmission lines/feeders of 22 KV or 11 KV voltage class (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 40% of the Distribution Transformer Capacity considered in proposed bid (i.e. Sum of KVA ratings of Distribution transformers proposed in the present bid) and 40% of length of lines considered in proposed bid (i.e. sum of 11 or 22 KV and LT lines proposed in the bid), and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

AND

- c) Each of the other partners should have successfully erected, tested & commissioned transmission lines/feeders of 22 KV or 11 KV voltage class (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 25% of the Distribution Transformer Capacity considered in proposed bid (i.e. Sum of KVA ratings of Distribution transformers proposed in the present bid) and 25% of length of lines considered in proposed bid (i.e. sum of 11 or 22 KV and LT lines proposed in the bid), and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Bidder's experience in higher voltage capacity substation or line will also be considered fit for above calculation. That means, if a Bidder is having experience of erection, testing and commissioning, through turnkey contract in past 7 years of 200 Kms 132 KV lines and 50 MVA capacity EHT substation, he shall be eligible for 11/0.4 KV Distribution substation part having sum of transforming capacity of up-to 100 MVA capacity and 11 KV + LT lines length up-to 400 kms.

(III) Part III: Combined Part of Part-I & II above

- i. The bidder must have successfully erected, tested & commissioned Sub-Station & transmission lines/feeders of [33 KV or 66 KV class] and [11 KV or 22 KV class] (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 50% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers for 33 KV/66 KV class and Sum of KVA ratings of Distribution transformers for 11 KV/22 KV class, as proposed in the present bid) and 50% of length of [33 KV/66 KV lines] and [sum of {11KV or 22KV and LT lines}], considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

OR

- ii. The bidder must have successfully erected, tested & commissioned Sub-Station & transmission lines/feeders of [33 KV or 66 KV class] and [11 KV or 22 KV class] (as the case may be in bid) in TWO turnkey contract in last 7 years as on the date of bid opening, each having installation of at least 40% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers for 33 KV/66 KV class and Sum of KVA ratings of Distribution transformers for 11 KV/22 KV class, as proposed in the present bid) and 40% of length of [33 KV/66 KV lines] and [sum of {11KV or 22KV and LT lines}], considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

OR

- iii. The bidder must have successfully erected, tested & commissioned Sub-Station & transmission lines/feeders of [33 KV or 66 KV class] and [11 KV or 22 KV class] (as the case may be in bid) in THREE turnkey contracts in last 7 years as on the date of bid opening, each having installation of at least 30% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers for 33 KV/66 KV class and Sum of KVA ratings of Distribution transformers for 11 KV/22 KV class, as proposed in the present bid) and 30% of length of [33 KV/66 KV lines] and [sum of {11KV or 22KV and LT lines}], considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,
- iv. Bids may also be submitted by joint venture firms (having not more than three partners with one partner as lead partner) wherein

All the partners should jointly meet qualification requirements set forth in para III (i) or III (ii) above

AND

The lead partner should have successfully erected, tested and commissioned sub-station & transmission line/feeder of [33 KV or 66 KV] and [11 KV or 22 KV class] (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 40% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers for 33 KV/66 KV class and Sum of KVA ratings of Distribution transformers for 11 KV/22 KV class, as proposed in the present bid) and 40% of length of [33 KV/66 KV lines] and [sum of {11KV or 22KV and LT lines}] lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

AND

each of the other partner(s) should have successfully erected, tested and commissioned sub-station & transmission line/feeder of [33 KV or 66 KV] and [11 KV or 22 KV class] (as the case may be in bid) in a single turnkey contract in last 7 years as on the date of bid opening, having installation of at least 25% of the transformation capacity considered in proposed bid (i.e. Sum of KVA ratings of Power transformers for 33 KV/66 KV class and Sum of KVA ratings of Distribution transformers for 11 KV/22 KV class, as proposed in the present bid) and 25% of length of [33 KV/66 KV lines] and [sum of {11KV or 22KV and LT lines}] lines considered in proposed bid, and the system so created must be in satisfactory operation for at least one (1) year as on date of opening of bid,

Bidder's experience in higher voltage capacity substation or line will also be considered fit for above calculation. That means, if a Bidder is having experience of erection, testing and commissioning, through turnkey contract in past 7 years of 200 Kms 132 KV lines and 50 MVA capacity EHT substation, he shall be eligible for sum of transformation capacities under 33/11 KV or 66/11 KV substation or 11/0.415 KV distribution transformer part up-to 100 MVA and 66KV or 33KV or 11KV or LT lines length up-to 400 kms.

- 1.01.1 For Bidder to qualify for more than one projects, the technical requirements of bidder shall be as per following:

S. No.	Description	Unit	Project1	Project2	Project3	QR for technical requirement of a bidder participating in all 3 projects
Part-I						
1	66 KV + 33 KV+ higher voltage capacity line	Km	500	200	150	500
2	sum of 33/11 KV and 66/11 KV substation transformation capacity	MVA	50	20	80	80
Part-II						
3	sum of 22 KV+11 KV+ LT line length	Km	1000	2000	3000	3000
4	sum of DTR transformation capacity	MVA	2000	8000	5000	8000
Part-III						
1	66 KV + 33 KV+ higher voltage capacity line	Km	500	200	150	500
2	sum of 33/11 KV and 66/11 KV substation transformation capacity	MVA	50	20	80	80
3	sum of 22 KV+11 KV+ LT line length	Km	1000	2000	3000	3000
4	sum of DTR transformation capacity	MVA	2000	8000	5000	8000

- 1.01.2 The bidder should possess "A" Class license issued by the Electrical inspectorate of Govt of (...) <sup>2</sup> /Central Inspectorial organization of Govt. of India/ other state Govt. In case bid submitted joint venture firm, any of partner should possess "A" class electrical license as stated above.
- 1.01.3 Work experiences of the bidder as per above shall be considered only if the works have been executed under Govt./semi-Govt./autonomous body of Central/State Govt./Electricity Power Utility/ Power Deptt. in India only.

<sup>2</sup> Name of state where work is to be executed.

- 1.02 Commercial:  
 For the purpose of this bid, the bidder shall meet the following requirements:
- 1.02.1 For the purpose of this particular bid, bidder shall meet the following minimum commercial criteria in past 5 years (up to 31.03.2015):
- i. Experience in single completed work of projects execution in electrical Transmission or sub-transmission & distribution sector costing not less than the amount equal to 50% of the estimated amount of the project.
- Or
- ii. Experience in two completed work of projects execution each in electrical Transmission or sub-transmission & distribution sector costing not less than the amount equal to 40% of the estimated amount of the project individually.
- Or
- iii. Experience in three completed work of projects execution each in electrical Transmission or sub-transmission & distribution sector costing not less than the amount equal to 30% of the estimated amount of the project individually.
- In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of experience of all quoted projects
- 1.02.2 Net Worth for the each of the last three Financial Years should be positive. Net worth means the sum total of the paid up capital and free reserves (excluding reserves created out of revaluation) reduced by aggregate value of accumulated losses (including debit balance in profit and loss account for current year) and intangible assets.
- 1.02.3 Minimum Average Annual Turnover (MAAT) for best three years out of last five financial years of the bidder should not be less than Rs.\_\_\_\_\_ Lakhs i.e. 30% of the estimated cost of the project. In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of MAAT of all quoted projects.
- 1.02.4 Bidder shall have liquid assets (LA) and/ or evidence of access to or availability of fund based credit facilities of not less than Rs.\_\_\_\_\_ Lakhs i.e. 10% of the estimated cost of the project and the Banker should confirm that the Credit facility is earmarked for the Work specified under Bid on receipt of the Bid. Liquid assets would include cash (and equivalents), bank deposits, securities that can be freely traded and receivables which has general certainty of getting received. In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of LA of all quoted projects.
- 1.02.5 In case a bid is submitted by a Joint Venture (JV), all the partners of the JV shall meet, individually, the qualification set forth at para 1.02.1 & 1.02.2 above and collectively the requirement of para 1.02.3 & 1.02.4 above. The figures for each of the partner of the joint venture shall be added together to determine the bidder's compliance with the minimum qualifying criteria set out in para 1.02.3 & 1.02.4 above; however in order for a joint venture to qualify, the partner(s) of joint venture must meet the following minimum criteria:
- 1.02.5.1 At least one partner shall meet, not less than 40% of the minimum criteria given at Para 1.02.3 & 1.02.4 above
- AND
- 1.02.5.2 Each of the other partner(s) shall meet not less than 25% of the criteria given at Para 1.02.3 & 1.02.4 above

- 1.02.6 Failure to comply with this requirement will result in rejection of the joint venture's bid. Sub contractors' experience and resources shall not be taken into account in determining the bidder's compliance with qualifying criteria.
- 1.02.7 One of the partners shall be nominated as lead partner, and the lead partner shall be authorized to incur liabilities and receive instruction for and on behalf of any and all partners of the joint venture and the entire execution of the contract including receipt of payment shall be done exclusively through the lead partner. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners as per proforma in section "Annexure" of Special Conditions of Contract-Vol.-IA.
- 1.02.8 All partner of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms and a copy of the agreement entered into by the joint venture partners having such a provision shall be submitted with the bid.
- 1.02.9 A statement to this effect shall be included in the authorization mentioned under para 1.02.7 above as well as in the Bid Form and in the Contract Form (in case of a successful bid);
- 2.0 Pre-qualification criteria – Part B:
- The Bidder shall also furnish following documents/details with its bid:
- 2.01.1 A certificate from banker (as per format) indicating various fund based/non fund based limits sanctioned to the bidder and the extent of utilization as on date Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary, the employer may make queries with the Bidders' bankers.
- 2.01.2 The complete annual reports together with Audited statement of accounts of the company for last five years of its own (separate) immediately preceding the date of submission of bid.
- 2.01.3 Note:
- 2.01.3.1 In the event the bidder is not able to furnish the information of its own (i.e. separate), being a subsidiary company and its accounts are being consolidated with its group/holding/parent company, the bidder should submit the audited balance sheets, income statements, other information pertaining to it only (not of its group/Holding/Parent Company) duly certified by any one of the authority [(i) Statutory Auditor of the bidder /(ii) Company Secretary of the bidder or (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.
- 2.01.3.2 Similarly, if the bidder happens to be a Group/Holding/Parent Company, the bidder should submit the above documents/information of its own (i.e. exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note - 2.01.3.1 above certifying that these information/ documents are based on the audited accounts, as the case may be.
- 2.01.4 Litigation History:
- 2.01.4.1 The bidder should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.

- 2.01.4.2 Notwithstanding anything stated hereinabove, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The Employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.
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66 KV + 33 KV+ higher voltage capacity line

LIST OF ELIGIBLE SCHEDULED COMMERCIAL PRIVATE INDIAN BANKS

Sl. No.	Name of Banks
1	HDFC Bank Ltd.
2	Axis Bank Ltd.
3	Kotak Mahindra Bank Ltd.
4	Federal Bank Ltd.
5	Indusind Bank Ltd.
6	Development Credit Bank Ltd.
7	ING Vysya Bank Ltd.
8	Karnataka Bank Ltd.
9	KarurVysya Bank Ltd.
10	Ratnakar Bank Ltd.
11	South Indian Bank Ltd.
12	Yes Bank Ltd.
13	ICICI Bank

VOLUME-I: SECTION – IV  
GENERAL CONDITIONS OF  
CONTRACT (GCC)

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## GENERAL CONDITIONS OF CONTRACT (GCC)

### Preamble

The Section–IV of the Bidding Documents is named as General Conditions of Contract (GCC) and provides all the rights and obligations of the parties under the Contract. This Section contains provisions which are to be used unchanged unless Section – V named as Special Conditions of Contract (SCC) states otherwise as any changes in GCC or any complementary information that may be needed has been shown in SCC. If there is a conflict between the provisions of Section – IV & Section – V, the provisions of Section – V shall prevail.

Suitable care has been taken to modify Standard bidding documents as per Ministry of Power's OM dated 14.08.2015 for New Initiative of Material Mobilization wherein major high value materials shall be procured centrally and these materials shall be issued by the Employer free of cost to the partial turnkey contractor. In case, modification at any place is left inadvertently, then provision of revised guidelines shall prevail.

A. Definitions and Interpretation

1. Definitions

1.1. The following words and expressions shall have the meanings hereby assigned to them:

- (a) "Arbitrator" means the person or persons appointed by agreement between the Employer and the Contractor to make a decision on or to settle any dispute or difference between the Employer and the Contractor referred to him or her by the parties pursuant to GCC Sub-Clause 39.1 (Arbitration) hereof.
- (b) "Associate" means a party who has been conjoined by the Contractor to independently execute a pre-selected part of facilities of the contract and grant him the associated contractual rights and obligations, without diluting the overall responsibility of the contractor in respect of the Facilities under the contract.
- (c) "Collaborator" or "Parent Company" means the firms/corporations who has provided technological support to the manufacturer for establishing production line for the specific Equipment.
- (d) "Commissioning" means operation of the Facilities or any part thereof, if any, as per GCC Sub-Clause 1.1(e) by the Contractor as specified in the Technical Specifications, which operation is to be carried out by the Contractor as provided in GCC Sub-Clause 20.1.3 (Commissioning), for the purpose of Trial – Operation (GCC Sub-Clause 20.1.4).
- (e) "Completion" means that the Facilities (or a specific part thereof where specific parts are specified in the SCC) 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 where specific parts are specified in the SCC) has been completed (wherever required, as per Technical Specifications) and Commissioning followed by Trial – Operation has been completed, as provided in GCC Sub-Clause 20.1 (Completion of Facilities) hereof.
- (f) "Contract" means the Contract Agreement entered into between the Employer and the Contractor together with the Contract Documents referred to therein.
- (g) "Contract Documents" means the documents listed in Clause 1.1 of Article 1 (Contract Documents) of the Form of Contract Agreement (including any amendments thereto); Volume-I:Section-VI.
- (h) "Contract Price" means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement, subject to such additions or deductions therefrom, as may be made pursuant to the Contract. For the purpose of Liquidated Damages and Contract Performance Guarantee, the "Contract Price" means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement.
- (i) "Contractor" means the firms whose bid to perform the Contract has been accepted by the Employer and is named in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.

- (j) "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.
- (k) "Contractor's Representative" means any person nominated by the Contractor and approved by the Employer in the manner provided in GCC Sub-Clause 13.2 (Contractor's Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.
- (l) "Day" means calendar day of the Gregorian Calendar.
- (m) "Defect Liability Period" means the period of validity of the warranties given by the Contractor commencing at Completion of the Facilities or a part thereof, if any, as per GCC Sub-Clause 1.1(e), during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in GCC Clause 22 (Defect Liability) hereof.
- (n) "Effective Date" means the date of Notification of Award from which the Time for Completion shall be determined.
- (o) "Employer" means the firm/corporation/ government entity, named in the SCC, who is responsible for getting the Facilities implemented. The Employer may be Owner himself or an agency appointed by the Owner (State/Central PSU) and shall include the legal successors or permitted assigns of the Employer.
- (p) "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.
- (q) "GCC" means the General Conditions of Contract hereof.
- (r) "Guarantee Test(s)" means the test(s) specified in the Technical Specifications to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Technical Specifications in accordance with the provisions of GCC Sub-Clause 20.2.1 (Guarantee Test) hereof during/after successful Commissioning followed by Trial - Operation.
- (s) "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.
- (t) "Month" means calendar month of the Gregorian Calendar.
- (u) "Notification of Award" means the official notice issued by the Employer notifying the Contractor that his bid has been accepted.

- (v) "Operational Acceptance" means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor's fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of GCC Sub-Clause 20.2.2 (Operational Acceptance) hereof after successful Commissioning followed by Trial - Operation.
- (w) "Owner" means the firm/corporation/government entity, named in the SCC, who has decided to set up the Facilities and shall includes the legal successors or permitted assigns of the Owner.
- (x) "Plant and Equipment" means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor under GCC Sub-Clause 3.3 hereof), but does not include Contractor's Equipment.
- (y) "Pre-commissioning" means the testing, checking and other requirements specified in the Technical Specifications that are to be carried out by the Contractor in preparation for Commissioning as provided in GCC Sub-Clause 20.1.2 (Pre-Commissioning)hereof.
- (z) "Project Manager" or "Engineer" or "Engineer – in Charge" means the person appointed by the Employer in the manner provided in GCC Sub-Clause 13.1 hereof to perform the duties delegated by the Employer.
- (aa) "SCC" means the Special Conditions of Contract.
- (bb) "Site" means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.
- (cc) "Subcontractor"/"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.
- (dd) "Taking Over" means the Employer's written acceptance of the Facilities under the Contract, after successful Trial – Operation for the specified period in accordance with the Contract, as provided in GCC Sub-Clause 20.1.5.
- (ee) "Time for Completion" means the time within which Completion of the Facilities is to be attained in accordance with the scope of work and specifications, as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed in the SCC) and "Taking Over" by the Employer is to be attained.

## 2. Interpretation

### 2.1 Contract

The Contracts to be entered into with the successful Bidder shall be as defined in SCC.

### 2.2 Contract Documents

All documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory, subject to Article 1.2 (Order of Precedence) of the Contract Agreement. The Contract shall be read as a whole.

2.3 Language

The ruling language of the Contract and the language for communications shall be English.

2.4 Singular and Plural

The singular shall include the plural and the plural the singular, except where the context otherwise requires.

2.5 Headings

The headings and marginal notes in the General Conditions of Contract are included for ease of reference, and shall neither constitute a part of the Contract nor affect its interpretation.

2.6 Entire Agreement

Subject to GCC Sub-Clause 12.4 hereof, the Contract constitutes the entire agreement between the Employer and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

2.7 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party hereto.

2.8 Independent Contractor

The Contractor shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture or other joint relationship between the parties hereto.

Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Employer, and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives or Subcontractors and the Employer.

2.9 Joint Venture

If the Contractor is a joint venture of two or more firms, all such firms shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract and shall designate one of such firms to act as a leader with authority to bind the joint venture.

The composition or the constitution of the joint venture shall not be altered without the prior written consent of the Employer.

2.10 Non-Waiver

2.10.1 Subject to GCC Sub-Clause 2.10.2 below, no relaxation, forbearance, delay or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

2.10.2 Any waiver of a party's rights, powers or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

2.11 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

2.12 Country of Origin

"Origin" means the place where the materials, equipment and other supplies for the Facilities are mined, grown, produced or manufactured, and from which the services are provided. Plant and equipment are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

2.13 Notices

2.13.1 Unless otherwise stated in the Contract, all notices to be given under the Contract shall be in writing, and shall be sent by personal delivery, special courier, telegraph, facsimile or Electronic Data Interchange (EDI) to the address of the relevant party set out in the Contract Agreement, with the following provisions:

- (a) Any notice sent by telegraph, facsimile or EDI shall be confirmed within two (2) days after dispatch by notice sent by special courier, except as otherwise specified in the Contract.
- (b) Any notice sent by special courier shall be deemed (in the absence of evidence of earlier receipt) to have been delivered ten (10) days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, stamped and conveyed to the postal authorities or courier service for transmission by special courier. Provided further that whenever the postal authorities or courier service provide a proof of delivery, the same shall also be applicable for presenting the fact of dispatch.

(c) Any notice delivered personally or sent by telegraph, facsimile or EDI shall be deemed to have been delivered on date of its dispatch.

(d) Either party may change its postal, facsimile or EDI address or addressee for receipt of such notices by ten (10) days' notice to the other party in writing.

2.13.2 Notices shall be deemed to include any approvals, consents, instructions, orders and certificates to be given under the Contract.

2.14 Governing Law & its Jurisdiction

The Contract shall be governed by and interpreted in accordance with laws of Union of India and the Courts of XXXX\* (High Court of concerned state) shall have exclusive jurisdiction in all matters arising under this Contract.

B. Subject Matter of Contract

3. Scope of Facilities

3.1 Standards and Regulations: Following CEA regulations shall be applicable during execution of work:

- a. Construction Regulation – Central Electricity Authority (Technical Standards for construction of electrical plants and electric lines) Regulation, 2010 (as amended time to time)
- b. Safety Regulation for construction and O&M - Central Electricity Authority (Safety requirements for construction, Operation and Maintenance of electrical plants and electric lines) Regulation, 2011 (as amended time to time)
- c. Connectivity Regulation – Technical Standard for connectivity to the grid (Amendment) Regulation 2013; Technical Standards for connectivity of the Distributed Generation resources, 2013; Central Electricity Authority (Grid Standard) Regulation, 2010 (as amended time to time)
- d. Metering Regulations – Central Electricity Authority (Installation and Operation of meters) Regulations, 2006; Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations, 2010 and 2015 (as amended time to time)
- e. Central Electricity Authority (Measures relating to safety and Electric supply regulations), 2010 and amendment regulation 2015 (as amended time to time)

3.2 Unless otherwise expressly limited in the Technical Specifications, the Contractor's obligation shall include the provision of all Plant and Equipment and the performance of all Installation Services required for the design, the manufacture (including procurement, quality assurance, construction, installation, associated civil works, Pre-commissioning and delivery) of the Plant and Equipment and the installation, completion, commissioning and performance testing of the facilities in accordance with the plans, procedures, specifications, drawings, codes and any other documents as specified in the Technical specifications. Such specifications include, but are not limited to, the provision of supervision and engineering services; the supply of labour, materials, equipment, spare parts (as specified in GCC Sub-Clause 3.3 below) and accessories; Contractor's Equipment; construction utilities and supplies; temporary materials, structures and facilities; transportation (including without limitation, custom clearance, port handling,

unloading and hauling to, from and at the Site); storage and training except for those supplies, works and services that will be provided or performed by the Employer, as set forth in Appendix-6 (Scope of Works and Supply by the Employer) to the Contract Agreement.

- 3.3 The Contractor shall, unless specifically excluded in the Contract, perform all such work and/or supply all such items and materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Completion of the Facilities as if such work and/or items and materials were expressly mentioned in the Contract.
- 3.4 The Contractor shall ensure the availability of spare parts required for the operation and maintenance of the Facilities to the Employer for a minimum period of 5 years from Completion of the Facilities. The Contractor shall carry sufficient inventories to ensure an ex-stock supply of consumable spares for the plant and equipment. If so desired by the Employer, the Contractor shall submit the specifications, price and the terms and conditions relating to the supply thereof for such spares identified by the Employer with validity period of 6 months within 30 days of receipt of request from Employer for its consideration and placement of order.
- 3.5 The Contractor shall guarantee that in the event of termination of production of spare parts by the Contractor or his Sub-Contractor:
  - (i) The Contractor shall send advance notification to the Employer of the pending termination, with 2 (two) years time to permit the Employer to procure needed requirements, and
  - (ii) Following such termination, the Contractor shall furnish at no cost to the Employer the blueprints, drawings and specification of the spare parts, if requested.
- 3.6 In case the Contractor fails to supply the spares parts in accordance with the terms stipulated above, the Employer shall sanction the Contractor declaring them ineligible for a stated period of time for future projects.
4. Time for Commencement and Completion
  - 4.1 The Contractor shall commence work on the Facilities from the Effective Date of Contract i.e. date of issuance of Letter of Intent (LoI) and without prejudice to GCC Sub-Clause 21.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the corresponding Appendix – 4 (Time Schedule) to the Contract Agreement of Volume-I : Section-VI (Sample Forms and Procedures).
  - 4.2 The Contractor shall attain Completion of the Facilities (or of a part where a separate time for Completion of such part is specified in the Contract) within the time stated under Time for Completion or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.
  - 4.3 The work under the contract shall preferably start from the “Sansad Adardh Gram” in presence of public representatives of the project. Hon’ble sitting Member of Parliament and Hon’ble sitting member of State Legislative Assembly shall be cordially invited on the occasion.
5. Contractor’s Responsibilities

- 5.1 The Contractor shall design, manufacture (including associated purchases and/or subcontracting), install and complete the Facilities with due care and diligence in accordance with the Contract.
- 5.2 The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities (including any data as to boring tests) provided by the Employer, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site (if access thereto was available) and of other data readily available to it relating to the Facilities as of the date twenty-eight (28) days prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.
- 5.3 The Contractor shall acquire in its name all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located that are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Employer under GCC Sub-Clause 6.3 hereof and that are necessary for the performance of the Contract.
- 5.4 The Contractor shall comply with all laws in force in India. The laws will include all local, state, national or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel, but without prejudice to GCC Sub-Clause 6.1 hereof.
- 5.5 Any Plant, Material and Services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GCC Sub-Clause 2.12 (Country of Origin).
- 5.6 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor.
- 5.7 First-aid: The Contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the Site. Enough number of Contractor's personnel shall be trained in administering first-aid.
- 5.8 Cleanliness: The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of Contract. The Contractor shall employ enough number of special personnel to thoroughly clean his work-area atleast once in a day. All such rubbish and scrap material shall be stacked or disposed off in a place to be identified by the Project Manager. Materials and stores shall be so arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.

Similarly the labour colony, the offices and the residential areas of the Contractor's employees and workmen shall be kept clean and neat to the entire satisfaction of the Project Manager. Proper sanitary arrangement shall be provided by the Contractor, in the work-areas, office and residential areas of the Contractor.

- 5.9 Fire Protection: The work procedures that are to be used during the erection shall be those, which minimize fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the Site at least once each day. Fuels, oils and volatile or inflammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Un-treated 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 the Site, the same shall be removed and replaced with acceptable materials before moving into the construction or storage area.

Similarly, corrugated paper fabricated cartons etc. will not be permitted in the construction area either storage or for handling of materials. All such materials used shall be of waterproof and flame resistant type. All other materials such as working drawings, plans etc., which 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.

All the Contractor's supervisory personnel and sufficient number of workers shall be trained for firefighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.

The Contractor shall provide enough fire protection equipment of the types and numbers for the warehouses, office, temporary structures, labour colony area etc. Access to such fire protection equipment shall be easy and kept open at all times.

- 5.10 Security: The Contractor shall have total responsibility for all equipment and materials 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 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 Project Manager in the prescribed manner.
- 5.11 Contractor's Area Limits: The Project Manager will mark-out the boundary limits of access roads, parking spaces, storage and construction areas for the Contractor and the Contractor shall not trespass the areas not so marked out for him. The Contractor shall be responsible to ensure 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 work out of the areas marked out for him, the same shall be done only with the written permission of the Project Manager.
- 5.12 Contractor's Co-Operation with the Employer: In case where the performance of the erection work by the Contractor affects the operation of the system facilities of the Employer, such erection work of the Contractor shall be scheduled to be performed only in the manner stipulated by the Project Manager and the same shall be acceptable at all times to the Contractor. The Project Manager may impose such restrictions on the facilities provided to the Contractor such as electricity, water, etc. as he may think fit in the interest of the Employer and the Contractor shall strictly adhere to such restrictions and co-operate with the Project Manager. It will be the responsibility of the Contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems, which are erected by him. The Contractor shall also be responsible for flushing and initial filling of all the oil and lubricants required for the equipment furnished and erected by him, so as to make such equipment ready for operation. The Contractor shall be responsible for supplying such flushing oil and other lubricants unless otherwise specified elsewhere in the document and specifications.

## 6. Employer's Responsibilities

Employer shall provide following high value major materials free of cost to the partial turnkey contractor:

- 6.1.1 Power Transformer
- 6.1.2 Distribution Transformer
- 6.1.3 All type of Overhead Conductor
- 6.1.4 HT/LT AB Cable
- 6.1.5 Meters

For this, partial turnkey contractor has to provide time line for requirement of material supported with site survey reports and including reports on deployment of sufficient manpower for erection, testing & commissioning of these materials. The requirement of materials must be conveyed to Employer in writing at least 3 months in advance.

- 6.2 The Employer shall ensure the accuracy of all information and/or data to be supplied by the Employer as described in the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract, except when otherwise expressly stated in the Contract.
- 6.3 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.
- 6.4 The Employer shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which such authorities or undertakings require the Employer to obtain them in the Employer's name, are necessary for the execution of the Contract (they include those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract), including those specified in Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement.
- 6.5 If requested by the Contractor, the Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals and/or licenses necessary for the execution of the Contract from all local, state or national government authorities or public service undertakings that such authorities or undertakings require the Contractor or Subcontractors or the personnel of the Contractor or Subcontractors, as the case may be, to obtain.
- 6.6 Unless otherwise specified in the Contract or agreed upon by the Employer and the Contractor, the Employer shall provide sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and shall perform all work and services of whatsoever nature, to enable the Contractor to properly carry out Commissioning, all in accordance with the provisions of Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement at or before the time specified in the program furnished by the Contractor under GCC Sub-Clause 14.2 (Program of Performance) hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.

- 6.7 The Employer shall be responsible for the continued operation of the Facilities after Taking Over, in accordance with GCC Sub-Clause 20.1.5.
- 6.8 All costs and expenses involved in the performance of the obligations under this GCC Clause 6 shall be the responsibility of the Employer.
- 6.9 facilities to be provided by the employer:
- a) Space: Land for Contractor's Office, Store, Workshop etc. –  
The Project Manager shall at his discretion and for the duration of execution of the Contract make available at site, land for construction of Contractor's field office, workshop, stores, magazines for explosives in isolated locations, assembling yard, etc. required for execution of the Contract. Any construction of temporary roads, offices, workshop, etc. as per plan approved by the Project Manager shall be done by the Contractor at his cost.
  - b) Electricity (Construction Power supply): Where power supply is available with the Employer for construction purpose the same will be provided at the job site at one point of the distribution system on chargeable basis for consumption in works. Electricity provided for construction site will be of 440 volts, 3 phase, 50 cycles and 230 volts, 1 phase, 50 cycles. Contractor shall provide and install all necessary switchgears, wiring fixtures, bulbs and other temporary equipment for further distribution and utilization of energy for power and lighting and shall remove the same on completion of the work. Should, however, electricity be used in the Contractor's labour/staff colony, the power so consumed shall be charged at the prevailing tariff rate of State as prevalent for that area at the time of its use; the supply may be withdrawn if the power is used for purposes other than for the work of the project.
  - c) Water: Free supply of water will be made available for the construction purpose wherever water is available and the same shall be given at an agreed single point at the Site. Any further distribution will be the responsibility of the Contractor. Free drinking water, if available, will also be provided at one agreed point in the Site. Further distribution either to his labour colony or his work Site or to his office shall be the responsibility of the Contractor. If water source is not available with the employer at site for construction works, the contractor at his own cost shall arrange the water supply.

C. Payment

7. Contract Price
- 7.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Form of Contract Agreement.
- 7.2 The Contract Price shall be subject to adjustment in accordance with the provisions of Appendix 2 (Price Adjustment) to the Contract Agreement. The Contract Price shall be increased or reduced on account of variation in quantity in accordance with Clause 33 of GCC.

7.3 Subject to GCC Sub-Clauses 5.2 and 6.1 hereof, the Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.

## 8. Terms of Payment

8.1 The Contract Price shall be paid as specified in the corresponding Appendix – 1 (Terms and Procedures of Payment) to the Contract Agreement of Volume-I: Section-VI (Sample Forms and Procedures). The procedures to be followed in making application for and processing payments shall be those outlined in the same Appendix.

8.1.1 The mounting accessories/structure supplied along with any material like circuit breaker, Lightening arrestor, Capacitor Bank, Control Panel, Isolator, AB Switch, CT/PT etc. as part of main equipment shall not be paid extra under Price Schedules. The equipment price in all such cases shall be inclusive of its mounting accessories/structure. For example: if Circuit Breaker has been supplied along with its mounting structure, the contractor shall not be paid separately for mounting structure/accessories associate with Circuit Breaker.

8.2 All payments shall be made in Indian Rupees under the Contract.

8.3 The Project Manager shall within twenty-one (21) days after receipt of invoices enclosing requisite documents as per payment terms release the payment through electronic mode in designated bank account of the contractor.

## 9. Securities

### 9.1 Issuance of Securities

The Contractor shall provide the securities specified below in favor of the Employer at the times, and in the amount, manner and form specified below.

### 9.2 Advance Payment Security

9.2.1 The Contractor shall, within twenty-eight (28) days of the notification of contract award, provide a security in an amount equal to the advance payment calculated in accordance with the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement, and in the same currency(ies) with initial validity of up to ninety (90) days beyond the date of Completion of the Facilities in accordance with GCC Sub-Clause 20.1. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual date of Completion of the Facilities, as may be required under the Contract.

9.2.2 The security shall be in the Form of unconditional Bank Guarantee attached hereto in Volume-I: Section VI - Sample Forms and Procedures. The security shall be discharged after completion of the facilities or relevant part thereof. The advance guarantee shall be reduced on two occasions. First reduction shall be on receipt of 50% supply cost of equipment and second reduction shall be on receipt of 75% supply cost of equipment. The advance BG shall also proportionately reduced to 50% and 25% value respectively of initial advance BG.

- Procedure for submission, reduction of Advance Payment Security is detailed in Appendix-1: Terms and Procedures of payments (refer Volume-I : Section-VI (Sample Forms and Procedures))

9.3 Performance Security

- 9.3.1 The Contractor shall, within twenty-eight (28) days of the notification of Letter of Intent, provide a performance security for the due performance of the Contract in the amount equivalent to Ten percent (10%) of the Contract Price, with a validity upto ninety (90) days beyond the Defect Liability Period. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.

Apart from the Contractor's performance security, the Contractor shall be required to arrange additional performance securities, as specified in SCC, within twenty-eight (28) days of the notification of award in favour of the Employer in the form acceptable to the Employer.

- 9.3.2 The performance security shall be in the Form of unconditional Bank Guarantee attached hereto in the Volume-I : Section VI - Sample Forms and Procedures.

- 9.3.3 Reduction in the security pro rata to the Contract Price of any part of the Facilities is not admissible. However, if the Defects Liability Period has been extended on any part of the Facilities pursuant to GCC Sub-Clause 22.8 hereof, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration, provided, however, that if the Contractor pursuant to GCC Sub-Clause 22, is liable for an extended warranty obligation, the performance security shall be reduced to ten percent (10%) of the value of the component covered by the extended warranty.

- 9.3.4 In case of award of the contract to a Joint Venture, the Bank Guarantees for performance security and the Bank Guarantee for advance payment shall be submitted in the name of all the partner(s) of the Joint Venture

9.4 Issuing Banks

The Bank Guarantee for Advance Payment Security and Performance Security are to be provided by the Contractor, which should be issued either:

(a) by a Public Sector Bank located in India, or

(b) a scheduled Indian Bank having paid up capital (net of any accumulated losses) of Rs. 1,000 Million or above (the latest annual report of the Bank should support compliance of capital adequacy ratio requirement) as per attached list only [List is placed at Annexure-I to Section-V (SCC)], or

9.5 Indemnity

- 9.5.1 For the equipment/material to be provided by the Contractor as well as for owner free issued materials, it will be the responsibility of the Contractor to take delivery, unload and store the materials at Site and execute an Indemnity Bond and obtain authorization letter from Employer as per proforma enclosed at Serial No. 9 – 'Form for Indemnity Bond to be executed by the Contractor' of Volume-I : Section VI (Sample Forms and Procedures), in favour of the Employer against loss, damage and any risks involved for the full value of the materials. This Indemnity Bond shall be furnished by the Contractor before commencement

of the supplies/taking delivery from owner stores and shall be valid till the scheduled date of Taking Over of the equipment by the Employer.

- 9.5.2 In case of divisible Contracts, where the Employer hands over his equipment to the Contractor for executing the Contract, then the Contractor shall, at the time of taking delivery of the equipment through Bill of Landing or other dispatch documents, furnish trust Receipt for Plant, Equipment and Materials and also execute an Indemnity Bond in favour of the Employer in the form acceptable to the Employer for keeping the equipment in safe custody and to utilize the same exclusively for the purpose of the said Contract. Samples of proforma for the Trust receipt and Indemnity Bond are enclosed at Serial No. 10 of Volume-I : Section VI (Sample Forms and Procedures). The Employer shall also issue a separate Authorization Letter to the Contractor to enable him to take physical delivery of plant, equipment and materials from the Employer as per proforma enclosed under Section VI (Sample Forms and Procedures).

9A Acceptance of Bank Guarantees:-

IT enabled confirmation system shall be used in addition to existing paper based confirmation system for verification of Bank Guarantee from issuing bank as under:

- i. Getting confirmation through digitally signed secured e-mails from issuing banks;
- ii. Online verification on company portal with user id and password followed by 2<sup>nd</sup> stage authentication system generated One Time Password (OTP) on portal for reconfirmation;
- iii. E-mail confirmation followed by 2<sup>nd</sup> stage authentication by system generated SMS through registered mobile and confirmation through SMS to the verifying officer.

Employer shall evolve its own procedure adopting any one or more of the above methods for ensuring genuineness of Bank Guarantees, which is compatible with the guidelines of Banks / Reserve Bank of India in addition to existing paper based confirmation system.

10. Taxes and Duties

- 10.1 The Contractor shall be entirely responsible for payment of all taxes, duties, license fees and other such levies legally payable/incurred until delivery of the contracted supplies to the Employer.

If it is statutory requirement to make deductions towards such taxes and duties or any other applicable taxes and duties, the same shall be made by the Employer and a certificate for the same shall be issued to the Contractor.

- 10.2 The Contractor shall be solely responsible for the taxes that may be levied on the Contractor's persons or on earnings of any of his employees and shall hold the Employer indemnified and harmless against any claims that may be made against the Employer. The Employer does not take any responsibility whatsoever regarding taxes under Indian Income Tax Act, for the Contractor or his personnel. If it is obligatory under the provisions of the Indian Income Tax Act, deduction of Income Tax at source shall be made by the Employer.

- 10.3 In respect of direct transaction between the Employer and the Contractor, the ex-works price is exclusive of all cost as well as duties and tax (viz., custom duties & levies, duties, sales

tax/VAT etc.) paid or payable on components, raw materials and any other items used for their consumption incorporated or to be incorporated in the Plant & Equipment.

Sales tax/VAT, excise duty, local tax and other levies for the Equipment/items under 'direct transaction' including octroi/entry tax as applicable for destination site/state are not included in the ex-works price. These amounts will be payable (along with subsequent variation if any), by the Employer on the supplies made by the Contractor but limited to the tax liability on the transaction between the Employer and the Contractor. The requisite Sales Tax declaration forms shall be issued as under:

- a) When project implementing agency or employer is a Central Public Sector Undertaking, form shall be issued by State Distribution Company to Employer for onward issuance to contractor
- b) When State Distribution Company is Employer, the form shall be issued by them.

In respect of bought-out finished items, which shall be dispatched directly from the sub-vendor's works to the Project site (sale-in-transit), the ex-works price is inclusive of all cost as well as duties and taxes (viz., custom duties & levies, duties, sales tax/VAT etc.) paid or payable and any such taxes, duties, levies additionally payable will be to Contractor's account and no separate claim on this behalf will be entertained by the Employer. The requisite Sales Tax declaration forms shall be issued as under:

- a) When project implementing agency or employer is a Central Public Sector Undertaking, form shall be issued by State Distribution Company to Employer for onward issuance to contractor
- b) When State Distribution Company is Employer, the form shall be issued by them.

Further, the ex-works price of (i) bought-out finished Equipments/items as 'Off the Self' items or dispatched directly from the Contractor's works are exclusive of all cost as well as duties and taxes (viz., custom duties & levies, duties, sales tax/VAT etc.) paid or payable and no separate claim on this behalf will be entertained by the Employer. Employer shall, however, issue requisite sales tax declaration form. If any tax exemptions, reductions, allowances or privileges may be available to the Contractor in the Country where the site is located, the Employer shall use its best endeavors to enable the Contractor to benefit from such tax savings to the maximum allowable extent.

For payment/reimbursement of Sales Tax, wherever applicable, in respect of despatches made directly from Contractor's works, invoices raised by the Contractor shall be accepted as documentary evidence and for payment/reimbursement of VAT, Vatable invoices raised by the Contractor shall be accepted as documentary evidence. Similarly, pre-numbered invoices duly signed by authorized signatory shall be considered as evidence for payment of Excise Duty.

- 10.4 Octroi/entry tax as applicable for destination site/state on all items of supply including bought-out finished items, which shall be dispatched directly from the sub-vendor's works to the Employer's site (sale-in-transit) are not included in the Contract price. The applicable octroi/entry tax in respect of all the items of supply would be reimbursed to the Contractor separately by the Employer subject to furnishing of documentary proof.
- 10.5 Employer would not bear any liability on account of Service Tax. Employer shall, however, deduct such tax at source as per the rules and issue necessary Certificate to the Contractor.

10.6 Sales Tax/VAT on Works Contract, Turnover Tax or any other similar taxes under the Sales Tax/VAT Act for services to be performed in India, as applicable is included in Contract Price and Employer would not bear any liability on this account. Employer shall, however, deduct such taxes at source as per the rules and issue Tax Deduction at Source (TDS) Certificate to the Contractor.

10.7 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2(Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies and charges prevailing at the date seven (07) days prior to the last date of bid submission (hereinafter called "Tax" in this GCC Sub-clause 10.7). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Contractor in connection with performance of the Contract, an equitable adjustment of the Contract price shall be made to fully take into account any such change by addition to the Contract price or deduction therefrom, as the case may be, in accordance with GCC Clause 31 (Changes in Laws and Regulations) hereof. However, these adjustments would be restricted to direct transactions between the Employer and the Contractor for which the taxes and duties are reimbursable by the Employer as per the Contract. These adjustments shall not be applicable on procurement of raw materials, intermediary components etc by the Contractor and also not applicable on the bought out items dispatched directly from sub-vendor's works to site.

In respect of raw materials, intermediary components etc and bought out items, neither the Employer nor the Contractor shall be entitled to any claim arising due to increase or decrease in the rate of Tax, introduction of a new Tax or abolition of an existing Tax in the course of the performance of the Contract.

#### D. Intellectual Property

##### 11. Copy Right

11.1 The copyright in all drawings, documents and other materials containing data and information furnished to the Employer by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the Employer directly or through the Contractor by any third party, including supplies of materials, the copyright in such materials shall remain vested in such third party.

The Employer shall however be free to reproduce all drawings, documents and other material furnished to the Employer for the purpose of the Contract including, if required, for operation and maintenance.

11.2 The copyright in all drawings, documents and other materials containing data and information furnished to the Contractor by the Employer herein shall remain vested in the Employer.

##### 12. Confidential Information

12.1 The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following

termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GCC Clause 12.

12.2 The Employer shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Employer for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the performance of the Contract.

12.3 The obligation of a party under GCC Sub-Clauses 12.1 and 12.2 above, however, shall not apply to that information which

- (a) now or hereafter enters the public domain through no fault of that party
- (b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto
- (c) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

12.4 The above provisions of this GCC Clause 12 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.

12.5 The provisions of this GCC Clause 12 shall survive termination, for whatever reason, of the Contract.

#### E. Execution of the Facilities

##### 13. Representatives

13.1 If the Project Manager is not named in the Contract, then within fourteen (14) days of the Effective Date, the Employer shall appoint and notify the Contractor in writing of the name of Project Manager. The Employer may from time to time appoint some other person as the project Manager in place of the person previously so appointed, and shall give a notice of the name of such other person to the Contractor without delay. The Employer shall take all reasonable care to see that no such appointment is made at such a time or in such a manner as to impede the progress of work on the Facilities. The Project Manager shall represent and act for the Employer at all times during the currency of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract shall be given by the Project Manager, except as herein otherwise provided.

All notices, instructions, information and other communications given by the Contractor to the Employer under the Contract shall be given to the Project Manager, except as herein otherwise provided.

##### 13.2 Contractor's Representative & Construction Manager

13.2.1 If the Contractor's Representative is not named in the Contract, then within fourteen (14) days of the Effective Date, the Contractor shall appoint the Contractor's Representative and

shall request the Employer in writing to approve the person so appointed. If the Employer makes no objection to the appointment within fourteen (14) days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within fourteen (14) days giving the reason therefor, then the Contractor shall appoint a replacement within fourteen (14) days of such objection, and the foregoing provisions of this GCC Sub-Clause 13.2.1 shall apply thereto.

- 13.2.2 The Contractor's Representative shall represent and act for the Contractor at all times during the currency of the Contract and shall give to the Project Manager all the Contractor's notices, instructions, information and all other communications under the Contract. All notices, instructions, information and all other communications given by the Employer or the Project Manager to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except as herein otherwise provided. The Contractor shall not revoke the appointment of the Contractor's Representative without the Employer's prior written consent, which shall not be unreasonably withheld. If the Employer consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the procedure set out in GCC Sub-Clause 13.2.1.
- 13.2.3 The Contractor's Representative may, subject to the approval of the Employer (which shall not be unreasonably withheld), at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Contractor's Representative, and shall specify the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Employer and the Project Manager. Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Sub-Clause 13.2.3 shall be deemed to be an act or exercise by the Contractor's Representative.
- 13.2.3.1 Notwithstanding anything stated in GCC Sub-Clause 13.1 and 13.2.1 above, for the purpose of execution of Contract, the Employer and the Contractor shall finalize and agree to a Contract Co-ordination Procedure and all the communication under the Contract shall be in accordance with such Contract Coordination Procedure.
- 13.2.4 From the commencement of installation of the Facilities at the Site until Operational Acceptance, the Contractor's Representative shall appoint a suitable person as the construction manager, (hereinafter referred to as "the Construction Manager"). The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site through-out normal working hours except when on leave, sick or absent for reasons connected with the proper performance of the Contract. Whenever the Construction Manager is absent from the Site, a suitable person shall be appointed to act as his or her deputy.
- 13.2.5 The Employer may by notice to the Contractor object to any representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the Employer, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the Site regulations provided under GCC Sub-Clause 18.3. The Employer shall provide evidence of the same, whereupon the Contractor shall remove such person from the Facilities.

- 13.2.6 If any representative or person employed by the Contractor is removed in accordance with GCC Sub-Clause 13.2.5, the Contractor shall, where required, promptly appoint a replacement.

14. Work Program

14.1 Contractor's Organization

The Contractor shall supply to the Employer and the Project Manager a chart showing the proposed organization to be established by the Contractor for carrying out work on the Facilities. The chart shall include the identities of the key personnel together with the curricula vitae of such key personnel to be employed within twenty-one (21) days of the Effective Date. The Contractor shall promptly inform the Employer and the Project Manager in writing of any revision or alteration of such an organization chart.

14.2 Program of Performance

Within twenty-eight (28) days after the date of Notification of Award, the Contractor shall prepare and submit to the Project Manager a detailed program of performance of the Contract (L2 Network) in the form of the Critical Path Method (CPM), the PERT network, or other internationally used programs and showing the sequence in which it proposes to design, manufacture, transport, assemble, install and pre-commissioning the Facilities, as well as the date by which the Contractor reasonably requires that the Employer shall have fulfilled its obligations under the Contract so as to enable the Contractor to execute the Contract in accordance with the program and to achieve Completion, Commissioning and Acceptance of the Facilities in accordance with the Contract. The program so submitted by the Contractor shall accord with the Time Schedule included in Appendix-4 (Time Schedule) to the Contract Agreement and any other dates and periods specified in the Contract. The Contractor shall update and revise the program as and when appropriate or when required by the Project Manager, but without modification in the Times for Completion under GCC Sub-Clause 4.2 and any extension granted in accordance with GCC Clause 34, and shall submit all such revisions to the Project Manager.

In the PERT chart contractor shall highlight clearly timelines for requirement of major high value owner supplied materials.

14.3 Progress Report

The Contractor shall monitor progress of all the activities specified in the program referred to in GCC Sub-Clause 14.2 above, and supply a progress report to the Project Manager every month and as & when required.

The progress report shall be in a form acceptable to the Project Manager and shall indicate: (a) percentage completion achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.

14.4 Progress of Performance

If at any time the Contractor's actual progress falls behind the program referred to in GCC Sub-Clause 14.2, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the Employer or Project Manager, prepare and submit to the Project Manager

a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager of the steps being taken to expedite progress so as to attain Completion of the Facilities within the Time for Completion under GCC Sub-Clause 4.2, any extension thereof entitled under GCC Sub-Clause 34.1, or any extended period as may otherwise be agreed upon between the Employer and the Contractor.

#### 14.5 Work Procedures

The Contract shall be executed in accordance with the Contract Documents and the procedures given in the section on Sample Forms and Procedures of the Contract Documents.

The Contractor may execute the Contract in accordance with its own standard project execution plans and procedures to the extent that they do not conflict with the provisions contained in the Contract.

14.6 It is emphasized to conduct monthly contract review meeting with senior most officers of partial turnkey contractor at their headquarters or at project site. Employer shall decide venue of such monthly contract review meeting. In this meeting, three months rolling plan of mobilisation of materials and manpower shall be reviewed. Progress of works achieved on ground shall also be reviewed along with all pending issues related to availability of fronts, payments, contractual issues, if any, etc. Minutes of the meeting shall be issued by Employer within a week time. Performance of contractor shall be reviewed based on commitment and actual achievement on ground. Planning, commitment, review and evaluation of performance of contractor through this meeting shall be under overall agreed project execution plan (PERT Chart).

14.7 It is also emphasized to conduct monthly contract review meeting with sub-contractor in presence of senior most officers of partial turnkey contractor at their headquarters or at project site. Employer shall decide venue of such review meeting. In this meeting, three months rolling plan of mobilisation of materials and manpower shall be reviewed. Progress of works achieved on ground shall also be reviewed along with all pending issues related to availability of fronts, payments, contractual issues, if any, etc.

#### 15. Subcontracting

The Contractor may, after informing the Project Manager and getting his written approval, assign or sub-let the Supply Contract or any part thereof other than for raw material, 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 suppliers shall be subjected to approval by the Project Manager. The experience list of equipment vendors under consideration by the Contractor for this Contract shall be furnished to the Project Manager for approval prior to procurement of all such items/equipment.

Field execution of the contract shall not be sub-contracted without written permission of the Employer. On case to case basis, if employer gets satisfied with, permission for sub-contracting entire or part project execution work may be permitted (level-1). However, further sub-letting of field execution works by sub-contractor (Level-2) shall not be acceptable by employer. In case of further sub-letting of contract, it would be construed as non-performance and breach of the contract. Contractual action shall then be initiated as per provisions of the contract.

Such assignment/sub-letting shall not relieve the Contractor of any obligation, duty or responsibility under the Contract.

15.1 The corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.

15.2 For items or parts of the Facilities not specified in the corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement for Supply Contract(s), the Contractor may employ such Subcontractors as it may select, at its discretion.

## 16. Design and Engineering

### 16.1 Specifications and Drawings

16.1.1 The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good engineering practice.

The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared, whether such specifications, drawings and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Employer.

16.1.2 The Contractor shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designated by or on behalf of the Employer, by giving a notice of such disclaimer to the Project Manager.

### 16.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date twenty-eight (28) days prior to date of bid submission shall apply unless otherwise specified. During Contract execution, any changes in such codes and standards shall be applied after approval by the Employer and shall be treated in accordance with GCC Clause 33.

### 16.3 Approval/Review of Technical Documents by Project Manager

16.3.1 The Contractor shall prepare (or cause its Subcontractors to prepare) and furnish to the Project Manager the documents listed in Appendix-7 (List of Documents for Approval or Review) to the Contract Agreement for its approval or review as specified and as in accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance).

Any part of the Facilities covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval thereof.

GCC Sub-Clauses 16.3.2 through 16.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

- 16.3.2 Within twenty one (21) days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GCC Sub-Clause 16.3.1, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefor and the modifications that the Project Manager proposes.
- 16.3.3 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with some specified provision of the Contract or that it is contrary to good engineering practice.
- 16.3.4 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval in accordance with GCC Sub-Clause 16.3.2. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), and upon resubmission with the required modifications the document shall be deemed to have been approved.

The procedure for submission of the documents by the Contractor and their approval by the Project Manager shall be discussed and finalized with the Contractor.

- 16.3.5 If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then such dispute or difference may be referred to an Arbitrator for determination in accordance with GCC Sub-Clause 39 hereof. If such dispute or difference is referred to an Arbitrator, the Project Manager shall give instructions as to whether and if so, how, performance of the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Arbitrator upholds the Contractor's view on the dispute and if the Employer has not given notice under GCC Sub-Clause 39 hereof, then the Contractor shall be reimbursed by the Employer for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the Arbitrator shall decide, and the Time for Completion shall be extended accordingly.
- 16.3.6 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.
- 16.3.7 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GCC Sub-Clause 16.3. If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GCC Clause 33 shall apply to such request.

## 17. Plant and Equipment

- 17.1 Subject to GCC Sub-Clause 10.2, the Contractor shall manufacture or procure and transport all the Plant and Equipment in an expeditious and orderly manner to the Site.
- 17.2 Employer-Supplied Plant, Equipment, and Materials
- If the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement provides that the Employer shall furnish any specific items of machinery, equipment or materials to the Contractor, the following provisions shall apply:
- 17.2.1 The Employer shall, at its own risk and expense, transport each item to the place on or near the Site as agreed upon by the parties and make such item available to the Contractor at the time specified in the program furnished by the Contractor, pursuant to GCC Sub-Clause 14.2, unless otherwise mutually agreed.
- 17.2.2 The equipment & materials to be furnished by the Employer shall be supplied to the Contractor at the depots established by the Contractor or the Employer. The Lorry Receipts for the materials will be handed over to the Contractor by the representative of the Employer as and when the same are received. The Contractor shall be responsible for taking delivery of these materials from the railways/road transporter, unloading them from the transporter, carting them to different stores built by him for the purpose, the unloading and cartage being at the cost of the Contractor. All wharfage and demurrage charges incurred due to delay in taking delivery will be to the Contractor's account, except those due to reasons beyond his control in which case the Contractor shall immediately intimate the Project Manager for settling the claims. The Contractor shall be responsible for proper handling and storage of these materials from the time of receipt upto the time of Taking Over of the Facilities by the Employer.
- 17.2.3 Yards and store provided by the Contractor for stacking and storage of materials shall be open for inspection by the Employer as and when required. The cost of handling and storage shall be to the Contractor's account.
- 17.2.4 Upon receipt of such item, the Contractor shall inspect the same visually and notify the Project Manager of any detected shortage, defect or default. For the material being arranged by the Employer and supplied to the Contractor for erection, are received short, broken or damaged, an entry shall be made in the delivery register of the railway authorities/road transporter as far as possible and a report of the same giving full details of shortage and damages along with a copy of report entered in the delivery register of the road transporter/railways shall be submitted by the Contractor to the Project Manager and Employer's consignee immediately. The Employer shall immediately remedy any shortage, defect or default, or the Contractor shall, if practicable and possible, at the request of the Employer, remedy such shortage, defect or default at the Employer's cost and expense. After inspection, such item shall fall under the care, custody and control of the Contractor. The provision of this GCC Sub-Clause 17.2.4 shall apply to any item supplied to remedy any such shortage or default or to substitute for any defective item, or shall apply to defective items that have been repaired.
- 17.2.5 The foregoing responsibilities of the Contractor and its obligations of care, custody and control shall not relieve the Employer of liability for any undetected shortage, defect or default, nor place the Contractor under any liability for any such shortage, defect or default whether under GCC Clause 22 or under any other provision of Contract.
- 17.3 Transportation

- 17.3.1 The Contractor shall at its own risk and expense transport all the Plant and Equipment (supplied by partial turnkey contractor or free supply by Employer) and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances. The contractor shall be responsible for taking delivery from DISCOM/Power Deptt. stores, loading, transportation, enroute stacking, unloading at site etc for employer free issued materials. In the event of damage, loss etc of materials free issued by Employer, the partial turnkey contractor shall be responsible to replace/replenish the materials/equipment having same size, capacity, technical specifications, drawing etc.
- 17.3.2 Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the Plant and Equipment and the Contractor's Equipment.
- 17.3.3 Upon dispatch of each shipment of the Plant and Equipment and the Contractor's Equipment, the Contractor shall notify the Employer by e-mail, telex, facsimile or Electronic Data Interchange (EDI) of the description of the Plant and Equipment and of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Site. The Contractor shall furnish the Employer with relevant shipping documents to be agreed upon between the parties.
- 17.3.4 The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the Plant and Equipment and the Contractor's Equipment to the Site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the Plant and Equipment and the Contractor's Equipment to the Site.
- 17.4 Delivery and Documents
- 17.4.1 Delivery Documents
- Upon shipment, the Contractor shall notify the Employer with full details of the dispatch and shall furnish the documents as specified in the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement
- 17.4.2 Packing
- 17.4.2.1 The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit.
- 17.4.2.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract.

#### 17.4.3 Materials Handling and Storage:

All the equipment furnished under the Contract and arriving at Site (materials supplied by contractor as well as material free issued by Employer) shall be promptly received, unloaded, transported and stored in the storage spaces by the Contractor.

Contractor shall be responsible for examining all the shipment and notify the Project Manager immediately of any damages, storage, discrepancy etc, for the purpose of Project Manager's information only. The Contractor shall submit to the Project Manager 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 and other such charges claimed by the transporters, railways etc, shall be to the account of the Contractor.

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 Project Manager.

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 Project Manager. 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.

All electrical panels, control gears, motors and such other devices shall be properly dried by heating before they are installed and energized. Motor bearings, slip ring, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.

All the electrical equipment such as transformers, cables, insulators, 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 Project Manager.

The Contractor shall ensure that all the packing materials and protection devices, used for various equipment during transit and storage, are removed before the equipment are installed.

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.

All the materials stored in the open or dusty location must be covered with suitable weatherproof and flame proof covering material wherever applicable.

If the materials belonging to the Contractor are stored in areas other than those earmarked for him, the Project Manager will have the right to get it moved to the area earmarked for the Contractor at the Contractor's cost.

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 gears, generators, exciters and consumables like electrodes, lubricants etc. shall be stored in the closed storage space. The Project Manager, 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.

## 18. Installation

### 18.1 Setting Out/Supervision/Labor

#### 18.1.1 Bench Mark: The Contractor shall be responsible for the true and proper setting-out of the Facilities in relation to bench marks, reference marks and lines provided to it in writing by or on behalf of the Employer.

If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error to the reasonable satisfaction of the Project Manager. If such error is based on incorrect data provided in writing by or on behalf of the Employer, the expense of rectifying the same shall be borne by the Employer.

#### 18.1.2 Contractor's Supervision: The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

#### 18.1.3 Labor:

- (a) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills.
- (b) Unless otherwise provided in the Contract, the Contractor at its own expense shall be responsible for the recruitment, transportation, accommodation and catering of all labor, local or expatriate, required for the execution of the Contract and for all payments in connection therewith.
- (c) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (d) The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

### 18.2 Contractor's Equipment

- 18.2.1 All Contractor's Equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract.
- 18.2.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.
- 18.2.3 The Employer will, if requested, use its best endeavors to assist the Contractor in obtaining any local, state or national government permission required by the Contractor for the export of the Contractor's Equipment imported by the Contractor for use in the execution of the Contract that is no longer required for the execution of the Contract.
- 18.3 Site Regulations and Safety
- The Employer and the Contractor shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. The Contractor shall prepare and submit to the Employer, with a copy to the Project Manager, proposed Site regulations for the Employer's approval, which approval shall not be unreasonably withheld.
- Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Facilities, gate control, sanitation, medical care, and fire prevention.
- 18.3.1 Compliance with Labour Regulations
- 18.3.1.1 During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.
- 18.3.1.2 The Contractor shall keep the Project Manager indemnified in case any action is taken against the Contractor by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.
- 18.3.1.3 If the Project Manager/Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/ byelaws/Acts/ Rules/regulations including amendments, if any, on the part of the Contractor, the Project Manager shall have the right to deduct any money due to the Contractor under this contract or any other contract with the Project Manager/Employer including his amount of performance security for adjusting the aforesaid payment. The Project Manager shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Project Manager/Employer.

Notwithstanding the above, the Contractor shall furnish to the Project Manager the details/documents evidencing the Contractor's compliance to the laws applicable to establishments engaged in building and other construction works, as may be sought by the Project Manager. In particular the Contractor shall submit quarterly certificate regarding compliance in respect of provisions of Employees' Provident Fund and Misc. Provisions Act 1952 or latest to the Project Manager.

18.3.1.4 Salient features of some major laws applicable to establishments engaged in building and other construction works:

- (a) Workmen Compensation Act 1923 or latest: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (b) Payment of Gratuity Act 1972 or latest: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (c) Employee P.F. and Miscellaneous Provision Act 1952 or latest: The Act provides for monthly contribution by the partial turnkey Contractor plus his workers @10% or 8.33%. The benefits under the Act are:
  - (i) Pension or family pension on retirement or death, as the case may be.
  - (ii) Deposit linked insurance on death in harness of the worker.
  - (iii) Payment of P.F. accumulation on retirement/death etc.
- (d) Maternity Benefit Act 1951 or latest: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (e) Contract Labour (Regulation & Abolition) Act 1970 or latest: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certification of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.
- (f) Minimum Wages Act 1948 or latest: The Contractor is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provision of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.
- (g) Payment of Wages Act 1936 or latest: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (h) Equal Remuneration Act 1979 or latest: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

- (i) Payment of Bonus Act 1965 or latest: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus is to be paid to employees getting Rs. 2500/- per month or above upto Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act. The above guidelines shall be liable to change with the change in act/notification by relevant statutory authority.
- (j) Industrial Dispute Act 1947 or latest: the Act lays down the machinery the procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment (Standing Orders) Act 1946 or latest: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer (i.e. partial turnkey contractor) on matters provided in the Act and get the same certified by the designated Authority.
- (l) Trade Unions Act 1926 or latest: The Act lays down the procedure for registration of trade unions of workmen and contractors. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986 or latest: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service Act 1979 or latest: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- (o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 or latest and the Cess Act of 1996 or latest: All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The partial turnkey contractor of the establishment is required to provide safety measures at the electrical construction site, substations, building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The

partial turnkey contractor to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the government.

- (p) Factories Act 1948 or latest: The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

#### 18.3.2 Protection of Environment

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974 or latest, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981 or latest, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986 or latest, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991 or latest, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986 or latest, and exceeding such quantity as may be specified by notification by the Central Government.

18.3.3 Safety Precautions

18.3.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until Taking Over, provide:

- a) Fencing, lighting, guarding and watching of the Works, and
- b) Temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

18.3.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to Employer 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 legislations and the Project Manager, as he may deem necessary.

18.3.3.3 The Contractor will notify well in advance to the Project Manager 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 Project Manager 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 Project Manager 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 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 Employer and the Employer shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Project Manager's instructions.

Further, any such decision of the Project Manager 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 Project Manager, the Contractor shall use alternative methods with the approval of the Project Manager without any cost implication to the Employer or extension of work schedule.

18.3.3.4 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 or latest, Explosives Act, 1948 or latest 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 Project Manager. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

18.3.3.5 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 these to be 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 Employer in this regard.

- 18.3.3.6 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 or latest or latest, Indian Electricity Act 2003 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 the Project Manager or by the person authorised by him.
- 18.3.3.7 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 the Contractor.
- 18.3.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Project Manager who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.
- 18.3.3.9 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 Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
- 18.3.3.10 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, good and standard quality of material only shall be used by the Contractor.
- 18.3.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Employer or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by Employer to handle such fuses, wiring or electrical equipment
- 18.3.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Employer, he shall:
  - a. Satisfy the Project Manager that the appliance is in good working condition;
  - b. Inform the Project Manager of the maximum current rating, voltage and phases of the appliances;
  - c. Obtain permission of the Project Manager detailing the sockets to which the appliances may be connected.
- 18.3.3.13 The Project Manager 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.

- 18.3.3.14 No electric cable in use by the Contractor/Employer 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.
- 18.3.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Project Manager and a permit to work shall be issued by the Project Manager before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to electricians/workmen/officers.
- 18.3.3.16 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.
- 18.3.3.17 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 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 employees/workmen for the above purpose.

The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Project Manager with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

- 18.3.3.18 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 Project Manager in prescribed form and also to all the authorities envisaged under the applicable laws.
- 18.3.3.19 The Project Manager 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 Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
- 18.3.3.20 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in GCC Sub-Clause 18.3.3.19 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.
- 18.3.3.21 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.
- d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate firefighting equipment shall be provided at crucial location.
- 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 energized 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 gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.
- k) In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

18.3.3.22 The Contractor shall follow and comply with all Employer 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 reservations. In case of any discrepancy between statutory requirement and Employer Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.

18.3.3.23 If the Contractor fails in providing safe working environment as per Employer Safety Rules or continues the work even after being instructed to stop work by the Project Manager as provided in GCC Sub-Clause 18.3.3.19 above, the Contractor shall promptly pay to Employer, on demand by the Employer, compensation at the rate of Rs. 5,000/- per day of part thereof till the instructions are complied with and so certified by the Project Manager. However, in case of accident taking place causing injury to any individual, the provisions

contained in GCC Sub-Clause 18.3.3.24 shall also apply in addition to compensation mentioned in this Clause.

- 18.3.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by the Employer or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors or Employer's employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with the Employer, which will be passed on by the Employer to such person or next to kith and kin of the deceased:

a.	Fatal injury or accident causing death	Rs. 1,000,000/- per person
b.	Major injuries or accident causing 25% or more permanent disablement	Rs. 100,000/- per person

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with Employer and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with Employer, such amount shall be recovered by Employer from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

- 18.3.3.25 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Employer and no accident occurs then Employer may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

- 18.3.3.26 The Contractor shall also submit 'Safety Plan' as per proforma specified in Section – Sample Forms and Procedures of the Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Project Manager for its approval within 60 days of award of Contract.

Further, one of the conditions for release of first progressive payment / subsequent payment towards Services Contract shall be submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Project Manager.

#### 18.4 Opportunities for Other Contractors

- 18.4.1 The Contractor shall, upon written request from the Employer or the Project Manager, give all reasonable opportunities for carrying out the work to any other contractors employed by the Employer on or near the Site.
- 18.4.2 If the Contractor, upon written request from the Employer or the Project Manager, makes available to other contractors any roads or ways the maintenance for which the Contractor is responsible, permits the use by such other contractors of the Contractor's Equipment, or provides any other service of whatsoever nature for such other contractors, the Employer shall fully compensate the Contractor for any loss or damage caused or occasioned by such

other contractors in respect of any such use or service, and shall pay to the Contractor reasonable remuneration for the use of such equipment or the provision of such services.

18.4.3 The Contractor shall also so arrange to perform its work as to minimize, to the extent possible, interference with the work of other contractors. The Project Manager shall determine the resolution of any difference or conflict that may arise between the Contractor and other contractors and the workers of the Employer in regard to their work.

18.4.4 The Contractor shall notify the Project Manager promptly of any defects in the other contractors' work that come to its notice, and that could affect the Contractor's work. The Project Manager shall determine the corrective measures, if any, required to rectify the situation after inspection of the Facilities. Decisions made by the Project Manager shall be binding on the Contractor.

#### 18.5 Emergency Work

If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the Contractor shall immediately carry out such work.

If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. In case such work is not in the scope of the Contractor, the cost of such remedial work shall be borne by the Employer.

#### 18.6 Site Clearance

18.6.1 Site Clearance in Course of Performance: In the course of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store or remove any surplus materials, clear away any wreckage, rubbish or temporary works from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract.

18.6.2 Clearance of Site after Completion: After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, rubbish and debris of any kind from the Site, and shall leave the Site and Facilities clean and safe.

#### 18.7 Watching and Lighting

The Contractor shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper execution and the protection of the Facilities, or for the safety of the owners and occupiers of adjacent property and for the safety of the public.

#### 18.8 Work at Night and on Holidays

- 18.8.1 Unless otherwise provided in the Contract, no work shall be carried out during the night and on public holidays of the country where the Site is located without prior written consent of the Employer, except where work is necessary or required to ensure safety of the Facilities or for the protection of life, or to prevent loss or damage to property, when the Contractor shall immediately advise the Project Manager, provided that provisions of this GCC Sub-Clause 18.8.1 shall not apply to any work which is customarily carried out by rotary or double-shifts.
- 18.8.2 Notwithstanding GCC Sub-Clauses 18.8.1 or 18.1.3, if and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Employer's consent thereto, the Employer shall not unreasonably withhold such consent.

## 19. Test and Inspection

- 19.1 The Contractor shall at its own expense carry out at the place of manufacture and/or on the Site all such tests and/or inspections of the Plant and Equipment and any part of the Facilities as are specified in the Contract.
- 19.2 The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, provided that the Employer shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.
- 19.3 Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give four weeks advance notice of such test and/or inspection and of the place and time thereof to the Project Manager. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer and the Project Manager (or their designated representatives) to attend the test and/or inspection.
- 19.4 The Contractor shall provide the Project Manager with a certified report of the results of any such test and/or inspection.
- If the Employer or Project Manager (or their designated representatives) fails to attend the test and/or inspection, or if it is agreed between the parties that such persons shall not do so, then the Contractor may proceed with the test and/or inspection in the absence of such persons, and may provide the Project Manager with a certified report of the results thereof.
- 19.5 The Project Manager may require the Contractor to carry out any test and/or inspection not required by the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of work on the Facilities and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.
- 19.6 If any Plant and Equipment or any part of the Facilities fails to pass any test and/or inspection, the Contractor shall either rectify or replace such Plant and Equipment or part of the Facilities and shall repeat the test and/or inspection upon giving a notice under GCC Sub-Clause 19.3.

- 19.7 If any dispute or difference of opinion shall arise between the parties in connection with or arising out of the test and/or inspection of the Plant and Equipment or part of the Facilities that cannot be settled between the parties within a reasonable period of time, it may be referred to an Arbitrator for determination in accordance with GCC Sub-Clause 39.
- 19.8 The Contractor shall afford the Employer and the Project Manager, at the Employer's expense, access at any reasonable time to any place where the Plant and Equipment are being manufactured or the Facilities are being installed, in order to inspect the progress and the manner of manufacture or installation, provided that the Project Manager shall give the Contractor a reasonable prior notice.
- 19.9 The Contractor agrees that neither the execution of a test and/or inspection of Plant and Equipment or any part of the Facilities, nor the attendance by the Employer or the Project Manager, nor the issue of any test certificate pursuant to GCC Sub-Clause 19.4, shall release the Contractor from any other responsibilities under the Contract.
- 19.10 No part of the Facilities or foundations shall be covered up on the Site without the Contractor carrying out any test and/or inspection required under the Contract. The Contractor shall give a reasonable notice to the Project Manager whenever any such part of the Facilities or foundations are ready or about to be ready for test and/or inspection; such test and/or inspection and notice thereof shall be subject to the requirements of the Contract.
- 19.11 The Contractor shall uncover any part of the Facilities or foundations, or shall make openings in or through the same as the Project Manager may from time to time require at the Site, and shall reinstate and make good such part or parts.

If any parts of the Facilities or foundations have been covered up at the Site after compliance with the requirement of GCC Sub-Clause 19.10 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating, and making good the same shall be borne by the Employer, and the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been delayed or impeded in the performance of any of its obligations under the Contract.

## 20. Completion of the Facilities and Operational Acceptance

### 20.1 Completion of the Facilities

#### 20.1.1 Physical Completion

- 20.1.1.1 As soon as the Facilities or any part thereof has, in the opinion of the Contractor, been completed operationally and structurally and put in a tight and clean condition as specified in the Technical Specifications, excluding minor items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Employer in writing.

#### 20.1.2 Pre-Commissioning

- 20.1.2.1 Within seven (7) days after receipt of the notice from the Contractor under GCC Sub-Clause 20.1.1.1, the Project Manager shall deploy the operating and maintenance personnel and other material if so specified in the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement for Pre-commissioning of the Facilities or any part thereof.

- 20.1.2.2 As soon as reasonably practicable after the operating and maintenance personnel have been deployed by the Employer and other materials have been provided by the Employer in accordance with GCC Sub-Clause 20.1.2.1, the Contractor shall commence Pre-commissioning of the Facilities or the relevant part thereof, in presence of the Employer's representatives, as per procedures detailed in Technical Specifications in preparation for Commissioning.
- 20.1.2.3 As soon as all works in respect of Pre-commissioning are successfully completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall notify the Project Manager in writing.
- 20.1.2.4 The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.3, notify the Contractor in writing of any defects and/or deficiencies.
- 20.1.2.5 If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GCC Sub-Clause 20.1.2.2. If in the opinion of the Contractor, the Facilities or any part thereof is now ready for Commissioning, the Contractor shall again notify the Project Manager in writing. If further defects and/or deficiencies are not notified by the Project Manager and if the Project Manager is satisfied that the Pre-commissioning of Facilities or that part thereof have been successfully completed, the Project Manager shall, within seven (7) days after receipt of the Contractor's such notice, advise the Contractor to proceed with the Commissioning of the Facilities or part thereof.
- 20.1.2.6 If the Project Manager fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.4 or within seven (7) days after receipt of the Contractor's notice on completion of repeat procedure under GCC Sub-Clause 20.1.2.5, then the Pre-commissioning of the Facilities or that part thereof shall be considered to have been successfully completed as of the date of the Contractor's notice.
- 20.1.2.7 As soon as possible after Pre-commissioning, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the Employer will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.
- 20.1.2.8 In the event that the Contractor is unable to proceed with the Pre-commissioning of the Facilities pursuant to Sub-Clause 20.1.2 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the following provisions shall apply:

When the Contractor is notified by the Project Manager that he will be unable to proceed with the activities and obligations pursuant to above GCC Sub-Clause 20.1.2.8, the Contractor shall be entitled to the following:

- a) the Time of Completion shall be extended for the period of suspension without imposition of liquidated damages pursuant to GCC Sub-Clause 21.2.
- b) payments due to the Contractor in accordance with the provisions specified in Appendix I (Terms and Procedures of Payment) to the Contract Agreement, which would have not been payable in normal circumstances due to non-completion of the

said activities and obligations, shall be released to the Contractor against submission of a security in the form of a bank guarantee of equivalent amount acceptable to the Employer, and which shall become null and void when the Contractor will have complied with its obligations regarding these payments, subject to the provisions of GCC Sub-Clause 21.2.9 below.

- c) the expenses payable by the Contractor to the Bankers toward the extension of above security and extension of other securities under the Contract, of which validity need to be extended, shall be reimbursed to the Contractor by the Employer against documentary evidence.
- d) the additional charges toward the care of the Facilities pursuant to GCC Sub-Clause 28.1 shall be reimbursed to the Contractor by the Employer for the period between the notification mentioned above and the notification mentioned in GCC Sub-Clause 20.1.2.10 below. The provisions of GCC Sub-Clause 29.2 shall apply to the Facilities during the same period.

- 20.1.2.9 In the event that the period of suspension under GCC Sub-Clause 20.1.2.8 actually exceeds one hundred eighty (180) days, the Employer and the Contractor shall mutually agree to any additional compensation payable to the Contractor.
- 20.1.2.10 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Pre-commissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.
- 20.1.3 Commissioning
  - 20.1.3.1 Commissioning of the Facilities or any part thereof shall be commenced by the Contractor immediately after being advised by the Project Manager, pursuant to GCC Sub-Clause 20.1.2.5 or immediately after the Pre-commissioning is considered to be completed under GCC Sub-Clause 20.1.2.6.
  - 20.1.3.1.1 Commissioning of the Facilities or any part thereof shall be completed by the Contractor as per procedures detailed in bid documents.
  - 20.1.3.2 The Employer shall, to the extend specified in Appendix – 6 (Scope of works and supply by the Employer), deploy the operating and maintenance personnel and supply all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other materials required for commissioning.
  - 20.1.3.3 In the event that the Contractor is unable to proceed with the Commissioning of the Facilities pursuant to Sub-Clause 20.1.3 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the provisions of GCC Sub-Clause 20.1.2.8 to 20.1.2.9 shall apply.
  - 20.1.3.4 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Commissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.

- 20.1.4 Trial - Operation
  - 20.1.4.1 Trial – Operation of the Facilities or any part thereof shall be commenced by the Contractor immediately after the Commissioning is completed pursuant to GCC Sub-Clause 20.1.3.1.1.
  - 20.1.4.2 Trial – Operation of the Facilities or any part thereof shall be completed by the Contractor for the period specified in Technical Specification (or for a continuous period of 24 hours where such period is not specified in Technical Specification) and as per procedures detailed in Technical Specifications.
  - 20.1.4.3 At any time after the events set out in GCC Sub-Clause 20.1.4.2 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Taking Over Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.
  - 20.1.4.4 The Project Manager shall within twenty-one (21) days after receipt of the Contractor's notice, issue an Taking Over Certificate.
- 20.1.5 Taking Over
  - 20.1.5.1 Upon successful Trial – Operation of the Facilities or any part thereof, pursuant to GCC Sub-Clause 20.1.4, the Project Manager shall issue to the Contractor a Taking Over Certificate as a proof of the acceptance of the Facilities or any part thereof. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.
  - 20.1.5.2 If within twenty one (21) days after receipt of the Contractor's notice, the Project Manager fails to issue the Taking Over Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Taking Over Certificate, the Facilities or the relevant part thereof shall be deemed to have been Taken Over as at the date of the Contractor's said notice.
  - 20.1.5.3 Upon Taking Over of the Facilities or any part thereof, the Employer shall be responsible for the care and custody of the Facilities or the relevant part thereof, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof.
- 20.2 Operational Acceptance
  - 20.2.1 Guarantee Test
    - 20.2.1.1 The Guarantee Test (and repeats thereof), if any specified in the SCC and/or the Technical Specification, shall be conducted by the Contractor after successful Trial – Operation of the Facilities or the relevant part thereof to ascertain whether the Facilities or the relevant part can attain the Functional Guarantees specified in the Contract Documents or if otherwise required as per the Technical Specifications. The Contractor's and Project Manager's advisory personnel may witness the Guarantee Test. The Contractor shall promptly provide the Employer with such information as the Employer may reasonably require in relation to the conduct and results of the Guarantee Test (and any repeats thereof).

20.2.1.2 If for reasons not attributable to the Contractor, the Guarantee Test of the Facilities or the relevant part thereof cannot be successfully completed within the time stipulated in the Technical Specifications the period for completing the same shall be as agreed upon by the Employer and the Contractor.

#### 20.2.2 Operational Acceptance

20.2.2.1 Operational Acceptance shall occur in respect of the Facilities or any part thereof as mentioned below:

(I) In case no Functional Guarantees are applicable, Operational Acceptance shall occur when the Facilities or part thereof have been successfully Commissioned and Trial – Operation for the specified period have been successfully completed

(II) In case Functional Guarantees are applicable, Operational Acceptance shall occur when the Functional Guarantees are met or the Contractor has paid liquidated damages specified in GCC Sub-Clause 23.3 hereof; or

20.2.2.2 At any time after any of the events set out in GCC Sub-Clause 20.2.2.1 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.

20.2.2.3 The Project Manager shall within seven (7) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

20.2.2.4 Upon Operational Acceptance, pursuant to GCC Sub-Clause 20.2.2.2, the Project Manager shall issue to the Contractor a Operational Acceptance Certificate as a proof of the final acceptance of the Plant and Equipment. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.

20.2.2.5 If within fourteen (14) days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the Facilities or the relevant part thereof shall be deemed to have been accepted as at the date of the Contractor's said notice.

#### 20.3 Partial Acceptance

20.3.1 If the Contract specifies that Commissioning shall be carried out in respect of parts of the Facilities, the provisions relating to Commissioning including the Trial – Operation and Guarantee Test shall apply to each such part of the Facilities individually, and the Operational Acceptance Certificate shall be issued accordingly for each such part of the Facilities.

#### 20A. Quantity Variation

- I. The quantity of all equipment/materials given in the Price Schedules of the bidding documents are provisional. The variation in quantity shall be limited to plus/minus (+/-) twenty percent (20%) for the individual items, total variations in all items under the contract shall be limited to ten percent (10%) of the contract price. For

quantity variation of the individual items beyond twenty percent (20%), the matter shall be referred to the Employer for mutually agreed rates.

II. However, in case of highly quoted rate of individual item as compared to its estimated cost, efforts shall be made so that no positive deviation in quantity during execution shall be permitted to its award quantity. However, in case, deviations are found inevitable, present market rate analysis of the item shall be made.

III. The Contractor shall be responsible for supply and execution of such final quantities for completion of the project and they shall be paid for such finalized quantity within plus ten percent (+) 10% overall deviation limit.

20B. Electrical Inspector inspection:

After successful completion of the work permission from State Electrical Inspectorate is required. Necessary fee etc. shall be paid by the Employer. However if Contractor pays such fee it shall be reimbursed on actual basis on documentary evidence.

Defects / in-complete works notified by Electrical Inspectorate shall be completed by the agency at no extra cost implication to Employer.

F. Guarantees and Liabilities

21. Completion Time Guarantee

21.1 The Contractor guarantees that it shall attain Completion of the Facilities (or a part for which a separate time for completion is specified in the SCC) within the Time for Completion specified in the SCC pursuant to GCC Sub-Clause 4.2, or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.

21.2 If the Contractor fails to comply with the Time for Completion in accordance with Clause GCC 21 for the whole of the facilities, (or a part for which a separate time for completion is agreed) then the Contractor shall pay to the Employer a sum equivalent to half percent (0.5%) of the Contract Price for the whole of the facilities, (or a part for which a separate time for completion is agreed) as liquidated damages for such default and not as a penalty, without prejudice to the Employer's other remedies under the Contract, for each week or part thereof which shall elapse between the relevant Time for Completion and the date stated in Taking Over Certificate of the whole of the Works (or a part for which a separate time for completion is agreed) subject to the limit of five percent (5%) of Contract Price for the whole of the facilities, (or a part for which a separate time for completion is agreed). The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to 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.

21.3 No bonus will be given for earlier Completion of the Facilities or part thereof.

21A. Pre-dispatch Inspection:

Pre-dispatch inspection shall be performed on various materials at manufacturer's work place for

which contractor shall be required to raise requisition giving at least 10-day time. Depending on requirement, inspection shall be witnessed by representatives of Employer, TPIA and/or REC/PFC/MoP.

The contractor shall ensure receipt of material at site within 21 days from date of receipt of dispatch instructions. In case materials are not received within 21 days from date of issue of dispatch instruction, the dispatch instruction shall stand cancelled. All expenditure incurred by Employer in performance of dispatch instruction shall be recovered from partial turnkey contractor.

The turnkey contractor shall ensure that pre-dispatch inspection for materials are intimated only when the material is completely ready for inspection. On due date of inspection, if it is found that materials are not ready in required quantities or the inspection could not be carried out due to non-availability of requisite calibrated certificate of instruments with manufacturer, closing of works on scheduled date of inspection, non-availability of sufficient testing/material handling staff at manufacturer works etc, all expenditures incurred on deployment of various inspecting officials along with a fine of Rs 50,000/- shall be recovered from the bills of the agency and re-inspection shall be carried out on expense of contractor. 2<sup>nd</sup> such situation at same manufacturer/supplier shall result in rejection of name of manufacturer from list of approved vendors/sub-vendors. In case sub-standard materials (old component, re-cycled materials, re-used core material, re-used transformer coil material etc) offered for inspection and are noticed during the inspection, materials shall be rejected and approval of sub-vendor shall also be cancelled for all DDUGJY/IPDS projects.

## 22. Defect Liability

22.1 The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.

22.1.1 Volume of concreting: If it was observed by employer, quality monitoring agencies and/or REC/MoP that volume and quality of concreting used in foundation of support, equipment foundation, gantry structure foundation, stay set etc. are not as per requirement specified in the scope of work/technical specifications, the contractor has to dismantle the supports, foundation and redo the concreting of all the supports in that particular section of line/redo all the foundations in that particular substation at his own cost. To ensure this, the employer reserves the right to withhold the payment of contractor for such defective works till such time the contractor conforms to scope of works, technical specification and tender drawings.

22.1.2 Galvanization of metallic structure: All Metallic structures& fabricated items excluding metallic supports (Steel tubular poles/H-Beam) must be galvanized. In case any metallic item found rusted during execution of works, the contractor has to replace the item used at all places. To ensure this, the employer reserves the right to withhold the payment of contractor for such works till such time the contractor conforms to scope of works, technical specification and tender drawings.

22.1.3 Painting of metallic supports (Steel tubular poles/H-Beam): Painting of metallic supports in overhead lines, distribution transformer substation and Power substation shall be ensured as per specifications. In case metallic supports found rusted during execution of works, the contractor has to remove inferior painting,

clean the surface and re-paint it as per given specifications. To ensure this, the employer reserves the right to withhold the payment of contractor for such works till such time the contractor conforms to scope of works, technical specification and tender drawings.

- 22.2 The Defect Liability Period shall be Twelve (12) months from the date of Taking Over /Completion of Facilities (or any part thereof).

If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:

- (a) improper operation or maintenance of the Facilities by the Employer
- (b) operation of the Facilities outside specifications provided in the Contract
- (c) normal wear and tear.

- 22.3 The Contractor's obligations under this GCC Clause 22 shall not apply to
- (a) any materials that are supplied by the Employer under GCC Sub-Clause 17.2, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein
  - (b) any designs, specifications or other data designed, supplied or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein
  - (c) any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under GCC Sub-Clause 22.7.

- 22.4 The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.

- 22.5 The Employer shall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under this GCC Clause 22. The Contractor may, with the consent of the Employer, remove from the Site any Plant and Equipment or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.

- 22.6 If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the

Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests.

22.7 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor or claimed under the Performance Security.

22.8 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons.

Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the Defect Liability Period extended by a period mentioned in GCC Sub-Clause 22.2 from the time of such replacement/repair of the facilities or any part thereof.

22.8.1 At the end of the Defect Liability Period, the Contractor's Liability ceases except for latent defects. The Contractor's liability for latent defects warranty shall be limited to period of ten (10) years from the end of Defect Liability Period. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency, which do not manifest themselves during the Defect Liability Period defined in this GCC Clause 22, but later.

22.9 Except as provided in GCC Clauses 22 and 29, the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or any part thereof, the Plant and Equipment, design or engineering or work executed that appear after Defect Liability Period except for the liability towards obligations that may survive in terms of the Contract after Defect Liability Period, except where such defects are the result of the gross negligence, fraud, criminal or willful action of the Contractor.

## 23. Functional Guarantees

23.1 The Contractor guarantees that the Facilities and all parts thereof shall attain the Functional Guarantees specified in the Technical Specifications, subject to and upon the conditions therein specified.

23.2 If, for reasons attributable to the Contractor, the minimum level of the Functional Guarantees specified in the Technical Specifications are not met either in whole or in part, the Contractor shall at its cost and expense make such changes, modifications and/or additions to the Plant or any part thereof as may be necessary to meet at least the minimum level of such Guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications and / or additions, and shall request the Employer to repeat the Guarantee Test until the minimum level of the Guarantees has been met. If the Contractor

eventually fails to meet the minimum level of Functional Guarantees, the Employer may consider termination of the Contract pursuant to GCC Sub-Clause 36.2.2 and recover the payments already made to the Contractor.

23.3 If, for reasons attributable to the Contractor, the Functional Guarantees specified in the Technical Specifications are not attained either in whole or in part, but the minimum level of the Functional Guarantees specified in the Technical Specifications is met, the Contractor shall, at the Contractor's option, either

- (a) make such changes, modifications and/or additions to the Facilities or any part thereof that are necessary to attain the Functional Guarantees at its cost and expense within a mutually agreed time and shall request the Employer to repeat the Guarantee Test, or
- (b) pay liquidated damages to the Employer in respect of the failure to meet the Functional Guarantees in accordance with the provisions in the SCC.

23.4 In case the Employer exercises its option to accept the equipment after levy of liquidated damages, the payment of liquidated damages under GCC Sub-Clause 23.3, upto the limitation of liability specified in the SCC, shall completely satisfy the Contractor's guarantees under GCC Sub-Clause 23.3, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof. Upon the payment of such liquidated damages by the Contractor, the Project Manager shall issue the Operational Acceptance Certificate for the Facilities or any part thereof in respect of which the liquidated damages have been so paid.

24. Equipment Performance Guarantees - Deleted

25. Patent Indemnity

25.1 The Contractor shall, subject to the Employer's compliance with GCC Sub-Clause 25.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Employer may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: (a) the installation of the Facilities by the Contractor or the use of the Facilities in the country where the Site is located; and (b) the sale of the products produced by the Facilities in any country.

Such indemnity shall not cover any use of the Facilities or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the Facilities or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Contractor, pursuant to the Contract Agreement.

25.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GCC Sub-Clause 25.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor

has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 25.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Contractor may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Employer.

## 26. Limitation of Liability

- 26.1 Except in cases of gross negligence or willful misconduct,
- (a) the Contractor and the Employer shall not be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Employer and
  - (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify the Employer with respect to patent infringement.
- 26.2 All payments to subcontractor shall be made by contractor. Contractor shall indemnify Employer from any legal issues related to delay in payment or not making any payment to sub-vendor/sub-contractor.

## G. Risk Distribution

### 27. Transfer of Ownership

- 27.1 Imported finished items are not covered under the contract. Only indigenous finished items are covered under the contract.
- 27.2 Ownership of the Plant and Equipment (including spare parts) procured in India, shall be transferred to the Employer upon loading on to the mode of transport to be used to carry the Plant and Equipment from the works to the site and upon endorsement of the dispatch documents in favour of the Employer.
- 27.3 Ownership of the Contractor's Equipment used by the Contractor and its Subcontractors in connection with the Contract shall remain with the Contractor or its Subcontractors.

- 27.4 Ownership of any Plant and Equipment in excess of the requirements for the Facilities shall revert to the Contractor upon Completion of the Facilities or at such earlier time when the Employer and the Contractor agree that the Plant and Equipment in question are no longer required for the Facilities provided quantity of any Plant and Equipment specifically stipulated in the Contract shall be the property of the Employer whether or not incorporated in the Facilities.
- 27.5 Notwithstanding the transfer of ownership of the Plant and Equipment, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the Contractor pursuant to GCC Clause 28 (Care of Facilities) hereof until Completion of the Facilities and Taking Over pursuant to GCC Clause 20 or the part thereof, if any, as per GCC Sub-Clause 1.1(e) in which such Plant and Equipment are incorporated.
28. Care of Facilities
- 28.1 The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Taking Over Certificate pursuant to GCC Clause 20 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GCC Clause 22. Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the Facilities or that part thereof caused by any use or occupation by the Employer or any third party (other than a Subcontractor) authorized by the Employer of any part of the Facilities.
29. Loss of or Damage to Property; Accident or Injury to Workers; Indemnification
- 29.1 The Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property (other than the Facilities whether accepted or not), arising in connection with the supply and installation of the Facilities and by reason of the negligence of the Contractor or its Subcontractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its contractors, employees, officers or agents.
- 29.2 If any proceedings are brought or any claim is made against the Employer that might subject the Contractor to liability under GCC Sub-Clause 29.1, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.
- If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 29.3 Notwithstanding anything in this Contract to the contrary, it is agreed that neither the Contractor nor the Employer shall be liable to the other party for loss of production, loss of profit, loss of use or any other indirect or consequential damages.

### 30. Insurance

- 30.1 To the extent specified in the corresponding Appendix-3 (Insurance Requirements) to the Contract Agreement, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified in the said Appendix. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

(a) Marine Cargo Policy/Transit Insurance Policy:

(I)(i) Marine Cargo policy for imported equipment

Since imported finished materials are not permitted under the contract, this policy shall not be applicable,

(I)(ii) Transit Insurance Policy for indigenous equipment

Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment supplied from within India. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause(ITC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) extension cover shall be taken. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. The policy shall cover all risk for loss or damage that may occur during transit of Plant and Equipment from the Contractor/sub-Contractor's works or stores until arrival at project's warehouse/ store at final destination. Institute Cargo Clause (ICC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) cover shall be taken.

- (II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

- (III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it

should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

(b) Erection All Risk Policy/Contractor All Risk Policy:

- (I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.
- (II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.

If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

(III) The following add-on covers shall also be taken by the Contractor:

- i) Earthquake
- ii) Terrorism
- iii) Escalation cost (approximately @10% of sum insured on annual basis)
- iv) Extended Maintenance cover for Defect Liability Period
- v) Design Defect
- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than 100 crores, cover for offsite storage/fabrication (over 100 crores).

(IV) Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

(V) As per para 30.8 below, the cost of insurance premium is to be reimbursed to the Contractor for Employer Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the

project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

- (VI) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) Automobile Liability Insurance

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act. Further the Contractor or its Subcontractors may also take comprehensive policy (own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) Workmen Compensation Policy:

- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Subcontractors for the project are adequately covered under the policy.
- (II) The policy may either be project specific covering all men of the Contractor and its Subcontractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Subcontractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Subcontractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) Contractor's Plant and Machinery (CPM) Insurance

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

- 30.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport, Workmen Compensation Policy Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.
- 30.3 The Contractor shall, in accordance with the provisions of the corresponding Appendix – 3 (Insurance Requirements) to the Contract Agreement, deliver to the Employer certificates of insurance (or copies of the insurance policies) as evidence that the required policies are in full force and effect. The certificates shall provide that no less than twenty-one (21) days' notice shall be given to the Employer by insurers prior to cancellation or material modification of a policy.
- 30.4 The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.
- 30.5 The Employer shall at its expense take out and maintain in effect during the performance of the Contract those insurances specified in the corresponding Appendix – 3 (Insurance Requirements) to the Contract Agreement, in the sums and with the deductibles and other conditions specified in the said Appendix. The Contractor and the Contractor's Subcontractors shall be named as co-insureds under all such policies. All insurers' rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies. The Employer shall deliver to the Contractor satisfactory evidence that the required insurances are in full force and effect. The policies shall provide that not less than twenty-one (21) days' notice shall be given to the Contractor by all insurers prior to any cancellation or material modification of the policies. If so requested by the Contractor, the Employer shall provide copies of the policies taken out by the Employer under this GCC Sub-Clause 30.5.
- 30.6 If the Contractor fails to take out and/or maintain in effect the insurances referred to in GCC Sub-Clause 30.1, the Employer may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Contractor under the Contract any premium that the Employer shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Contractor. If the Employer fails to take out and/or maintain in effect the insurances referred to in GCC 30.5, the Contractor may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Employer under the Contract any premium that the Contractor shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Employer.

- 30.7 Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GCC Clause 30, and the monies payable by any insurers under all the insurance except Third Party Liability Insurance and Workmen Compensation Policy, shall be paid to the joint account of the Employer and the Contractor as mutually agreed and such amounts paid shall be apportioned between the Employer and the Contractor in accordance with the respective responsibilities under the Contract. The Employer shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which the Employer's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of the Employer. With respect to insurance claims in which the Contractor's interest is involved, the Employer shall not give any release or make any compromise with the insurer without the prior written consent of the Contractor.
- 30.8 Further all equipment and materials being supplied by Employer for the erection (as per Technical Specification) shall be kept insured by the Contractor against any loss, damage, pilferage, theft, fire, etc. from the point of unloading up to the time of taking over by Employer including handling, transportation, storage, erection, testing and commissioning etc. The premium paid to the Insurance company by the Contractor for such insurance shall be reimbursed by Employer to the Contractor. The Contractor shall obtain competitive quotation for such insurance and shall take prior approval from Employer before taking the insurance. The insurable value of the equipment being supplied by Employer shall be intimated to the Contractor for arranging the insurance.
- 30.9 It will be the responsibility of the Contractor to lodge, pursue and settle all claims with the insurance company in case of any damage, loss, theft, pilferage or fire during execution of Contract and Employer shall be kept informed about it. The Contractor shall replace 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.
31. Change in Laws and Regulations
- 31.1 If, after the date 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 Employer and the Contractor and not on procurement of raw materials, intermediary components etc. by the Contractor for which the Employer 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, in accordance with the Appendix-2 to the Contract Agreement.
32. Force Majeure
- 32.1 "Force Majeure" shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:

- (a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war,
  - (b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion,
  - (c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster,
- 32.2 Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance of such obligation is prevented by any circumstances of Force majeure, which arises after date of Notification of Award.
- 32.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.
- 32.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GCC Clause 34.
- H. Change in Contract Elements
  - 33. Change in the Facilities
    - 33.1 Introducing a Change
      - 33.1.1 Subject to GCC Sub-Clause 33.2.5, the Employer shall have the right to propose, and subsequently require, that the Project Manager order the Contractor from time to time during the performance of the Contract to make any change, modification, addition or deletion to, in or from the Facilities (hereinafter called "Change"), provided that such Change falls within the general scope of the Facilities and does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Facilities and the technical compatibility of the Change envisaged with the nature of the Facilities as specified in the Contract.
      - 33.1.2 The Contractor may from time to time during its performance of the Contract propose to the Employer (with a copy to the Project Manager) any Change that the Contractor considers necessary or desirable to improve the quality, efficiency or safety of the Facilities. The Employer may at its discretion approve or reject any Change proposed by the Contractor, provided that the Employer shall approve any Change proposed by the Contractor to ensure the safety of the Facilities.
      - 33.1.3 Changes made necessary because of any default of the Contractor in the performance of its obligations under the Contract shall be not be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.
      - 33.1.4 The procedure on how to proceed with and execute Changes is specified in GCC Sub-Clauses 33.2 and 33.3.

33.2 Changes Originating from Employer

33.2.1 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If such rates and prices are inequitable, the parties thereto shall agree on specific rates for the valuation of the Change.

33.2.2 The Contract Price for (i) the items for which quantities have been indicated as lumpsum or lot or set and/or (ii) where the quantities are to be estimated by the Contractor shall remain constant unless there is change made in the Scope of Work by Employer. The quantities and unit prices (i) subsequently arrived while approving the Bill of Quantities (BOQ)/Billing breakup of lumpsum quantities/lot/Set and/or (ii) estimated by the Contractor shall be for on account payment purpose only. In case additional quantities, over and above the quantities in BOQ/billing breakup and /or estimated by the Contractor, are required for successful completion of the scope of work as per Technical Specification, the Contractor shall execute additional quantities of these items for which no additional payment shall be made over and above the lumpsum Contract Price. In case quantities of these items supplied at site are in excess of that required for successful completion of scope of work, such additional quantities shall be the property of the Contractor and they shall be allowed to take back the same from the site for which no deduction from the lumpsum Contract Price shall be made. Further, in case actual requirement of quantities for successful completion of scope of work is less than the quantities identified in the approved BOQ /billing breakup and/or estimated by the Contractor, the lumpsum contract price shall remain unchanged and no deduction shall be made from the lumpsum price due to such reduction of quantities.

It shall be the responsibility of the Contractor to pay all statutory taxes, duties and levies to the concerned authorities for such surplus material which would otherwise have been, lawfully payable in case of non-deemed export contracts. The Contractor shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the Contractor by Employer.

Set/Lot/Lumpsum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications and the Billing breakup referred to above shall be issued by the Employer based on Contractor's request, if and as may be required during the currency of the Contract.

33.2.3 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Contractor under this GCC Clause 33 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement by more than the percentage specified in SCC, the Employer and the Contractor shall mutually agree on specific rates for valuation of the Change beyond the specified percentage.

For the said purpose, the Contract Price means the Contract Price of the Facilities notwithstanding the Construction of the Contract.

33.2.4 If rates and prices of any change are not available in the Contract, the parties thereto shall agree on specific rates for the valuation of the change and all matters therein related to the change. Based on the same, the Employer shall, if it intends to proceed with the Change, issue the Contractor with a Change Order.

- 33.2.5 The Employer shall issue the Contractor with a Change Order pursuant to GCC Sub-Clause 33.2 by way of amendment to the Contract or in any other manner deemed appropriate. Even if the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters related to the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change by issue of a "Pending Agreement Change Order" ("Pending Agreement Amendment").

Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

If the parties cannot reach agreement within sixty (60) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Arbitrator in accordance with the provisions of GCC Clause 38 & 39.

### 33.3 Changes Originating from Contractor

- 33.3.1 If the Contractor proposes a Change pursuant to GCC Sub-Clause 33.1.2, the Contractor shall submit to the Project Manager a written "Request for Change Proposal", giving reasons for the proposed Change and which shall include the following:

- (a) brief description of the Change
- (b) effect on the Time for Completion
- (c) estimated cost of the Change
- (d) effect on Functional Guarantees (if any)
- (e) effect on any other provisions of the Contract.

Upon receipt of the Request for Change Proposal, the parties shall follow the procedures outlined in GCC Sub-Clauses 33.2.1 and 33.2.5. However, should the Employer choose not to proceed, the Contractor shall not be entitled to recover the costs of preparing the Request for Change Proposal.

### 33A. Surplus Materials

- a. On completion of the works all such materials supplied by contractor for erection that remain unutilized, if any, shall be taken back by Contractor after detailed materials and payment reconciliations.
- b. The Contractor, within two (2) months from the taking over of the equipment/ materials under the package, shall submit payment and materials account for the reconciliations, failing which necessary recoveries will be made from the outstanding bills of the Contractor for the cost of the materials left unaccounted as decided by the Project Manager.

### 34. Extension of Time for Completion

- 34.1 The Time(s) for Completion specified in the SCC shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

- (a) any Change in the Facilities as provided in GCC Clause 33
- (b) any occurrence of Force Majeure as provided in GCC Clause 32
- (c) any suspension order given by the Employer under GCC Clause 35 hereof or reduction in the rate of progress pursuant to GCC Sub-Clause 35.2 or
- (d) any changes in laws and regulations as provided in GCC Clause 31 or
- (e) any other matter specifically mentioned in the Contract

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.

34.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to Arbitration, pursuant to GCC Sub-Clause 39.

34.3 The Contractor shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

### 35. Suspension

35.1 The Employer may request the Project Manager, by notice to the Contractor, to order the Contractor to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefor. The Contractor shall thereupon suspend performance of such obligation (except those obligations necessary for the care or preservation of the Facilities) until ordered in writing to resume such performance by the Project Manager.

If, by virtue of a suspension order given by the Project Manager, other than by reason of the Contractor's default or breach of the Contract, the Contractor's performance of any of its obligations is suspended for an aggregate period of more than ninety (90) days, then at any time thereafter and provided that at that time such performance is still suspended, the Contractor may give a notice to the Project Manager requiring that the Employer shall, within twenty-eight (28) days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in accordance with GCC Clause 33, excluding the performance of the suspended obligations from the Contract.

If the Employer fails to do so within such period, the Contractor may, by a further notice to the Project Manager, elect to treat the suspension, where it affects a part only of the Facilities, as a deletion of such part in accordance with GCC Clause 33 or, where it affects the whole of the Facilities, as termination of the Contract under GCC Sub-Clause 36.1.

35.2 If the Contractor's performance of its obligations is suspended or the rate of progress is reduced pursuant to this GCC Clause 35, then the Time for Completion shall be extended in accordance

- with GCC Sub-Clause 34.1, and any and all additional costs or expenses incurred by the Contractor as a result of such suspension or reduction shall be paid by the Employer to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.
- 35.3 During the period of suspension, the Contractor shall not remove from the Site any Plant and Equipment, any part of the Facilities or any Contractor's Equipment, without the prior written consent of the Employer.
36. Termination
- 36.1 Termination for Employer's Convenience
- 36.1.1 The Employer may at any time terminate the Contract for any reason by giving the Contractor a notice of termination that refers to this GCC Sub-Clause 36.1.
- 36.1.2 Upon receipt of the notice of termination under GCC Sub-Clause 36.1.1, the Contractor shall either immediately or upon the date specified in the notice of termination
- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
  - (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii) below
  - (c) remove all Contractor's Equipment from the Site, repatriate the Contractor's and its Subcontractors' personnel from the Site, remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition
  - (d) In addition, the Contractor, subject to the payment specified in GCC Sub-Clause 36.1.3, shall
    - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
    - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
    - (iii) deliver to the Employer all non-proprietary drawings, specifications and other documents prepared by the Contractor or its Subcontractors as at the date of termination in connection with the Facilities.
- 36.1.3 In the event of termination of the Contract under GCC Sub-Clause 36.1.1, the Employer shall pay to the Contractor the following amounts:
- (a) the Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination

- (b) the costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel
- (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges
- (d) costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.1.2
- (e) the cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken with third parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above.

## 36.2 Termination for Contractor's Default

36.2.1 The Employer, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Contractor, referring to this GCC Sub-Clause 36.2:

- (a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
- (b) if the Contractor assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 37.
- (c) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
- (d) If the contractor fails to achieve mutually agreed deadline (as set in mutually agreed Project Execution Plan/PERT chart) for consecutive 3 months, Employer shall issue contract termination notice giving suitable time to contractors which may be up to time agreed between employer and contractor. In case, contractor does not improve its performance as per contract termination notice, which shall be within overall plan under mutually agreed project execution plan, employer will terminate the contract and encash performance securities.

For the purpose of this Sub-Clause:

"corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

"fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

"collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

“coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

“obstructive practice” is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Employer’s investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation;

or

(bb) acts intended to materially impede the exercise of the Employer’s inspection and audit rights.

In pursuance of its policy, the Employer will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract.

#### 36.2.2 If the Contractor

- (a) has abandoned or repudiated the Contract
- (b) has without valid reason failed to commence work on the Facilities promptly or has suspended (other than pursuant to GCC Sub-Clause 35.2) the progress of Contract performance for more than twenty-eight (28) days after receiving a written instruction from the Employer to proceed
- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause
- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program furnished under GCC Sub-Clause 14.2 at rates of progress that give reasonable assurance to the Employer that the Contractor can attain Completion of the Facilities by the Time for Completion as extended,

then the Employer may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Employer may terminate the Contract forthwith by giving a notice of termination to the Contractor that refers to this GCC Sub-Clause 36.2.

36.2.3 Upon receipt of the notice of termination under GCC Sub-Clauses 36.2.1 or 36.2.2, the Contractor shall, either immediately or upon such date as is specified in the notice of termination,

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) below
- (c) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
- (d) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
- (e) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection with the Facilities.

36.2.4 The Employer may enter upon the Site, expel the Contractor, and complete the Facilities itself or by employing any third party. The Employer may, to the exclusion of any right of the Contractor over the same, take over and use with the payment of a fair rental rate to the Contractor, with all the maintenance costs to the account of the Employer and with an indemnification by the Employer for all liability including damage or injury to persons arising out of the Employer's use of such equipment, any Contractor's Equipment owned by the Contractor and on the Site in connection with the Facilities for such reasonable period as the Employer considers expedient for the supply and installation of the Facilities.

Upon completion of the Facilities or at such earlier date as the Employer thinks appropriate, the Employer shall give notice to the Contractor that such Contractor's Equipment will be returned to the Contractor at or near the Site and shall return such Contractor's Equipment to the Contractor in accordance with such notice. The Contractor shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.

36.2.5 Subject to GCC Sub-Clause 36.2.6, the Contractor shall be entitled to be paid the Contract Price attributable to the Facilities executed as of the date of termination, the value of any unused or partially used Plant and Equipment on the Site, and the costs, if any, incurred in protecting the Facilities and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.2.3. Any sums due to the Employer from the Contractor accruing prior to the date of termination shall be deducted from the amount to be paid to the Contractor under this Contract.

36.2.6 If the Employer completes the Facilities, the cost of completing the Facilities by the Employer shall be determined.

If the sum that the Contractor is entitled to be paid, pursuant to GCC Sub-Clause 36.2.5, plus the reasonable costs incurred by the Employer in completing the Facilities, exceeds the Contract Price or the entire Facilities if entire Facilities have been completed or the price for

part of the Facilities if part of the Facilities have been completed, the Contractor shall be liable for such excess.

If such excess is greater than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Contractor shall pay the balance to the Employer, and if such excess is less than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Employer shall pay the balance to the Contractor. For facilitating such payment the Employer shall encash the Bank Guarantees of the Contractor available with the Employer and retain such other payments due to the Contractor under the Contract in question or any other Contract that the Employer may have with the Contractor.

The Employer and the Contractor shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

36.3 In this GCC Clause 36, the expression "Facilities executed" shall include all work executed, Installation Services provided, and all Plant and Equipment acquired (or subject to a legally binding obligation to purchase) by the Contractor and used or intended to be used for the purpose of the Facilities, up to and including the date of termination.

36.4 In this GCC Clause 36, in calculating any monies due from the Employer to the Contractor, account shall be taken of any sum previously paid by the Employer to the Contractor under the Contract, including any advance payment paid pursuant to the corresponding Appendix (Terms and Procedures of Payment) to the Contract Agreement.

### 37. Assignment

37.1 Neither the Employer nor the Contractor shall, without the express prior written consent of the other party (which consent shall not be unreasonably withheld), assign to any third party the Contract or any part thereof, or any right, benefit, obligation or interest therein or thereunder, except that the Contractor shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

## I. Resolution of Disputes

### 38. Settlement of Disputes

38.1 If any dispute of any kind whatsoever shall arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the Facilities, whether during the progress of the Facilities or after their completion and whether before or after the termination, abandonment or breach of the Contract, the parties shall seek to resolve any such dispute or difference, to the extent possible, amicably by mutual consultation.

38.2 If the parties fail to resolve such a dispute or difference by mutual consultation at the execution site level, then the dispute shall be referred by the Contractor to the Project Manager, who, within a period of thirty (30) days after being requested by Contractor to do so, shall give written notice of his decision.

- 38.2.1 The decision/instruction of the Project Manager shall be deemed to have been accepted by the Contractor unless notified by the Contractor of his intention to refer the matter for Arbitration within thirty (30) days of such decision/instruction.
- 38.2.2 In the event the Project Manager fails to notify his decision as aforesaid within thirty (30) days, the Contractor, if he intends to go for Arbitration, shall notify his intention to the Project Manager within 30 days of expiry of the first mentioned period of thirty days failing which it shall be deemed that there are no dispute or difference between the Employer and the Contractor.
- 38.3 In case of dispute or difference between the Employer and the Contractor, if the Employer intends to go for Arbitration, he shall notify such intention to the Contractor.

#### 39. Arbitration

- 39.1 All disputes or differences in respect of which the decision, if any, of the Project Manager and/or the Head of the Implementing Authority has not become final or binding as aforesaid shall be settled by arbitration in the manner provided herein below:
- 39.2 The arbitration shall be conducted by three arbitrators, one each to be nominated by the Contractor and the Employer and the third to be appointed by both the arbitrators in accordance with the Indian Arbitration Act. If either of the parties fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration.
- 39.3 The language of the arbitration proceedings and that of the documents and communications between the parties shall be English. The arbitration shall be conducted in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be xxxxx (headquarter of Employer).
- 39.4 The decision of the majority of the arbitrators shall be final and binding upon the parties. In the event of any of the aforesaid arbitrators dying, neglecting, resigning or being unable to act for any reason, it will be lawful for the party concerned to nominate another arbitrator in place of the outgoing arbitrator.
- 39.5 During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the Contract.

#### 40. Up-front intimation of approved manufacturers and criterion for Fresh Vendor approval:

Employer shall up-front intimate list containing name of already approved vendors/manufacturers of various sub-transmission and distribution materials. Employer shall upload the list on their web portal. Partial turnkey contractor shall choose one or more than one vendors from the pre-approved lists depending upon capacity and capability of vendors to supply the materials for DDUGJY & IPDS works. No separate approval for vendor shall be required from Employer.

Also, normal procedure being followed for empanelment of new vendors shall be uploaded and up-front intimated to all partial turnkey contractors. In case Partial turnkey Contractor desires to

add new vendor, up-front intimation shall be available on criterion and procedure for selection of vendors.

41. Up-front intimation of Guaranteed Technical Particulars:

Technical Specifications are enclosed with the bid documents. Employer shall up-front intimate acceptable Guaranteed Technical Particulars of various materials through their web portal.

Partial turnkey contractor will examine these documents and supply only those materials which meets the above acceptable criterion. In case there are Employer's approved vendor(s) (one or more) through which Partial turnkey Contractor wish to procure the materials and are complying with the acceptable GTP parameters of Employer as available on their web portal, there would not be any formality needed like approval of sub-vendor or approval of GTP again.

In event of change in name of vendor or change in GTP parameter, separate approval of Employer shall be sought by successful partial turnkey contractor.

42. Partial turnkey Contractor's Store at Project site:

"Project wise separate Site Stores shall be maintained and manned by partial turnkey contractor. Same store shall not be used for more than one projects even if neighboring districts' projects are awarded to the same agency. The partial turnkey contractor shall deploy his own manpower in stores for round the clock security and for its day to day operation through trained Store-ki-per.

Since materials received in this stores are owned by Employer (including owner's free issued material) and are pre-dispatch inspected by Employer's representative, materials in a lot shall not be issued to the sub-contractor for physical execution by Partial turnkey Contractor. Instead, day to day requirements shall be issued to the working teams of sub-vendors by authorized store-ki-per. In exceptional cases, on prior written permission of Employer, materials for a week time may be issued to working team of sub-vendor. Daily accounting of materials receipt, materials issues, materials in custody of sub-vendors are to be maintained by Partial turnkey Contractor. Handing of Stores shall, in no circumstances, be off loaded.

In no case, inter-project transfer of materials shall be permitted.

43. Handing over of assets:

On completion of erection and testing of a section of line, DTR substation, power substation, contracting agency shall submit digital photographs in soft copies of each and every support structures along-with submission of completion report in support of their claim for energisation and handing over of assets. Project Manager within a week time, shall review the photographs for acceptance of quality of works and shall immediately deploy officials for joint measurement and inspection of executed works for energisation. In parallel, a requisition to State Electrical Inspectorate shall also be submitted by Project Manager. Fee/Charges for inspection by electrical inspector shall be paid by Project Manager.

While offering section of work / substation for commissioning and handing over, partial turnkey contractor shall provide pre-commissioning test reports and detail checklist (format provided along with quality guidelines at Volume-II : Section-I).

44. Supply of Materials in lots:

Item wise mobilization of materials shall be planned in 6 lots. Employer shall arrange pre-dispatch inspections for 6 lots at his own expenditure. Any additional resource mobilization for inspection of materials by employer beyond 6 lots shall be chargeable at actual. However, in case of approved quantity variation, employer may consider to increase the number of Lots.

45. Contract Closing:

On completion of handing over formality and successfully completion of defect liability / guarantee period, the contract shall be closed on completion of following formality:

- I. Material reconciliation of owner free issued materials as well as material supplied by partial turnkey contractor,
- II. Payment reconciliations, submission and verifications that reconciliation of payment toward statutory provisions like CST/VAT/Entry Tax/Excise Duty, any other dues etc. Reconciliation statement shall be verified and vetted by chartered accountant.
- III. Approval for extension of Completion period, with or without compensation, as required.
- IV. Certification from agency regarding payment of dues to its
  - i. Sub-vendors
  - ii. Workers/ contract laborers,
  - iii. Payment of statutory dues toward Provident Funds, wages etc as required.
- V. Certification of Project Manager & agency to the effect that erection, testing and commissioning of the equipment have been completed as per specifications laid down in the contract and defects noted at the time of commissioning and notified to the agency have been liquidated to the satisfaction of Employer.
- VI. Removal of construction meant for site stores, hutment, labour colony etc. in the premises of EMPLOYER.
- VII. Certificate from Project Manager in charge regarding final amendment of drawings and detailed of such amendments,
- VIII. Drawing receipt certificate by the Project Manager,
- IX. Receipt of compliance report on Quality Assurance Mechanism along with photograph, Assurance documents by Project Manager
- X. Shortfall in equipment / Line performance Certificate issued by Project Manager,
- XI. No demand certificate issued by contractor,
- XII. Certificate about completion of Defect Liability Period of the package by Project Manager,

XIII. Certificate regarding return of Performance Security / Indemnity Bond by Project Manager/Employer.

46. Banning of business dealings

- 46.1. Employer shall ban business dealings with contractor on following grounds for the period as decided by Project Manager:-
- a. If the contractor fails to submit Performance Security after issuance of Letter of Intent (LoI) within 28 days.
  - b. If the Contractor fails to accept the award of contract or has abandoned or repudiated the Contract.
  - c. If the Contractor is found to be non-performing in execution of contract by the Employer.
  - d. If a disaster / major failure / accident / collapse of a structure / system is caused during erection or during defect liability period due to negligence of contractor or design deficiency or poor quality of execution.
  - e. Misbehavior or physical manhandling by the Contractor or his representative or any person acting on his behalf with any official of the Company dealing with the concerned contract is established.
  - f. If the Director / Owner of the Contractor, proprietor or partner of the Contractor, is convicted by a court of law for offences involving corrupt and fraudulent practices including moral turpitude in relation to its business dealings with the government or State Public Sector Undertakings or Central Public Sector Undertakings or Employer or Employer's group companies, during the last five years.
  - g. If the proprietors of the Contractor have been guilty of malpractices such as bribery, corruption, fraud, substitution of the tenders, interpolations, etc.
  - h. If the Contractor continuously refuses to return / refund the dues of Employer or Employer's group companies, without showing adequate reason and this is not due to any reasonable dispute which would attract proceedings in arbitration or court of Law;
  - i. If the Contractor employs a public servant dismissed / removed or employs a person convicted for an offence involving corruption or abetment of such offences;
  - j. If business dealings with the Contractor have been banned by the Ministry of Power or Government of India and the ban is still in force,
  - k. If it is established that Contractor has resorted to corrupt, fraudulent practices including misrepresentation of facts;
  - l. If the Contractor uses intimidation/threatening or brings undue outside pressure on the Project Manager or his authorised representatives or its officials in acceptance / performance of the job under the contract.
  - m. If the Contractor indulges in repeated and / or deliberate use of delay tactics in complying with contractual stipulations;

- n. If the Contractor is found to be involved in cartel formation during bidding.
- o. On wilful indulgence by the Contractor in supplying sub-standard material with respect to Technical Specifications under the Contract irrespective of whether pre-dispatch inspection was carried out by Employer or not;
- p. If the Contractor is declared bankrupt or insolvent or its financial position has become unsound, and in the case of a limited company, it is wound up or liquidated.
- q. Established litigant nature of the Contractor to derive undue benefit;
- r. Continued poor performance of the Contractor;
- s. If the Contractor violates the provisions of the Integrity Pact provided in the Contract.
- t. If the Contractor commits fraud as defined under the Fraud Prevention Policy of Employer.
- u. If the Contractor has assigned or transferred the contract or engaged subcontractor(s) without the prior approval of the Competent Authority in violation of the provisions of the contract.
- v. If the Contractor misuses the premises or facilities of the Employer, forcefully occupies, tampers or damages the Employer's properties including land, water resources, forests / trees, etc.
- w. If the security consideration, including questions of loyalty of the Contractor to the state, so warrants;

----- End -----

VOLUME-I: SECTION – V

SPECIAL CONDITIONS OF  
CONTRACT (SCC)

### SPECIAL CONDITIONS OF CONTRACT (SCC)

The following bid specific data for the Plant and Equipment to be procured shall amend and/or supplement the provisions in the General Conditions of Contract (GCC)

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC									
1.	GCC 1.1(o)	<p>Supplementing Sub-Clause GCC 1.1(o)</p> <p>The Employer is: Name &amp; Postal Address of the Employer with Contact Number, Fax, Email etc.</p> <p>For the purpose of execution of the contract, the contractual activities shall be performed by the Employer "for and on behalf of the Owner" except in cases where the Owner itself is statutorily required to do so.</p>									
2.	GCC 1.1(w)	<p>Supplementing Sub-Clause GCC 1.1(w)</p> <p>The Owner is:  Government of XXXX(State Name)</p>									
3.	GCC 1.1 (ee)	<p>Supplementing Sub-Clause GCC 1.1(ee)</p> <p>Time for Completion:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Sl. No.</th><th style="width: 65%;">Activities</th><th style="width: 30%;">Duration in Months from the effective date of Contract</th></tr> </thead> <tbody> <tr> <td></td><td>Taking Over by the Employer upon successful Completion of:</td><td></td></tr> <tr> <td>1.</td><td>Package-XXX for Electrification works of XXXX(Project/District Name) in XXXX(State Name) under DDUGJY/IPDS [Spec. No.:.....].</td><td>24 (Months)</td></tr> </tbody> </table>	Sl. No.	Activities	Duration in Months from the effective date of Contract		Taking Over by the Employer upon successful Completion of:		1.	Package-XXX for Electrification works of XXXX(Project/District Name) in XXXX(State Name) under DDUGJY/IPDS [Spec. No.:.....].	24 (Months)
Sl. No.	Activities	Duration in Months from the effective date of Contract									
	Taking Over by the Employer upon successful Completion of:										
1.	Package-XXX for Electrification works of XXXX(Project/District Name) in XXXX(State Name) under DDUGJY/IPDS [Spec. No.:.....].	24 (Months)									
4.	GCC 2.1	<p>GCC 2.1.1 The Contracts to be entered into with the successful Bidder shall be as under :</p> <ul style="list-style-type: none"> <li>- First Contract: For Ex-Works supply of all equipment and materials (Ex-Works Supply Contract)</li> <li>- Second Contract: For providing all erection services including inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipment supplied under the "First Contract", and any other services specified in the Contract Documents (Services Contract).</li> </ul> <p>GCC 2.1.2 The award of two separate Contracts shall not in any way dilute the responsibility of the Contractor for the successful completion of the facilities as per Specification and a breach in one Contract shall automatically be construed as a breach of the other Contract(s) which will confer a right on the Employer to terminate the other Contract(s) also at the risk and the cost of the Contractor.</p> <p>GCC 2.1.3 The Contract will be signed in two originals and the Contractor shall be provided with one signed original and the second will be retained by the Employer.</p> <p>GCC 2.1.4 The Contractor shall provide free of cost to the Employer all the engineering data, drawing and descriptive materials submitted with the bid, in at least two (2) copies to form a part of the Contract immediately after Notification of Award.</p>									

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		GCC 2.1.5 Subsequent to signing of the Contract, the Contractor at his own cost shall provide the Employer with at least Two (2) true copies of Contract Agreement within fifteen (15) days after signing of the Contract.
5.	GCC 8.3	<p>Addition of following new Sub-Clause after GCC 8.2:</p> <p>All the payments upto 60% (or 85% for special category states) of project cost of infrastructure to the Contractor shall be made by XXXX (Name of Employer) strictly out of the funds received from REC/PFC on behalf of the Owner, 30% (10% for special category states) of infrastructure cost shall be arranged by owner from REC loan/loan from other FIs/own resources and 10% (5% for special category states) of infrastructure cost shall be arrange by utility from own resources.</p>
6.	GCC 9.3.1	<p>Supplementing Sub-Clause GCC 9.3.1</p> <p>In addition to the above, the Contractor shall arrange to provide additional Performance Security(ies), if applicable, as per Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 19 of Volume-I : Section-VI (Sample Forms and Procedures). The said security(ies) shall be required to be extended time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.</p> <p>The Performance Security(ies) to be furnished by the Contractor under the Contract shall be in favour of the Employer. The Owner shall also be entitled to enforce these performance security(ies).</p>
7.	GCC 10.3	<p>Supplementing Sub-Clause GCC 10.3</p> <p>The requisite Sales Tax declaration forms shall be issued as under:</p> <ol style="list-style-type: none"> <li>When project implementing agency or Employer is a Central Public Sector Undertaking, form shall be issued by State Distribution Company to Employer for onward issuance to contractor</li> <li>When State Distribution Company is Employer, the form shall be issued by them.</li> </ol>
8.	GCC 10.6	<p>Supplementing the Clause GCC 10.6</p> <p>In case Employer is Central Public Sector Undertaking, the recovery of TDS under CST/VAT/WCT/Income Tax Act and any other acts as per Govt. regulation related to this work shall be done by XXXXX (Name of Employer) on behalf of XXXXX(DISCOM Name)/State Govt.. TDS so deducted by XXXXX (Employer Name) on behalf of the XXXX (Name of DISCOM)/State Govt. shall be deposited with the relevant tax authorities and TDS certificates shall be issued on behalf of XXXXX (DISCOM Name)/State Govt. using PAN, TIN, TAN of XXXXX(DISCOM Name). Relevant challans and copies of the TDS certificates shall be forwarded to XXXXX(DISCOM Name) for filling necessary returns. In case, wherever E-filling system is applicable, the relevant information would be given to the Owner for issuing TDS certificate, filling returns, etc.</p>
9.	GCC 11	At all places in the clause, replace the word "Employer" with "Employer/Owner/State Distribution Utility in case employer is a Central Public Undertaking.
10.	GCC 22.4, 22.5, 22.6 & 22.7	At all places in the clause, replace the word "Employer" with "Employer/Owner/State Distribution Utility in case employer is a Central Public Undertaking'.
11.	GCC 24.1	
12.	GCC 24.2 (b) & GCC 24.3	Supplementing Clause GCC 24.2 (b)

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		<p>LD for Non-Performance of the Equipment</p> <p>The guaranteed loss at rated voltage for each equipment shall be corrected in accordance with IS2026, Part-I for the purpose of comparison of guaranteed losses with measured losses for levy of liquidated damages. However, the equipment (i.e. Power Transformer/Station Transformer) under no circumstances shall be accepted if the measured losses are more than +15 percent of the guaranteed losses at rated voltage, specified in Appendix – 8 (Guarantees, Liquidated Damages for Non – Performance) to the Contract Agreement.</p> <p>In case of Distribution Transformer, the equipment under no circumstances shall be accepted if the total losses exceed the max. limit specified in Technical Specifications.</p> <p>Differential Price Factors for Liquidated Damages</p>
13.	GCC 33.2.3	<p>Supplementing Sub-Clause GCC 33.2.3</p> <p>Percentage for the Change Proposal under this Clause shall be limited to Ten (10) percent.</p>
14.	Annexure-I to SCC	Enclosed herewith
15.	Others	Rating of Transformers - Standard Ratings of Distribution & Power Transformers as per IS are covered in bid documents. Transformer ratings must be confirming to IS specifications. Non Standard ratings shall not be permitted.

----- End of Section-V (SCC) -----

LIST OF ELIGIBLE SCHEDULED COMMERCIAL PRIVATE INDIAN BANKS

Sl. No.	Name of Banks
1	HDFC Bank Ltd.
2	Axis Bank Ltd.
3	Kotak Mahindra Bank Ltd.
4	Federal Bank Ltd.
5	Indusind Bank Ltd.
6	Development Credit Bank Ltd.
7	ING Vysya Bank Ltd.
8	Karnataka Bank Ltd.
9	KarurVysya Bank Ltd.
10	Ratnakar Bank Ltd.
11	South Indian Bank Ltd.
12	Yes Bank Ltd.
13	ICICI Bank

VOLUME-I: SECTION – VI

SAMPLE FORMS AND PROCEDURES  
(FORMS)

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## SAMPLE FORMS AND PROCEDURES (FORMS)

### Preamble

This Section (Section –VI) of the Bidding Documents [named as Sample Forms and Procedures (FORMS)] provides proforma to be used by the bidders at the time of their bid preparation and by the Contractor subsequent to the award of Contract.

The Bidder shall complete, sign and submit with its bid the relevant FORMS to be used un-amended, in accordance with the requirements included in the Bidding Documents.

The Bidder shall provide the Bid Security, either in the form included hereafter or in another form acceptable to the Employer, pursuant to the provisions in the instructions to Bidders.

The Form of Contract Agreement shall be used un-amended, except for the need to complete Article 1.1 (Contract Documents), as appropriate and as may be required to suit the specific requirement of the Contract. The form shall also include the Appendices listed, as required, which should be completed according to the instructions for their completion provided at the beginning of each Appendix. The Price Schedule deemed to form part of the contract shall be modified according to any corrections or modifications to the accepted bid resulting from price corrections, pursuant to the provisions of the Instructions to Bidders.

The Performance Security(ies) and Bank Guarantee for Advance Payment forms should not be completed by the bidders at the time of their bid preparation. Only the successful Bidder will be required to provide the Performance Security(ies) and Bank Guarantee for Advance Payment, according to one of the forms indicated herein or in another form acceptable to the Employer and pursuant to the provisions of the General and Special Conditions of Contract, respectively.

Depending on specific facts and circumstances related to the Bid, other specific agreement, if any, and the contract, the text of the Forms herein may need to be modified to some extent. The Employer reserves the right to make such modifications in conformity with such specific facts and circumstances and rectify and consequent discrepancies, if any. However, modifications, if any, to the text of the Forms that may be required in the opinion of the Bidder/Contractor shall be effected only if the same is approved by the Employer. The Employer's decision in this regard shall be final and binding.

1. BID FORMS AND PRICE SCHEDULES

1.1 Bid Form

Please see Volume – III.

1.2 Price Schedule

Please see Volume - III

## 2. BID SECURITY FORM

(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper should be in the name of the issuing Bank)

Bank Guarantee No.: .....

Date: .....

To: (insert Name and Address of Employer)

WHEREAS M/s. .... (insert name of Bidder)..... having its Registered/Head Office at ..... (insert address of the Bidder) ..... (hereinafter called "the Bidder") has submitted its Bid for the performance of the Contract for.....(insert name of the Package).....under.....(insert Specification No)..... (hereinafter called "the Bid")

KNOW ALL PERSONS by these present that WE ..... (insert name & address of the issuing bank) ..... having its Registered/Head Office at .....(insert address of registered office of the bank)..... (hereinafter called "the Bank"), are bound unto .....(insert name of Employer)..... (hereinafter called "the Employer") in the sum of .....(insert amount of Bid Security in figures & words)..... for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents.

Sealed with the Common Seal of the said Bank this ..... day of ..... 20....

THE CONDITIONS of this obligation are:

- (1) If the Bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or
- (2) In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid and/or accept the withdrawals/rectifications pursuant to the declaration/confirmation made by him in Attachment – Declaration of the Bid; or
- (3) If the Bidder does not accept the corrections to arithmetical errors identified during preliminary evaluation of his bid pursuant to ITB Clause 27.2; or
- (4) If, as per the requirement of Qualification Requirements the Bidder is required to submit a Deed of Joint Undertaking and he fails to submit the same, duly attested by Notary Public of the place(s) of the respective executant(s) or registered with the Indian Embassy/High Commission in that Country, within ten days from the date of intimation of post – bid discussion; or
- (5) in the case of a successful Bidder, if the Bidder fails within the specified time limit
  - (i) to sign the Contract Agreement, in accordance with ITB Clause 33, or
  - (ii) to furnish the required performance security, in accordance with ITB Clause 34.
 or
- (6) In any other case specifically provided for in ITB.

WE undertake to pay to the Employer up to the above amount upon receipt of its first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer will note that the amount claimed by it is due to it, owing to the occurrence of any of the above-named CONDITIONS or their combination, and specifying the occurred condition or conditions.

This guarantee will remain in full force up to and including ..... (insert date, which shall be the date 30 days after the period of bid validity)....., and any demand in respect thereof must reach the Bank not later than the above date.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature\_\_\_\_\_

Name\_\_\_\_\_

Designation\_\_\_\_\_

POA Number\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

Fax Number\_\_\_\_\_

email \_\_\_\_\_

Common Seal of the Bank\_\_\_\_\_

Witness:

Signature\_\_\_\_\_

Name\_\_\_\_\_

Address\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

email \_\_\_\_\_

Note:

1. In case the bid is submitted by a Joint Venture, the bid security shall be in the name of the Joint Venture and not in the name of the Lead Partner or any other Partner(s) of the Joint Venture.
2. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph for limitation of liability, the following may be added at the end of the proforma of the Bank Guarantee [i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee]:

Quote

"Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed \_\_\_\_\_ (value in figures)\_\_\_\_\_  
[\_\_\_\_\_ (value in words)\_\_\_\_\_].
2. This Bank Guarantee shall be valid upto \_\_\_\_\_ (validity date)\_\_\_\_\_.

3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before \_\_\_\_\_ (validity date) \_\_\_\_\_."

Unquote

3a. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK  
(Applicable for Forfeiture of Bank Guarantee)

To: (insert Name and Address of the issuing Bank)

Ref.: Forfeiture of Bid Security Amount against Bank Guarantee No. .... dated ..... for  
....., issued by you on behalf of M/s. ....(insert name of the Bidder) .....

Dear Sirs,

Please refer to the subject Bank Guarantee executed by you in our favour for ..... as Bid Security for  
the bid submitted by M/s. ....(insert name of the Bidder) ..... against .... (insert name of the Package)  
..... ; Specification No. ....

As per the terms of the said guarantee, the bank has guaranteed and undertaken to pay immediately on demand  
by the Employer the amount of ..... without any reservation, protest, demur and recourse. Further, any  
demand made by the Employer shall be conclusive and binding on the Bank irrespective of any dispute or  
difference raised by the Bidder.

In terms of the said guarantee, we hereby submit our claim/demand through this letter for remittance of Bid  
Security amount to .... (insert name of the Employer) ..... owing to the occurrence of the condition referred to  
at Sl. No. .... The Bank is requested to remit the full guaranteed sum ..... towards proceeds of  
the bid security in the form of Demand Draft in favour of '.... (insert name of the Employer) .....', payable at  
....(insert place of the Employer)....'.

Thanking you,

For.....(Name of the Employer)

(AUTHORISED SIGNATORY)

Copy to:

.....(Registered Office of the Bank)....

3b. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK

(Applicable for conditional claim pending extension of Bank Guarantee by the Bidder)

To: (insert Name and Address of the issuing Bank)

Ref.: Conditional Claim against Bank Guarantee No. .... dated ..... for ..... valid up to ..... issued by you on behalf of M/s. ....(insert name of the Bidder) .....

Dear Sirs,

Please refer to the subject Bank Guarantee executed by you in our favour on behalf of M/s. ....(insert name of the Bidder) ....., who have submitted this Bank Guarantee to us towards Bid Security against .... (insert name of the Package) ..... ; Specification No. ....

We, ..... (insert name of the Employer) ..... do hereby request you to lodge our claim/demand against the subject Bank Guarantee for full guaranteed sum. Kindly note that this claim/demand against the subject Bank Guarantee is without any further notice in case the amendment to Bank Guarantee No. .... dated ..... extending its validity upto ..... is not got arranged by .....(insert name of the Bidder) ..... in our favour and are not received by us upto ..... In such an event you are requested to remit the full guaranteed amount in terms of the subject guarantee in its letter and spirit and proceeds of this Bank Guarantee shall be forwarded to us in form of demand draft in favour of '.... (insert name of the Employer) ....., payable at ....(insert place of the Employer)....'.

This is without prejudice to our right under this guarantee and under the law.

Thanking you,

For.....(Name of the Employer)

(AUTHORISED SIGNATORY)

Copy to:

(insert Name and Address of the Bidder)

- You are requested to do the needful so that the amendment to the subject Bank Guarantee extending the validity up to ..... is received by us by .....

4. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT'

4a. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR SUPPLY OF PLANT AND EQUIPMENT

Ref. No. :

Date :

.....(insert Contractor's Name & Address).....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. .... and M/s. ....)]

Attn : Mr.....

Sub. : Notification of Award for Ex-works Supply Contract for ..... (insert name of the Package) .....  
Specification No.: ..... Domestic Competitive Bidding. (Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated .....

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. .... dated ....., comprising the following:

- a) Conditions of Contract Volume-I  
(Document Code No. ....)
- b) Technical Specifications, Drawings Volume-II  
(Document Code No. ....)
- c) Bid Form, Price Schedules Volume-III  
& Technical Data Sheets  
(Document Code No. ....)

1.2.1 Amendment/Errata No. .... to Bidding Documents issued to you vide our letter no. .... dated .....  
(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on ....., issued to you vide our letters no. .... dated ..... (Use as applicable)

(Applicable only if any clarification to the Bidding Documents has been issued subsequently)  
(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)

1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) for the subject package under Proposal reference no. .... dated ..... was opened on ..... (Use as applicable)

- 1.4 Intimation for Opening of Price Schedule issued to you vide our letter no. .... dated .....
- 1.5 Your Bid/the Bid by the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) under proposal reference no. .... dated ..... was opened on.....(Use as applicable)
- 1.6 Post bid discussions we had with you on various dates from ..... to ..... resulting into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX (NOA)-1with this Notification of Award.

## 2.0 AWARD OF CONTRACT AND ITS SCOPE

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) (Use as applicable) (referred to at para 1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2 [modify as applicable] above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV(use as applicable) the 'Ex-works Supply Contract' (also referred to as the 'First Contract') covering inter-alia Ex-works supply of all equipment and materials including Type Testing to be conducted, required for the complete execution of the ..... (insert name of Package alongwith name of the Project) ....., as detailed in the documents referred hereinabove. The scope of work inter-alia includes the following:

..... (Indicate brief Scope of Work) .....

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or your bid but are necessary for the successful completion of your scope under the Contract for the construction of ..... (insert name of Package alongwith name of the Project) ....., unless otherwise specifically excluded in the Bidding Documents or in this NOA.

- 2.1.1 You, the Lead Partner of the JV, along with M/s. ...., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. (This provision shall be included only in case the Bidder is a Joint Venture)
- 2.2 The notification for award of Contract for performance of all other activities, as set forth in the Bidding Documents, viz.  
..... (Indicate brief scope of work of the Second Contract) .....  
has been issued on you vide our NOA no. .... dated ..... (hereinafter called the "Second Contract" or "Services Contract").

Notwithstanding the award of work under two separate Contracts in the aforesaid manner, you/the JV (use as applicable) shall be overall responsible to ensure the execution of both the Contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding Documents. It is expressly understood and agreed by you/the JV (use as applicable) that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'Second Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's (use as applicable) risk, cost and responsibility, either in full or in part and/or recover damages under this 'First Contract' as well. However, such default or breach or occurrence in the 'Second Contract', shall not automatically relieve you/the JV (use as applicable) of any of your/JV's (use as

applicable) obligations under this 'First Contract'. It is also expressly understood and agreed by you/the JV (use as applicable) that the equipment/materials supplied by you/the JV (use as applicable) under this 'First Contract', when erected, installed & commissioned by you under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

### 3.0 CONTRACT PRICE

- 3.1 The total Contract Price for the entire scope of work under this Contract shall be ..... (Specify the currency and the amount in figures & words) ..... as per the following break-up:

Sl. No.	Price Component	Amount
1.	Ex-Works Price component	
2.	Type Test Charges	Not Applicable
Total for Ex-works Supply Contract		

- 3.2 Notwithstanding the break-up 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 a breach of the entire Contract.
- 4.0 You/The JV (use as applicable) are/is required to furnish at the earliest a Performance Security(ies), as per the Bidding Documents, for an amount of ..... (Specify the value) ..... i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including ..... and any other securities as per the Bidding Documents.  
(In case any other performance security is required to be furnished, the same is to be mentioned here)
- 5.0 For release of advance payment (admissible as per the Bidding Documents) equal to .....% of the Ex-works Price component of the Contract Price, you are, inter-alia, required to furnish a Bank Guarantee for the equivalent advance amount. The validity of the Advance Bank Guarantee shall be up to and including ..... Further, please note that furnishing of all the Contract Performance Securities under the 'First Contract' and 'Second Contract' shall be one of the conditions precedent to release of advance under this Contract.
- 6.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.
- 7.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the ..... (insert name of Package alongwith name of the Project) .... shall be ... (indicate the completion schedule) .... months from the date of issue of this Notification of Award for all contractual purposes.
- 8.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.
- 9.0 You shall enter into a Contract Agreement with us within twenty-eight (28) days from the date of this Notification of Award.
- 10.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

For and on behalf of

.....(Name of the Employer).....  
(Authorised Signatory)

Enclosures:

APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates from .....  
to .....

4b. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR INSTALLATION OF PLANT AND EQUIPMENT

Ref. No. :

Date :

.....(insert Contractor's Name & Address).....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. .... and M/s. ....)]

Attn : Mr.....

Sub. : Notification of Award for Services Contract for ..... (insert name of the Package) ..... Specification  
No.: ..... Domestic Competitive Bidding. (Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated .....

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. .... dated  
....., comprising the following:

a) Conditions of Contract Volume-I  
(Document Code No. ....)

b) Technical Specifications Volume-II  
(Document Code No. ....)

c) Bid Form, Price Schedules Volume-III  
& Technical Data Sheets  
(Document Code No. ....)

1.2.1 Amendment/Errata No. .... to Bidding Documents issued to you vide our letter no. .... dated  
.....  
(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on ....., issued to you  
vide our letters no. .... dated ..... (Use as applicable)  
(Applicable only if any clarification to the Bidding Documents has been issued subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)

- 1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) for the subject package under Proposal reference no. .... dated ..... was opened on ..... (Use as applicable)
- 1.4 Intimation for Opening of Price Schedule issued to you vide our letter no. .... dated .....
- 1.5 Your Bid/the Bid by the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) under proposal reference no. .... dated ..... was opened on.....(Use as applicable)
- 1.6 Post bid discussions we had with you on various dates from ..... to ..... resulting into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX (NOA)-1with this Notification of Award.

## 2.0 AWARD OF CONTRACT AND ITS SCOPE

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s. .... (Lead Partner) and M/s. .... (Other Partner) (Use as applicable) (referred to at para 1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2 [modify as applicable] above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV(use as applicable) the 'Services Contract' (also referred to as the 'Second Contract') for performance of all other activities, as set forth in the documents, viz. .... (Indicate brief scope of work) ..... for the ..... (insert name of Package alongwith name of the Project)....

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or your bid but are necessary for the successful completion of your scope under the Contract for the construction of ..... (insert name of Package alongwith name of the Project) ....., unless otherwise specifically excluded in the Bidding Documents or in this NOA.

- 2.1.1 You, the Lead Partner of the JV, along with M/s. ...., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. (This provision shall be included only in case the Bidder is a Joint Venture)
- 2.2 The notification for award of Contract for Ex-works Supply of all equipment and materials including Type Testing to be conducted, as set forth in the documents, viz.

..... (Indicate brief scope of work of the First Contract) .....

has been issued on you vide our NOA no. .... dated ..... (hereinafter called the "Ex-works Supply Contract" or "First Contract").

Notwithstanding the award of work under two separate Contracts in the aforesaid manner, you/the JV (use as applicable) shall be overall responsible to ensure the execution of both the Contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding Documents. It is expressly understood and agreed by you/the JV(use as applicable) that any default or breach under the 'First Contract' shall automatically be deemed

as a default or breach of this 'Second Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'First Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's (use as applicable) risk, cost and responsibility, either in full or in part and/or recover damages under this 'Second Contract' as well. However, such default or breach or occurrence in the 'First Contract', shall not automatically relieve you/the JV(use as applicable) of any of your obligations under this 'Second Contract'. It is also expressly understood and agreed by you/the JV(use as applicable) that the equipment/materials supplied by you/the JV(use as applicable) under the 'First Contract', when erected, installed & commissioned by you/the JV(use as applicable) under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

### 3.0 CONTRACT PRICE

- 3.1 The total Contract Price for the entire scope of work under this Contract shall be ..... (Specify the currency and the amount in figures & words) ..... as per the following break-up:

Sl. No.	Price Component	Amount
1.	Local Transportation, Insurance and other Incidental Services (including port clearance etc)	
2.	Installation Services	
3.	Training Charges	Not Applicable
Total for Services Contract		

- 3.2 Notwithstanding the break-up 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 a breach of the entire Contract.

- 4.0 You/the JV(use as applicable)are/is required to furnish at the earliest a Performance Security(ies), as per the Bidding Documents, for an amount of ..... (Specify the value) ..... i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including ..... and any other securities as per the Bidding Documents.

(In case any other performance security is required to be furnished, the same is to be mentioned here)

- 5.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.
- 6.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the ..... (insert name of Package alongwith name of the Project) .... shall be ... (indicate the completion schedule) .... months from the date of issue of this Notification of Award for all contractual purposes.
- 7.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.
- 8.0 You shall enter into a Contract Agreement with us within twenty-eight (28) days from the date of this Notification of Award.
- 9.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

For and on behalf of

.....(Name of the Employer).....

(Authorised Signatory)

Enclosures:

APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates from .....  
to .....

Note:

- (1) Instructions indicated in italics in this notification of award are to be taken care of by the issuing authority.  
The Forms may be modified appropriately to suit the specific requirement of the Contract.

## 5. FORM OF CONTRACT AGREEMENT

[Alternative – a]

SUPPLY CONTRACT AGREEMENT BETWEEN ..... (Name of Employer) ..... AND M/s. ....  
(Name of Contractor) ...../JOINT VENTURE (JV) OF M/s. .... (Name of Lead Partner).... (THE LEAD  
PARTNER OF THE JV) AND M/s. ....(Name of Other Partner)..... (THE PARTNER OF THE JV) [Use as applicable]

THIS CONTRACT AGREEMENT No. .... (also referred to as 'Ex-Works Supply Contract/the First  
Contract') is made on the .... day of ..... 20....

BETWEEN

(1) ..... (Name of Employer)..... a company incorporated under the laws of Companies Act  
1956/2013 (with amendment from time to time) and having its Registered Office at .....(registered address of  
the Employer) ..... and its Corporate Office at .....(address of the Employer)..... (hereinafter  
called "the Employer" and also referred to as ".....(insert abbreviated name of the Employer) .....")

and

(2) M/s ..... (Name of Contractor) ....., a company incorporated under the laws of Companies Act  
1956/2013 (with amendment from time to time) and having its Principal place of business at .....(Address of  
Contractor) ..... and Registered Office at .....(Registered address of Contractor) .....  
(hereinafter called "the Contractor" and also referred to as ".....(insert abbreviated name of the Contractor)  
.....")

or

Joint Venture (JV) of M/s ..... (Name of Lead Partner) ..... (the Lead Partner of JV), a company  
incorporated under the laws of Companies Act 1956 and having its Principal place of business at  
.....(Address of Lead Partner) ..... and Registered Office at .....(Registered address of  
Lead Partner) ..... and M/s ..... (Name of Other Partner) ..... (the Partner of JV), a  
company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and  
having its Principal place of business at .....(Address of Other Partner) ..... and Registered  
Office at .....(Registered address of Other Partner) ..... (hereinafter called "the Contractor" and  
also referred to as "Joint Venture"/the 'JV'")  
(Applicable only in case of Joint Venture)

WHEREAS the Employer desires to engage the Contractor for the supply of all equipment and materials including  
taxes and duties as applicable, Type Testing to be conducted inter-alia including ..... (Indicate  
brief scope of work) ..... for the complete execution of the ..... (insert name of Package  
alongwith name of the Project)..... as detailed in the Contract Document ("the Facilities"), and the Contractor  
has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

### Article 1. Contract Documents

#### 1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and  
each shall be read and construed as an integral part of the Contract:

VOLUME – A

1. This Contract Agreement and the Appendices thereto.
2. Invitation for bids (Reference No..... dated.....)
3. Pre-bid clarification (Reference No..... dated.....)
4. Letter of Intent (Reference No..... dated.....)
5. Mutually agreed contract execution plan/PERT chart (Reference No..... dated.....)
6. Contract Performance Securities (Reference No..... dated.....)
7. Letter of Award (Reference No..... dated.....)

#### VOLUME – B

3. “Bidding Documents” comprising of the following:

The Bidding Document is a compilation of the following and shall include amendments.... to ....., if any, thereto:

- a. VOLUME – I: Condition of contract (Document Code No.: .....):
  - Section I: Invitation for Bid (Section - IFB)
  - Section II: Instructions to Bidders (Section – ITB)
  - Section III: Bid Data sheets (BDS)
  - Section IV: General Conditions of Contract (GCC)
  - Section V: Special Conditions of Contract (SCC)
  - Section VI: Sample Forms and Procedures (FP)
    1. Bid Form & Price Schedule
      - 1.1 Bid Form
      - 1.2 Price Schedule
    2. Bid Security Form
    3. Form of Notification by the Employer to the Bank
      - 3.a Applicable for forfeiture of Bank Guarantee
      - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
    4. Form of ‘Notification of Award of Contract’
      - 4(a) Form of ‘Notification of Award of Contract’ for Supply of Plant and equipment
      - 4(b) Form of ‘Notification of Award of Contract’ for Installation of Plant and equipment
    5. Form of Contract Agreement
      - Alternative A
      - Alternative B
    - 5.1 Appendix-1: Terms and Procedures of Payment: Grid/Power Substation, and 11KV, Distribution Transformer, LT and Service connection
    - 5.2 Appendix-2: Price Adjustment
    - 5.3 Appendix-3: Insurance Requirements
    - 5.4 Appendix-4: Time Schedule
    - 5.5 Appendix-5: List of Approved Subcontractors
    - 5.6 Appendix-6: Scope of Works and Supply by the Employer
    - 5.7 Appendix-7: List of Document for Approval or Review
    - 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
    6. Performance Security Form
    7. Bank Guarantee Form for Advance Payment
    8. Form of Taking over Certificate

9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in installments by Employer For performance of its contract
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture
15. Form of Undertaking by the Joint Venture Partners
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
20. Form of Certificate of Financial Parameters for QR

Section VII: Scope of works,

- b. VOLUME-II: Bid –Proposal Sheets(Document Code No.: .....):
  - Section I: Project Management System (PMS), Quality Assurance & Evaluation Mechanism, Documentation & PMA
  - Section II: Bid Forms
  - Section III: Price Schedules
- c. Volume-III: Technical Specifications, Drawings (Document Code No.: .....):
  - Section I: Technical Specifications
  - Section II: Tender Drawings
  - Section III: Technical Specifications for IPDS

## VOLUME – C

### 4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.).

#### 1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

#### 1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

- 1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

### Article 2. Contract Price and Terms of Payment

## 2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of ..... (amount in words) ..... (.....(amount in figures) .....), or such other sums as may be determined in accordance with the terms and conditions of the Contract. The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Ex-Works Price Component	
2.	Type Test Charges	Not Applicable
Total for Ex-Works Supply Contract		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

## 2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

## Article 3. Effective Date for Determining Time for Completion

### 3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from .....

## Article 4. Appendices

The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

### List of Appendices

Appendix 1	Terms and Procedures of Payment
Appendix 2	Price Adjustment
Appendix 3	Insurance Requirements
Appendix 4	Time Schedule
Appendix 5	List of Approved Subcontractors
Appendix 6	Scope of Works and Supply by the Employer
Appendix 7	List of Document for Approval or Review
Appendix 8	Guarantees, Liquidated Damages for Non-Performance

## Article 5.

The Contract Agreement No. .... has also been made on the ..... day of ..... 20...., between the Employer and the Contractor for the Services Contract (hereinafter referred to as the "Second Contract") for the subject package which includes performance of all the servicesinteralia including ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'Second Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'First Contract' as well. However, such breach or default or occurrence in the 'Second Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'First Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under this 'First Contract' when installed and commissioned by the Contractor under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and  
on behalf of the Employer

.....

Signature

.....

Title

in the presence of

Signed by for and  
on behalf of the Contractor

.....

Signature

.....

Title

in the presence of

## 5. FORM OF CONTRACT AGREEMENT

[Alternative – b]

SERVICES CONTRACT AGREEMENT BETWEEN ..... (Name of Employer) ..... AND M/s. .... (Name of Contractor) ...../JOINT VENTURE (JV) OF M/s. .... (Name of Lead Partner).... (THE LEAD PARTNER OF THE JV) AND M/s. ....(Name of Other Partner)..... (THE PARTNER OF THE JV) [Use as applicable]

THIS CONTRACT AGREEMENT No. .... (also referred to as 'Services Contract/the Second Contract') is made on the .... day of ..... 20....

BETWEEN

(1) ..... (Name of Employer)..... a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Registered Office at .....(registered address of the Employer) ..... and its Corporate Office at .....(address of the Employer)..... (hereinafter called "the Employer" and also referred to as ".....(insert abbreviated name of the Employer) .....")

and

(2) M/s ..... (Name of Contractor) ....., a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at .....(Address of Contractor) ..... and Registered Office at .....(Registered address of Contractor) ..... (hereinafter called "the Contractor" and also referred to as ".....(insert abbreviated name of the Contractor) .....")

or

Joint Venture (JV) of M/s ..... (Name of Lead Partner) ..... (the Lead Partner of JV), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at .....(Address of Lead Partner) ..... and Registered Office at .....(Registered address of Lead Partner) ..... and M/s ..... (Name of Other Partner) ..... (the Partner of JV), a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at .....(Address of Other Partner) ..... and Registered Office at .....(Registered address of Other Partner) ..... (hereinafter called "the Contractor" and also referred to as "Joint Venture"/the 'JV'")  
(Applicable only in case of Joint Venture)

WHEREAS the Employer desires to engage the Contractor for providing all the services inter-alia including ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project)..... as detailed in the Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

### Article 1. Contract Documents

#### 1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

VOLUME – A

1. This Contract Agreement and the Appendices thereto.
2. Invitation for bids (Reference No..... dated.....)
3. Pre-bid clarification (Reference No..... dated.....)
4. Letter of Intent (Reference No..... dated.....)
5. Mutually agreed contract execution plan/PERT chart (Reference No..... dated.....)
6. Contract Performance Securities (Reference No..... dated.....)
7. Letter of Award (Reference No..... dated.....)

VOLUME – B

3. “Bidding Documents” comprising of the following:

The Bidding Document is a compilation of the following and shall include amendments.... to ....., if any, thereto:

- a. VOLUME – I : Condition of contract (Document Code No.: .....):
  - Section I: Invitation for Bid (Section - IFB)
  - Section II: Instructions to Bidders (Section – ITB)
  - Section III: Bid Data sheets (BDS)
  - Section IV: General Conditions of Contract (GCC)
  - Section V: Special Conditions of Contract (SCC)
  - Section VI: Sample Forms and Procedures (FP)
    1. Bid Form & Price Schedule
      - 1.1 Bid Form
      - 1.2 Price Schedule
    2. Bid Security Form
    3. Form of Notification by the Employer to the Bank
      - 3.a Applicable for forfeiture of Bank Guarantee
      - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
    4. Form of ‘Notification of Award of Contract’
      - 4(a) Form of ‘Notification of Award of Contract’ for Supply of Plant and equipment
      - 4(b) Form of ‘Notification of Award of Contract’ for Installation of Plant and equipment
    5. Form of Contract Agreement
      - Alternative A
      - Alternative B
    - 5.1 Appendix-1: Terms and Procedures of Payment: Grid/Power Substation, and 11KV, Distribution Transformer, LT and Service connection
    - 5.2 Appendix-2: Price Adjustment
    - 5.3 Appendix-3: Insurance Requirements
    - 5.4 Appendix-4: Time Schedule
    - 5.5 Appendix-5: List of Approved Subcontractors
    - 5.6 Appendix-6: Scope of Works and Supply by the Employer
    - 5.7 Appendix-7: List of Document for Approval or Review
    - 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
    6. Performance Security Form
    7. Bank Guarantee Form for Advance Payment
    8. Form of Taking over Certificate

9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in installments by Employer For performance of its contract
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture
15. Form of Undertaking by the Joint Venture Partners
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
20. Form of Certificate of Financial Parameters for QR

Section VII: Scope of works

- d. VOLUME-II: Bid –Proposal Sheets (Document Code No.: .....):
  - Section I: Project Management System (PMS), Quality Assurance & Evaluation Mechanism, Documentation & PMA
  - Section II: Bid Forms
  - Section III: Price Schedules
- e. Volume-III: Technical Specifications, Drawings (Document Code No.: .....):
  - Section I: Technical Specifications
  - Section II: Tender Drawings
  - Section III: Technical Specifications for IPDS

VOLUME – C

4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.).

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

- 1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

Article 2. Contract Price and Terms of Payment

## 2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of ..... (amount in words) ..... (.....(amount in figures) .....), or such other sums as may be determined in accordance with the terms and conditions of the Contract. The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Local Transportation, Insurance and other Incidental Services	
2.	Installation Services	
3.	Training Charges (if required)	Not Applicable
Total for Services Contract		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

## 2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

## Article 3. Effective Date for Determining Time for Completion

### 3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from .....

## Article 4. Appendices

The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

### List of Appendices

Appendix 1	Terms and Procedures of Payment
Appendix 2	Price Adjustment
Appendix 3	Insurance Requirements
Appendix 4	Time Schedule
Appendix 5	List of Approved Subcontractors
Appendix 6	Scope of Works and Supply by the Employer
Appendix 7	List of Document for Approval or Review
Appendix 8	Guarantees, Liquidated Damages for Non-Performance

## Article 5.

The Contract Agreement No. .... has also been made on the ..... day of ..... 20...., between the Employer and the Contractor for the Ex-Works Supply Contract (hereinafter referred to as the "First Contract") for the subject package which includes Ex-works supply of all equipment and

materials including Type Testing to be conducted interalia including ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'First Contract' shall automatically be deemed as a default or breach of this 'Second Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'First Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'Second Contract' as well. However, such breach or default or occurrence in the 'First Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'Second Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under the 'First Contract' when installed and commissioned by the Contractor under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and  
on behalf of the Employer

Signed by for and  
on behalf of the Contractor

.....  
Signature

.....  
Signature

.....  
Title

.....  
Title

in the presence of

in the presence of

(Separate Contract Agreements shall be executed by the Employer and the Contractor in accordance with the Construction of the Contract stipulated at BDS Clause [ITB 30.4]. The forms of Contract under both Alternative i.e., a & b shall be used).

## Appendix-1: TERMS AND PROCEDURES OF PAYMENT

- I. "Billable Items" are worked out and attached to Price Schedule. Items otherwise required for completion of work but not listed in the Price Schedule shall also be in the scope of the contractor. The costs of such "Non- billable Items" may be included in the quoted price of "Billable Items" by the bidder in the Price Schedule. The payment shall be made on billable item wise basis only as indicated in Price Schedule.
  - II. The payment to the Contractor under the contract will be made by the Employer in line with Clause 8, Section GCC, Vol.-I and as per the guidelines and conditions specified hereunder.
  - III. All progressive payments shall be released on validity of Contract Performance Security and securities against Initial Advance.
  - IV. The interest rate on advance payment shall be SBI's Base rate on the date of disbursement of advance payment. The interest accrued on interest bearing advance shall be adjusted first before releasing any payment. The interest rate shall be calculated on the daily progressive balances outstanding as on the date of recovery/adjustment i.e. on daily rest basis.
  - V. Upon award of the contract, contractor shall be free to take on the work at all the fronts or at specified fronts as advised by Project Manager.
  - VI. Unmeasured ad-hoc payment: The employer, at his discretion in exigencies, to ensure liquidity of funds with the contractor may accept un-measured ad-hoc bill of the contractor. In this method, following methodology shall be adopted:
    - a. Submission of certificate on measurement book by Project Manager that materials under consideration have been erected, tested and commissioned as per technical specification, scope of work & approved drawings.
    - b. Quantum and completion of works is certified by Project Manager jointly with contractor and eligible amount of such works are computed as per approved payment terms.
    - c. 50% of such eligible amount shall be released to the contractor immediately within a week. The amount of un-measured bill should not be more than average of previous two measured bill.
    - d. Next bill of the work shall invariably be a measured bill in which, various quantities of unmeasured bill shall be verified and measured jointly by Project Manager and contractor.
- A. Supply, Erection, Testing and Commissioning of works under DDUGJY/IPDS:
1. Advance payment (Optional):
    - i. For Ex-works Supply contract, initial interest bearing adjustable Mobilization Advance of 15% of ex-works contract cost excluding taxes and duties shall be released for all the materials in two tranches of 7.5% each, First installment of 7.5% of ex-works price component shall be released on presentation of the following:

- a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
- b. Contractor's detailed invoice.
- c. Submission and acceptance of unconditional & irrevocable part Bank Guarantees (as many number as proposed recovery installments and should be of 110% amount of each installment) in favor of employer with total amounting to 110% of total advance amount as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said Bank Guarantees shall be initially valid upto end of ninety (90) days after the scheduled month of supply of materials and shall be extended from time to time till ninety (90) days beyond revised scheduled month of supply of materials, as may be required under the Contract.
- d. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid up to ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- e. Detailed PERT Network/Bar chart and its approval by the Employer.

The bidder must utilize first advance installment of 7.5% of ex-works supply component before requesting for second advance installment. Second installment of 7.5% shall be released on presentation of contractor's invoice and satisfactory utilization certificate supported with documentary evidences of first advance installment.

- ii. For Services Contract, initial interest bearing adjustable Mobilization Advance of 10% of erection contract price excluding taxes and duties shall be released for all the works in two tranches of 5% each. First installment of 5% of total erection price shall be released on presentation of the following:
  - a. Submission of detailed invoice for advance payment.
  - b. Establishment of Contractor's site offices and certification by Engineer that satisfactory mobilization for erection exists.
  - c. Submission and acceptance of unconditional & irrevocable part Bank Guarantees (as many number as proposed recovery installments and should be of 110% amount of each installment) in favor of employer with total amounting to 110% of total advance amount as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said Bank Guarantees shall be initially valid up to end of ninety (90) days after the scheduled month of erection of materials and shall be extended from time to time till ninety (90) days beyond revised scheduled month of erection of materials, as may be required under the Contract.
  - d. Submission of an unconditional & irrevocable Bank Guarantee in favor of Employer for **ten percent (10%)** of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with Clause 34.1 of Section-ITB, Vol.-I and as per proforma attached with Section-VI of Volume-I (Conditions of Contract). The said Bank Guarantee shall be initially valid up to 90 (ninety) days after the expiry of warranty period and shall be extended from

time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.

The bidder must utilize first advance installment of 5% of total erection price before requesting for second advance installment. Second installment of 5% shall be released on presentation of contractor's invoice and satisfactory utilization certificate of first advance installment.

## 2. Progressive payments (Supply):

2.1. First Installment(60%) : Sixty percent (60%) payments against various items of price schedule 1 including 100% Excise Duty, Taxes etc shall be paid on receipt and acceptance of Materials on submission of documents indicated herein under:

- a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
- b. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid upto ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- c. Detailed Project Execution Plan/PERT chart and its approval by the Employer.
- d. Evidence of dispatch (R/R or receipted L/R)
- e. Contractor's detailed invoice & packing list identifying contents of each shipment.
- f. Invoice certifying payments of ED, Taxes for the direct transaction between Employer and Contractor,
- g. Copy of Certificate to the effect of payments of State/ Central taxes, duties, levies etc have been made against supply of materials through sub-vendors under the contract.
- h. Certified copy of Insurance policy/Insurance Certificate.
- i. Manufacturer's/Contractor's guarantee certificate of Quality.
- j. Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works. MDCC/DI shall be issued by authorized officer of Employer
- k. Manufacturer's copy of challan
- l. submission of the certificate by the Employer's representative that the item(s) have been received,
- m. Submission of certificate by Project Manager that materials have been supplied as per technical specification, scope of work & approved drawings enclosing certified copy of inspection reports and dispatch clearances.

- a. 60% of proportionate Mobilization Advance against Supply shall be adjusted while making payments of this installment. In case of delay of project, the entire mobilization advance shall get recovered from the contractor as per supply and erection contracts' works completion schedule respectively.

2.2. Second Installment (30%): Thirty percent (30%) payments against various items of price schedule 1 shall be paid on following conditions:

- a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
- b. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid upto ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- c. Detailed Project Execution Plan/PERT chart and its approval by the Employer.
- d. Evidence of dispatch (R/R or receipted L/R)
- e. Contractor's detailed invoice & packing list identifying contents of each shipment.
- f. Invoice certifying payments of ED, Taxes for the direct transaction between Employer and Contractor,
- g. Copy of Certificate to the effect of payments of State/ Central taxes, duties, levies etc have been made against supply of materials through sub-vendors under the contract.
- h. Certified copy of Insurance policy/Insurance Certificate.
- i. Manufacturer's/Contractor's guarantee certificate of Quality.
- j. Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works. MDCC/DI shall be issued by authorized officer of Employer
- k. Manufacturer's copy of challan
- l. submission of the certificate on measurement book by the Project Manager that the item(s) have been received,
- m. Submission of certificate on measurement book by Project Manager that materials under consideration have been erected, tested and commissioned as per technical specification, scope of work & approved drawings.
- n. Test check certification on Measurement Book be recorded by officers in hierarchy with the claim as per policy.  
While releasing 2<sup>nd</sup> installment of 30% supply payment following adjustment shall be made:
  - a. Balance initial mobilization advance shall be adjusted. Also, up-to-date accrued interest shall also be recovered.

- b. In case of delay of project, the entire mobilization advance shall get recovered at this stage.

### 2.3. Third and Final Installment (10%):

- a. The balance ten percent (10%) of payment against Supply contracts excluding Excise Duty, Taxes etc shall be reimbursable on successful supply, erection, testing and commissioning of the works in the project and issuance of Taking over Certificate by the Employer.
- b. 'Commissioning' for the purpose of payments shall mean satisfactory completion of all supplies, erection, commissioning checks and successful completion of all site tests and continuous energisation of the equipment/ materials at rated voltage as per the Contract and to the satisfaction/approval of the Employer.
- c. On submission of the certificate by the Project Manager that the item(s) have been received, erected, tested and commissioned.
- d. On certification by Project Manager for validity of an unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid upto ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- e. In case, for any reason not attributable to the contractor, the commissioning and charging of equipment/materials is delayed beyond 120 days of successful completion of final checking and testing of works, the balance 10% payment shall be released against an unconditional & irrevocable bank guarantee of equivalent amount initially valid till 6 months from the readiness of works for commissioning and charging at rated voltage, to be extended till 90 days beyond actual commissioning & taking over.

### 3. Progressive payments (Erection):

#### 3.1. First Installment (90%) : Ninety percent (90%) payments against Erection contracts shall be paid on erection, testing and commissioning of works and on submission of documents of all villages indicated herein under:

- a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
- b. Detailed Project Execution Plan/PERT chart and its approval by the Employer.
- c. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Erection Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid upto ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- d. Certified copy of Insurance policy/Insurance Certificate.

- e. Material reconciliation statement consisting of the materials utilized for erection, testing & commissioning vis-à-vis erection activity of the lot of villages.
- o. Submission of certificate on measurement book by Project Manager that materials under consideration have been erected, tested and commissioned as per technical specification, scope of work & approved drawings.
- p. Test check certification on Measurement Book be recorded by officers in hierarchy with the claim as per policy.

While releasing 1<sup>st</sup> installment of 90% erection payment following adjustment shall be made:

- b. 100% Mobilization Advance against Erection shall be fully adjusted while making payments of first installment. Also, up-to-date accrued interest shall also be recovered.
- c. In case of delay of project, the entire mobilization advance shall get recovered from the contractor as per supply and erection contracts' works completion schedule respectively.

### 3.2. Second and Final Installment (10%):

- a. The balance ten percent (10%) of payment against Erection contract shall be released on successful commissioning of the works in the project and issuance of Taking over Certificate of the project.
- b. 'Commissioning' for the purpose of payments shall mean satisfactory completion of all supplies, erection, commissioning checks and successful completion of all site tests and continuous energisation of the equipment/ materials at rated voltage as per the Contract and to the satisfaction/approval of the Employer.
- c. On submission of the certificate by the Project Manager that the equipment/materials have been erected, tested and commissioned.
- d. On certification by Project Manager for validity of an unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid upto ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
- e. On certification of Project Manager for reconciliation of materials and payments.
- f. On certification of Project Manager that assets under the project are created and are taken over by Employer.
- g. However, in case, for any reason solely attributable to the Owner/Employer, the commissioning of equipment/materials is delayed beyond 120 days of successful completion of final checking and testing of line for the purpose of commissioning as defined in bid documents, the balance 10% payment shall be released against an unconditional & irrevocable bank guarantee of equivalent amount initially valid till 6 months from the readiness of transmission lines/ distribution transformer/ service connections for commissioning and charging at rated voltage, to be extended till 90 days beyond actual commissioning & taking over.

## Appendix-2 : PRICE ADJUSTMENT

The prices for execution of the entire works covered under the scope of this work shall be quoted by the Bidder in the manner specified, in the BPS. The Ex-works price component, less advance will be subject to price adjustment, only for equipment/materials/items of work specifically stated under clause 1.0 below, (for which the bidder shall quote a base price), based on separate formulae as per price adjustment provisions given herein.

Prices for Ex-works price component for all other equipment/items except specified at Clause 1.0 below, Charges for Erection, Inland Freight & Insurance etc shall be FIRM and no price adjustment shall be applicable for these components for the entire duration of the Contract.

No price adjustment shall be applicable on the portion of the Contract Price payable to the Contractor as advance payment.

### 1.0 Materials and Labour portion:

#### ~~1.0.1 For ACSR Conductor ---- Deleted~~

~~The price adjustment on the Ex-works price component, less advance, of Conductor shall be as follows:-~~

$$\text{dECc} = \text{ECc} - [0.80 \times \{(A_1 - A_0) / A_0\} + 0.05 \times \{(L_1 - L_0) / L_0\}]$$

~~Where,~~

~~dECc = Price adjustment amount payable on Ex-works price of Conductor, shipment wise (if it works out negative, that would mean the amount to be recovered by the employer from the contractor);~~

~~ECc = Ex-works price for Conductor, shipment wise, less advance (Quoted Price)~~

~~A = Published price indices for EC grade aluminum ingots as published by IEEMA~~

~~L = All India consumer price index for industrial workers as published by Labour Bureau, Shimla (Govt. of India)~~

~~Fixed portion of the ex-works price component shall be 0.15. This shall not be subject to any adjustment.~~

~~In the above price adjustment formulae:-~~

~~Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices);~~

~~Subscript '1' refers to indices as on 60 days prior to date of shipment.~~

#### ~~1.0.2 For Station/ Power Transformer (Copper Wound) ---- Deleted~~

~~The price adjustment on the Ex-works price component, less advance, of Transformers shall be as follows:-~~

1.0.2.1 For power transformer (Copper wound)

$$dP = P_0 \times [0.15 + 0.23 \times (C_4/C_0) + 0.26 \times (ES_4/ES_0) + 0.08 \times (IS_4/IS_0) + 0.05 \times (IM_4/IM_0) + 0.11 \times (TB_4/TB_0) + 0.12 \times (L_4/L_0)] - P_0$$

Where,

dP = Price adjustment amount shipmentwise,

P<sub>0</sub> = Ex works price component of Transformer (Quoted Price),

C, ES, IS, IM, TB & L are the price indices for material and labour as below,

C = Price of copper wire bars, in Rupees per MT, as published by IEEMA,

ES = Price of Electrical steel sheets, C&F price of M4 grade Electrical Steel Sheets in Rupees per MT, as published by IEEMA,

IS (Iron & Steel) = Wholesale Price Index Number for 'Iron & Steel' (Base 2004-05 = 100), as published by IEEMA,

IM (Insulating Materials) = Price of Insulating Materials, as published by IEEMA,

TB = Price of Transformer Oil Base Stock (TOBS) in Rs./KL, as published by IEEMA,

L = All India Average Consumer Price Index Number, for Industrial Workers (base 2001=100) as published / declared by Labour Bureau, Shimla, GOI and circulated by IEEMA.

In the above price adjustment formulae:-

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

1.0.3 Station / Distribution Transformer (Aluminium Wound) ---- Deleted

The price adjustment on the Ex works price component, less advance, of Transformers shall be as follows:-

1.0.3.1 For station/distribution transformer(Aluminium wound) (of rating up to 160 kVA and voltage up to 33 kV)

$$dP = P_0 \times [0.13 + 0.27 \times (A_4/A_0) + 0.31 \times (ES_4/ES_0) + 0.09 \times (IS_4/IS_0) + 0.02 \times (IM_4/IM_0) + 0.06 \times (TB_4/TB_0) + 0.12 \times (L_4/L_0)] - P_0$$

Where,

dP = Price adjustment amount shipmentwise,

P<sub>0</sub> = Ex works price component of Transformer (Quoted Price),

~~G, ES, IS, IM, TB & L are the price indices for material and labour as below,~~

~~A = Published price indices for EC grade aluminum ingots as published by IEEMA~~

~~ES = Price of Electrical steel sheets, C&F price of M4 grade Electrical Steel Sheets in Rupees per MT, as published by IEEMA,~~

~~IS (Iron & Steel) = Wholesale Price Index Number for 'Iron & Steel' (Base 2004-05 = 100), as published by IEEMA,~~

~~IM (Insulating Materials) = Price of Insulating Materials, as published by IEEMA,~~

~~TB = Price of Transformer Oil Base Stock (TOBS) in Rs./KL, as published by IEEMA,~~

~~L = All India Average Consumer Price Index Number, for Industrial Workers (base 2001=100) as published / declared by Labour Bureau, Shimla, GOI and circulated by IEEMA.~~

~~In the above price adjustment formulae:-~~

~~Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),~~

~~Subscript '1' refers to indices as on 60 days prior to date of shipment.~~

#### 1.0.4 Cables

The price adjustment on the Ex-works price component, less advance, of Cables shall be as follows:

$$dP = P_0 \times \{0.85 + 0.15 \times (A_1/A_0)\} - P_0 + (M_1 - M_0),$$

Where,

dP = Price Adjustment amount per kilometer of cable,

P0 = Ex-works price per kilometer of cable (Quoted Price)

A = Price Index for PVC / XLPE as published by IEEMA,

M1-M0 = Change in metal component of the ex-works price of particular type and size of cable,

M = (Weight in MT of metal per kilometer of cable) x (published price index of metals per MT as published by IEEMA)

The bidder has to specify in his bid the metal component per km for each type and size of cable.

In the above price adjustment formulae:

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

### 1.0.5 Steel Structure

Steel structure (excluding nuts, bolts) used in fabrication work at various places in Sub-Transmission and Distribution network (such as lattice structure used in ST&D network/line, switchyard etc.), which are billable items in the Bill of quantity (BOQ) shall be covered under this head. The price adjustment formula for such structural steel items shall be as mentioned hereinafter.

The price component of the structural steel for any shipment/ dispatch comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for respective materials and labour (description and co-efficient as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/dispatch shall be computed as under:

$$EC = EC1 - EC0$$

EC1 will be computed as follows in any of appropriate manner as applicable (a or b or c):

a) For structure using both heavy and lighter angles:

$$EC1 = EC0 * [F + 0.18 * (HA1/HA0) + 0.40 * (LA1/LA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

b) For structure using only heavy angles:

$$EC1 = EC0 * [F + 0.58 * (HA1/HA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

c) For structure using only lighter angles:

$$EC1 = EC0 * [F + 0.58 * (LA1/LA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

Where

EC = Adjustment to Ex-Works price component payable to contractor for each shipment/dispatch

EC1 = Adjusted amount of Ex-works price component of Contract payable to Contractor for each shipment / dispatch.

EC0 = Ex-works price for the respective item of the Contract, Shipment/dispatch wise (quoted price).

F = Fixed portion of the ex-works/FOB component of the Contract Price (F) shall be 0.15.

HA = Price of Heavy angle steel, as published by IEEMA

LA = Price of Lighter angle steel, as published by IEEMA

Zn = Price of electrolytic high grade zinc, as published by IEEMA

L = All India average Consumer Price Index Number for Industrial Workers (base 2001=100) as published/declared by Labour Bureau, Shimla, Government of India and circulated by IEEMA.

For the indices, subscript 'o' refers to indices as on 30 days prior to date set for opening of bids. Subscript '1' refers to indices as of

- (a) two months/sixty (60) days prior to the date of shipment/dispatch for labour, and
- (b) at the expiry of two third (2/3) period from the date of Notification of Award to the date of shipment/dispatch, for material.

For the purpose of this clause the date of shipment/ dispatch shall mean the Schedule date of shipment/dispatch or actual date of shipment/dispatch, whichever is earlier. The schedule date of shipment/dispatch shall be as identified in line with provisions of Time Schedule in the Contract Agreement.

In case of shipments/ dispatches which are delayed beyond the schedule date of shipment/dispatch for reasons attributable to the Contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of shipment/dispatch and the actual date of shipment/dispatch.

Note: As per IEEMA Circular No. IEEMA(PVC)/TLT/(R)/02/2007-

- 1) Heavy Steel Angles of size 150mm\*150mm\*12mm as per IS-2062 has been categorized as Heavy Angles (HA).
- 2) Re-rolled steel angles of size 50mm\*50mm\*4 mm Lighter has been categorized as Lighter Angles (LA).
- 3) Input costs for all heavy angles of size above 110m\*110mm are deemed to be related to the price under Sr No.1.
- 4) Input costs for all lighter angles of size below & including 110m\*110mm are deemed to be related to the price under Sr No.2.

#### 1.0.6 66/11 KV & 33/11 KV Switchgear (indoor/outdoor) including 66/33/11 KV Circuit Breakers, RMU, Sectionalizer and Isolators:

The Contract Price shall be subject to price adjustment during performance of the Contract to reflect changes in the cost of labour and material components in accordance with the provisions described below.

The Ex-Works price of 66/11 KV & 33/11 KV Switchgear (Indoor/Outdoor), Circuit Breakers, RMU, Sectionalizer and Isolators excluding Mandatory Spares and Type Tests Charges (if any) will be subject to Price adjustment. The price adjustment formula for the components of the Contract Price, as mentioned above shall be as stipulated hereinafter.

The price component of the equipment for any shipment/ dispatch comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for various materials and labour (description and co-efficient as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/dispatch shall be computed as under:

$$EC = EC_1 - EC_0$$

EC<sub>1</sub> will be computed as follows:

$$EC_1 = EC_0 * [F + 0.17 * (IS_1/IS_0) + 0.18 * (C/C_0) + 0.10 * (AL_1/AL_0) + 0.13 * (ER_1/ER_0) + 0.17 * (L_1/L_0)]$$

Where

EC = Adjustment to Ex-Works price component payable to contractor for each shipment/dispatch

EC<sub>1</sub> = Adjusted amount of Ex-works price component of Contract payable to Contractor for each shipment / dispatch.

EC<sub>0</sub> = Ex-works price for the respective equipment of the Contract, shipment/dispatch wise.

F = Fixed portion of the ex-works/FOB component of the Contract Price (F) shall be 0.25.

IS = Wholesale Price Index Number for 'Iron & Steel' (Base 2004-05=100), as published by IEEMA

C = Price of copper wire bars, as published by IEEMA

AL = Price of EC grade Aluminium rods, as published by IEEMA

ER = Price of Insulating Materials (epoxy resin), as published by IEEMA

L = All India average Consumer Price Index Number for Industrial Workers (base 2001=100) as published/declared by Labour Bureau, Shimla, Government of India and circulated by IEEMA.

For the indices, subscript 'o' refers to indices as on 30 days prior to date set for opening of bids.

Subscript '1' refers to indices as of:

three months/ninety (90) days prior to the date of shipment/dispatch for labour, and

at the expiry of two third (2/3) period from the date of Notification of Award to the date of shipment/dispatch, for material.

For the purpose of this clause the date of shipment/dispatch shall mean the Schedule date of shipment/dispatch or actual date of shipment/dispatch, whichever is earlier. The schedule date of shipment/dispatch shall be as identified in line with provisions of Time Schedule in the Contract Agreement.

In case of shipments/dispatches which are delayed beyond the schedule date of shipment/dispatch for reasons attributable to the Contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of shipment/dispatch and the actual date of shipment/dispatch.

- 1.0.7 The price adjustment amount towards price components of aforesaid materials i.e. conductor, transformers, cable, Steel structure and 66/11 KV & 33/11 KV Switchgear shall be subject to a ceiling of twenty percent (20%) of Ex-works price component of the corresponding Contract Price.
- 1.0.8 For the purpose of price adjustment for Ex-works price component, the date of shipment for goods shall mean the scheduled date of shipment or actual date of shipment, whichever is earlier. Scheduled date of shipment will be ex-works date of dispatch, governed by the approved Bar Chart.
- 1.0.9 No price increase shall be allowed beyond the original delivery dates unless specifically stated in the Time Extension letter, if any, issued by the Employer. The Employer will, however, be entitled to any decrease in the Contract price which may be caused due to lower price adjustment amount in case of delivery beyond the original delivery dates. Therefore, in case of delivery of goods beyond the original delivery dates, the liability of the Employer shall be limited to the lower of the price adjustment amount which may be worked out either on scheduled date or actual date of dispatch of goods.
- 1.0.10 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.
- 1.0.11 If the price adjustment amount works out to be positive, the same is payable to the Contractor by the Employer and if it works out to be negative, the same is to be recovered by the Employer from the Contractor without any ceiling.
- 1.0.12 The Contractor shall promptly submit the price adjustment invoices for the supplies made and works executed at site, positively within three (3) months from the date of shipment/work done whether it is positive or negative.
- 1.0.13 Bids shall conform to the price adjustment provisions detailed above. Bids specifying prices for items on variable basis run the risk of rejection. A bid submitted on a fixed price basis will not be rejected but the price adjustment will be treated as zero.

### Appendix-3 : INSURANCE REQUIREMENTS

#### A) Insurances to be taken out by the Contractor

In accordance with the provisions of GCC Clause 30, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld. The inability of the insurers to provide insurance cover in the sums and with the deductibles and other conditions as set forth below, shall not absolve the Contractor of his risks and liabilities under the provisions of GCC Clause 30. However, in such a case the Contractor shall be required to furnish to the Employer documentary evidence from the insurer in support of the insurer's inability as aforesaid.

##### (a) Marine Cargo Policy/Transit Insurance Policy:

###### (I) Transit Insurance Policy for indigenous equipment

Similarly, Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment supplied from within India. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause(ITC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) extension cover shall be taken.

Amount	Deductible Limits	Parties insured	From	To
120% of Ex-work Price of all the Plant and Equipment to be supplied from within India plus Excise Duty and Sales Tax/ VAT etc., if additionally payable.	Nil	Contractor & Employer	Mfrs ware-house	Project's ware-house store at final destination

(II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

##### (b) Erection All Risk Policy/Contractor All Risk Policy:

- (I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.

Amount	Deductible limits	Parties insured	From	To
105% of Ex-work Price of all the Plant and Equipment to be supplied from within India plus Excise Duty and Sales Tax/ VAT etc., if additionally payable. and 100% of erection price component	Nil	Contractor & Employer	Receipt at site of first lot of the Plant and Equipment	Up to Operational Acceptance

- (II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.

If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

- (III) The following add-on covers shall also be taken by the Contractor:

- i) Earthquake
- ii) Terrorism
- iii) Escalation cost (approximately @10% of sum insured on annual basis)
- iv) Extended Maintenance cover for Defect Liability Period
- v) Design Defect
- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than Rs.100 crores, cover for offsite storage/fabrication (over Rs.100 crores).

- (IV) Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

Amount	Deductible limits	Parties insured	From	To
<ul style="list-style-type: none"> <li>For projects upto Rs. 100 crores, the third party liability limit shall be 10% of the project value for single occurrence/ multiple occurrences in aggregate during the entire policy period.</li> <li>For projects from Rs. 100 crores</li> </ul>	Nil	Contractor/ Sub-contractor	Receipt at site	Upto Defect Liability Period.

to Rs. 500 crores, the third party liability limit shall be Rs. 10 crores for single occurrence/multiple occurrences in aggregate during entire policy period. For projects of more than Rs.500 crores, the third party liability limit shall be Rs. 25 crores for single occurrence/multiple occurrences in aggregate during entire policy period.				
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- (V) As per GCC Clause 30.8, the cost of insurance premium is to be reimbursed to the Contractor for Owner Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) Automobile Liability Insurance

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act. Further the Contractor or its Subcontractors may also take comprehensive policy (own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) Workmen Compensation Policy:

- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Subcontractors for the project are adequately covered under the policy.

- (II) The policy may either be project specific covering all men of the Contractor and its Subcontractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Subcontractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The

insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Subcontractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) Contractor's Plant and Machinery (CPM) Insurance

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport and Workmen Compensation

Policy Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

B) Insurances to be taken out by the Employer

The Employer shall at its expense take out and maintain in effect during the performance of the Contract the following insurances.

Amount	Deductible limits	Parties Insured	From	To
_____ NIL _____				

-- End --

#### Appendix-4 : TIME SCHEDULE

1. The Project Completion Schedule shall be as follows:

Sl. No.	Activities	Duration in Months from the effective date of Contract
	Taking Over by the Employer upon successful Completion of:	
1.	Electrification works of XXXXXXXX (name of district) district in XXXXX (Name of State) under DDUGJY/IPDS [Specification No.:XXXXXXX].	24 (Twenty Four) 25% work should get completed within 9 months, 25% balance works should get completed in next 5 months, 25% balance works should get completed in next 5 months and final 25% balance works should get completed in next 5 months. However, all Un-electrified villages covered under the package shall be electrified within 6 months from date of Letter of Intent (LoI).

- 1.1 The activity(ies) under the Contractor's programme for Project Completion shall be in the form a PERT chart and shall identify the various activities like engineering, vendor finalization, placement of orders to sub-vendors, survey, Resource mobilization, erection, testing & commissioning including submission of closure proposals. Format of PERT chart is enclosed at Annexure-A. The PERT Chart shall conform to the above Project Completion Schedule.

This PERT Chart shall be discussed and agreed before Award in line with above, engineering drawing and data submission schedule shall also be discussed and finalised before Award. Liquidated damages for delay in successful Completion of the Facilities or specific part thereof (where specific parts are specified in SCC) and Operational Acceptance at rates specified in Clause 21 of GCC shall be applicable beyond the date specified above.

- 1.2 The Employer reserves the right to request minor changes in the work schedule at the time of Award of Contract to the successful Bidder.
- 1.3 The successful Bidder shall be required to prepare detailed PERT Chart and finalise the same with the Employer as per the requirement, which shall form a part of the Contract.

#### Appendix-5 : LIST OF APPROVED SUBCONTRACTORS

Prior to award of Contract, the following details shall be completed indicating those sub-contractors proposed by the Bidder by Attachment to its bid that are approved by the Employer for engagement by the Contractor during the performance of the contract.

The following Subcontractors are approved for carrying out the item of the facilities indicated. Where more than one Subcontractor is listed, the Contractor is free to choose between them, but it must notify the Employer of its choice in good time prior to appointing any selected Subcontractor. In accordance with GCC Sub-Clause 15.1, the Contractor is free to submit proposals for Subcontractors for additional items from time to time. No Subcontracts shall be placed with any such Subcontractors for additional items until the Subcontractors have been approved in writing by the Employer and their names have been added to this list of Approved Subcontractors.

Item of Facilities	Approved Subcontractors	Nationality

Further, erection portion of the contract shall not be subcontracted without the prior approval of the Employer. However, such approval shall not be necessary for engaging labour.

#### Appendix-6 : SCOPE OF WORKS AND SUPPLY BY THE EMPLOYER

The following personnel, facilities, works and supplies will be provided/supplied by the Employer, and the provisions of GCC 6, 16, 17 and 20 as well as Employer responsibilities stated in technical specifications shall apply as appropriate.

All personnel, facilities, works and supplies will be provided by the Employer in good time so as not to delay the performance of the Contractor in accordance with the approved Time Schedule and Program of Performance pursuant to GCC Sub-Clause 14.2.

Unless otherwise indicated, all personnel, facilities, works and supplies will be provided free of charge to the Contractor.

Personnel	Charge to Contractor – None
-----NIL-----	

Facilities	Charge to Contractor - None except as noted
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Electricity and Water	Charge to Contractor - as noted
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The Contractor shall be entitled to use for the purposes of the facilities such supplies of electricity and water as may be available on the Site and shall provide any apparatus necessary for such use. The Contractor shall pay the Employer at the applicable tariff plus Employer's overheads, if any, for such use. Where such supplies are not available, the Contractor shall make his own arrangement for provision of any supplies he may require.

Works	Charge to Contractor - None
-----NIL-----	

Supplies	Charge to Contractor – None
-----NIL-----	

#### Appendix-7 : LIST OF DOCUMENTS FOR APPROVAL OR REVIEW

Pursuant to GCC Sub-Clause 16.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance), the following documents for:

A. Approval

- 1.
- 2.
- 3.

B. Review

- 1.
- 2.
- 3.

Note:

Bidder shall furnish the exhaustive list, which shall be discussed and finalised for incorporation into the Contract Agreement.

Appendix-8 : GUARANTEES, LIQUIDATED DAMAGES FOR NON – PERFORMANCE

1. The equipment offered shall meet the rating and performance requirements stipulated in Technical Specification for various equipment or indicated in Data requirement.
2. The ratings and performance figures of the below mentioned equipment are guaranteed as per losses given in respective Indian Standard (up to date) by bidder.

Sl. No.	Description
A.	12/10/8/6.3/5/3.15/1.6 MVA 33/11kV, 3 ph. Power Transformer
B.	1000/630/500/315/200/100/63/25/16 KVA, 11/0.433kV, 3 phase Station & Distribution Transformer
C.	16/10KVA, 11/0.250kV, 1 phase Distribution Transformer

3. If the aforementioned guarantees are not established at factory tests, then the Employer shall reject the equipment.

## 6. PERFORMANCE SECURITY FORM

Bank Guarantee No. ....

Date.....

Contract No.....

.....[Name of Contract].....

To:[Name and address of Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract") signed on .....(insert date of the Contract)..... between M/s. XXXXX (Name of Employer), having its Registered Office at XXXXX (Registered Address of employer) ("the Employer"/" XXXXX (Name of Employer)") on behalf of XXXX (Name of owner) (hereinafter referred to as 'XXXX (Short Name of Owner)' / 'Owner'), and M/s ..... (Name of Contractor) ....., having its Principal place of business at .....(Address of Contractor) ..... and Registered Office at .....(Registered address of Contractor) ..... ("the Contractor") concerning ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project)..... [Applicable for Bank Guarantees issued by Contractor/Associate for those Contracts awarded to them]

Or

We refer to the Contract signed on .....(insert date of the Contract)..... between M/s. XXXXX (Name of Employer), having its Registered Office at XXXXX (Registered Address of employer) ("the Employer"/" XXXXX (Name of Employer)") on behalf of XXXX (Name of owner) (hereinafter referred to as 'XXXX (Short Name of Owner)' / 'Owner'), and M/s ..... (Name of Contractor) ....., having its Principal place of business at .....(Address of Contractor) ..... and Registered Office at .....(Registered address of Contractor) ..... ("the Contractor") and the Contract ("the Contract") signed on .....(insert date of the Contract)..... between XXXXX (Name of Employer)on behalf of Owner and M/s ..... (Name of Associate) ....., having its Principal place of business at .....(Address of Associate) ..... and Registered Office at .....(Registered address of Associate) ....., the Associate of the Contractor for executing the Facilities concerning ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project)..... [Applicable for Bank Guarantees to be issued by Contractor against those Contracts awarded to their Associate]

By this letter we, the undersigned, .....(insert name & address of the issuing bank) ....., a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of ..... and having its Registered/Head Office at .....(insert address of registered office of the bank)..... do hereby irrevocably guarantee payment to the Employer up to ..... i.e., Ten percent (10%) of the Contract Price until ninety (90) days beyond the Defect Liability Period i.e., upto and inclusive of ..... (dd/mm/yy).

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by the Employer duly authorized officer or the authorized officer of Owner declaring the Contractor to be in default under the Contract and without cavil or argument any sum or sums within the above named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Contractor to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to the Employer whichever is the lesser of the sum so requested or the amount then guaranteed hereunder in respect of any demand duly made hereunder prior to

expiry of the Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue until ninety (90) days beyond the Defect Liability Period of the Facilities i.e. upto and inclusive of ..... (dd/mm/yy) and shall be extended from time to time for such period (not exceeding one year), as may be desired by M/s. .... on whose behalf this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made hereunder after such expiry or after the aggregate of the sums paid by us to the Employer shall equal the sums guaranteed hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature\_\_\_\_\_

Name\_\_\_\_\_

Designation\_\_\_\_\_

POA Number\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

Fax Number\_\_\_\_\_

email \_\_\_\_\_

Common Seal of the Bank\_\_\_\_\_

Witness:

Signature\_\_\_\_\_

Name\_\_\_\_\_

Address\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

email \_\_\_\_\_

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph for limitation of liability, the following may be added at the end of the proforma of the Bank Guarantee [i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee]:

Quote

"Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed \_\_\_\_\_ (value in figures)\_\_\_\_\_ [\_\_\_\_\_ (value in words)\_\_\_\_\_].
2. This Bank Guarantee shall be valid upto \_\_\_\_\_(validity date)\_\_\_\_\_.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before \_\_\_\_\_ (validity date) \_\_\_\_\_."

Unquote

7. BANK GUARANTEE FORM FOR ADVANCE PAYMENT

Bank Guarantee No. ....

Date.....

Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract") signed on .....(insert date of the Contract)..... between you and M/s ..... (Name of Contractor) ....., having its Principal place of business at .....(Address of Contractor) ..... and Registered Office at .....(Registered address of Contractor) ..... ("the Contractor") concerning ..... (Indicate brief scope of work) ..... for the complete execution of the ..... (insert name of Package alongwith name of the Project).....

Whereas, in accordance with the terms of the said Contract, the Employer has agreed to pay or cause to be paid to the Contractor an Advance Payment in the amount of .....(Amount in figures and words).....

By this letter we, the undersigned, .....(insert name & address of the issuing bank) ....., a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of ..... and having its Registered/Head Office at .....(insert address of registered office of the bank)..... do hereby irrevocably guarantee repayment of the said amounts upon the first demand of the Employer without cavil or argument in the event that the Contractor fails to commence or fulfill its obligations under the terms of the said Contract, and in the event of such failure, refuses to repay all or part (as the case may be) of the said advance payment to the Employer.

Provided always that the Bank's obligation shall be limited to an amount equal to the outstanding balance of the advance payment, taking into account such amounts, which have been repaid by the Contractor from time to time in accordance with the terms of payment of the said Contract as evidenced by appropriate payment certificates.

This Guarantee shall remain in full force from the date upon which the said advance payment is received by the Contractor upto ninety (90) days beyond the date on which the entire advance so advanced alongwith the interest if any due thereon has been fully adjusted in terms of the Contract i.e., upto of ninety (90) days beyond the date of Completion of the Facilities under the Contract. This Guarantee may be extended from time to time, as may be desired by M/s. .... on whose behalf this Guarantee has been issued.

Any claims to be made under this Guarantee must be received by the Bank during its period of validity, i.e. upto ninety (90) days beyond the date of Completion of the Facilities by the Employer i.e. upto and inclusive of ..... (dd/mm/yy).

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature\_\_\_\_\_

Name\_\_\_\_\_

Designation\_\_\_\_\_

POA Number\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

Fax Number\_\_\_\_\_

email \_\_\_\_\_

Common Seal of the Bank\_\_\_\_\_

Witness:

Signature\_\_\_\_\_

Name\_\_\_\_\_

Address\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

email \_\_\_\_\_

Note:

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph for limitation of liability, the following may be added at the end of the proforma of the Bank Guarantee [i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee]:

Quote

"Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed \_\_\_\_\_ (value in figures)\_\_\_\_\_ [\_\_\_\_\_ (value in words)\_\_\_\_\_].
2. This Bank Guarantee shall be valid upto \_\_\_\_\_(validity date)\_\_\_\_\_.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before \_\_\_\_\_ (validity date) \_\_\_\_\_."

Unquote



8. FORM OF TAKING OVER CERTIFICATE

Date.....  
Name of Contract.....  
Contract No.....

To :

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated ..... relating to the ..... (insert brief description of the Facilities)..... we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below :

1. Description of the Facilities or part thereof .....
2. Date of Completion : .....

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defects Liability Period.

Very truly yours,

Title  
(Project Manager)

9. FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN ONE LOT BY .....(abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this..... day of ..... 20..... by ..... a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/proprietary concern having its Registered Office at.....(hereinafter called as 'Contractor' or "Obligor" which expression shall include its successors and permitted assigns) in favour of ..... (insert name of the Employer)....., a Company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at .....(insert registered address of the Employer) and its project at ..... (hereinafter called ".....(abbreviated name of the Employer)....." which expression shall include its successors and assigns):

WHEREAS .....(abbreviated name of the Employer)..... has awarded to the Contractor a Contract for..... vide its Notification of Award/Contract No..... dated..... and its Amendment No. .... (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which .....(abbreviated name of the Employer)..... is required to hand over various Equipment to the Contractor for execution of the Contract.

And WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of .....(abbreviated name of the Employer)..... for the Equipment handed over to it by .....(abbreviated name of the Employer)..... for the purpose of performance of the Contract/Erection portion of the contract (hereinafter called the "Equipment").

AND THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of various Equipment as mentioned in the Contract, valued at (amount in words.....) handed over to the Contractor for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep .....(abbreviated name of the Employer)..... indemnified, for the full value of the Equipment. The Contractor hereby acknowledges receipt of the Equipment as per despatch title documents handed over to the Contractor duly endorsed in their favour and detailed in the Schedule appended hereto. It is expressly understood by the Contractor that handing over of the despatch title documents in respect of the said Equipments duly endorsed by .....(abbreviated name of the Employer)..... in favour of the Contractor shall be construed as handing over of the Equipment purported to be covered by such title documents and the Contractor shall hold such Equipment in trust as a Trustee for and on behalf of .....(abbreviated name of the Employer).....
2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at .....(abbreviated name of the Employer)..... project Site against all risks whatsoever till the Equipment are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by .....(abbreviated name of the Employer)..... The Contractor undertakes to keep .....(abbreviated name of the Employer)..... harmless against any loss or damage that may be caused to the Equipment.
3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work of purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.

4. That .....(abbreviated name of the Employer)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employee or Employer's Representative in this regard. Further, .....(abbreviated name of the Employer)..... shall always be free at all times to take possession of the Equipment in whatever form the equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of .....(abbreviated name of the Employer)..... to return the equipment without any demur or reservation.
  
5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at his own cost and/or shall pay the amount of loss to .....(abbreviated name of the Employer)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to .....(abbreviated name of the Employer)..... against the Contractor under the Contract and under this Indemnity Bond.
  
6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of .....(abbreviated name of the Employer)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorized representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE

Particulars of the Equipment handed over	Quantity	Particulars of Despatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		

For and on behalf of  
M/s.....

WITNESS

1. Signature.....

Name.....

Address.....

2. Signature.....

Name.....

Address.....

Signature.....

Name.....

Address.....

Authorised representative

(Common Seal)

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

10. FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN INSTALLMENTS BY .....(abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this ..... day of ..... 20..... by ..... a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/proprietary concern having its Registered Office at .....(hereinafter called as 'Contractor' or 'Obligor' which expression shall include its successors and permitted assigns) in favour of ..... (insert name of the Employer)....., a company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at .....(insert registered address of the Employer)..... and its project at ..... (hereinafter called ".....(abbreviated name of the Employer)....." which expression shall include its successors and assigns):

WHEREAS .....(abbreviated name of the Employer)..... has awarded to the Contractor a Contract for .....vide its Notification of Award/Contract No. ....dated .....and Amendment No. .... (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which .....(abbreviated name of the Employer)..... is required to handover various Equipment to the Contractor for execution of the Contract.

AND WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of .....(abbreviated name of the Employer)..... for the Equipment handed over to it by .....(abbreviated name of the Employer)..... for the purpose of performance of the contract/Erection portion of the Contract (hereinafter called the "Equipment".)

NOW THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of various Equipments as mentioned in the Contract, valued at (amount in words \_\_\_\_\_) to be handed over to the Contractor in installments from time to time for the purpose of performance of the contract, the Contractor hereby undertakes to indemnify and shall keep .....(abbreviated name of the Employer)..... indemnified, for the full value of Equipment. The Contractor hereby acknowledges receipt of the initial installment of the equipment per details in the schedule appended hereto. Further, the Contractor agrees to acknowledge receipt of the subsequent installments of the Equipment as required by .....(abbreviated name of the Employer)..... in the form of Schedules consecutively numbered which shall be attached to this Indemnity bond so as to form integral parts of this Bond. It is expressly understood by the Contractor that handing over the despatch title documents in respect of the said Equipments duly endorsed by .....(abbreviated name of the Employer)..... in favour of the Contractor shall be construed as handing over the Equipment purported to be covered by such title documents and the Contractor shall hold such Equipments in trust as a Trustee for and on behalf of .....(abbreviated name of the Employer).....
2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at .....(abbreviated name of the Employer)..... project Site against all risks whatsoever till the Equipment are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by .....(abbreviated name of the Employer)..... The Contractor undertakes to keep .....(abbreviated name of the Employer)..... harmless against any loss or damage that may be caused to the Equipment.
3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia

constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.

4. That .....(abbreviated name of the Employer)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employer or Employer's Representative in this regard. Further, .....(abbreviated name of the Employer)..... shall always be free at all times to take possession of the Equipment in whatever form the Equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of .....(abbreviated name of the Employer)..... to return the equipment without any demur or reservation.
5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at its own cost and/or shall pay the amount of loss to .....(abbreviated name of the Employer)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to .....(abbreviated name of the Employer)..... against the Contractor under the Contract and under this Indemnity Bond.
6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of .....(abbreviated name of the Employer)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE No. 1

Particulars of the Equipment handed over	Quantity	Particulars of Despatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		

For and on behalf of  
M/s.....

WITNESS

1. Signature.....  
  
Name.....  
  
Address.....

Signature.....  
  
Name.....  
  
Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

11. FORM OF AUTHORISATION LETTER

Ref. No:

Date :

To

M/s.....  
.....  
.....

REF.: Contract No. .... dated ..... for ..... awarded by ....(insert name of the Employer).....

Dear Sir,

Kindly refer to Contract No. .... dated ..... for ..... You are hereby authorised on behalf of ..... (Name of Employer)..... a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Registered Office at .....(registered address of the Employer) ..... and its Project at ..... to take physical delivery of materials/equipments covered under Despatch Document/Consignment Note No. ....\* ..... dated .....and as detailed in the enclosed schedule for the sole purpose of successful performance of the aforesaid contract and for no other purpose, whatsoever.

(Signature of Project Authority)\*\*

Designation.....

Date.....

Encl: As Above.

\*\* To be signed not below the rank of Manager.

\* Mention LR/RR No.

Schedule of Material/Equipment covered under Despatch Title Document (RR No./LR No. ....)

Sl. No.	Contract Name	NOA No./ CA No.	Description of Materials/ Equipments	Spec. No.	Qty.	Value	Remarks

--	--	--	--	--	--	--	--

(Signature of the Project Authority)

(Designation) .....

(Date) .....

12. FORM OF TRUST RECEIPT FOR PLANT, EQUIPMENT AND MATERIALS RECEIVED

We M/s. ....(insert name of the Contractor) ..... having our Principal place of business at ..... having been awarded a Contract No. .... dated ..... for ..... (insert Package name alongwith name of the Project)..... by .....(insert name of the Employer) .....

We do hereby acknowledge the receipt of the Plant, Equipment and Materials as are fully described and mentioned under Documents of Title/RR/LR etc. and in the schedule annexed hereto, which shall form an integral part of this receipt as "Trustee" of ..... (insert name of the Employer)..... The aforesaid materials etc. so received by us shall be exclusively used in the successful performance of the aforesaid Contract and for no other purpose whatsoever. We undertake not to create any charge, lien or encumbrance over the aforesaid materials etc, in favour of any other person/institution(s)/Banks.

For M/s .....  
(Contractor's Name)

Dated : .....

(AUTHORISED SIGNATORY)

Place : .....

SEAL OF COMPANY

13. FORM OF EXTENSION OF BANK GUARANTEE

Ref. No.....

Dated:.....

To: [Name and address of the Employer]

Dear Sirs,

Sub.: Extension of Bank Guarantee No. .... dated ..... for ....., issued to you on behalf of M/s. ....(insert name of the Contractor) ..... in respect of Contract No. .... dated ..... for ..... (insert name of the Package alongwith the Project name) ..... (hereinafter called original Bank Guarantee).

At the request of M/s..... (insert name of the Contractor) ....., We .....(insert name & address of the issuing bank) ....., a Bank organized under the laws of ..... and having its Registered/Head Office at .....(insert address of registered office of the bank)..... do hereby extend our liability under the above-mentioned Guarantee No. .... Dated ..... for a further period of ..... Years/Months from ..... to expire on ..... Except as provided above, all other terms and conditions of the original Bank Guarantee No. .... dated ..... shall remain unaltered and binding.

Please treat this as an integral part of the original Guarantee to which it would be attached.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature\_\_\_\_\_

Name\_\_\_\_\_

Designation\_\_\_\_\_

POA Number\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

Fax Number\_\_\_\_\_

email \_\_\_\_\_

Common Seal of the Bank\_\_\_\_\_

Witness:

Signature\_\_\_\_\_

Name\_\_\_\_\_

Address\_\_\_\_\_

Contact Number(s): Tel.\_\_\_\_\_ Mobile\_\_\_\_\_

email \_\_\_\_\_

Note:

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.

#### 14. FORM OF POWER OF ATTORNEY FOR JOINT VENTURE

KNOW ALL MEN BY THESE PRESENTS THAT WE , the Partners whose details are given hereunder ..... have formed a Joint Venture under the laws of ..... and having our Registered Office(s)/Head Office(s) at ..... (hereinafter called the 'Joint Venture' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s ..... being the Partner in-charge do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of ..... and having its Registered/Head Office at ..... as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorised Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Joint Venture in regard to Specification No..... Package ..... the bids for which have been invited by ..... (insert name of the Employer alongwith address) ..... (hereinafter called the 'Employer') to undertake the following acts :

- i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Joint Venture".
- ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Joint Venture".
- iii) To do any other act or submit any document related to the above.
- iv) To receive, accept and execute the Contract for and on behalf of the "Joint Venture".

It is clearly understood that the Partner In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Joint Venture hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/Authorised Representatives/Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf of the Joint Venture by virtue of this Power of Attorney and the same shall bind the Joint Venture as if done by itself.

IN WITNESS THEREOF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this ..... day of ..... under the Common Seal(s) of their Companies.

for and on behalf of the  
Partners of Joint Venture

.....  
.....  
.....

The Common Seal of the above Partners of the Joint Venture:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature.....  
Name .....  
Designation .....  
Occupation .....
2. Signature.....  
Name .....  
Designation .....  
Occupation .....

Note:

1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Agreement shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.

# 15. FORM OF UNDERTAKING BY THE JOINT VENTURE PARTNERS

THIS JOINT DEED OF UNDERTAKING executed on this..... day of..... Two Thousand and..... by ..... a company incorporated under the laws of ..... and having its Registered Office at .....(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s.....a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns ) and M/s..... a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award}] against the Specification No..... for ..... (insert name of the package alongwith project name) .....of ..... (insert names of the Employer) ....., a Company incorporated under the Companies Act of 1956/2013 (with amendment from time to time) having its registered office at .....(insert registered address of the Employer)..... (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated.....

AND WHEREAS the Employer invited bids as per the above mentioned Specification for the design, manufacture, supply, erection, testing and commissioning of Equipment/ Materials stipulated in the Bidding Documents under ..... (insert name of the package alongwith project name) .....

AND WHEREAS Clause 9.3, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure-A to BDS forming part of the Bidding Documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in Annexure-A to BDS, as applicable may bid, provided, the Joint Venture fulfills all other requirements under Clause 9.3 (c) of ITB and Qualification Criteria in Annexure-A to BDS and in such a case, the Bid Forms shall be signed by all the partners so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that this Undertaking shall be attached to the bid and the Contract performance guarantee will be as per the format enclosed with the Bidding Documents without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No.....dated ..... by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of Clause 9.3, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure-A to BDS, has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake:

1. In requirement of the award of the Contract by the Employer to the Joint Venture Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful performance of the equipment in accordance with the Contract:
2. In case of any breach or default of the said Contract by any of the parties to the Joint Venture, the party(s) do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.

3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of these presents undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(s), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Employer.
4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims rising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix – I (to be suitably appended by the Parties alongwith this Undertaking in its bid) to this Deed of Undertaking. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for submission of the bid and performance of the Contract and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Joint Venture, other than the express provisions of the Contract.
7. This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.
8. In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsible for furnishing a Contract performance security from a bank in favour of the Employer in the currency/currencies of the Contract.
9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHEREOF, the Parties to this Deed of Undertaking have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

Common Seal of .....  
has been affixed in my/ our  
presence pursuant to Board of  
Director's Resolution dated .....

For Lead Partner (Party No.-1)  
For and on behalf of M/s  
.....

Name .....

Designation .....

Signature .....

(Signature of the authorized  
representative)

WITNESS :

I. ....

II. ....

Common Seal of .....  
has been affixed in my/ our  
presence pursuant to Board of  
Director's Resolution dated .....

Name .....

Designation .....

Signature .....

For Party No.-2  
For and on behalf of M/s.....

(Signature of the authorized  
representative)

WITNESS :

I. ....

II. ....

Common Seal of .....  
has been affixed in my/ our  
presence pursuant to Board of  
Director's Resolution dated .....

Name .....

Designation .....

Signature .....

For Party No.-3  
For and on behalf of M/s.  
.....

(Signature of the authorized  
representative)

WITNESS :

I. ....

II. ....

Note:

1. For the purpose of executing the Joint Deed of Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.

16. FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

BANK CERTIFICATE

This is to certify that M/s. \_\_\_\_\_ (insert Name & Address of the Contractor) \_\_\_\_\_ who have submitted their bid to .....(insert name of the Employer)..... against their tender specification Vide ref. No. .... for ..... (insert name of the package alongwith the project name) ..... is our customer for the past ..... years.

Their financial transaction with our Bank have been satisfactory. They enjoy the following fund based and non fund based limits including for guarantees, L/C and other credit facilities with us against which the extent of utilization as on date is also indicated below:

Sl. No.	Type of Facility	Sanctioned Limit as on Date	Utilisation as on Date

This letter is issued at the request of M/s. \_\_\_\_\_.

Signature \_\_\_\_\_

Name of Bank \_\_\_\_\_

Name of Authorised Signatory \_\_\_\_\_

Designation \_\_\_\_\_

Phone No. \_\_\_\_\_

Address \_\_\_\_\_

SEAL OF THE BANK

17. FORM OF OPERATIONAL ACCEPTANCE

Date.....

Name of Contract.....

Contract No.....

To :

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated ..... relating to the ..... (insert brief description of the Facilities)..... we hereby notify you that the we System tests and Acceptance tests of the following part(s) of the Facilities were satisfactorily completed on the date specified below :

1. Description of the Facilities or part thereof .....  
.....
2. Date of Operational Acceptance:.....

This letter does not relieve you of your obligation during the Defects Liability Period and Latent Defect warranty.

Very truly yours,

Title  
(Project Manager)

18. FORM OF SAFETY PLAN TO BE SUBMITTED BY THE CONTRACTOR WITHIN SIXTY DAYS OF AWARD OF CONTRACT

[TO BE EXECUTED ON A NON JUDICIAL STAMP PAPER WORTH RS. TWENTY ONLY]

SAFETY PLAN

THIS SAFETY PLAN is made this ..... day of ..... 20..... by ..... a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/proprietary concern having its Registered Office at .....[to be modified suitably for JV Contractor] (hereinafter called as 'Contractor' which expression shall include its successors and permitted assigns) for approval of .....(insert name of the Employer)....., a company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at .....(insert registered address of the Employer)..... for its Contract for ..... (insert package name, project name alongwith Specification number of the Contract).....

WHEREAS .....(abbreviated name of the Employer)..... has awarded to the Contractor the aforesaid Contract vide its Notification of Award/Contract No. .... dated .....and Amendment No. .... (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which the Contractor is required to submit 'Safety Plan' alongwith certain documents to the Engineer In-Charge/Project Manager of the Employer within Sixty (60) days of Notification of Award for its approval.

NOW THEREFORE, the Contractor undertakes to execute the Contract as per the safety plan as follows:

1. THAT the Contractor shall execute the works as per provisions of Bidding Documents including those in regard to Safety Precautions / provisions as per statutory requirements.
2. THAT the Contractor shall execute the works in a well planned manner from the commencement of Contract as per agreed mile stones of work completion schedule so that planning and execution of construction works goes smoothly and consistently through out the contract duration without handling pressure in last quarter of the financial year/last months of the Contract and the shall be finalized in association with XXXX (Name of Employer) Engineer In-charge/Project Manager from time to time as required.
3. THAT the Contractor has prepared the safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site, which is enclosed at Annexure – 1A (SP) for acceptance and approval of Engineer In-charge/Project Manager. The Contractor shall ensure that on approval of the same from Engineer In-charge/Project Manager , the approved copies will be circulated to Employer's personnel at site [Supervisor(s)/Executive(s)] and Contractor's personnel at site [Gang leader, supervisor(s) etc.] in their local language / language understood by gang.

THAT the Contractor has prepared minimum manpower deployment plan, activity wise as stated above, which is enclosed at Annexure – 1B (SP) for approval of Engineer In-charge/Project Manager.

4. THAT the Contractor shall ensure while executing works that they will deploy minimum 25% of their own experienced work force who are on the permanent roll of the company and balance 75% can be a suitable mixed with the hired gangs / local workers / casual workers if required. The above balance 75% work force should be provided with at least 10 days training by the construction agencies at sites and shall be issued with a certificate. No worker shall be engaged without a valid certificate. Hired gang workers shall also follow safe working procedures and safety norms as is being followed by company's workmen. It should also be ensured by the contractor that certified workers fitters who are climbing towers / doing stringing operations can be easily identifiable with a system like issue of Badge / Identification cards (ID cards) etc. Colour identification batches should be worn by the workers.

Contractor has to ensure that inexperience workers / unskilled workers should not be deployed for skilled job.

5. THAT the Contractor's Gang leader / Supervisor / Senior most member available at every construction site shall brief to each worker daily before start of work about safety requirement and warn about imminent dangers and precautions to be taken against the imminent dangers (Daily Safety Drill). This is to be ensured without fail by Contractor and maintain record of each gang about daily safety instructions issued to workers and put up to XXXX(Name of Employer) site In-charge for his review and record.
6. THAT the Contractor shall ensure that working Gangs at site should not be left at the discretion of their Gang Leaders who are generally hired and having little knowledge about safety. Gang leader should be experienced and well versed with the safe working procedures applicable for transmission line/ Sub Station works. In case gang is having Gang leader not on permanent roll of the company then additional Supervisor from company's own roll having thorough knowledge about the works would be deployed so as to percolate safety instructions upto the grass root level in healthy spirits. Contractor has to ensure close supervision while executing critical locations of transmission lines / sub stations and ensures that all safety instructions are in place and are being followed.
7. THAT the Contractor shall maintain in healthy and working condition all kind of Equipments / Machineries / Lifting tools / Lifting tackles / Lifting gears / All kind of Ropes including wire ropes / Polypropylene ropes etc. used for Lifting purpose during execution of the project and get them periodically examined and load tested for safe working load in accordance with relevant provisions and requirement of Building & other construction workers Regulation of Employment and Conditions of Services Act and Central Rule 1998 or latest, Factories Act 1948 or latest, Indian Electricity Act 2003 before start of the project. A register of such examinations and tests shall be properly maintained by the contractor and will be promptly produced as and when desired by the Engineer In-charge/Project Manager or by the person authorised by him. The Contractor has to ensure to give special attention on the formation / condition of eye splices of wire rope slings as per requirement of IS 2762 Specification for wire rope slings and sling legs.

THAT the Contractor has prepared a list of all Lifting machines, lifting Tools / Lifting Tackles / Lifting Gears etc. / All types of ropes and Slings which are subject to safe working load is enclosed at Annexure – 2 (SP) for review and approval of Engineer In-charge/Project Manager.

8. THAT the Contractor has to procure sufficient quantity of Personal Protective Equipment (PPE) conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of Engineer-in-charge/Project Manager of XXXX (Name of the Employer). The Contractor's Site Supervisor/ Project Manager has to ensure that all workmen must use Personal Protective Equipment at site. The Contractor shall also ensure that Industrial Safety helmets are being used by all workmen at site irrespective of their working (at height or on ground). The Contractor shall further ensure use of safety shoes by all ground level workers and canvas shoes for all workers working at height, Rubber Gum Boots for workers working in rainy season and concreting job, Use of Twin Lanyard Full body Safety Harness with attachment of light weight such as aluminium alloy etc. and having features of automatic locking arrangement of snap hook, by all workers working at height for more than three meters and also for horizontal movement on tower shall be ensured by contractor. The Contractor shall not use ordinary half body safety harness at site. The Contractor has to ensure use of Retractable type fall arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., Use of Mobile fall arrestor for ascending / descending from tower by all workers. The contractor has to provide cotton / leather hand gloves as per requirement, Electrical Resistance Hand gloves for operating electrical installations / switches, Face shield for protecting eyes while doing welding works and Dust masks to workers as per requirement. The Contractor will have to take action against the workers not using Personal Protective Equipment at site and those workers shall be asked to rest for that day and also their Salary be deducted for that day. XXXX (Name of the Employer) may issue warning letter to Project Manager of contractor in violation of above norms.

THAT the Contractor shall prepare a detailed list of PPEs, activity wise, to commensurate with manpower deployed, which is enclosed at Annexure – 3 (SP) for review and approval of Engineer In-charge/Project Manager. It shall also be ensured that the sample of these equipment shall be got approved from XXXX (Name of the Employer) supervisory staff before being distributed to workers. The contractor shall submit relevant test certificates as per IS / International Standard as applicable to PPEs used during execution of work. All the PPE's to be distributed to the workers shall be checked by XXXX (Name of the Employer) supervisory staff before its usage.

The Contractor also agrees for addition / modification to the list of PPE, if any, as advised by Engineer In-Charge/Project Manager.

9. THAT the Contractor shall procure, if required sufficient quantity of Earthing Equipment / Earthing Devices complying with requirements of relevant IEC standards (Generally IECs standards for Earthing Equipments / Earthing Devices are – 855, 1230, 1235 etc.) and to the satisfaction of Engineer In-Charge/Project Manager and contractor to ensures to maintained them in healthy condition.

THAT the Contractor has prepared / worked out minimum number of healthy Earthing Equipments with Earthing lead confirming to relevant IS / European standards per gang wise during stringing activity/as per requirement, which is enclosed herewith at Annexure – 4 (SP) for review and acceptance of Engineer In-Charge/Project Manager prior to execution of work.

10. THAT the Contractor shall provide communication facilities i.e. Walky – Talkie / Mobile Phone, Display of Flags / whistles for easy communication among workers during Tower erection / stringing activity, as per requirement.
11. THAT the Contractor undertakes to deploy qualified safety personnel responsible for safety as per requirements of Employer/Statutory Authorities.

THAT 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 qualified safety officer having diploma in safety to supervise safety aspects of the equipment and workmen who will coordinate with Engineer In-charge /Project Manager/Safety Co-ordinator of the Employer. In case of work being carried out through sub contractors the sub – contractor's workmen / employees will also be considered as the contractor's employees / workmen for the above purpose. If the number of workers are less than 250 then one qualified safety officer is to be deployed for each contract. He will report directly to his head of organization and not the Project Manager of contractor He shall also not be assigned any other work except assigning the work of safety. The curriculum vitae of such person shall be got cleared from XXXX (Name of the Employer) Project Manager / Construction staff.

The name and address of such safety officers of contractor will be promptly informed in writing to Engineer In-charge with a copy to safety officer - In-charge before start of work or immediately after any change of the incumbent is made during the currency of the contract. The list is enclosed at Annexure – 5A (SP).

THAT the Contractor has also prepared a list including details of Explosive Operator (if required), Safety officer / Safety supervisor / nominated person for safety for each erection / stringing gang, list of personnel trained in First Aid Techniques as well as copy of organisation structure of the Contractor in regard to safety. The list is enclosed at Annexure – 5B (SP).

12. The Project Manager 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 Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.

13. THAT, if, any Employer's Engineer/ supervisor at site observes that the Contractor is failing to provide safe working environment at site as per agreed Safety Plan / XXXX (Name of the Employer) Safety Rule/ Safety Instructions / Statutory safety requirement and creates hazardous conditions at site and there is possibility of an accident to workmen or workmen of the other contractor or public or the work is being carried out in an un safe manner or he continues to work even after being instructed to stop the work by Engineer / Supervisor at site / RHQ / Corp. Centre, the Contractor shall be bound to pay a penalty of Rs. 10,000/- per incident per day till the instructions are complied and as certified by Engineer / Supervisor of Employer at site. The work will remain suspended and no activity will take place without compliance and obtaining clearance / certification of the Site Engineer / Supervisor of the Employer to start the work.
  
14. THAT, if the investigation committee of Employer observes any accident or the Engineer In-charge/Project Manager of the Employer based on the report of the Engineer/Supervisor of the Employer at site observes any failure on the Contractor's part to comply with safety requirement / safety rules/ safety standards/ safety instruction as prescribed by the Employer or as prescribed under the applicable law for the safety of the equipment, plant and personnel and the Contractor does not take adequate steps to prevent hazardous conditions which may cause injury to its own Contractor's employees or employee of any other Contractors or Employer or any other person at site or adjacent thereto, or public involvement because of the Contractor's negligence of safety norms, the Contractor shall be liable to pay a compensation of Rs. 10,00,000/- (Rupees Ten Lakh only) per person affected causing death and Rs. 1,00,000/- (Rupees One Lakh only) per person for serious injuries / 25% or more permanent disability to the Employer for further disbursement to the deceased family/ Injured persons. The permanent disability has the same meaning as indicated in Workmen's Compensation Act 1923 or latest. The above stipulations is in addition to all other compensation payable to sufferer as per workmen compensation Act / Rules  
  

THAT as per the Employer's instructions, the Contractor agrees that this amount shall be deducted from their running bill(s) immediately after the accident, That the Contractor understands that this amount shall be over and above the compensation amount liable to be paid as per the Workmen's Compensation Act /other statutory requirement/ provisions of the Bidding Documents.
  
15. THAT the Contractor shall submit Near-Miss-Accident report alongwith action plan for avoidance such incidence /accidents to Engineer – In-charge/ Project Manager. Contractor shall also submit Monthly Safety Activities report to Engineer – In-charge/ Project Manager and copy of the Monthly Safety Activities report also to be sent to Safety In-charge at RHQ of the Employer for his review record and instructions.
  
16. THAT the Contractor is submitting a copy of Safety Policy/ Safety Documents of its Company which is enclosed at Annexure – 6 (SP) and ensure that the safety Policy and safety documents are implemented in healthy spirit.
  
17. THAT the Contractor shall make available of First Aid Box [Contents of which shall be as per Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Rule 1998 or latest / XXXX (Name of the Employer) Guidelines)] to the satisfaction of Engineer In-Charge/ Project Manager with each gang at site and not at camp and ensures that trained persons in First Aid Techniques with each gang before execution of work.
  
18. THAT the Contractor shall submit an 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. which is enclosed at Annexure – 7 (SP) for approval of the Engineer In-Charge/ Project Manager before start of work.

19. THAT the Contractor shall organise Safety Training Programs on Safety, Health and Environment and for safe execution of different activities of works i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. for their own employees including sub contractor workers on regular basis.

The Contractor, therefore, submits copy of the module of training program, enclosed at Annexure – 9 (SP), to Engineer In-charge/Project Manager for its acceptance and approval and records maintained.

20. THAT the Contractor shall conduct safety audit, as per Safety Audit Check Lists enclosed at Annexure – 8 (SP), by his Safety Officer(s) every month during construction of Transmission Lines / Sub Stations / any other work and copy of the safety audit report will be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipments (PPEs) shall be checked individually by safety officer of contractor and issue a certificate of its healthiness or rejection of faulty PPEs and contractor has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed in the presence of XXXX (Name of the Employer) construction staff. Contractor has to ensure that each gang be safety audited at least once in two months. During safety audit by the contractor, Safety officer's feedback from XXXX (Name of the Employer) concerned shall be taken and recorded. The Employer's site officials shall also conduct safety audit at their own from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards.
  21. THAT the Contractor shall develop and display Safety Posters of construction activity at site and also at camp where workers are generally residing.
  22. THAT the Contractor shall ensure to provide potable and safe drinking water for workers at site / at camp.
  23. THAT the Contractor shall do health check up of all workers from competent agencies and reports will be submitted to Engineer In-Charge within fifteen (15) days of health check up of workers as per statutory requirement.
  24. THAT the Contractor shall submit information alongwith documentary evidences in regard to compliance to various statutory requirements as applicable which are enclosed at Annexure – 10A (SP).
- The Contractor shall also submit details of Insurance Policies taken by the Contractor for insurance coverage against accident for all employees are enclosed at Annexure – 10B (SP).
25. THAT a check-list in respect of aforesaid enclosures alongwith the Contractor's remarks, wherever required, is attached as Annexure – Check List herewith.

THE CONTRACTOR shall incorporate modifications/changes in this 'Safety Plan' necessitated on the basis of review/comments of the Engineer In-Charge/Project Manager within fourteen (14) days of receipt of review/comments and on final approval of the Engineer In-Charge/Project Manager of this 'Safety Plan', the Contractor shall execute the works under the Contract as per approved 'Safety Plan'. Further, the Contractor has also noted that the first progressive payment towards Services Contract shall be made on submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Engineer In-Charge/Project Manager.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Note:

All the annexure referred to in this "Safety Plan" are required to be enclosed by the contractor as per the attached " Check List "

1. Safety Plan is to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute such contract documents etc., (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to this Safety Plan.
2. For all safety monitoring/ documentation, Engineer In-charge / Regional In-charge of safety at RHQ will be the nodal Officers for communication.

CHECK LIST FOR SEFETY PLAN

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
1.	<p>Annexure – 1A (SP)</p> <p>Safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing &amp; commissioning, disposal of materials at site / store etc. to be executed at site.</p>	Yes/No	
2.	<p>Annexure – 1B (SP)</p> <p>Manpower deployment plan, activity wise foundation works including civil works, erection, stringing (as applicable), testing &amp; commissioning, disposal of materials at site / store etc.</p>	Yes/No	
3.	<p>Annexure – 2 (SP)</p> <p>List of Lifting Machines i.e. Crane, Hoist, Triffor, Chain Pulley Blocks etc. and Lifting Tools and Tackles i.e. D shackle, Pulleys, come along clamps, wire rope slings etc. and all types of ropes i.e. Wire ropes, Poly propylene Rope etc. used for lifting purposes along with test certificates.</p>	Yes/No	
4.	<p>Annexure – 3 (SP)</p> <p>List of Personal Protective Equipment (PPE), activity wise including the following along with test certificate of each as applicable:</p> <ol style="list-style-type: none"> <li>1. Industrial Safety Helmet to all workmen at site. (EN 397 / IS 2925) with chin strap and back stay arrangement.</li> <li>2. Safety shoes without steel toe to all ground level workers and canvas shoes for workers working on tower.</li> <li>3. Rubber Gum Boot to workers working in rainy season / concreting job.</li> <li>4. Twin lanyard Full Body Safety harness with shock absorber and leg strap arrangement for all workers working at height for more than three meters. Safety Harness should be with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook and comply with EN 361 / IS 3521 standards.</li> <li>5. Mobile fall arrestors for safety of workers during their ascending / descending from tower / on</li> </ol>	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	<p>tower. EN 353 -2 (Guided type fall arresters on a flexible anchorage line.)</p> <p>6. Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc.</p> <p>7. Providing of good quality cotton hand gloves / leather hand gloves for workers engaged in handling of tower parts or as per requirement at site.</p> <p>8. Electrical Resistance hand gloves to workers for handling electrical equipment / Electrical connections. IS : 4770</p> <p>9. Dust masks to workers handling cement as per requirement.</p> <p>10. Face shield for welder and Grinders. IS : 1179 / IS : 2553</p> <p>11. Other PPEs, if any, as per requirement etc.</p>		
5.	<p>Annexure – 4 (SP)</p> <p>List of Earthing Equipment / Earthing devices with Earthing lead conforming to IECs for earthing equipments are – (855, 1230, 1235 etc.) gang wise for stringing activity/as per requirement</p>	Yes/No	
6.	<p>Annexure – 5A (SP)</p> <p>List of Qualified Safety Officer(s) alongwith their contact details</p>	Yes/No	
7.	<p>Annexure – 5B (SP)</p> <p>Details of Explosive Operator (if required), Safety officer / Safety supervisor for every erection / stringing gang, any other person nominated for safety, list of personnel trained in First Aid as well as brief information about safety set up by the Contractor alongwith copy of organisation of the Contractor in regard to safety</p>	Yes/No	
8.	<p>Annexure – 6 (SP)</p> <p>Copy of Safety Policy/ Safety Document of the Contractor's company</p>	Yes/No	
9.	<p>Annexure – 7 (SP)</p> <p>'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing &amp; commissioning, disposal of materials at site / store etc.</p>	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
10.	Annexure – 8 (SP)  Safety Audit Check Lists ( Formats to be enclosed)	Yes/No	
11.	Annexure – 9 (SP)  Copy of the module of Safety Training Programs on Safety, Health and Environment, safe execution of different activities of works for Contractor's own employees on regular basis and sub contractor employees.	Yes/No	
12.	Annexure – 10A (SP)  Information alongwith documentary evidences in regard to the Contractor's compliance to various statutory requirements including the following:		
(i)	Electricity Act 2003  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(ii)	Factories Act 1948 or latest  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iii)	Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Act 1996 or latest) and Welfare Cess Act 1996 or latest with Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iv)	Workmen Compensation Act 1923 or latest and Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(v)	Public Insurance Liabilities Act 1991 or latest and Rules.  _____ [Name of Documentary evidence in support of	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	compliance]		
(vi)	Indian Explosive Act 1948 or latest and Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(vii)	Indian Petroleum Act 1934 or latest and Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 or latest and Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(ix)	Indian Electricity Rule 2003 and amendments if any, from time to time.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(x)	The Environment (Protection) Act 1986 or latest and Rules.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xi)	Child Labour (Prohibition & Regulation) Act 1986 or latest.  _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xii)	National Building Code of India 2005 or latest (NBC 2005).  _____ [Name of Documentary evidence in support of compliance]	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(xiii)	<p>Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line</p> <p>_____</p> <p>[Name of Documentary evidence in support of compliance]</p>	Yes/No	
(iv)	<p>Any other statutory requirement(s) [please specify]</p> <p>_____</p> <p>[Name of Documentary evidence in support of compliance]</p>	Yes/No	
13.	<p>Annexure – 10B (SP)</p> <p>Details of Insurance Policies alongwith documentary evidences taken by the Contractor for the insurance coverage against accident for all employees as below:</p>		
(i)	<p>Under Workmen Compensation Act 1923 or latest and Rules.</p> <p>_____</p> <p>[Name of Documentary evidence in support of insurance taken]</p>	Yes/No	
(ii)	<p>Public Insurance Liabilities Act 1991 or latest</p> <p>_____</p> <p>[Name of Documentary evidence in support of insurance taken]</p>	Yes/No	
(iii)	<p>Any Other Insurance Policies</p> <p>_____</p> <p>[Name of Documentary evidence in support of insurance taken]</p>	Yes/No	

\_\_\_\_\_

19. FORM OF JOINT DEED OF UNDERTAKING BY THE SUB-CONTRACTOR ALONGWITH THE BIDDER/CONTRACTOR

THIS DEED OF UNDERTAKING executed this ..... day of ..... Two Thousand and ..... by M/s. ...., a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Sub-contractor" which expression shall include its successors, executors and permitted assigns), and M/s. ...., a Company incorporated under the laws of ..... having its Registered Office at ..... (hereinafter called the "Bidder"/"Contractor" which expression shall include its successors, executors and permitted assigns) in favour of XXXX (Name of the Employer) a Company incorporated under the Companies Act of 1956/2013 (with amendment from time to time) having its registered office at XXXX (Registered Address of the Employer) (hereinafter called the "Employer" which expression shall include its successors, executors and permitted assigns)

WHEREAS the "Employer" invited Bid as per its Specification No.....for DDUGJY/IPDS works of ..... including installation of Sub-stations, lines, bays, DTs and providing service connections etc.

AND WHEREAS Clause No. ...., Section ....., of ....., Vol.-I... forming part of the Bid Documents inter-alia stipulates that the Bidder and/or Sub-contractor must fulfill the Qualifying Requirements and be jointly and severally bound and responsible for the quality and timely execution of DDUGJY/IPDS works in the event the Bid submitted by the Bidder is accepted by the Employer resulting in a Contract.

AND WHEREAS the Bidder has submitted its Bid to the Employer vide Proposal No. .... dated ..... based on tie-up with the Sub-contractor for execution of aforesaid DDUGJY/IPDS works.

NOW THEREFORE THIS UNDERTAKING WITNESSETH as under:

- 1.0 In consideration of the award of Contract by the Employer to the Bidder (hereinafter referred to as the "Contract") we, the Sub-contractor and the Bidder/Contractor do hereby declare that we shall be jointly and severally bound unto the XXXX (Name of the Employer), for execution of DDUGJY/IPDS works in accordance with the Contract Specifications.
- 2.0 Without in any way affecting the generality and total responsibility in terms of this Deed of Undertaking, the Sub-contractor hereby agrees to depute their representatives from time to time to the Employer's Project site as mutually considered necessary by the Employer, Bidder/Contractor and the Sub-contractor to ensure proper quality, manufacture, testing and supply on FOR destination delivery at site basis and successful performance of DDUGJY/IPDS works in accordance with Contract Specifications. Further, if the Employer suffers any loss or damage on account of non-performance of the material fully meeting the performance guaranteed as per Bid Specification in terms of the contract. We the Sub-contractor and the Contractor jointly and severally undertake to pay such loss or damages to the Employer on its demand without any demur.
- 3.0 This Deed of Undertaking shall be construed and interpreted in accordance with the laws of India and the Courts in xxxxx (Headquarter of Employer) shall have exclusive jurisdiction in all matters arising under the Undertaking.
- 4.0 We, the Bidder/Contractor and Sub-contractor agree that this Undertaking shall be irrevocable and shall form an integral part of the Contract and further agree that this Undertaking shall continue to be enforceable till the Employer discharges it. It shall become operative from the effective date of Contract.

IN WITNESS WHEREOF the Sub-contractor and/or the Bidder/Contractor have through their Authorised Representatives executed these presents and affixed Common seals of their respective Companies, on the day, month and year first above mentioned.

WITNESS	(For Sub-contractor)
Signature .....	(Signature of the authorized representative)
Name .....	Name .....
Office Address .....	Common Seal of Company .....

WITNESS	(For Bidder)
Signature .....	(Signature of the authorized representative)
Name .....	Name .....
Office Address .....	Common Seal of Company .....

Note:

1. For the purpose of executing the Deed of Joint Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of executant(s).
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.
3. This Deed of Joint Undertaking duly attested by Notary Public of the place(s) of the respective executant(s), shall be submitted alongwith the bid.
4. In case the bid is submitted by a Joint Venture (JV) of two or more firms as partners, then the Joint deed of undertaking shall be modified accordingly.

20. FORM OF CERTIFICATE OF FINANCIAL PARAMETERS FOR QR

(as per clause ref. no. 1.02 and 2.0 of Annexure-A(BDS))

(Rupees in Lakhs)

S. No.	Financial parameters	2014-15	2013-14	2012-13	2011-12	2010-11
1.	Net Worth					
a)	Paid up Capital					
b)	Free Reserves and Surplus*					
c)	Misc expenses to the extent not written off					
	Net Worth (a+b-c)					
2.	Annual Turnover **					
3.	Liquid Asset (Total Current Asset – Inventories)					

\* Free Reserve and Surplus should be Exclusive of Revaluation Reserve, written back of Depreciation Provision and Amalgamation.

\*\* Annual total Income/ turnover as incorporated in the Profit and Loss Account excluding non recurring income, i.e. sale of fixed asset etc.

It is certified that all the figures are based on audited accounts read with auditors report and Notes to Accounts etc.

Date

Certified By

Place

(Chartered Accountants)

Membership No.

Seal

PERT Chart Format under DDUGJY / IPDS Schemes

Name of State  
Name of Project  
Reference No. of PERT Chart (unique code to be  
given by Employer)  
Version of PERT Chart

Original/R1/R2/R3...

Name of Employer  
Name of Turnkey Contractor (TC)  
Date of approval of PERT Chart  
Lot No. and date

S. NO.	Activity	Responsibility	Unit	Qty as per Scope	Month																							
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Letter of Intent (zero date)	Employer																										
2	PERT Chart	TC / E																										
3	Submission of CPG	TC																										
4	Upfront sharing of approved sub-vendors by PIA	Employer																										
5	Up Front sharing of existing approved GTPs of Employer	Employer																										
6	LoA	Employer																										
7	Contract Agreement	TC/E																										
8	Finalisation of Subcontract & Vendors	TC/E																										
9	Submission of Engineering Drawing (other than existing approved)	TC																										
10	Approval of Engineering Drawings (other than existing approved)	Employer																										
11	Submission of GTP (other than existing approved)	TC																										
12	Approval of GTP (other than existing approved)	Employer																										
13	Placement of Award for following Key Materials:																											
13.01	Poles																											
13.02	Conductor																											
13.03	Power Transformer																											
13.04	Distribution Transformer																											
13.05	Steel Structure Materials																											
13.06	Vacume circuit breakers																											
13.07	GI wires																											
13.08	Insulators																											
13.09	Meters																											
13.1	Power & Control Cables																											
13.11	Distribution Box																											
13.12	Line Equipments (LA, Isolator, AB switch, CT/PT)																											
13.13	Earthing Materials																											
13.14	Stay Sets																											
14	Establishment of Site Office, Office Infrastructure, Vehicle																											
15	Deployment of manpower at site																											
16	Survey																											
16.01	Foot survey																											
16.02	Approval of Survey report																											
17	Receipt of following Key Materials at Site:																											
17.01	Poles																											
17.02	Conductor																											
17.03	Power Transformer																											
17.04	Distribution Transformer																											
17.05	Steel Structure Materials																											
17.06	Vacuum circuit breakers																											
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17.12	Line Equipments (LA, Isolator, AB switch, CT/PT)																											
17.13	Earthing Materials																											
17.14	Stay Sets																											
18	Erection, testing & Commissioning of following works																											
18.01	33 KV Lines																											
18.02	33/11 KV or 66/11 KV Substations																											
18.03	11 KV Lines																											
18.04	DTR Substation																											
18.05	LT Line																											
18.06	HVDS																											
18.07	Metering																											
18.08	Aug/ R&M of Power Substation																											
18.09	Aug/ R&M of DTR Substation																											
19	Submission of reconciliation & closure proposal																											

(Employer)  
Signature  
Name of Authorised Signatory  
Designation

(Turnkey Contractor)  
Signature  
Name of Authorised Signatory  
Designation

Note-

- 1 Approving authority of Employer shall sign and stamp the PERT chart on approval.
- 2 approved PERT chart shall be part of contract agreement.
- 3 Original PERT chart shall not be changed during execution of project.
- 4 Revision in PERT chart or acceptance of catch up plan, shall be within overall contract execution period of the project.
- 5 Revised PERT chart / catch up plan shall be signed by same authorities of Employer and Turnkey contractor.
- 6 Approved PERT chart shall be basic document to take a decision on extension of time for contract and to evaluate performance of project execution contractor.
- 7 Item wise responsibility should be identified between Employer and turnkey contractor
- 8 Clear time line to be agreed for various activities between Employer and Turnkey Contractor
- 9 Unique reference no. to be assigned with date to approved PERT chart by Employer.
- 10 Any revision should be clearly assigned with unique reference no., date and revision no. (R1/R2/R3 etc)
- 11 Items specified may be customised based on project formation.

# VOLUME-I: SECTION – VII

## SCOPE OF WORKS

## Scope of works

The scope of works also include General Technical Instructions enclosed at Annexure-A.

Ministry of Power (MoP) vide their OM No. 44/30/2015-RE dated 14.08.2015 has formulated two committees to facilitate and handhold States for mobilizing major material/equipment with Standard Technical Specification at competitive rates through a transparent bidding process under DDUGJY & IPDS. The major high value materials selected under Material Mobilisation are Power Transformer, Distribution Transformer, Conductor, AB Cable & Meters. Committee-A has also finalised Technical Specification of these materials, which are provided in these bidding documents for reference.

The State shall place the orders for supply of high value major materials as per rate, terms & conditions and allocated quantities as finalized by committee 'B'. These major materials shall be issued by the DISCOM/Power Deptt. free of cost to the partial turnkey contractor. Partial turnkey contractor shall be responsible for taking delivery of these high value major materials from the DISCOM/Power Deptt stores on submission of Indemnity Bond and Insurance cover starting from loading at stores to commissioning & handing over. Partial turnkey contractor shall also be responsible for safe and secure loading of equipment/materials from DISCOM/Power Deptt Stores, shifting to site, reroute storage, erection, testing and commissioning.

The subject tender for DDUGJY & IPDS works is invited on partial turnkey basis. The supply of high value major materials namely Power transformers, Distribution Transformer, all type of Conductor, AB cable and Energy Meter has not been kept under the scope of contract. Materials other than these high value major materials shall be kept in the scope of this partial turnkey contract.

Accordingly, scope of works under this contract is as under:

1. Taking delivery of five major high value materials (Power Transformer, Distribution Transformer, Conductor, AB Cable & Energy Meters), safe and secure loading of equipment/materials from DISCOM/Power Deptt Stores, shifting to site, reroute storage, erection, testing and commissioning.
2. The meters (consumer meter, DT meter, Feeder meter) shall be provided by employer from their stores. Hence, partial turnkey contractor shall ensure suitable provisions in DT meter panel, feeder meter panel, consumer board for fixing of these meters. Project Manager shall approve drawings for DT meter panel, feeder meter panel, consumer board suiting with mounting arrangements and size of meters to be provided by employer.
3. Supply, Erection, Testing & Commissioning of balance of the materials including erection, testing & commissioning of above five major high value materials
4. Execution of all other works as per tender document. All Steel structure shall be hot dip galvanized as per relevant Indian Standard.
5. A set of drawings are enclosed with this bid document. These are tender drawings and are to be approved by the Project Manager. These drawings are indicative in nature and therefore, must be referred while preparing drawings for approval.

The section wise scope of works are covered as under:

- |                                 |                                  |
|---------------------------------|----------------------------------|
| • New 33 kV Lines               | • LT Line                        |
| • New 66/11 kV Power Substation | • Augmentation & Renovation      |
| • New 33/11 kV Power Substation | • HVDS                           |
| • New 11 kV Lines               | • Metering                       |
| • DTR Substations               | • Ring Main Unit (RMU)           |
|                                 | • 11 KV Sectionalizer under IPDS |

A. New 33 KV Lines

1.00 Survey

Mapping of route of proposed new 33 kV line by foot survey in rural/urban areas be performed mentioning various milestones. While surveying, existing electrical infrastructure in the locality should also be mapped. Line alignment (single line diagram) on political map with fair correctness, be prepared. SLD and foot survey report shall be approved by Project Manager and shall be used as basic document for assessment of works under the contract. On completion of line work, as built Single Line Diagram and pole wise line diagram showing pole wise materials used and pole-to-pole span should be submitted to Project Manager. This details shall be used as reference documents by Quality and Quantity Inspecting officials to execute inspection works.

2.00 Support (pole):

Following type of supports are envisaged for new 33 KV overhead lines-

- a. 9.1 meter long /280 KG PCC Poles (PCC Pole as per state practice)
- b. 13 m long H-Beam 152x152 mm 37.1 kg/m
- c. 11 M long steel Tubular poles of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
- d. 13 M long steel Tubular poles of Designation 540 SP 72 (IS 2713, Pt I, II, III 1980)

In rural area, PCC poles are to be used. In urban area, PCC or H-Beam supports are to be used of suitable length. In hilly areas where handling of material is a challenge, tubular poles may be used. In location specific conditions like forest area, vicinity of other existing overhead lines or permanent structures etc, H- beam or tubular poles may be used. Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

H-Beam support and steel tubular poles shall be cleaned till good surface finish and painted with 2 or more coats of red oxide paint and 2 or more coats of aluminium paint till good finish. Steel tubular poles and H-Beams shall also be painted with 2 or more coats till good surface finish with anti-corrosive paint (in case of tubular poles shall also be painted on the inner walls) which goes in to the foundation. Project Manager shall approved brand and shade of paints.

Painting of H-Beams and Steel Tubular Poles shall be performed at stores. Before shifting to site for erection, poles shall be offered for inspection and approval by Project Manager.

3.00 Fabricated steel items:

Fabricated steel items like V cross arm, top clamp, DC cross arm, bracket, clamps, cross bracings, bracings, strain plate, guarding channels, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings. While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Fabricated steel structure items shall be offered for inspection and approval by Project Manager.

4.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

5.00 Stay Set:

Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (2Nos.), anchor plate (300x300x8mm) , nut-bolts, 2 Nos turn-buckles, 1.8 m long, 20 mm diameter solid GS stay rod & 7/4.00 mm dia GI stranded wire complete.

Stay set shall be used at all turning locations, conductor dead end location, double pole structure, triple pole structure, four pole structure to nullify the tension of conductor. At dead end locations, stay sets shall be used in pairs in separate foundations. Erection of storm guys at suitable location in straight line may also be provided.

0.3 cmt cement concreting in mixture 1 part cement, 3 part coarse sand, 6 part 40mm size aggregate stone chips (1:3:6) shall be provided in each stay set foundation. 2 Nos. guy insulator shall be provided in stranded GI wire at middle location between two turn buckles. Shuttering and vibrator shall be used for cement concreting works.

6.00 Earthing:

Following earthing arrangements are envisaged for new 33 kV lines:

- a. 40 mm dia., 3000 mm long GI pipe earth electrode with test link, RCC pit, RCC cover plate on GI frame, bentonite powder and other accessories complete
- b. GI Earthing spike made of 20mm solid rod
- c. Chemical rod earthing including electrode, chemical, with 2000mm long, 50 mm diameter GI pipe, GI Strip of 24x3mm minimum in hard rock locations only.
- d. 8 SWG GI Earthing Coil.
- e. 6 SWG GI wire for earthing and guarding
- f. 8 SWG GI wire for earthing and guarding

Each 33 kV line support shall be provided with one GI earthing spike made of 20 mm solid rod or 8 SWG GI Earthing Coil and connected with 8 SWG GI wire. Overhead line structure shall be connected to GI earthing spike or GI Earthing Coil using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. Project Manager shall decide use of GI Earthing Coil or GI Solid earth Road for earthing of individual poles.

At railway crossing, line crossing and other specific locations 40 mm dia, 3000 mm long GI pipe earth electrode with test link, RCC pit, RCC cover plate on GI frame, bentonite powder and other accessories shall be used. Overhead line structure at these locations shall be connected to GI earth pipe using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 40 mm GI earth pipe.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. GI flats and GI wires must be properly dressed, bundled and fixed on supporting structure at 1 to 2 feet intervals.

7.00 Insulator and hardware –

33 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator should be tied properly using binding wire and tape/helical form fitting. In road crossing and line crossing locations bridling cross arms and pin insulator shall be used.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator should properly be cleaned before installation. No damage/crack insulator should be used.

8.00 ACSR/AAAC Conductors:

Following ACSR Conductors (or equivalent AAAC conductor) are envisaged for new 33 kV lines:

- a. 6/4.09 + 1/4.09 mm (80 mm<sup>2</sup> Al. Area) - Raccoon
- b. 6/4.72 mm + 7/1.57 mm (100 mm<sup>2</sup> Al. Area) – Dog
- c. 30/2.59 mm + 7/2.59 mm (150 mm<sup>2</sup> Al. Area) – Wolf
- d. 30/3.00 + 7/3.00 mm (200 mm<sup>2</sup> Al. Area) - Panther

Care should be taken while drawing conductor from the drum. Proper roller should be used while handling conductors during erection. Jointing sleeves, binding materials, PG clamps, bi-metallic conductor shall be used for conductor jointing, insulators fixing, jumpering and termination at equipment respectively.

Proper sag should be maintained using sag chart table. While tensioning, care should be taken to avoid tension on pin insulator. Therefore, proper alignment of line to be ensured. Conductor joint should not be in the middle span but may be planned nearer the support.

At terminal location, care should be taken while connecting two sections to avoid bird faults. Therefore, pin insulator is to be used to handle the conductor on DC cross arm (as per state practice).

9.00 Pole numbering:

Each support pole should be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint. Warning instruction, if any, of availability of two sources of 33 kV supply on same structure, at source structure, at cut points should exclusively be provided as per state practice.

10.00 Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each 33 kV support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

11.00 Danger board:

Each support should be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

12.00 33 KV AB Switch:

33 kV, 3-ph, 600 A, 3 Pin type, Vertical/Horizontal Mounting type, Gang Operated, AB Switch shall be installed at cut points and at suitable locations as per instructions of Project Manager. B Class GI pipe shall be used (without any joints) for operation of switch. AB Switch structure and handle must be earthed using 8 SWG GI wire.

13.00 Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40mm size aggregate stone chips (1:3:6) shall be used in all the types of 33 kV line supports.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shuttering and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

14.00 33 kV line for underground railway crossing –

A separate composite item of railway crossing is kept in BoQ. 2 Nos. separate cables shall be laid in separate GI pipe enclosures. At a time, one shall be used and another shall be kept idle as spare in ready to join condition. Cable termination, cable identification, protective covering, laying of jumpering cable etc shall all be completed in this head. This composite item shall contain following key items:

- a. 3Cx300 Sqmm XLPE armored cable (approx. length is 0.3 km each) – 2 sets
- b. 150mm dia GI pipe of A class (red color painted on edges) for cable protection in underground laying – 2 sets
- c. 150mm dia GI pipe of B class (blue color painted on edges) for cable support at DP structure – 2 sets
- d. Outdoor heat shrinkable cable jointing kits for main cable and jumpering cable – 4 Nos for main cable, 8 Nos for jumpering cables.
- e. 33 kV lightening arrestor station class 10kA (6 nos.),
- f. 4 Nos GI 3-meters long pipe earthing,
- g. 6 SWG GI wires with GI nuts, bolts & washers,
- h. Cable markers,
- i. Bi-metallic clamps,
- j. Jumpering with 33 kV Aerial Bunched Cables 200 Sqmmdia (10 mtr) etc – 4 sets

Detail survey of location of railway crossing be performed by contractor to avoid multi-crossing at nearby location. Prior railway permission for execution of this work shall be obtained by Project Manager for which necessary technical support shall be provided by contractor. Line crossing shall be performed using underground cabling. Block on railway traffic shall be arranged by Project Manager. Contractor should ensure timely completion of work during block period by mobilizing requisite man, materials and machine at crossing locations.

Horizontal drilling machine shall be used for horizontal bore below railway tracks.

15.00 Quality&Quantity inspection and compliance to the observation:

The line works, before or after commissioning/energisation, shall be inspected by Quality Inspectors and State Inspection Inspectorate. Contractor shall provide all requisite details of line like approved survey report, as built drawings and joint measurement sheet etc to the inspector. Contractor shall rectify defects/deficiencies and submit compliance to the observations with supporting photographs in digital form within one month from receipt of observations.

16.00 Tree-cutting/trimming of tree:

The Contractor shall count, mark and put proper numbers with suitable quality of paint at his own cost on all the trees that are to be cut/trim to obtain required tree clearance. Contractor shall pay compensation for any loss or damage for tree cutting due to Contractor's work. Wherever forest clearance is envisaged for execution of work, clearance of forest department for tree cutting, if required, shall be arranged by the Project Manager and compensation shall also be paid by the Project Manager. Necessary fee if required to pay to Govt. dept. for arranging such clearances shall paid by Project Manager. However, the contractor would require to provide all necessary assistance for execution of this work.

17.00 Statutory clearances:

During execution of 33 KV Line work, all statutory clearances shall be ensured for ground clearance, line-to-line clearance, road crossing clearance, horizontal and vertical clearances from buildings/objects etc. All road crossings and line crossings shall be guarded as per specifications. Conductor joint should not be provided in mid span length. Instead, it should be nearer to the support.

## B. 66/11KV new Substation

## 1.00 Electrical Details of New 66/11 KV Grid Substations –

No	Name of Proposed Substation	Circle/ town	66 KV line LILO or Radial	Capacity in MVA	Nos of proposed 11 KV outgoing feeders

## 2.00 Following works are in the scope of Owner:

- a) Acquisition of land for the substation and its possession to start constructional activities,
- b) Approach road to the substation land,
- c) Leveling of the substation land,
- d) Construction of retaining wall wherever required including cutting, digging or filling of earth as required,
- e) Availability of up-stream source and plan for incomer 66KV line (if the same is not part of package)
- f) General layout of the substation
- g) Three (3phase) 415V AC power supply at one point on contractor's expense & as per prevailing electricity tariff provided LT network is available in the vicinity of the proposed substation.
- h) Space for construction office & store yard for agency provided free of charge provided it is available at site.

Since above works are not covered under substation works, Owner shall provide all above input before start of substation work by turnkey contractor. A format protocol note for handing over/taking over of sub-station land, approach road, retaining wall(wherever needed) and layout plan shall be signed between Project Manager and authorized representative of Turnkey Contractor.

## 3.00 Following works are in the scope of Contractor:

The scope of works include on turnkey basis for design, engineering, manufacturing, shop testing, transportation, supply, storage, erection, testing & commissioning of the following:

- a. 66/11 KV new Sub-station at specified locations with 66 KV outdoor switchyard comprising of .....nos. bays with .....nos. 66/11 KV 16/20/25/30 MVA Power Transformers, 66/11 KV transforms bays, 66 KV bus coupler bay and 11 KV indoor switchgear along with switchyard control room and all associated facilities (to be modified suitably by utility).

The Scope includes:

- a) Complete design and engineering of all the systems, sub-systems, equipment, material and services.
- b) Providing engineering data, drawings and O&M manuals for Owner's review, approval and records.
- c) Manufacturing, supply, testing, packing, transportation and insurance from the manufacturer's work to the site including port and customs clearance, if required.
- d) Receipt, storage, insurance, preservation and conservation of equipment at site.
- e) All civil and structural works as required.

- f) Fabrication, pre-assembly (if any), erection, testing and putting into satisfactory operation of all the equipment/material including successful commissioning
- g) Satisfactory conclusion of the contract.
- h) Enabling work as per the site requirement.

In addition to the requirements indicated herein, all the requirements as stated in other sections shall also be considered as a part of this specification as if completely bound herewith.

The Bidder shall be responsible for providing all material, equipment and services specified or otherwise which are required to fulfill the intent of ensuring operability, maintainability and the reliability of the complete work covered under this specification.

It is not the intent to specify all aspects of design and construction of equipment mentioned herein. The systems, sub-systems and equipment shall conform in all respect to high standards of engineering, design and workmanship, and shall be capable of performing in continuous commercial operation.

Whenever a material or article is specified or described by the name of a particular brand, manufacturer or trade mark, the specific item shall be understood as establishing type, function and quality desired. Products of other manufacturers may also be considered, provided sufficient information is furnished so as to enable the owner to determine that the products are equivalent to those named.

The scope of work shall comprise, but not limited to the design, engineering, manufacture, testing and inspection at manufacture's works, packing, supply, transportation, transit insurance, delivery to site, unloading, and storage and equipment erection including associated civil and structural works. Further it shall include the cabling, lighting, earthing, supervision, site testing, inspection and commissioning of Sub-Station. The scope shall also include all enabling works required for modification to existing facilities within the project area.

a. Bay Details:

The Sub-Station shall comprise of .....nos. of 66/11 kV Transformer bay, 1 No. 66 kV Bus-Coupler bay. The Sub-Station shall be with Double-Main bus-switching scheme for 66 kV (to be modified suitably by utility).

66 kV Bus bar shall be of ACSR zebra/..... conductor (to be filled by utility).

The equipment and materials to be supplied by the Bidder shall form a complete 66 kV Sub-Station.

Any items though not specifically mentioned but which are required to make the switchyard complete in all respects for its safe, efficient, reliable and trouble free operation shall also be deemed to be included and the same shall be supplied and erected by the Bidder without any additional cost to owner. The following items of works are covered under scope-

- 66 kV equipment including structures: Circuit Breakers, Isolators with/without earth-switch, current transformers, surge arresters, bus-post insulators and capacitor voltage transformers.
- Sub-Station Control Room Building or extension of existing one.
- 66/11 kV Power Transformer of rating as specified (16/20/25/30 MVA as specified in BOQ)
- Structures for supporting XLPE Power Cables connected to Secondary Terminals of Power Transformer.

- 11 KV ..... MVAR Capacitor bank, isolator, series reactor & associated equipments for .....banks of ..... MVAR with structure (details to be filled by utility).
- 100 kVA, 11 kV / 415V Station Transformer.
- 11kV metal clad indoor switchgear with draw out type VCB, CT and PT, all control, protection and mimic arrangement.
- Vacuum Contactor Panel for capacitor feeder.
- DC System: 220V.
- 66 kV Sub-Station including internal roads, drains, boundary wall, gates, Barbed wire fencing for complete substation boundary & Chain Link fencing for Switchyard, Borewell, oil sump pit, Geo Technical Survey, soil investigation, Soil filling & compaction including construction of retaining wall for Civil Works as required.
- Supply & Erection of material for all Civil Works including equipment & gantry structure complete for 66KV outdoor yard equipment for transformer bay & line bay including earthing system & lightening protection etc. Erection including supply of material for transformer foundation, cable trench extension, fire wall for new power transformer.
- 66 kV Sub-Station Materials.
- ACSR Zebra Conductor.
- G.S. Earth wire.
- Insulators and Hardware.
- Clamps, Connectors and Spacers.
- Bay Marshalling Box.
- Fire Fighting Equipment
- Complete earthing grid for a system fault current of 31.5 KA and 1s duration (to be modified suitably by utility if required), earthing of all switchyard equipment including transformers and direct stroke lightning protection system and its connection to earthing grid.
- Bidder shall make earth resistivity measurements at site and design the earthing grid as per latest edition of relevant standards.
- Complete Direct Stroke Lightning Protection using Lightning Mast and/or shield wire and its connection to earth mat.
- Power & Control cables, cabling (including inter pole and inter panel), Cabling between equipment and panels, cable support angles, cable trays and accessories necessary for cable erection such as glands, lugs, clamps for cables, ferrules, cable ties, hume pipe etc., cable route markers for buried cables, cable trench with covers also included in the scope.
- Power & Control cable schedule & termination schedules shall be prepared by the Bidder.
- Internal and outdoor lighting system for control room building and 66 kV Sub-Station. The substation area inside the fencing should be illuminated provided with 100 Watts LED flood light fittings. Tubular poles 12m high as per IS: 2713 (Latest Version) shall be used for installation of area light fixtures in Urban as well as Rural substations. Internal electrification of the control room includes provision of fans, exhaust fans, LED illumination fixtures, switches and sockets. Control Room lighting shall be designed to ensure 300 lux illumination level through LED lamp fittings. The bidder shall submit calculation for achieving the above illumination before start of lighting work for approval of project manager.
- Control, protection and metering system.

b. Services and Items:

The scope includes but not limited to the following services/items described herein and elsewhere in specification:

- a) System design and engineering
- b) Supply of equipment and material
- c) Civil works
- d) Structural works
- e) Erection works
- f) Project management and site supervision
- g) Testing and commissioning
- h) Clearances from statutory authorities.

c. System Design and Engineering:

- i. The Bidder shall be responsible for detailed design and engineering of overall system, sub-systems, elements, system facilities, equipments, auxiliary services, etc. It shall include proper definition and execution of all interfaces with systems, equipment, material and services of Owner for proper and correct design, performance and operation of the project.
- ii. Bidder shall provide complete engineering data, drawings, reports, manuals etc. for Owner's review, approval and records.
- iii. The scope shall also include the design and engineering as per details elaborated elsewhere in this specification.
- iv. The Bidder shall carry out earth resistivity measurements at the switchyard site
- v. Relay setting calculations shall also be submitted by the Bidder for approval.
- vi. For all civil and structural works, the Bidder shall carry out design calculations; prepare all the detailed construction and fabrication drawings.

4.00 Arrangement by the Contractor

Contractor shall make his own necessary arrangements for the following and for those not listed anywhere else:

- 1. Distributions of power supply at all work areas in the substation premises.
- 2. Construction of office and store (open & covered)
- 3. Construction of workshop and material/field testing laboratory
- 4. Fire protection and security arrangements during construction stage

5.00 Civil works:

Details scope under civil works have been provided in Volume II section I – "Civil Works and Soil Investigation".

6.00 Basic Reference Drawings

The reference drawings, which are indicative of the type of specifications owner intends to accept, shall be developed by contractor and approved by Project Manager. The contractor shall maintain the overall dimensions of the substation, buildings, bay length, bay width, phase to earth clearance, phase to phase clearance and sectional clearances, clearances between buses, bus heights but may alter the locations of equipment to obtain the statutory electrical clearances required for the substation.

## C. New 33/11 kV Power Substation

## 1.00 Electrical Details of New 33/11 KV Grid Substations –

No	Name of Proposed Substation	Division	33KV line LILO or Radial	Capacity in KVA	Nos of proposed 11 KV outgoing feeders

## 2.00 Following works are in the scope of Employer and shall be executed by Project Manager:

- i) Acquisition of land for the substation and its possession to start constructional activities,
- j) Approach road to the substation land,
- k) Leveling of the substation land,
- l) Construction of retaining wall wherever required including cutting, digging or filling of earth as required,
- m) Availability of up-stream source and plan for incomer 33 KV line (if the same is not part of package)
- n) General layout of the substation
- o) Three (3phase) 415V AC power supply at one point on contractor's expense & as per prevailing electricity tariff provided LT network is available in the vicinity of the proposed substation.
- p) Space for construction office & store yard for agency provided free of charge provided it is available at site.

Since above works are not covered under substation works, Employer/Owner shall provide all above input before start of substation work by turnkey contractor. A format protocol note for handing over/taking over of sub-station land, approach road, retaining wall(wherever needed) and layout plan shall be signed between Project Manager and authorized representative of Turnkey Contractor.

## 3.00 Types of substation: Two types of substations are envisaged under this head as per following:

- a. Partly-Outdoor substation – in this type, 33KV section comprising breakers, isolators, 11/0.4 KV station transformer, CTs, PT, Lightning Arrester, Power Transformer, feeder metering equipment & 11 KV Capacitor Bank, 33KV gantry shall be installed in out-door switch yard. Control panels of breakers shall be installed inside the control room. All 11KV equipment like CTs, Breakers and control panels, feeder meter shall be installed inside the control room. 11 KV cables shall be used for connection of power transformer and breaker and Breaker to outgoing isolators. 11KV feeder isolators and 11KV Lightning Arresters shall be installed outdoor.
- b. Fully-Outdoor substation – in this type, all 33KV and 11 KV equipment comprising Breakers, Isolators, CTs, PT, 11/0.4 KV Station Transformer, feeder metering equipment, Lightning Arrester, Power Transformer, metering equipment and 11 kV capacitor bank shall be installed in substation yard i.e. outdoor. Control panels and feeder meter shall be installed indoor. Fully outdoor substation shall be constructed using H-beam support or gantry structure supports as decided by Project Manager.

## 4.00 Power Transformers:

Power Transformers shall be 33/11 kV, 3 ph, 50 Hz, ONAN, Cu Wound, Outdoor Conventional type Power Transformer along with transformer oil, Buchholtz relay, breather, OTI & WTI, Marshalling Box, Conservator tank, oil level indicator, valves, Vent explosion plug, control wiring between sensing equipment and marshalling box, cable supporting tray on the body of transformer, transformer

wheels, LV/HV bushing etc as required. Following type and capacity of power transformers are envisaged under the scheme:

- a) 1.60 MVA without tap changer
  - b) 3.15 MVA without tap changer
  - c) 5.00 MVA with off load / on load tap changer
  - d) 6.3 MVA with off load / on load tap changer
  - e) 8.00 MVA with off load / on load tap changer
  - f) 10.0 MVA with off load / on load tap changer
  - g) 12.5 MVA with off load / on load tap changer
- Or any other rating as per latest Indian Standard Specification.

Transformer foundations shall be designed by turnkey contractor considering manufacturer's recommendations. Cement concrete including reinforcement steel shall be used for the foundation. Project Manager shall approved design and drawings of foundations. Proper shuttering, vibrator, curing shall be performed while constructing the foundations. Transformer rails shall also be provided for mounting of transformers on wheels.

2 sets of 50x8 mm galvanized neutral earthing strips shall be supplied with the transformer along with braided copper conductor links for connections at bushing ends. Two distinct earth connection shall be provided for neutral earthing. The earthing strips shall be mounted on 11KV post insulators. An isolating link shall be provided on individual earth strips for testing purposes.

Transformer protective equipment like OTI, WTI and Buchholtz relay shall be tested during pre-commissioning stage. Their electric connection upto marshalling box shall be performed as per Original Equipment Manufacturer recommendations. Cable tray shall be installed for laying of control cable shall be laid on cable tray on transformer body so that cable shall not get heated by transformer temperature. While commissioning the transformer tripping of breaker through all these equipment must be checked.

#### 5.00 Breaker:

33 kV & 11 kV Vacuum Circuit Breakers shall be used for protection and control of power circuits. In partly outdoor substation, all 11 KV switchgears shall be indoor mounted type and 33 KV breakers shall be outdoor mounting type whereas in fully outdoor substation, 11 KV as well as 33 KV breakers shall be outdoor mounting type. In both the type of substation, control panels shall be indoor type. Outdoor breakers are to be supplied with Current Transformers. The outdoor mounting type breakers shall be supplied with its mounting galvanized steel structures.

Detailed cable schedules, termination details and circuit diagrams of control panels, transformer marshalling box, breaker marshalling box, and capacitor banks equipment shall be prepared and submitted by turnkey contractor for approval of Project Manager before commencing the work.

Cement concrete including reinforcement steel shall be used for the foundation. Project Manager shall approved design and drawings of foundations. Proper shuttering, vibrator, curing shall be performed while constructing the foundations for breaker.

Permanent maintenance platform shall be constructed for outdoor breakers and CT. Project Manager shall approve design of platform.

Control wiring between CT/breaker and control panel for outdoor mounting breakers/CT shall be routed through Junction box. Metallic Junction box shall be installed on support gantry structure of substation or on MS angle (50x50x6 mm) support. The boxes are to be erected, electrically connected

with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks shall be prepared and submitted. All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals. The Junction box are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution box shall be provided of 10mm dia.

#### 6.00 Station Transformer:

100 KVA, aluminium / copper wound, 11/0.4 KV (or 33/0.4 KV) Station Transformers shall be installed on DP structure made of H-Beam 152x152 mm 37.1 kg 8 meter long. Outdoor type Distribution Box for station transformer shall be comprising of 200 A switch fuse unit, 6 Nos SP MCCB– 90 A, 2 Nos 32 A SP MCCB, 3-ph, 63A, contactor controlled yard lighting timer unit, tri-vector electronic energy meter (mounted in separate metallic LTCT cum meter box) with suitable CT, control/power cabling and terminals, 1 No 20 A Industrial socket and switch for local power supply requirements, mounting channel, clamps and hardware.

The Station Transformer substation shall be provided with Station Class LA, 33KV / 11KV AB Switch and 33KV / 11KV DO Fuse. Except type of Distribution Board, Lightening Arresters, and DP Structures, all other scope of work as mentioned under 100 KVA capacity Distribution Transformer work shall be the scope of work under 100 KVA Station Transformer on LT side.

#### 7.00 Gantry structures:

There are two type of gantry structures envisaged under the scheme.

- a) Gantry structures made of H-Beam 152x152 mm 37.1 kg 8 meter long, double MS Channel 100x50mm for bus bar supports (Beam), 65x65x6mm angle for cross arms/supporting structures and 50x8mm flats for clamps along with hardware items duly painted etc., and
- b) Gantry structures made of Lattice structures of equal angles sections, flat as per approved drawings. State practices are to be adopted in the design. All structural steel members and bolts shall be galvanized after fabrication as per IS:4759 and zinc coating shall not be less than 610gm/sq. meter for all structural steel members. All L45x45x5 will have 23 mm back mark. All L50x50x6 will have 28mm back mark. 3.5mm spring washers are to be used under each nut, structural steel shall conform to IS 2026. All weld shall be 6mm filled weld unless specified otherwise. All nuts and bolts shall be of property class 5.6 of IS 1367. Plain washers shall be as per IS 2016 & spring washers shall be IS: 3063.

H-Beam support shall be cleaned till good surface finish and painted with 2 or more coats of red oxide paint and 2 or more coats of aluminium paint till good finish. Steel tubular poles and H-Beams shall also be painted with 2 or more coats till good surface finish with anti-corrosive paint (in case of tubular poles shall also be painted on the inner walls) which goes in to the foundation. Project Manager shall approved brand and shade of paints. Painting of H-Beams shall be performed at stores. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

Cement concrete in mixture 1 part cement, 3 part coarse sand, 4 part 20mm size aggregate stone chips (1:3:4) shall be used in all the types of gantry supports.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang

wise shutting and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

300x300mm X 12" inch height muffing shall be provided on gantry support to prevent direct entry of rain water along the support. Cement Concrete of 1:2:4 (1 part Cement, 4 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

#### 8.00 AC Distribution board (ACDB)

415 Volts, ACDB shall be indoor floor mounted with mounting arrangements, three phase-neutral voltmeter, three phase ammeter and Selector switches, 63 Amps TPN switch fuse unit in incomer circuit, 32 Amps TPN switches in outgoing circuits equals the number of indoor breaker control panels plus number of outdoor VCB kiosk panel and having 20% spare outgoing circuits, etc. Alternatively, ACDB can also be erected on separate MS frame made of 50x50x6 angle.

Substation flooring shall be provided with suitable inserts to fix ISMC 75 channel. This channel shall hold ACDB board. The board shall be installed on indoor trench. Cables shall have bottom entry. The board shall be grounded by 50x6mm GI strip at two distinct connections.

#### 9.00 DC Distribution board (DCDB)

Indoor floor mounted, two pole 100 Amp 2 pole DC Switch Fuse unit as incomer, two pole 40 Amp Switch Fuse units in outgoing circuits equals the numbers of indoor breaker control panels plus numbers of outdoor VCB kiosks panels plus control room lighting panel and 20% spares outgoing circuits. Direct Current Distribution Board shall be installed in each substation. It would comprises of DC volt meter including mounting arrangements etc as required as per technical specifications, approved drawings and scope of works. Alternatively, DCDB can also be erected on separate MS frame made of 50x50x6 angle.

Substation flooring shall be provided with suitable inserts to fix ISMC 75 channel. This channel shall hold DCDB board. The board shall be installed on indoor trench. Cables shall have bottom entry. The board shall be grounded by 50x6mm GI strip at two distinct connections.

#### 10.00 Cables:

- a. Control cables: 1.1 KV grade 2.5 mm<sup>2</sup> PVC insulated and PVC sheathed, armored, stranded, copper control cable with 2 core, 6 core and 10 core are envisaged in the substation.
- b. HT Power Cables: In partly outdoor substation, 11KV XLPE Cables shall be used as per following requirements;
  - Between Power Transformer and Main transformer breaker
  - Between Feeder breaker and outdoor feeder DP structures
  - Between capacitor bank switch and capacitor bank
- c. LT Power cables: 1.1 KV grade, armored, stranded, aluminum power cable PVC insulated and PVC sheathed with complete accessories as per detailed engineering
  - 3.5Cx150mm<sup>2</sup> (between station transformer & Distribution Box)
  - 3.5Cx70mm<sup>2</sup> (between Distribution Box & yard receptacles)
  - 3.5Cx35mm<sup>2</sup> to be used from Station Transformer Distribution Board to:
    - Control room building Internal Electrification DB,
    - ACDB Board,
    - Tube well Start Panel,
    - Outdoor area lighting control and distribution panel

- 2 core x16 mm<sup>2</sup> for supply to area lighting masts.
- d. LT cable for Internal Electrification works: following cables shall be used for internal electrification purpose:
- 1.1 KV PVC insulated PVC sheathed ISI marked, IS 694, 10mm<sup>2</sup>, copper conductor, stranded, for internal electrification works between main DB and Sub DB or Su DB to switch board,
  - 1.1 KV PVC insulated PVC sheathed ISI marked, IS 694, 2.5mm<sup>2</sup> /4.00mm<sup>2</sup>, copper conductor, stranded, for internal electrification works light & Fan and Power circuits respectively,
  - 1.1 KV PVC insulated PVC sheathed ISI marked, IS 694, 4.00mm<sup>2</sup>, copper conductor, stranded weather proof cable for connection between outdoor area lighting luminary fixtures and its junction boxes,

Power Cables are to be laid as per best engineering practices. Power and control cables are to be laid in different alignments in cable trench. However, in case power/control cable is required to extend up to the equipment where cable trench is not constructed, they shall be laid in underground trench of width 300 – mm wide, provided with 2<sup>nd</sup> class brick protection (Approx. 10 bricks per meter length of laying) and sand protective covering (200 mm thick) and laid at the depth of 750mm minimum for LT cables and 1000mm for 11 kV cables. Laying specification of cable shall be as detailed in CPWD specification of laying power cables. Suitable loop length of 1.5 meter to be kept at the end points. Excessive loop lengths shall not be paid.

#### 11.00 Metering & metering equipment:

Following two types of metering equipment are envisaged in the work comprising of:

- a. 33 kV/110 V Metering equipment (CTPT unit) with CT of ratio 400-200/5 A
- b. 11 kV/110 V Metering equipment (CTPT unit) with CT of ratio 300-150/5 A

Meter shall be HT trivector DLMS compliant category suitable for substation/feeder metering. Meter shall be 3 ph 4 w 110 V 5 A accuracy class 0.5s with GSM (GPRS compatible) modem.

#### 12.00 Junction Box and Control Cabling:

Junction box is to be installed on support gantry structure of substation or erected on separate galvanized steel structures in the yard nearer to metering equipment. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks shall be prepared and submitted.

All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals.

The Meter-cum-meter box are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution boards shall be provided of 10mm dia.

#### 13.00 Capacitor banks:

Capacitor banks of 600 KVAR, 1200 KVAR and 1500 KVAR capacity shall be provided with 3.15 MVA, 5.0 MVA and 8.0 MVA capacity power Transformer respectively. Capacitor bank shall comprises of switching vacuum circuit breaker, current transformers (100-50/5-5A), fully automatic control panel mounted inside the substation buildings, 11 KV residual voltage transformer, 11 KV three phase

Isolator, Earthing system, capacitor banks complete with individual fuses, interconnection mounting rakes, external fuses mounting arrangement, base insulators & accessories, 3 Nos. 11 KV single phase Metal oxide (Gap less) lighting arresters, isolators etc as per requirements. Hot dip galvanized mounting structure made of sections of 100x50x6 mm channel or 75x40x6 mm channel or 75x75x8 mm equal angles only.

#### 14.00 DC emergency lighting:

At-least four Philips make LED bulbs are to be provided of 7 watts {2 Nos in control room, 1 No in station battery room, 1 No in yard area}. These bulbs shall be fed by DC station battery. The wiring of these bulbs shall be so designed that it will automatically turn ON in event of failure of normal power supply. Provision for putting these bulbs OFF by operator is also to be provided. Wiring is to be performed concealed using PVC insulated PVC sheathed 2.5 mm<sup>2</sup> stranded copper wire. An automatic change over switch is envisaged for this purpose. This may be installed at prominent location, generally easily approachable by operator in the substation control room.

#### 15.00 Station Battery and battery Charger:

Station battery are to be supplied with wooden racks made of teak/sal wood planks of thickness not less than 25mm, support legs made of size not less than 2 inches X 2 inches. The battery may be placed on two-tier formation of stand. The construction of battery rack shall suit site conditions of their placement. The rack shall be painted with three coat of acid proof paint of reputed make as approved by Project Manager. No metal fasteners / nails shall be used for construction of battery racks. The stand shall be supported on insulators to obtain necessary insulation from the earth and there shall be insulators between each cell and stand.

Initial charging of stationary battery shall strictly be as per Original Equipment Manufacturer (OEM) recommendations. Detail charging and discharging cycle readings shall be recorded and submitted to Project Manager for approval.

Battery room shall be provided with exhaust fan of air displacement capacity more than six times volume of battery room per hour. Wooden doors and windows shall be provided in the battery room. Anti-acid tiles shall be used in the floor and upto six feet height of the wall of the battery room.

The battery connections / terminals are to be cleaned and provided with petroleum jelly. Terminals hardware is to be provided with connecting cables. The inter-battery wiring cable shall be neatly dressed using cable ties, clamped and wired using ferrules, tag mark. New battery sets are to be provided with battery chargers as per detail specifications enclosed. Interconnecting cables and power supply cables originating / terminating at the battery charger, shall be neatly dressed using cable ties, clamped and wired using ferrules, tag marks, double compression glands etc as applicable. Connecting cable and associated materials needed for commissioning of charger shall be treated as part of the battery charger. 1.1 KV multi-strands, 30 sqmm, copper conductors, PVC insulated and PVC sheathed cable for DC wiring between DCDB and Battery bank.

The agency shall provide following equipment at all the substations:

- a) Two copies of battery instruction sheet duly laminated,
- b) Two sets of ISI marked electrical hand gloves,
- c) One cell testing voltmeter 3 – 0 – 3 volts,
- d) Two syringe hydrometers
- e) One thermometer with specific gravity correction scale,
- f) One set of suitable spanners,
- g) Two acid resistant funnel,
- h) One acid resisting jar of 2 liters capacity,

#### 16.00 Outdoor type Current Transformer and Potential Transformer:

Outdoor type CTs are to be erected on supporting structure provided on the breaker structure or suitable structure as per state practices. Potential Transformers shall be erected on gantry structures and connected with bus. In both the case, separate metallic Junction Box shall be installed on support gantry structure of substation or erected on separate galvanized steel structures in the yard nearer to equipment. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks shall be prepared and submitted for approval of Project Manager.

All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided in the junction box keeping 20% each spare ring type/fork type terminals.

The junction box shall be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the junction box of 10mm dia.

Testing and pre commissioning checks shall be conducted in accordance with OEM recommendations and as approved by the owner. Terminal connectors at HT as well as LT side shall be provided with the CT/PT equipment.

#### 17.00 Control Panels:

New panels as per the requirement of protection like feeder protection, transformer protection or incomer protection are to be supplied with each newly supplied breaker:

- a. In case of fully outdoor type substation, control Panel to be erected on ISMC75 (75x40x6 mm) MS channel duly welded on MS angle inserted on indoor trench. Panels shall then be properly aligned, Cables shall enter with double compression glands, codified, lugged, and dressed.
- b. Breaker cum control panel shall be erected on ISMC 100(75x50x6 mm) MS channel duly welded on MS angle inserted on indoor trench. Panels shall then be properly aligned, Cables shall enter with double compression glands, codified, lugged, and dressed.
- c. Functional checks shall be performed on the control panel as per control wiring diagram.
- d. All alarm, annunciation and trip circuits / indication & alarm circuits shall be tested and made operative,
- e. The indication lamp shall be LED type lamp as per given specifications and shall be made operative,
- f. Indicating instruments shall be calibrated,
- g. Grounding of panel at two different locations by 50x6mm flat shall be provided. ,
- h. Control relays shall be calibrated and checked for tripping and closing operations,
- i. Pick up time / trip time and tripping at normal and reduced voltages shall be checked, properly adjusted and recorded,
- j. Latching arrangement of relays shall be checked for operation,

#### 18.00 Lightning Arrester:

Station Class LAs will be used in 33 KV and 11 KV with base steel structure, terminals bi – metallic connectors / PG clamps and earth connectors. LAs are to be connected with separate earth connection using 50x6mm GS flat. All LA terminals / connections are to be tightened. All lightening arresters installed in grid substations shall be Station Class Lightening Arresters.

#### 19.00 Internal Electrification:

Indoor Distribution Board having 63A TPN MCB, outgoing MCBs of suitable ratings for power and light & fan circuits are to be installed. Internal electrification of the control room includes provision of fans, exhaust fans, LED illumination fixtures, switches and sockets.

Two nos separate 3 m long 40 mm dia earthing shall be provided for internal electrification works. 8 SWG GI wires shall connect following equipment:

- a. Main Distribution Board and Sub-Distribution Boards,
- b. ACDB, DCDB, Battery Chargers each at 2 distinct locations

Internal Electrification works' wiring shall be provided with single core PVC insulated & PVC sheathed 2.5 mm<sup>2</sup> stranded ISI 694 marked copper flexible wire (for light and fan circuits) and 4.0 mm<sup>2</sup> stranded ISI 694 marked copper flexible wire (for power points) in conceal arrangement in 25 mm dia 2 mm thick PVC ISI marked pipe and 2.5mm thick switch boards in flush arrangement. Neutral links are to be used in each switchboards. Jointing in neutral conductor other than at switching board shall not be permitted.

Iron junction box made of 18 gauges CRCA sheet shall be used for switchboard; 2 mm thick cotton impregnated hylum sheet is to be used for the purpose of switch board. ISI marked switched and sockets are to be used for Internal Electrification works. Earth wire must be made available duly connected with earth circuit for Earthing in each and every switchboard.

Reputed make indoor double door Miniature circuit breaker DB fitted with Miniature Circuit Breakers of MDS/ Havells/ Standard make or equivalent ISI marked shall be used for the protection. Reputed make LED fittings and fans are to be used for the substation. These materials are to be procured from authorized dealer of the materials manufacturers only. Documentary evidence may be submitted for source of supply of all electrical materials. Before procurement of materials Project Manager shall approve make, type and quality of materials.

Control Room lighting shall be designed to ensure 300 lux illumination level through LED lamp fittings. The bidder shall submit calculation for achieving the above illumination before start of lighting work for approval of project manager.

#### 20.00 Yard Lighting:

The substation area inside the fencing shall be illuminated provided with 100 Watts LED flood light fittings. Each fitting and its Junction box enclosures shall be IP 55 protection type. Water and vermin proof-ness is a must. At least 4 Nos. fittings at all the four corners shall be provided. Acceptable make of fitting, fixtures and lamp are Philips, Crompton, Alstom, and Bajaj only.

Area light supply from Substation DB to be extended through 2X16 mm<sup>2</sup> PVC insulated PVC Sheathed aluminum stranded armored power cable laid in underground trench of width 300 – mm wide, provided with 2nd class brick protection (Appro. 10 bricks per meter length of laying) and sand protective covering (200 mm thick) and laid at the depth of 750mm minimum. Laying specification of cable shall be as detailed in CPWD specification of laying power cables. Suitable loop length of 1.5 metre to be kept at the end points.

Pole mounted junction box (and not the Control Gear Box supplied with the fitting) shall be made of 2mm thick CR steel sheet of size 300X300X200mm fitted with SPN terminal block of 32A capacity, 10A SPN miniature circuit breaker of ISI mark and reputed manufacture. The JB shall be hot dip galvanized. The JB shall also conform to IP 55 protection for enclosure. Neoprene gasket shall be used in JB. 2 Nos. earthing terminals of 10 – mm dia shall be provided with 25X6mm size of mounting clamps. Bidders shall get JB drawing approved before start of manufacturing.

4 Sq.mm, 1100V grade, weather proof three core (One core for phase, one core for Neutral and one core for earthing) aluminum stranded flexible conductor PVC sheathed and PVC insulated cable conforming to IS 694 shall be used for connection of fitting and its Control Gear Box from pole

mounted Junction Box. Control Gear box must provide ISI approved components. Copper wound heavy chocks shall be acceptable.

Tubular poles 12m high as per IS: 2713 (Latest Version) embossed with ISI certification mark and pole designation shall be used for installation of area light fixtures in Urban as well as Rural substations. Pole shall be designated as 410 – SP - 60. Poles and fitting structures shall be painted with two coat of anti – rusting bitumen paint inside and outside up to the planting depth and two coat zinc oxide paint followed by 2 or more coats of aluminum paint of approved make, brand and shade on portion of pole which will remain above ground level.

#### 21.00 ACSR / AAAC Conductor:

Following ACSR conductors (or equivalent AAAC conductor) are envisaged for bus bars, jumpers, droppers:

- a. 6/4.72 mm + 7/1.57 mm (100 sqmm Dog conductor),
- b. 30/2.59 mm + 7/2.59 mm (150 sqmm Wolf conductor), and
- c. 30/3.00 mm + 7/3.00 mm (200 sqmm Panther conductor)

Conductor shall be provided with hardware fittings, T-clamps, bi-metallic clamps and PG clamps as per requirements. T – Clamps shall be provided on each jumper on bus bars. Line jumpers shall be provided with adequate size of PG Clamps (Two numbers PG Clamps at each end of jumper). Clamp shall be made of aluminum grade T-1F as per IS – 8309 having good electrical quality aluminum material and shall not be brittle in nature. Suitable Bi – metallic clamps shall be provided at bushings of transformers and circuit breakers. Also at all those points where joining of two different materials is found, bi –metallic clamps shall be provided.

Care shall be taken while drawing conductor from the drum. Proper roller shall be used while handling conductors during erection.

#### 22.00 Insulator, hardware and connections to equipment:

33 KV and 11 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator shall be tied properly using binding wire/helical form fitting. In road crossing and line crossing locations bridling cross arms and pin insulator shall be used.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator shall properly be cleaned before installation. No damage/crack insulator shall be used.

#### 23.00 Power receptacles:

Two power receptacles are envisaged in switch yard area to provide power supply to Transformer Oil Filtration machine and other testing and commissioning related works. Each receptacles shall house 63A MCCB as incomer, 40A 3 phase socket/switch and 1 No, 20A single phase Industrial type socket/switch of reputed brand and type.

#### 24.00 Tube well:

Deep Tube is envisaged for all the substations. Depending on the depth of the bore, suitable capacity of submerged pump shall be installed. Bore diameter shall be 6" which must be penetrated vertically in all type of soil condition. Before digging the bore, soil Resistivity needs to be checked to ascertain the location of the best site for the tube well. Following works are envisaged under this scope:

- Digging bore of diameter six inches. Providing MS casing on bore up to the suitable depth finalized during detailed engineering.
- Providing new 3 phase submersible pump 32 stages or 30 stages depending on technical requirements.
- Providing Start Panel of reputed make like L&T, Havells or equivalent make having single phase protection, Over load protection, Pre – set timer of L&T make, Star Delta Starter, Indications for Load currents in all three phases, Indications for Supply voltages in all three phases etc. Starting panel must conform to IP 52 protection for enclosure. It shall be mounted indoor inside the Control room on 50x50x6 mm GS angle supports. Start panel must be earthed with 2 Nos 8 SWG wires. 4 core 16 Sq mm aluminum armored cable must be used for energizing this Start Panel.
- Three phase, 4 wires, copper flexible supply cables suitable for submersible pump operations, ISI marked, 1100V grade shall be connected to submersible pump through underground trench up to the well as per CPWD specifications duly protected from brick and sand cushioning.
- A Heavy-duty gunmetal wheel valve (tap) may be provided on the discharge line for drinking water requirements.
- Provision for lifting the pump in case of overhauling / breakdown maintenance may also be provided.
- ISI marked PVC or 2<sup>nd</sup> GI Pipes are to be used for suction as well as discharge water lines.
- An open drain must be provided in the vicinity of the tube well. Detail arrangement shall be finalized in detailed engineering.

#### 25.00 Yard Earthing:

Earthing shall be provided with GI earth pipe, GS solid rod 25 mm dia and 75x8mm GS flat forming earth mat. 50x6mm GI flat shall be used for earth-riser along with GI wires / Stay wires as per requirement of Project Manager. Project Manager shall approve arrangement of earthing network. Following arrangement envisaged for grid/earth rod/ earth pipe: (Indicative drawing is enclosed with the document)

Description of equipment	Fully outdoor Substation
Earth Pit made of 3 m long, 40 mm dia GI pipe	2 Nos for power transformer neutral direct connection, 1 No for 33 kV & 11 kV Lightning Arresters direct connection, 3 Nos. for station transformer, 2 Nos. for indoor panels, 2 Nos. for internal electrification works of control room, and 2 Nos. for substation fencing
Earth rod GI solid 25 mm dia	19 Nos (+/-) 20%
Earth mat	75X8 mm GS Flat
Laying of earth mat	Below ground 0.5 meter
Earth riser	50x6mm and 25x3 mm GI Flats

Description of equipment	Partly outdoor Substation
Earth Pit made of 3 m long, 40 mm dia GI pipe	2 Nos for power transformer neutral direct connection, 1 No for 33 kV & 11 kV Lightning Arresters direct connection, 3 Nos. for station transformer, 2 Nos. for indoor panels, 2 Nos. for internal electrification works of control room, and 2 Nos. for substation fencing
Earth rod GS solid 25 mm dia	14 Nos (+/-) 20%
Earth mat	75X8 mm GS Flat
Laying of earth mat	Below ground 0.5 meter
Earth riser	50x6mm and 25x3 mm GI Flats

Standard requirements / provisions of earthing are enclosed herewith. Connections of earth-grid / earth – pit with Lightning Arrester and Power Transformer Neutral and Transformer body (at two distinct points) are to be made using 50X6mm GS flat. Connections of other equipment may be

provided with 8 SWG GI wire or GI Stay wire as per approval of Project Manager. Following arrangements are envisaged for earth connection:

1. Power Transformer Neutral (Two distinct connections)	50x8 mm GS Flat
2. Transformer Body	50x6 mm GS Flat
3. Breaker body / legs (Two distinct connections)	50x6 mm GS Flat
4. Lightning Arrester	50x6 mm GS Flat
5. Station transformer Neutral (Two distinct connections)	25x3 mm GI flat
6. Fencing	50x6 mm GI Flat
7. Control Panels (Two distinct connections)	50x6 mm GI Flat
8. Isolator structure / handle	50x6 mm GI Flat
9. Steel structure of substation	50x6 mm GI Flat
10. Line meters	25x3 mm GI Flat
11. CT, PT and Cable Tray	25x3 mm GI Flat

Fencing and gate shall be grounded. Moving portion of gate shall be grounded with flexible braided conductors of equivalent aluminum 25 mm<sup>2</sup> sizes of conductors duly lugged and bolted.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod.

GI flats and GI wires must be properly dressed, bundled and fixed on supporting structure at 1 to 2 feet intervals.

#### 26.00 33 KV & 11 KV Isolators:

33 KV & 11 kV, 3-ph, 3 Pin type, Horizontal Mounting type, Gang Operated, Isolator Switch shall be installed at suitable locations as per instructions of Project Manager to isolate line section, power transformer, bus bars etc. B Class GI pipe shall be used (without any joints) for operation of isolator switch. Isolator Switch structure and handle must be earthed using 50x6 GI flat.

#### 27.00 Fabricated steel items:

Fabricated steel structure items DC cross arm, clamp, bracket, clamps, cross bracings, bracings, strain plate, guarding channels, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set shall not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. Items shall be offered for inspection and approval by Project Manager.

In lattice structure substation, gantry structure including all fabricated structure items like DC cross arm, clamp, bracket, cross bracing etc shall be galvanized.

#### 28.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

#### 29.00 Fire Protection System:

Fire Buckets filled with sand: The fire buckets confirming to IS 2546/1974 filled with sand shall be installed at two places in new s/s – in control room and in switchyard near power transformer. There shall be 4 no. of buckets at each location in a s/s. The buckets shall be hanging on a steel stand. The buckets and the stand shall be as per relevant standards and will be filled with sand.

#### 30.00 Portable Fire Extinguishers:

Carbon dioxide type and Dry chemical powder type fire extinguishers are also to be installed in newly constructed substation. All the portable extinguishers shall be of free standing type and shall be capable of discharging freely and completely in upright position. Each extinguisher shall have the instructions for operating the extinguishers on its body itself. All extinguishers shall be supplied with initial charge and accessories as required. Portable type extinguishers shall be provided with suitable clamps for mounting on walls or columns. All extinguishers shall be painted with durable enamel paint of fire red color conforming to relevant Indian Standards. Capacities of each type shall be as indicated in the schedule of quantities. Carbon dioxide (CO<sub>2</sub>, type) extinguisher shall of 4.5 kg for control room conform to IS:2878. Dry chemical powder type extinguisher shall be of 6 kg capacity for control room conform to IS:2171.

#### 31.00 Safety and operation equipment:

The substation shall be equipped with one following equipment for smooth operation and maintenance:

- a. Megger 1000 Volt (Electrically as well as manually operated) of Megger/Fluke/Motwane or equivalent make
- b. Earth resistance meter, Megger/Fluke/Motwane or equivalent make
- c. Crimping tool for cable from 2.5 sqmm to 185 sqmm,
- d. Torque wrench M8 to M16
- e. Multi-meter Motwane make analogue type,
- f. Tong tester digital 0-600A capacity,
- g. Allen key set,
- h. ISI marked, Discharge rod 66 KV rating with discharging copper cables & terminals – 6 Nos
- i. Electrician tool box – Taparia standard kit
- j. Set of D-spanners
- k. 12" size electrical screw driver
- l. 12" size electrical hexagonal head screw driver
- m. Pipe wrench suitable for 2 ½ inch dia pipe
- n. ISI marked rubber mat rated for 11 KV insulation, ¾" thick, size 1000mm x 2000 mm – in front of all the control panels.

Project Manager shall approve make and type of equipment.

32.00 Following details shall be provided at each substations:

For suitable information to operating staff or the other related persons visiting the substation, following facilities shall be provided before commissioning of substation or on date of inauguration of the substation.

- Sketch of substations electrical circuit inside the substation in white cotton impregnated 2 mm thick hylum sheet 2x2 feet size installed on the wall,
- Notice board 3x3 feet made out of 10 mm thick water proof ply, painted suitably and provided with 1<sup>st</sup> class teak wood ribs at the sides of 2 x ½ inches size,
- Electrical safety charts,
- Provision for notifying name, address, telephone numbers, qualification details etc of the operational staff owner intends to post at the substations and their officials in hierarchy,
- Depicting working drawings of cable terminals details and cable laying details in laminated sheets
- Color coding of bus bars and terminal conductors of the feeders using enamel painting round marks and labeling name of feeders, equipment, etc as defined.

33.00 Others:

Buildings for substation control room – shall be 10mx12m size. Details are enclosed in the tender drawing.

Indoor trenches covered with 6 mm thick chequirred plates: Concrete trench are required inside control room with 50x50x6 mm GS angle inserted at the edges for erection of control panels. Unused part of cable trench shall be covered with 6mm thick MS chequirred plates inside control room. At the entry point of trench in control room, proper sealing arrangement shall be provided so as to stop entry of reptiles and rainwater inside control room through trench.

Bi-metallic connectors shall be provided wherever there is a connection between two metal parts on all electrical equipment like 33/11 KV Power transformer, 11/0.4 KV station transformer, vacuum circuit breakers, isolators, DO Fuse, Lighting Arrester, etc.

34.00 Labelling:

Each substation equipment shall be labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words shall be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles and equipment to site for erection. Base painting and marking of digits shall be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint. The identification of phases through Red, Yellow and Blue circles shall be provided on transformer, CT, PT, 33 KV and 11 KV feeder Double Pole structures.

Control panels shall be labelled from front as well as from the back by providing serial number and name of feeder/transformer. The color coding sign on two adjacent panels shall also be provided with 100mm dia color circle overlapping two adjacent panel sheet for safety purpose.

Labeling of following information is intended by the owner preferably in local HINDI language:

1. Transformer capacity and designated name like T - 1 or T – 2,
2. VCB designated name
3. Identification of CT & PT
4. Color coding of bus bars, transformer terminals, feeders phases (R-Y-B)

5. Name of incoming / outgoing feeder – like 11 KV Nandlapur Feeder I
6. Warning instruction, if any, of availability of two sources of HT supply on same structure.
7. Earth pit designation and date of checking,

#### 35.00 Danger board:

Each substation equipment and structures shall be provided with a danger board as per approved drawing. Danger board shall be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

#### 36.00 Site Testing and Pre – Commissioning Checks:

An indicative list of tests is given below. Contractor shall perform any additional test based on specialties of the items as per the Field Quality Plan/ instructions of the equipment manufacturer or owner without any extra cost to the Owner. The Contractor shall arrange all instruments required for conducting these tests along with calibration certificates and shall furnish the list of instruments to the Owner for approval. Detail test certificates duly signed by Employer's representative & agency representative of tests jointly carried out at site before putting the equipment in use, shall be submitted by the contractor in three copies.

Agency shall also be responsible to prepare Single Line Diagram of substations and an overall power distribution network of the circle showing 400KV, 220KV, 132KV, 33 KV network and point of metering. A set of drawings which includes drawing of Single phasing AB Switch, Substation earthing arrangement are enclosed for basic information. These drawings are not necessarily showing the exact dimensions of the substations.

#### 37.00 Equipment test records, commissioning test records and drawings –

Factory test certificates of equipment, test certificates at the time of pre-dispatch inspections, pre-dispatch inspection reports, pre-commissioning check results and post commissioning check results shall be compiled and provided in three sets to Project Manager for his approval and records.

A copy of such test record shall be offered to electrical inspector and other inspecting officials during his/her visit to substation for inspection.

#### 38.00 Electrical Inspection by state Electrical Inspectorate:

The substations shall be subjected to the inspection of state owned Electrical Inspectorate for which payment of fees shall be made by Employer.

The responsibility of contractor shall include rectification / alteration / addition of installation as per advice of electrical inspector for successful commissioning of the substations within timelimit.

#### 39.00 Arrangement by the Contractor:

Contractor shall project-wise make his own separate arrangements for the following:

1. Opening of a site office-cum-store,
2. Distributions of power supply at all work areas in the substation premises.
3. Construction of office and store (open & covered)
4. Construction of steel fabrication workshop and material/field testing laboratory
5. Round the clock fire protection and security arrangements for site store-cum-office during construction stage

#### 40.00 Civil works:

Details scope under civil works have been provided in "Civil Works and Soil Investigation" at point M below.

Foundation design for power transformer, outdoor type vacuum circuit breaker, control room building, fencing, gantry structure etc shall be submitted by contractor. While designing OEM recommendations must be considered. Foundation for power transformer, outdoor type vacuum circuit breaker, control room building and fencing shall be provided with reinforcement steel. Project Manager shall approve foundation designs.

#### 41.00 Basic Reference Drawings:

The reference drawings, which are indicative of the type of specifications owner intends to accept, are annexed with the specification. The contractor shall maintain the overall dimensions of the substation, buildings, bay length, bay width, phase to earth clearance, phase to phase clearance and sectional clearances, clearances between buses, bus heights but may alter the locations of equipment to obtain the statutory electrical clearances required for the substation.

The enclosed drawings give the basic scheme, layout of substation, associated services, earthing arrangement. These drawings are provided for general information only.

Note: The insulation and RIV levels of the equipment shall be as per values given in the respective chapter of the equipment.

#### 42.00 Commissioning spares:

The Contractor shall supply spares, which he expects to consume during installation testing and commissioning of system. The quantity of these spares shall be decided based on his previous experience, such that site works shall not be hampered due to non-availability of these spares. Contractor shall submit a complete list of such spares along with the bid, the cost of which shall be deemed to have been included in the lump-sum proposal price of the package. The contractor, if so agreed at a cost to be negotiated may leave the unused commissioning spares at the site for use of owner.

#### 43.00 Recommended spares:

The Contractor shall provide a list of recommended spares giving unit prices and total prices for 3 years of normal continuous operation of equipment. This list shall take into consideration and shall be given in a separate list. The Owner reserves the right to buy any or all the recommended spares. The recommended spares parts shall be delivered at the site. The list of recommended spares to be furnished by the Bidder shall also contain the following:

1. Location of each item installed along with reference drawing number.
2. Service life expectancy of each item.
3. Offer validity period

Price of recommended spares will not be used for evaluation of bids. The prices of these spares will remain valid for a period of not less than 120 days after the date on which the validity of main bid expires. Whenever recommended spares are the same as mandatory spares, then the prices of the mandatory spares and such common recommended spares shall be the same. Further, the prices of any recommended spares shall be subject to review by the Owner and shall be finalized after mutual discussions.

D. New 11 KV Lines

1.00 Survey

Mapping of route of proposed new 11 kV line by foot survey in rural/urban areas be performed mentioning various milestones. While surveying, existing electrical infrastructure in the locality should also be mapped. Line alignment (single line diagram) on political map with fair correctness, be prepared. SLD and foot survey report shall be approved by Project Manager and shall be used as basic document for assessment of works under the contract. On completion of line work, as built Single Line Diagram and pole wise line diagram showing pole wise materials used and pole-to-pole span should be submitted to Project Manager. This details shall be used as reference documents by Quality Inspecting officials to execute inspection works.

In case of feeder separation, existing agriculture load shall be mapped during survey. A report to be presented indicating location wise pumps to be fed through separate feeder. Percentage voltage regulation at farthest point on various spur sections shall be examined during survey and submitted to project manager who will take a decision for feeder separation works.

2.00 Support (pole):

Following types of support are envisaged for 11 KV overhead line:

- a) 8 m/140 kgs PCC Poles - (PCC Pole as per state practice)
- b) 13 m long H-Beam 152x152 mm, 37.1 kg/mtr
- c) 11 m long H-Beam 152x152 mm, 37.1 kg/mtr
- d) 11 M long Steel Tubular poles of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
- e) 9 M long Steel Tubular poles of Designation 540 SP 28 (IS 2713, Pt I, II, III 1980)

In rural area, PCC poles are to be used. In urban area, PCC or H-Beam supports are to be used of suitable length. In hilly areas where handling of material is a challenge, tubular poles may be used. In location specific conditions like forest area, vicinity of other existing overhead lines or permanent structures etc, H- beam or tubular poles may be used. Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

H-Beam support and steel tubular poles shall be cleaned till good surface finish and painted with 2 or more coats of red oxide paint and 2 or more coats of aluminium paint till good finish. Steel tubular poles and H-Beams shall also be painted with 2 or more coats till good surface finish with anti-corrosive paint (in case of tubular poles shall also be painted on the inner walls) which goes in to the foundation. Project Manager shall approved brand and shade of paints.

Painting of H-Beams and Steel Tubular Poles shall be performed at stores. Before shifting to site for erection, poles shall be offered for inspection and approval by Project Manager or authorized representative before erection.

3.00 Fabricated steel items:

Fabricated steel items like V cross arm, top clamp, DC cross arm, bracket, clamps, cross bracings, bracings, strain plate, guarding channels, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have

any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

#### 4.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

#### 5.00 Stay Set:

Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (2Nos.), anchor plate (200x200x6mm) , nut-bolts, 2 Nos turn-buckles, 1.8 m long, 16 mm diameter solid GS stay rod & 7/3.15 mm dia GI stranded wire complete.

Stay set shall be used at all turning locations, conductor dead end supports, double pole structure, triple pole structure, four pole structure to nullify the tension of conductor. Erection of storm guys at suitable location in straight line may also be provided. Erection of storm guys at suitable location in straight line may also be provided.

0.2 cmt cement concreting in mixture 1 part cement, 3 part coarse sand, 6 part 40mm size aggregate stone chips (1:3:6). 2 Nos. guy insulator shall be provided in stranded GI wire at middle location between two turn buckles.

#### 6.00 Earthing:

Following earthing arrangements are envisaged for new 11 kV lines:

- a) 40 mm dia., 3000 mm long GI pipe earth electrode with test link, RCC pit, RCC cover plate on GI frame, bentonite powder and other accessories complete
- b) GI Earthing spike made of 20mm solid rod
- c) Chemical rod earthing including electrode, chemical, with 2000mm long, 50 mm diameter GI pipe, GI Strip of 24x3mm minimum in hard rock locations only.
- d) 6 SWG GI wire for earthing and guarding
- e) 8 SWG GI wire for earthing and guarding

Each 11 kV line support shall be provided with one GI earthing spike made of 20 mm solid rod or GI Earth Coil and connected with 8 SWG GI wire. Overhead line structure shall be connected to GI earthing spike or GI Earth Coil using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. Project Manager shall decide use of GI Earth Coil or 20mm dia GI Solid Rod for individual pole earthing.

At railway crossing, line crossing and other specific locations 40 mm dia, 3000 mm long GI pipe earth electrode with test link, RCC pit, RCC cover plate on GI frame, bentonite powder and other accessories shall be used. Overhead line structure at these locations shall be connected to GI earth pipe using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 40 mm GI earth pipe.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod.

In road crossings and line crossings, 6 SWG GI wire shall be used for cross lacing and 8 SWG wire shall be used for guard wires.

GI flats and GI wires must be properly dressed, bundled and fixed on supporting structure at 1 to 2 feet intervals.

#### 7.00 Insulator and hardware –

11 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator should be tied properly using binding wire& tape/helical form fitting. In road crossing and line crossing locations bridling cross arms and pin insulator shall be used.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator should properly be cleaned before installation. No damage/crack insulator should be used.

#### 8.00 ACSR / AAAC Conductors:

Following ACSR Conductors (or equivalent AAAC Conductor) are envisaged for new 11 kV lines:

- a) 6/2.11 + 1/2.11 mm (20 mm<sup>2</sup> Al. Area) - Squirrel
- b) 6/2.59 + 1/2.59 mm (30 mm<sup>2</sup> Al. Area) - Weasel
- c) 6/3.35 + 1/3.35 mm (50 mm<sup>2</sup> Al. Area) - Rabbit
- d) 6/4.09 + 1/4.09 mm (80 mm<sup>2</sup> Al. Area) - Raccoon
- e) 6/4.72 mm+7/1.57 mm (100 mm<sup>2</sup> Al. Area) - Dog

Project Manager shall decide size of conductor on proposed 11 KV line.

Care should be taken while drawing conductor from the drum. Proper roller should be used while handling conductors during erection. Jointing sleeves, binding materials, PG clamps, bi-metallic conductor shall be used for conductor jointing, insulators fixing, jumpering and termination at equipment respectively. There must not be uneven sag between conductor/spans.

Proper sag should be maintained using sag chart table. While tensioning, care should be taken to avoid tension on pin insulator. Therefore, proper alignment of line to be ensured.

At terminal location, care should be taken while connecting two sections to avoid bird faults. Therefore, pin insulator is to be used to handle the conductor on DC cross channel.

#### 9.00 11 KV AB Switch:

11 kV, 3-ph, 600 A, 3 Pin type, Vertical/Horizontal Mounting type, Gang Operated, AB Switch shall be installed at cut points and at suitable locations as per instructions of Project Manager. B Class GI pipe shall be used (without any joints) for operation of switch. AB Switch structure and handle must be earthed using 8 SWG GI wire.

10.00 Pole numbering:

Each support pole shall be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint. Warning instruction, if any, of availability of two sources of 33 kV supply on same structure, at source structure, at cut points should exclusively be provided as per state practice.

11.00 Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each 11 kV support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

12.00 Danger board:

Each support shall be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

13.00 Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40 mm size aggregate stone chips (1:3:6) shall be used in steel tubular poles and H-Beam 11 kV line supports.

In rural areas, PCC pole pit shall be refilled with 200 mm average size of bolder mixed with excavated earth. Proper ramming shall be performed for better compaction. All Double pole (DP), Triple pole (TP), cut point poles, Distribution Transformer substation poles and poles erected on water logging area shall be grouted using cement concrete mixture similar to H-Beam & Tubular poles. Prior approval of Project Manager shall be obtained for concreting of PCC poles in water logging area. While preparing route survey report, water logging areas shall be earmarked.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shuttering and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

14.00 11 kV line for underground railway crossing –

Two separate composite items of 11 kV line railway crossing is kept in BoQ. One is with 300 sq.mm cable & another one with 185 sq.mm cable.

2 Nos. separate cables shall be laid in separate GI pipe enclosures. At a time, one shall be used and another shall be kept idle as spare in ready to connect condition. Cable termination, cable identification, protective covering, laying of jumpering cable etc shall all be completed in this head. These composite items shall contain following sub-items:

- a) 3Cx185 (3Cx300) sqmm XLPE armored cable (approx. length is 0.3 km each) – 2 sets
- b) 150mm dia GI pipe of A class (red color painted on edges) for cable protection in underground laying – 2 sets
- c) 150mm dia GI pipe of B class (blue color painted on edges) for cable support at DP structure – 2 sets
- d) Outdoor heat shrinkable cable jointing kits for main cable and jumpering cable – 4 Nos for main cable and 8 Nos for jumpering cables.
- e) 11 kV lightening arrestor station class 10kA (6 nos.),
- f) 4 Nos GI 3-meters long pipe earthing,
- g) 6 SWG GI wires with GI nuts, bolts & washers,
- h) Cable markers,
- i) Bi-metallic clamps,
- j) Jumpering with 11 kV Aerial Bunched Cables 200 Sqmm dia (10 mtr) etc – 4 sets

Detail survey of location of railway crossing be performed by contractor to avoid multi-crossing at nearby location. Prior railway permission for execution of this work shall be obtained by Project Manager for which necessary technical support shall be provided by contractor. Line crossing shall be performed using underground cabling. Block on railway traffic shall be arranged by Project Manager. Contractor should ensure timely completion of work during block period by mobilizing requisite man, materials and machine at crossing locations.

Horizontal drilling machine shall be used for horizontal bore below railway tracks.

15.00 Quality & Quantity inspection and compliance to the observation:

The line works, before or after commissioning/energisation, shall be inspected by Quality Inspectors and State Inspection Inspectorate. Contractor shall provide all requisite details of line like approved survey report, as built drawings and joint measurement sheet to the inspector to conduct. Contractor shall rectify defects/deficiencies and submit compliance to the observations with supporting photographs in digital form within one month from receipt of observations.

16.00 Tree-cutting/trimming of tree:

The Contractor shall count, mark and put proper numbers with suitable quality of paint at his own cost on all the trees that are to be cut/trim to obtain required tree clearance. Contractor shall pay compensation for any loss or damage for tree cutting due to Contractor's work. Wherever forest clearance is envisaged for execution of work, clearance of forest department for tree cutting, if required, shall be arranged by the Project Manager and compensation shall also be paid by the Project Manager. Necessary fee if required to pay to Govt. dept. for arranging such clearances shall be paid by Project Manager. However, the contractor would require to provide all necessary assistance for execution of this work.

17.00 Statutory clearances:

During execution of 11 KV Line work, all statutory clearances shall be ensured for ground clearance, line-to-line clearance, road crossing clearance, horizontal and vertical clearances from buildings/objects etc. All road crossings and line crossings shall be guarded as per specifications. Conductor joint should not be provided in mid span length. Instead, it should be nearer to the support.

E. Distribution Transformer Substations

1.00 Survey of Distribution Transformer Substations:

A detailed survey of existing habitation/village shall be performed in presentable document showing population residing in the un-electrified area/existing electrified area of habitation/ village, best location of installation of a new distribution transformer substation and the capacity of transformers to be selected for installation. The capacity of DTR shall be governed by following technical aspects:

- a) Optimistic lengths of LT lines needed to feed the beneficiaries,
- b) Space available for installation of support/transformers,
- c) Probable load expected to come on the transformer due to existing BPL beneficiaries /others connected /un-connected probable beneficiaries in the locality taking care of their expected load growth in next 5 years.
- d) Distribution Transformers of capacity 16 KVA to 315 KVA (single phase as well as three phase) shall be decided as per standard rating of distribution transformer as depicted in IS specifications. Nonstandard ratings of DTR shall not be installed.
- e) Distribution Transformers of capacity 16 KVA to 315 KVA (single phase as well as three phase) shall be installed on double pole structures. Hence, three phase 11 KV lines shall be laid for 16 KVA to 315 KVA (single phase as well as three phase) capacity sub-stations. Single phase lines shall only be permitted for 10 KVA single phase transformers mounted on single pole structure.
- f) Double pole support galvanized steel structures for 16 KVA and 25 KVA distribution transformers shall be designed in such a way that they can be augmented to 63 KVA transformer structures without any addition in near future on technical requirements.

Based on survey report, Project Manager shall decide type, capacity and location of Distribution Transformer sub-station.

2.00 Following types of support are envisaged for 11/0.4 or 11/0.25 KV Distribution Transformer Substation support:

- f) 8 m/140 kgs PCC Poles - (PCC Pole as per state practice) – up to 100 KVA rating only
- g) 13 m long H-Beam 152x152 mm, 37.1 kg/mtr
- h) 11 m long H-Beam 152x152 mm, 37.1 kg/mtr
- i) 11 M long Steel Tubular poles of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
- j) 9 M long Steel Tubular poles of Designation 540 SP 28 (IS 2713, Pt I, II, III 1980)

In rural area, PCC poles are to be used. In urban area, PCC or H-Beam supports are to be used of suitable length. In hilly areas where handling of material is a challenge, tubular poles may be used. In location specific conditions like forest area, vicinity of other existing lines and permanent structures etc, H- beam or tubular poles may be used. Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

PCC supports shall be used for distribution transformer substation up to 100 KVA capacity only. Beyond 100 KVA rating, H-Beam supports shall be used for mounting of distribution transformer.

H-Beam support and steel tubular poles shall be cleaned till good surface finish and painted with 2 or more coats of red oxide paint and 2 or more coats of aluminium paint till good finish. Steel tubular poles and H-Beams shall also be painted with 2 or more coats till good surface finish with anti-corrosive paint (in case of tubular poles shall also be painted on the inner walls) which goes in the foundation. Project Manager shall approved brand and shade of paints.

Painting of H-Beams and Steel Tubular Poles shall be performed at stores yard. Before shifting to site for erection, poles shall be offered for inspection and approval by Project Manager before erection.

### 3.00 Fabricated steel items:

Fabricated steel items like DC cross arm (100x50x6 mm), back clamps (65x8 mm), pole clamp (65x8 mm), DO mounting channel (100x50x6 mm), transformer mounting channel (100x50x6 mm), transformer clamping set (50x50x6 mm), transformer belting set (50x50x6 mm), V cross arm, top clamp, DC cross arm, bracket, clamps, cross bracings, bracings, strain plate, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electric cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

### 4.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

### 5.00 Stay Set:

Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (2Nos.), anchor plate (200x200x6mm), nut-bolts, 2 Nos turn-buckles, 1.8 m long, 16 mm diameter solid GS stay rod & 7/3.15 mm dia GI stranded wire complete.

Stay set shall be used at all sub-station location to nullify the tension of conductor/cable/transformer on the supports. 0.2 cmt cement concreting in mixture 1 part cement, 3 part coarse sand and 6 part 40mm size aggregate stone chips (1:3:6) shall be provided in the foundation of the stay set. 2 Nos. guy insulator shall be provided in 7/3.15 mm dia stranded GI wire at middle locations between two turn buckles.

### 6.00 Distribution Transformer:

Following type and sizes of minimum 4star rated {as per Bureau of Energy Efficiency (BEE)}, distribution transformers are standardized in the project:

- a) 5/6 KVA 1 phase Aluminium / Copper wound DTR
- b) 10 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- c) 16 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- d) 25 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- e) 63 KVA 3 phase Aluminium / Copper wound DTR

- f) 100 KVA 3 phase Aluminium / Copper wound DTR
  - g) 200 KVA 3 phase Aluminium / Copper wound DTR
  - h) 250 KVA 3 phase Aluminium / Copper wound DTR
  - i) 315 KVA 3 phase Aluminium / copper wound DTR
- Or any other rating as per latest Indian Standard Specification

The Distribution Transformers shall be 11/0.4 KV or 11KV/230 V or 22/0.44 KV non-sealed type BEE specified minimum 4 Star Distribution Transformers. The transformers shall be double wound, three phase, CRGO M3 Grade (0.23mm) or better (The core shall be constructed from high grade, non-ageing, Cold Rolled Grain Oriented (CRGO) silicon steel of M3 Grade (0.23mm) laminations only. PRIME CORE M3 Grade (0.23mm) materials are to be used for transformers core.

Distribution Transformers shall be subject to inspection during manufacturing (stage inspection), pre-delivery inspection, and inspection at site during pre-erection/post erection/post commissioning conditions. Project Manager shall select samples from the core laminations and get the same tested in CPRI/ NABL Accredited laboratory to prove the quality of the core material.

The distribution transformers shall be supplied with transformer oil filled up-to maximum permissible level and breather with silica gel.

The distribution transformers must have been successfully type tested within five years from date of Letter of Intent and the designs should have been in satisfactory operation for a period not less than two years as on the date of bid opening. Compliance shall be demonstrated by submitting, (i) authenticated copies of the type test reports and (ii) performance certificates from the users, specifically from Central Govt./State Govt. or their undertakings.

4 STAR LEVEL: Each Distribution Transformers must contain minimum 4 Star Label with style and information provided by the Bureau of Energy Efficiency (B.E.E), Ministry of Power, Government of India.

The losses in Distribution Transformer should be as per Energy Efficiency Level-2 and above as specified in IS 1180 (Part-1):2014 for all kVA ratings of distribution transformers

Bimetallic connectors of suitable capacities are to be provided on LT side and on HT side of the transformer.

T-Clamps should be provided on each jumper on bus bars. Line jumpers should be provided with adequate size of PG Clamps (Two numbers PG Clamps at each end of jumper). Clamp should be made of aluminum grade T-1F as per IS-8309 having good electrical quality aluminum material and should not be brittle in nature.

Transformers should be tested for pre-commissioning checks which includes Insulation Resistance Test, ratio test and oil breakdown voltage test. Before formal energisation, oil leakages from the parts of the transformer, oil level in conservator tank, condition of silica gel, earth connection (two separate) between neutral and earthing, proper jointing of earth wires/flats at the joints and earth resistance of the individual earthing pits are to be checked and recorded. On commissioning of the transformer, phase current and phase to phase voltage, phase to neutral voltage are to be recorded. The loading on the transformers should be balanced. The quantum of neutral current flowing through neutral shall be recorded. A record of pre-commissioning checks/tests are to be prepared and submitted to the Project Manager.

## 7.00 ACSR / AAAC Conductor:

ACSR raccoon conductor (or equivalent AAAC Conductor) is to be used for connection between overhead lines to transformer studs/bushing.

## 8.00 Distribution box and Power Cabling:

Distribution boxes are to be installed as per specifications enclosed. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks should be prepared and submitted.

All CT terminals are to be ring type and other terminals are fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals.

The distribution boxes are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution boards should be provided of 10mm dia.

The single core power cables should be terminated with proper size lugs and gland. Necessary tagging, identification of cores and dressing of cables with nylon cable ties shall be in the scope of work. The unutilized holes in the DBs provided for cable entry needs to be plugged properly in a manner that it must stop access to reptiles, dust and water ingress.

The Low Tension bus bars are to be painted with two or more coats of brush-able epoxy compound suitable to insulate the bus bars for 415 volts exposure.

The distribution box, for transformers upto and including 25 KVA, should also house three phase tri-vector energy meter / single phase meter depending on capacity and type of distribution transformer as per specifications. For higher capacity transformers, CT operated meters are to be installed. Separate LTCT cum Meter Box at eye height shall be installed for housing of meter, CTs, terminal block and wiring.

The single core un-armored power cables shall be used for connection from Distribution Transformer to Distribution Box and Distribution Box to Outgoing LT lines. Cable should not be used in underground laying arrangement. Cables should be dressed & tied properly using clamps / cable ties at 1 meter intervals and tied with substation structure/poles. At-least one meter cable is to be kept as spare at the individual ends.

Following arrangements shall be made for LT Distribution Transformers and LT Cables:

No	Type of DTR	Incomer		Outgoing	Cable	
		MCB/Isolator	HRC fuse	MCCB	1	2
1	5/6/10 KVA 1 Ph	45A SPN MCCB		2x32A SP MCCB	1Cx16 sqmm UA	
2	16 KVA 1 Ph	80A SPN MCCB		2x50A SP MCCB	1Cx16 sqmm UA	
3	16 KVA 3 Ph	25A TPN MCCB		6x16A SP MCCB	1Cx16 sqmm UA	
4	25 KVA 1 Ph	40A SPN MCCB		3x25A SP MCCB	1Cx35 sqmm UA	
5	25 KVA 3 Ph	40A TPN MCCB		6x25A SP MCCB	1Cx35 sqmm UA	
6	63 KVA 3 Ph	200A TPN Isolator	100 A	6x60A SP MCCB	1Cx50/70 sqmm UA	1Cx70 sqmm UA
7	100 KVA 3 Ph	200A TPN Isolator	160 A	6x90A SP MCCB	1Cx50/70 sqmm UA	1Cx150 sqmm UA
8	200 KVA 3 Ph	600A TPN Isolator	315 A	9x120A SP MCCB	1Cx150 sqmm UA	1Cx300 sqmm UA
9	315 KVA 3 Ph	600A TPN Isolator	500 A	12X120A SP MCCB	1CX150 sqmm UA	1CX300 sqmm UA

1.1 KV XLPE Aluminium Conductor, Stranded, un-armored cable be used for connection of transformer LV bushing to Distribution Box and Distribution box to overhead line.

## 9.00 Earthing:

Distribution Transformer Earthing shall be provided with 3 Nosearthing and making earth mat /risers using 50X6mm GI Flat. Earthing should be provided with GI earth pipe or Chemical Earthing depending of strata of soil in the location. Project Manager shall decide the type of earthing.

25x3mm GI Flat and 8 SWG GI shall be used for making earthing connection to various sub-station equipment as per given details. GI Flat and GI wire shall be properly dressed, bunched and clamped with the support at 2 feet intervals. An overlapping of 35mm shall be used at the place of flat to flat joint. Two sets of GI nuts, bolts and washers shall be used for flat-to-flat joints. GI nuts, bolts and washers must be used for GI Flat-to-GI wire & GI wire-to-GI wire joints.

Substation wise measurement of earth resistance of earth pits / mesh and corresponding drawing of existing earthing arrangement shall be recorded and submitted to Project Manager.

Description of equipment	Earth connection
Earthing pits	3 Nos. Earth Pipe 3 m long, 40 mm dia or Chemical Earthing
Earth mat and riser	50X6 mm GI Flat / 8 SWG GI wire
Laying of earth mat	Below ground 0.5 meter

Standard requirements of earthing shall be as under:

- Earth Pit – 1 for Transformer Neutral,
- Earth pit - 2 for Lightning Arrester,
- Earth pit – 3 for Equipment body earthing.

Following arrangement is envisaged for various equipment of distribution transformer substation:

- |   |                  |
|---|------------------|
| a) Transformer Neutral (Two distinct connections) | : GS Flat 25X3mm |
| b) Transformer Body                               | : GS Flat 25X3mm |
| c) Lightning Arrester                             | : GS Flat 25X3mm |
| d) Fencing (Wherever required)                    | : GI wire 8 SWG  |
| e) LT Distribution Box (Two distinct connections) | : GI wire 8 SWG  |
| f) AB Switch handle                               | : GI wire 8 SWG  |
| g) Steel structure of substation                  | : GI wire 8 SWG  |
| h) Line meters                                    | : GS wire 8 SWG  |

The location of earth pits should be at-least 3m apart, so that they their earth conductive areas do not overlap. In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used in place of normal GI pipe type earthing. Project Manager shall decide type of earthing pits.

## 10.00 Metering of DTR:

Single phase or three phase metering of DTR shall be provided. The meter shall be installed in a metallic enclosure. Enclosure shall be earthed at two locations. The meter board shall be provided with push-and clamp type terminals. All CT terminals are to be provided with ring type lugs. Meter shall be tested before installation as per prevailing practice Employer. There would be no testing charges levied by Employer for testing of meters in their authorized laboratories, if facilities are available. In case of CT operated meter, metallic LTCT cum Meter box shall be provided at working height.

Upto 25 KVA transformers, meter shall be installed in distribution box. For transformer capacity 63 KVA and above, LTCT-cum-meter box shall be installed at working height on substation support.

11.00 Insulator and hardware:

11 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator should be tied properly using binding wire/helical form fitting. Bi-metallic clamps must be used at terminals.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator should properly be cleaned before installation. No damage/crack insulator should be used.

12.00 Substation numbering:

Each Substation should be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

13.00 Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each sub-station support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

14.00 Danger board:

Each support should be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

15.00 Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40 mm size aggregate stone chips (1:3:6) shall be used in PCC Pole, steel tubular poles and H-Beam support foundation.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shuttering and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

16.00 11 KV AB Switch:

11 kV, 3-ph, 200 A, 3 Pin type, Horizontal/Vertical Mounting type, Gang Operated, AB Switch shall be installed on 100 KVA and more capacity distribution transformer substation only. B Class GI pipe shall

be used (without any joints) for operation of switch. AB Switch structure and handle must be earthed using 8 SWG GI wire.

17.00 11 KV Drop Out Fuses:

11 kV, 3-ph, Drop Out fuse units (set of 3 units) along with Support Insulators, Base Channel, fuse barrel etc. shall be used for all capacity Distribution Transformer Substations. DO Fuse structure shall be earthed using 8 SWG GI wire.

18.00 Lighting Arrester:

Distribution Class LAs on each phase shall be provided in the sub-station with base steel structure, terminals bi – metallic connectors / PG clamps and earth connectors. LAs are to be connected with separate earth connection. 25x3 mm GI flat shall be used for earth connection.

F. New LT Line

1. Survey:

Mapping of route of proposed new LT line by foot survey in rural/urban areas be performed mentioning various milestones. While surveying, existing electrical infrastructure in the locality should also be mapped. Line alignment (single line diagram) on political map with fair correctness, be prepared. SLD and foot survey report shall be approved by Project Manager and shall be used as basic document for assessment of works under the contract. On completion of line work, as built Single Line Diagram and pole wise line diagram showing pole wise materials used and pole-to-pole span should be submitted to Project Manager. This details shall be used as reference documents by Quality & Quantity Inspecting officials to execute inspection works.

2. The LT line between distribution transformer and consumers shall be on LT Aerial Bunched cables.

3. Support for LT overhead Line:

- a) 8 M/140 kgs PCC Poles (PCC Pole as per state practice)
- b) 11 M long H-Beam 152x152 mm, 37.1kg/mtr
- c) 11 M long Steel Tubular poles of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
- d) 9 M long Steel Tubular poles of Designation 540 SP 28 (IS 2713, Pt I, II, III 1980)

In rural area, PCC poles are to be used. In urban area, PCC or H-Beam supports are to be used of suitable length. In hilly areas where handling of material is a challenge, tubular poles may be used. In location specific conditions like forest area, vicinity of other existing overhead lines or permanent structures etc, H- beam or tubular poles may be used.

H-Beam support and steel tubular poles shall be cleaned till good surface finish and painted with 2 or more coats of red oxide paint and 2 or more coats of aluminium paint till good finish. Steel tubular poles and H-Beams shall also be painted with 2 or more coats till good surface finish with anti-corrosive paint (in case of tubular poles shall also be painted on the inner walls) which goes in to the foundation. Project Manager shall approved brand and shade of paints.

Painting of H-Beams and Steel Tubular Poles shall be performed at stores. Before shifting to site for erection, poles shall be offered for inspection and approval by Project Manager.

4. Fabricated steel items:

Fabricated steel items like clamps, stay clamp, etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

5. Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure wherever required.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

6. Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (1 No.), anchor plate (200x200x6mm), nut-bolts, 2 Nos turn-buckles, 1.8 m long, 16 mm diameter solid GS stay rod shall be used with 7/3.15 mm dia GI stranded wire.

Stay set shall be used at all turning locations, cable dead end locations to nullify the tension of the cable. Erection of storm guys at suitable location in straight line may also be provided. Erection of storm guys at suitable location in straight line may also be provided.

0.2 cmt cement concreting in mixture 1 part cement, 3 part coarse sand, 6 part 40mm size aggregate stone chips (1:3:6). 2 Nos. guy insulator shall be provided in stranded GI wire at middle location between two turn buckles.

7. Following earthing arrangements are envisaged for new LT lines:

- 7.1.1. 40 mm dia., 3000 mm long GI pipe earth electrode with test link, RCC pit, RCC cover plate on GI frame, bentonite powder and other accessories complete
- 7.1.2. GI Earthing spike made of 20mm solid rod or 8 SWG, 50 turns earthing coil
- 7.1.3. Chemical rod earthing including electrode, chemical, with 2000mm long, 50 mm diameter GI pipe, GI Strip of 24x3mm minimum in hard rock locations only.
- 7.1.4. 8 SWG GI wire for earthing and guarding

Every sixth LT line support shall be provided with one GI earthing spike made of 20 mm solid rod or GI Earth Coil and connected with 8 SWG GI wire. Overhead steel items shall be connected to GI earthing spike or GI Earth Coil using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. Project Manager shall decide use of GI Earth Coil or 20mm dia GI Solid Rod for individual pole earthing.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod.

GI wires must be properly dressed and fixed on supporting structure at 1 to 2 feet intervals.

8. LT line shall form following areal bunched XLPE cables:

- 8.01 1X16 (Ph) + 1X25 (bare messenger cum neutral) SQ. MM.
- 8.02 1X16 (Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting)SQ. MM.
- 8.03 3X16(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 8.04 3 X 16(Ph) +1x25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 8.05 1X25(Ph)+1x25 (bare messenger cum neutral) SQ. MM.
- 8.06 1X25(Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 8.07 3X25(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 8.08 3 X 25(Ph) +1x25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 8.09 1X35(Ph)+1X25 (bare messenger cum neutral) SQ. MM.

- 8.10 1x35(Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 8.11 3X35(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 8.12 3X35 (Ph) + 1x25 (bare messenger cum neutral)+ 1x16 (insulated Street lighting) SQ. MM.
- 8.13 3X50(Ph)+1X35 (bare messenger cum neutral) SQ. MM.
- 8.14 3X50 (Ph)+1x35 (bare messenger cum neutral) +1x16 (insulated Street lighting) SQ. MM.
- 8.15 3X95(Ph)+1X70 (bare messenger cum neutral) SQ. MM.
- 8.16 3X95(Ph)+1X70 (bare messenger cum neutral) +1x16 (insulated Street lighting) SQ. MM.

9. Distribution box:

Single phase or three phase distribution box shall be provided for extending power supply to LT consumers. Distribution Box (DB) shall be mounted on LT pole with MS clamp of 40x3 mm size duly painted. DB shall be earthed using 8 SWG GI wire.

Single phase DB shall be suited for two core 25 sqmmaluminium conductor cable as incomer and 8 nos. two core 10 sqmm conductor cables as outgoing cables. Three phase DB shall be suited for four core 35 sqmmaluminium conductor cable as incomer and 4 nos. four core 16 sqmm conductor cables as outgoing cables.

The distribution box shall be installed only at locations where BPL connections are provided.

10. Connection from ABC cable:

2Cx25 sqmm cable or 4Cx35 sqmm cable shall be used between LT line and Distribution box. T-connector shall be used at LT line for tapping. While tapping connection from ABC cable, highly skilled lineman/wireman shall be deployed along with sophisticated cutting plier/tool so that no damage should result in AB cable conductor. T-connector should be crimped properly for resistance free/maintenance free electric connection. Alternately, piercing type connector may be used for tapping of LT connection from ABC cable conductor.

11. Pole numbering:

Each support pole should be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

12. Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each LT line support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

13. Danger board:

Each support should be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

14. Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40 mm size aggregate stone chips (1:3:6) shall be used in steel tubular poles and H-Beam LT line supports.

In rural areas, PCC pole pit shall be refilled with 200 mm average size of bolder mixed with excavated earth. Proper ramming shall be performed for better compaction. PCC pole at cut point and PCC poles erected on water logging area shall be grouted using cement concrete mixture similar to H-Beam & Tubular poles. Prior approval of Project Manager shall be obtained for concreting of PCC poles in water logging area. While preparing route survey report, water logging areas shall be earmarked.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shuttering and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

15. Quality& Quantity inspection and compliance to the observation:

The line works, before or after commissioning/energisation, shall be inspected by Quality Inspectors and State Inspection Inspectorate. Contractor shall provide all requisite details of line like approved survey report, as built drawings and joint measurement sheet to the inspector to conduct. Contractor shall rectify defects/deficiencies and submit compliance to the observations with supporting photographs in digital form within one month from receipt of observations.

16. Tree-cutting/trimming of tree:

The Contractor shall count, mark and put proper numbers with suitable quality of paint at his own cost on all the trees that are to be cut/trim to obtain required tree clearance. Contractor shall pay compensation for any loss or damage for tree cutting due to Contractor's work. Wherever forest clearance is envisaged for execution of work, clearance of forest department for tree cutting, if required, shall be arranged by the Project Manager and compensation shall also be paid by the Project Manager. Necessary fee if required to pay to Govt. dept. for arranging such clearances shall paid by Project Manager. However, the contractor would require to provide all necessary assistance for execution of this work.

17. Statutory clearances:

During execution of LT Line works, all statutory clearances shall be ensured for ground clearance, line-to-line clearance, road crossing clearance etc.

18. The earthing point of distribution transformer should be extended to the single phase beneficiary premises having en-route earth connection at every 6th supports. The earth conductor is to be connected with earth point provided in the premises of single phase consumers. The bearer wire shall be earthed at every sixth pole.

19. Bearer wire of LT AB cable shall be anchored through eyehook or dead end (anchor) clamps.

20. Extra length of continuous AB cable along with messenger / bearer wire shall be properly dressed and clamped.

21. LT Consumer Connection From Service Pole (As Per Rec Spec.5/1986)

21.1. General arrangement for LT consumer connection shall be as depicted in REC Construction Standard drawing H-1 and H-2. For all identified BPL (Below Poverty Line) consumers, the contractor shall carry out following works:

- a. Service line from nearby LT pole/Distribution Board/Distribution Transformer,
- b. Installation of energy meter, metal meter box, double pole miniature circuit breaker, meter board and earthing point,
- c. Internal wiring works comprising of separate wooden/ Fiber Glass Reinforced Polyester sheet moulding compound (SMC) board, 5 A switch & socket, one separate LED light point, bakelite/wooden round base to house pendant holder, LED lamp, internal wiring between meter board to switch board and switch board to pendant holder.
- d. Testing of consumer meter at distribution licensee's test laboratory,

Following materials shall be used for single phase service connection:

21.1.1. Service Cable: 2.5 mm<sup>2</sup> twin core (unarmoured) PVC insulated cables with aluminium conductors as per REC Specification 26/1983 shall be used, Alternatively, PVC insulated cables with embedded bearer wire as per REC Specification No27 /1983 can also be used. These are particularly useful for costal and polluted areas, where corrosion of G.I bearer wire is a problem. Following are instruction for service cables:

- a. The cable shall be free of joints,
- b. The cables shall have substantial weather proof and weather resisting properties.
- c. The span shall not be more than 35 meters or shorter as indicated in REC Construction Standards H-1 to H-9.
- d. The size of the bearer wire, which should be used invariably when insulated wire services are given should be 3.15 mm (10 SWG) GI wire (55-95 kg. quality)
- e. The service wire should be taken through suitable porcelain spool or any other insulating cleat attached with bearer wire by means of binding wire.

21.1.2. Meter Board: The meter board should be preferably of the box type with sides covered and back open i.e. the meter board will have a frame all round having a clear depth of 40mm to which front board will be fixed. Size of the meter board should be 350 x 200 mm. Each meter board shall be provided with 4(four) anchor bolts 6 mm. Meter board shall be of good quality wood or Fiber Glass Reinforced Polyester sheet moulding compound (SMC) board. The back part of the board should be covered.

21.1.3. Switch Board: Wooden / Fiber Glass Reinforced Polyester sheet moulding compound (SMC) board {200x150x40 (minimum)} should be installed at normal operating height. Following accessories shall be installed on switch board:

- i. 2 Nos. ISI mark, Piano type 5A, 240V, Switch,
- ii. 1 No ISI mark, 5A, 240V, three-pin socket,

21.1.4. Service Supports: Service supports comprising of G.I. Pipe, M.S. angle or Rigid Steel conduit and of sizes given in REC Construction Standard H-1 shall be used.

21.1.5. Single Phase energy meter: Fully Static, class 1.0, compatible with state's existing metering system, 5-30A, 240 Volts. Meter body and cover shall be sealed after testing and adjustment with the sealing plier in association with DISCOM officials.

- 21.1.6. PVC Pipe: PVC Pipe 25 mm<sup>2</sup>dia (ISI marked) as per IS-2509 (3 mtr piece) for service termination – if PVC pipe is being used to receive service wire, then 3 meter length angle 35x35x5mm duly painted shall be used to support the pipe.
- 21.1.7. GI Wire: 3.15mm dia hard quality GI wire as per IS 280 is to be used to support the service wire coming from the LT line pole and for guy. The service wire shall have ground clearance of 5800mm across the road, 5500mm along the road and 4000mm elsewhere. The span should not be more than 35 meters.
- 21.1.8. LT line support should be installed matching with the single-phase-service-wire length requirements of “up to 35 meters”.
- 21.1.9. GI pipe or MS angle 35mmx35mmx5mm shall be clamped firmly using 40x3mm MS flat clamps at at-least two locations.
- 21.1.10. GI Medium Class ISI marked, (Blue tripped painted) pipe 20 mm dia (3 mtr single length without joints) as per IS 1161
- 21.1.11. Double pole miniature circuit breaker - 16 amps (one number)
- 21.1.12. Meter box for single phase meter made of shall be provided for meter protection. The Polycarbonate Meter Box (MMBs) shall be 285mmx200mmx150mm(i.e. height x width x depth).
- 21.1.13. Reel Insulator and Egg Insulator as per requirements,
- 21.1.14. G.I. Wire No. 10 (3.15 MM) (For extension of system earth to meter board)
- 21.1.15. Protection and Earthing: Meter board {200x350x40mm(minimum)} should house earth terminal as per CEA regulations and 16 A two pole MCB. It should be installed at 1500mm min height on the wall. The earth terminal shall be installed and maintained by DISCOM/Distribution licensee. The back part of the board should also be covered.
- 21.1.16. House wiring: Each BPL Household shall be provided with internal house wiring between switch board and Angle Holder. 1 No. 9W screw type LED Lamp shall also be provided. PVC insulated and PVC sheathed single core 1.5 sq mm multi-strandscopper conductor cable as per IS 694/1990 (ISI marked) wiring on PVC pipe (IS marked) IS 2509 as per specification shall be used. Clips for supporting the pipes at every 1 feet distance shall be used.

All construction activities shall be performed as per REC construction standard H-1. The switch board shall be installed at operating height whereas lamp should be installed at a height of 7 to 8 feet above the ground level depending on availability of height in consumer house. Neutral wire should not be short-circuited. Earthing point of three-pin socket should be connected with earth point installed on the meter board.

## G. Augmentation and Renovation

### 1. Section-I: 33/11 kV substation augmentation

Following types of augmentation works are envisaged in 33/11 kV substation:

- a. Installation of additional 3.15 MVA Transformer with two additional bay on 11 KV side.
- b. Installation of additional 5 MVA Transformer with two additional bay on 11 KV side.
- c. Installation of additional 6.3 MVA Transformer with three additional bay on 11 KV side.
- d. Installation of additional 8 MVA Transformer with four additional bay on 11 KV side.
- e. Installation of additional 10 MVA Transformer with four additional bay on 11 KV side.
- f. 11 KV out-door yard extension for additional bay H-beam structure.
- g. 11 KV out-door yard extension for additional bay by providing PCC support (pole).
- h. 33 KV out-door yard extension for additional bay by providing H-beam structure.
- i. Installation of 33 KV VCB for 1.6 MVA, 3.15 MVA, 5.0 MVA Transformer.
- j. Augmentation of Power Transformer without additional bay on 11 KV side 1.65 MVA to 3.15 MVA.
- k. Augmentation of Power Transformer without additional bay on 11 KV side 3.15 MVA to 5.0 MVA.
- l. Augmentation of Power Transformer without additional bay on 11 KV side 5.00 MVA to 8.0 MVA.
- m. Augmentation of Power Transformer without additional bay on 11 KV side with old transformer 1.6 MVA to 3.15 MVA.
- n. Augmentation of Power Transformer without additional bay on 11 KV side with old transformer 3.15 MVA to 5.0 MVA.
- o. Augmentation of Power Transformer using old transformer with 2 no. additional bay on 11 KV side 1.6 MVA to 3.15 MVA.
- p. Augmentation of Power Transformer using old transformer with 2 no. additional bay on 11 KV side 3.15 MVA to 5.0 MVA.
- q. Augmentation of Power Transformer with 2 no. additional bay on 11 KV side 1.6 MVA to 3.15 MVA.
- r. Augmentation of Power Transformer with 2 no. additional bay on 11 KV side 3.15 MVA to 5.0 MVA.
- s. Augmentation of Power Transformer with 2 no. additional bay on 11 KV side 5.00 MVA to 8.0 MVA.
- t. Capacitor Bank 600 KVAR - Fixed type.
- u. Capacitor Bank 1200 KVAR - Auto type.
- v. Capacitor Bank 1500 KVAR - Auto type.
- w. Revamping of 33/11 kV substation earth mat.

Above list is of various options of substation renovation/augmentation. The list of works is indicative. Employer shall provide location wise exact details of works to be executed on existing substation. Accordingly, various BoQ items (extracted from items of new 33/11 kV substations) shall be utilized. Item-wise scope of works under new 33/11 kV substations is detailed out under scope of new substation. It shall be utilized on item to item requirement under renovation/augmentation of 33/11 kV substation also. Under this head, only damaged/defective items with approval of Project Manager shall be replaced by good ones. All removed defective/damaged items and good replaced power transformers received should be returned to employer's stores within a time limit decided by the Project Manager in the same condition as replaced.

### 2. Section-II: Renovation/Augmentation of 33 kV line

- 1.00 Augmentation of 3 phase 33 kV line using additional supports matching with length and type of existing support is envisaged on following type of supports:
  - i. 9.1 meter long /280 KG PCC Poles (PCC Pole as per state practice)
  - ii. 11 m or 13 m long H-Beam 152x152 mm 37.1 kg/m
  - iii. 11 M long steel Tubular poles with welded steel base plate of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
  - iv. 13 M long steel Tubular poles with welded steel base plate of Designation 540 SP 72 (IS 2713, Pt I, II, III 1980)

- 2.00 Augmentation of existing conductor with following type of new ACSR conductor including jointing sleeves, binding materials and helical formed fittings etc as required are envisaged under this work-
- i. 6/4.72 mm+7/1.57 mm (100 mm<sup>2</sup> Al. Area) - Dog replacing existing raccoon conductor
  - ii. 6/4.09 + 1/4.09 mm (80 mm<sup>2</sup> Al. Area) - Raccoon replacing existing rabbit/weasel conductor
  - iii. 30/2.59 + 7/2.59 mm (150 mm<sup>2</sup> Al. Area) - Wolf replacing existing dog/raccoon conductor
  - iv. 30/3.00 + 7/3.00 mm (200 mm<sup>2</sup> Al. Area) - Panther replacing existing dog/raccoon/wolf conductor
- 3.00 While executing this work, mid span pole with all fittings may be provided matching with existing poles of the line.
- 4.00 Following works shall also be executed by contractor under this head –
- a. Replacement of damaged insulators
  - b. Straightening of tilted supports by providing additional foundation or by providing boulders etc as required.
  - c. Revamping of pole earthing and replacement of GI earth wire.
  - d. Labelling, providing danger board, providing anti climbing device and painting of all the poles shall be in the scope of work
  - e. Replacement of damaged/bent V-cross arms & top clamps with new ones
  - f. Providing of stay set wherever required
  - g. Providing of guarding wherever required
  - h. Removal of old conductor in coil form, removal of old steel structure, removal of old conductor fittings, removal of any other worn out/defective material and deposit them in Employer's store within a reasonable time as decided by Project Manager

Item-wise scope of works under renovation/augmentation of 33 kV line is detailed out under scope of new 33 kV line. It shall be utilized on item to item requirement under renovation/augmentation of 33 kV line also.

### 3. Section-III: Renovation/Augmentation of 11 kV line

- 1.00 Augmentation of 3 phase 11 kV line using additional supports matching with length and type of existing support is envisaged on following type of supports:
- a. 8 meter long /140 KG PCC Poles (PCC Pole as per state practice)
  - b. 9 m or 11 m or 13 m long H-Beam 152x152 mm 37.1 kg/m
  - c. 11 M long steel Tubular poles with welded steel base plate of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
  - d. 13 M long steel Tubular poles with welded steel base plate of Designation 540 SP 72 (IS 2713, Pt I, II, III 1980)
- 2.00 Augmentation of existing conductor with following type of new ACSR conductor including jointing sleeves, binding materials and helical formed fittings etc as required are envisaged under this work-
- a. 6/3.35 + 1/3.35 mm (50 mm<sup>2</sup> Al. Area) - Rabbit by replacing existing weasel/squirrel conductor
  - b. 6/4.09 + 1/4.09 mm (80 mm<sup>2</sup> Al. Area) - Raccoon by replacing existing rabbit/weasel/squirrel conductor
  - c. 6/4.72 mm+7/1.57 mm (100 mm<sup>2</sup> Al. Area) - Dog by replacing existing raccoon/rabbit conductor

3.00 While executing this work, mid span pole with all fittings may be provided matching with existing poles of the line.

4.00 Following works shall also be executed by contractor under this head –

- a. Replacement of damaged insulators
- b. Straightening of tilted supports by providing additional foundation or by providing boulders etc as required.
- c. Revamping of pole earthing and replacement of GI earth wire.
- d. Labelling, providing danger board, providing anti climbing device and painting of all the poles shall be in the scope of work
- e. Replacement of damaged/bent V-cross arms & top clamps with new ones
- f. Providing of stay set wherever required
- g. Providing of guarding wherever required
- h. Removal of old conductor in coil form, removal of old steel structure, removal of old conductor fittings, removal of any other worn out/defective material and deposit them in Employer's store within a reasonable time as decided by Project Manager

Item-wise scope of works under renovation/augmentation of 11 kV line is detailed out under scope of new 11 kV line. It shall be utilized on item to item requirement under renovation/augmentation of 11 kV line also.

#### 4. R & M and augmentation of Distribution Transformer Substations

1.00 Survey of Distribution Transformer Substations:

A detailed survey of overloaded Distribution Transformer substation shall be performed. Existing electrical connected loading and habitation/village shall be surveyed and a presentable document showing population residing in the un-electrified area/existing electrified area of habitation/ village shall be performed. Based on survey, best option for augmentation of distribution transformer substation and the capacity of new transformer shall be decided. The capacity of augmented DTR shall be governed by following technical aspects:

- a) Optimistic lengths of LT lines needed to feed the existing consumers, existing un-connected consumers and future growth in electrical loading,
- b) Space available for installation of support/transformers,
- c) Probable load expected to come on the transformer due to existing BPL beneficiaries /others connected /un-connected probable beneficiaries in the locality taking care of their expected load growth in next 5 years.
- d) Distribution Transformers of capacity 16 KVA to 315 KVA (single phase as well as three phase) shall be decided as per standard rating of distribution transformer as depicted in IS specifications. Nonstandard ratings of DTR shall not be installed.
- e) Distribution Transformers of capacity 16 KVA to 315 KVA (single phase as well as three phase) shall be installed on existing structures/plinth.

Based on survey report, Project Manager shall decide type, capacity and location of Distribution Transformer sub-station for augmentation/R&M works.

2.00 Following types of works are envisaged for Distribution Transformer sub-station for augmentation/R&M works:

- a. Replacement of defective materials of DTR substations
- b. Re-erection/re-concreting of substation supports
- c. Dismantling of defective/worn-out steel structure materials, 11 kV/LT equipment like Lightning Arrester, DO Fuse, Distribution box, LT cable, jumpering conductor, terminal

clamps, insulators etc as required. Shifting of dismantled material to Employer's store within reasonable period of time.

- d. Installation of stay set for strengthening of DTR substation structure.
- e. Topping up of new and filtered transformer oil wherever required.
- f. De-moisturizing of silica gel, filling of transformer oil in silica gel breather.
- g. Providing new DTR substation equipment like steel structure materials, 11 kV/LT equipment like Lightning Arrester, DO Fuse, Distribution box, LT cable, jumpering conductor, terminal clamps, insulators etc
- h. Renovation of DTR substation earthing by providing new earth pits, inter connection of earth pits and their connection to various equipment
- i. Cleaning of metallic structure items by rubbing through emery paper and re-painting using two coats of red oxide paint and two coats of aluminium oxide paints of reputed type and make as approved by Project Manager using painting brush.

### 3.00 Fabricated steel items:

Fabricated steel items like DC cross arm (100x50x6 mm), back clamps (65x8 mm), pole clamp (65x8 mm), DO mounting channel (100x50x6 mm), transformer mounting channel (100x50x6 mm), transformer clamping set (50x50x6 mm), transformer belting set (50x50x6 mm), V cross arm, top clamp, DC cross arm, bracket, clamps, cross bracings, bracings, strain plate, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electric cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

### 4.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

### 5.00 Stay Set:

Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (2Nos.), anchor plate (200x200x6mm) , nut-bolts, 2 Nos turn-buckles, 1.8 m long, 16 mm diameter solid GS stay rod & 7/3.15 mm dia GI stranded wire complete.

Stay set shall be used at all sub-station location to nullify the tension of conductor/cable/transformer on the supports. 0.2 cmt cement concreting in mixture 1 part cement, 3 part coarse sand and 6 part

40mm size aggregate stone chips (1:3:6) shall be provided in the foundation of the stay set. 2 Nos. guy insulator shall be provided in 7/3.15 mm dia stranded GI wire at middle locations between two turn buckles.

#### 6.00 Distribution Transformer:

Following type and sizes of minimum 4star rated {as per Bureau of Energy Efficiency (BEE)}, distribution transformers are standardized in the project for augmentation:

- a) 5/6 KVA 1 phase Aluminium / Copper wound DTR
- b) 10 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- c) 16 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- d) 25 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
- e) 63 KVA 3 phase Aluminium / Copper wound DTR
- f) 100 KVA 3 phase Aluminium / Copper wound DTR
- g) 200 KVA 3 phase Aluminium / Copper wound DTR
- h) 250 KVA 3 phase Aluminium / Copper wound DTR
- i) 315 KVA 3 phase Aluminium / copper wound DTR

Or any other rating as per latest Indian Standard Specification

The Distribution Transformers shall be 11/0.4 KV or 11KV/230 V or 22/.44 KV non-sealed type BEE specified minimum 4 Star Distribution Transformers. The transformers shall be double wound, three phase, CRGO M3 Grade (0.23mm) or better (The core shall be constructed from high grade, non-ageing, Cold Rolled Grain Oriented (CRGO) silicon steel of M3 Grade (0.23mm) laminations only. PRIME CORE M3 Grade (0.23mm) materials are to be used for transformers core.

Distribution Transformers shall be subject to inspection during manufacturing (stage inspection), pre-delivery inspection, and inspection at site during pre-erection/post erection/post commissioning conditions. Project Manager shall select samples from the core laminations and get the same tested in CPRI/ NABL Accredited laboratory to prove the quality of the core material.

The new distribution transformers shall be supplied with transformer oil filled up-to maximum permissible level and breather with silica gel.

The distribution transformers must have been successfully type tested within five years from date of Letter of Intent and the designs should have been in satisfactory operation for a period not less than two years as on the date of bid opening. Compliance shall be demonstrated by submitting, (i) authenticated copies of the type test reports and (ii) performance certificates from the users, specifically from Central Govt./State Govt. or their undertakings.

4 STAR LEVEL: Each Distribution Transformers must contain minimum 4 Star Label with style and information provided by the Bureau of Energy Efficiency (B.E.E), Ministry of Power, Government of India.

The losses in Distribution Transformer should be as per Energy Efficiency Level-2 and above as specified in IS 1180 (Part-1):2014 for all kVA ratings of distribution transformers

Bimetallic connectors of suitable capacities are to be provided on LT side and on HT side of the transformer.

T-Clamps should be provided on each jumper on bus bars. Line jumpers should be provided with adequate size of PG Clamps (Two numbers PG Clamps at each end of jumper). Clamp should be made of aluminum grade T-1F as per IS-8309 having good electrical quality aluminum material and should not be brittle in nature.

Transformers should be tested for pre-commissioning checks which includes Insulation Resistance Test, ratio test and oil breakdown voltage test. Before formal energisation, oil leakages from the parts of the transformer, oil level in conservator tank, condition of silica gel, earth connection (two separate) between neutral and earthing, proper jointing of earth wires/flats at the joints and earth resistance of the individual earthing pits are to be checked and recorded. On commissioning of the transformer, phase current and phase to phase voltage, phase to neutral voltage are to be recorded. The loading on the transformers should be balanced. The quantum of neutral current flowing through neutral shall be recorded. A record of pre-commissioning checks/tests are to be prepared and submitted to the Project Manager.

#### 7.00 ACSR / AAAC Conductor:

ACSR raccoon conductor (or equivalent AAAC conductor) is to be used for connection between overhead lines to transformer studs/bushing.

#### 8.00 Distribution box and Power Cabling:

Distribution boxes are to be installed as per specifications enclosed. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks should be prepared and submitted.

All CT terminals are to be ring type and other terminals are fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals.

The distribution boxes are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution boards should be provided of 10mm dia.

The single core power cables should be terminated with proper size lugs and gland. Necessary tagging, identification of cores and dressing of cables with nylon cable ties shall be in the scope of work. The unutilized holes in the DBs provided for cable entry needs to be plugged properly in a manner that it must stop access to reptiles, dust and water ingress.

The Low Tension bus bars are to be painted with two or more coats of brush-able epoxy compound suitable to insulate the bus bars for 415 volts exposure.

The distribution box 16 KVA should also house three phase tri-vector energy meter / single phase meter depending on capacity and type of distribution transformer as per specifications. For higher capacity transformers, CT operated meters are to be installed. Separate LTCT cum Meter Box at eye height shall be installed for housing of meter, CTs, terminal block and wiring.

The single core un-armored power cables shall be used for connection from Distribution Transformer to Distribution Box and Distribution Box to Outgoing LT lines. Cable should not be used in underground laying arrangement. Cables should be dressed & tied properly using clamps / cable ties at 1 meter intervals and tied with substation structure/poles. At-least one meter cable is to be kept as spare at the individual ends.

Following arrangements shall be made for LT Distribution Transformers and LT Cables:

No	Type of DTR	Incomer		Outgoing	Cable	
		MCB/Isolator	HRC fuse	MCCB	1	2
1	5/6/10 KVA 1 Ph	45A SPN MCCB		2x32A SP MCCB	1Cx16 sqmm UA	
2	16 KVA 1 Ph	80A SPN MCCB		2x50A SP MCCB	1Cx16 sqmm UA	
3	16 KVA 3 Ph	25A TPN MCCB		6x16A SP MCCB	1Cx16 sqmm UA	

No	Type of DTR	Incomer		Outgoing	Cable	
		MCB/Isolator	HRC fuse	MCCB	1	2
4	25 KVA 1 Ph	40A SPN MCCB		3x25A SP MCCB	1Cx35 sqmm UA	
5	25 KVA 3 Ph	40A TPN MCCB		6x25A SP MCCB	1Cx35 sqmm UA	
6	63 KVA 3 Ph	200A TPN Isolator	100 A	6x60A SP MCCB	1Cx50/70 sqmm UA	1Cx70 sqmm UA
7	100 KVA 3 Ph	200A TPN Isolator	160 A	6x90A SP MCCB	1Cx50/70 sqmm UA	1Cx150 sqmm UA
8	200 KVA 3 Ph	600A TPN Isolator	315 A	9x120A SP MCCB	1Cx150 sqmm UA	1Cx300 sqmm UA
9	315 KVA 3 Ph	600A TPN Isolator	500 A	12X120A SP MCCB	1Cx150 sqmm UA	1Cx300 sqmm UA

1.1 KV XLPE Aluminium Conductor, Stranded, un-armored cable be used for connection of transformer LV bushing to Distribution Box and Distribution box to overhead line.

#### 9.00 Earthing:

Distribution Transformer Earthing shall be provided with 3 Nosearthing and making earth mat /risers using 50X6mm GI Flat. Earthing should be provided with GI earth pipe or Chemical Earthing depending of strata of soil in the location. Project Manager shall decide the type of earthing.

25x3mm GI Flat and 8 SWG GI shall be used for making earthing connection to various sub-station equipment as per given details. GI Flat and GI wire shall be properly dressed, bunched and clamped with the support at 2 feet intervals. An overlapping of 35mm shall be used at the place of flat to flat joint. Two sets of GI nuts, bolts and washers shall be used for flat-to-flat joints. GI nuts, bolts and washers must be used for GI Flat-to-GI wire & GI wire-to-GI wire joints.

Substation wise measurement of earth resistance of earth pits / mesh and corresponding drawing of existing earthing arrangement shall be recorded and submitted to Project Manager.

Description of equipment	Earth connection
Earthing pits	3 Nos. Earth Pipe 3 m long, 40 mm dia or Chemical Earthing
Earth mat and riser	50X6 mm GI Flat / 8 SWG GI wire
Laying of earth mat	Below ground 0.5 meter

Standard requirements of earthing shall be as under:

- d) Earth Pit – 1 for Transformer Neutral,
- e) Earth pit - 2 for Lightning Arrester,
- f) Earth pit – 3 for Equipment body earthing.

Following arrangement is envisaged for various equipment of distribution transformer substation:

- i) Transformer Neutral (Two distinct connections) : GS Flat 25X3mm
- j) Transformer Body : GS Flat 25X3mm
- k) Lightning Arrester : GS Flat 25X3mm
- l) Fencing (Wherever required) : GI wire 8 SWG
- m) LT Distribution Box (Two distinct connections) : GI wire 8 SWG
- n) AB Switch handle : GI wire 8 SWG
- o) Steel structure of substation : GI wire 8 SWG
- p) Line meters : GS wire 8 SWG

The location of earth pits should be at-least 3m apart, so that they their earth conductive areas do not overlap. In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used in place of normal GI pipe type earthing. Project Manager shall decide type of earthing pits.

10.00 Metering of DTR:

Single phase or three phase metering of DTR shall be provided. The meter shall be installed in a metallic enclosure. Enclosure shall be earthed at two locations. The meter board shall be provided with push-and clamp type terminals. All CT terminals are to be provided with ring type lugs. Meter shall be tested before installation as per prevailing practice Employer. There would be no testing charges levied by Employer for testing of meters in their authorized laboratories, if facilities are available. In case of CT operated meter, metallic LTCT cum Meter box shall be provided at working height.

11.00 Insulator and hardware:

11 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator should be tied properly using binding wire/helical form fitting. Bi-metallic clamps must be used at terminals.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator should properly be cleaned before installation. No damage/crack insulator should be used.

12.00 Substation numbering:

Each Substation should be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

13.00 Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each sub-station support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

14.00 Danger board:

Each support should be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

15.00 Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40 mm size aggregate stone chips (1:3:6) shall be used in PCC Pole, steel tubular poles and H-Beam support foundation.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shuttering and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

16.00 11 KV AB Switch:

11 kV, 3-ph, 200 A, 3 Pin type, Horizontal/Vertical Mounting type, Gang Operated, AB Switch shall be installed on 100 KVA and more capacity distribution transformer substation only. B Class GI pipe shall be used (without any joints) for operation of switch. AB Switch structure and handle must be earthed using 8 SWG GI wire.

17.00 11 KV Drop Out Fuses:

11 kV, 3-ph, Drop Out fuse units (set of 3 units) along with Support Insulators, Base Channel, fuse barrel etc. shall be used for all capacity Distribution Transformer Substations. DO Fuse structure shall be earthed using 8 SWG GI wire.

18.00 Lighting Arrester:

Distribution Class LAs on each phase shall be provided in the sub-station with base steel structure, terminals bi – metallic connectors / PG clamps and earth connectors. LAs are to be connected with separate earth connection. 25x3 mm GI flat shall be used for earth connection.

5. Section-IV: Renovation/Augmentation of LT line

1.00 Conversion of LT line using additional supports with all fittings matching with length and type of existing support is envisaged on following type of supports:

- a) 8 m/140 kgs PCC Poles (PCC Pole as per state practice)
- b) 13 m long H-Beam 152x152 mm, 37.1kg/mtr
- c) 11 m long H-Beam 152x152 mm, 37.1kg/mtr
- d) 11 M long Steel Tubular poles with welded steel base plate of Designation 540 SP 52 (IS 2713, Pt I, II, III 1980)
- e) 9 M long Steel Tubular poles with welded steel base plate of Designation 540 SP 28 (IS 2713, Pt I, II, III 1980)

2.00 Conversion of existing LT line of bare conductor with following type of new ABC cable LT line as required are envisaged under this work-

- 2.01 1X16 (Ph) + 1X25 (bare messenger cum neutral) SQ. MM.
- 2.02 1X16 (Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 2.03 3X16(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 2.04 3 X 16(Ph) +1x25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 2.05 1X25(Ph)+1x25 (bare messenger cum neutral) SQ. MM.
- 2.06 1X25(Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 2.07 3X25(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 2.08 3 X 25(Ph) +1x25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 2.09 1X35(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 2.10 1x35(Ph) + 1X25 (bare messenger cum neutral) + 1x16 (insulated Street lighting) SQ. MM.
- 2.11 3X35(Ph)+1X25 (bare messenger cum neutral) SQ. MM.
- 2.12 3X35 (Ph) + 1x25 (bare messenger cum neutral)+ 1x16 (insulated Street lighting) SQ. MM.
- 2.13 3X50(Ph)+1X35 (bare messenger cum neutral) SQ. MM.
- 2.14 3X50 (Ph)+1x35 (bare messenger cum neutral) +1x16 (insulated Street lighting) SQ. MM.
- 2.15 3X95(Ph)+1X70 (bare messenger cum neutral) SQ. MM.
- 2.16 3X95(Ph)+1X70 (bare messenger cum neutral) +1x16 (insulated Street lighting) SQ. MM.

3.00 While executing this work, mid span pole with all fittings may be provided matching with existing poles of the line.

4.00 Following works shall also be executed by contractor under this head –

- a) Straightening of tilted supports by providing additional foundation or by providing boulders etc as required.
- b) Revamping of pole earthings and replacement of GI earth wire.
- c) Labelling, providing danger board, providing anti climbing device and painting of all the poles shall be in the scope of work
- d) Providing of stay set wherever required
- e) Removal of old bare conductor and depositing in Employer's store

Item-wise scope of works under renovation/augmentation of LT line is detailed out under scope of new LT line. It shall be utilized on item to item requirement under renovation/augmentation of LT line also.

5.00 Cable connection to distribution box and to consumer.

All removed old material shall be deposited to employer's store in a reasonable time as decided by Project Manager.

## H. HIGH VOLTAGE DISTRIBUTION SYSTEM (HVDS)

### 1.00 HVDS system shall be used in following three situations:

- a. To provide LT power supply to remote/farthest locations particularly in hilly areas or farthest location in newly developed plain areas. In this case entire work of erecting 11 kV lines, providing Distribution Transformers shall be executed. While executing HVDS scheme, extreme care to be taken to estimate loading on distribution transformer as capacity of distribution transformer shall be between 10 KVA to 25 KVA.
- b. In areas where length of LT line is more than 300 meters causing line losses and in theft prone areas where unauthorized hooking is observed, HVDS is recommended. Existing LT line supports shall be used for erection of 11 kV lines.
- c. To provide dedicated distribution transformer at location of agriculture pump (for maximum two pumps) connections by either extending 11kV new line or by converting existing LT lines to 11 kV line.

### 2.00 Survey of 11 kV line:

Mapping of route of proposed new HVDS system or conversion of LT line to 11 kV line by foot survey in rural/urban areas be performed mentioning various milestones. While surveying, existing electrical infrastructure in the locality should also be mapped. Line alignment (single line diagram) on political map with fair correctness, be prepared. SLD and foot survey report shall be approved by Project Manager and shall be used as basic document for assessment of works under the contract. On completion of line work, as built Single Line Diagram and pole wise line diagram showing pole wise materials used and pole-to-pole span should be submitted to Project Manager. This details shall be used as reference documents by Quality Inspecting officials to execute inspection works.

### 3.00 Survey of Distribution Transformer Substations:

A detailed survey of existing habitation/village shall be performed in presentable document showing population residing in the un-electrified area/existing electrified area of habitation/ village, best location of installation of a new distribution transformer substation and the capacity of transformers to be selected for installation. The capacity of DTR shall be governed by following technical aspects:

- a) Optimistic lengths of service lines needed to feed the beneficiaries,
- b) Space available for installation of support/transformers,
- c) Probable load expected to come on the transformer due to existing BPL beneficiaries /others connected /un-connected probable beneficiaries in the locality taking care of their expected load growth in next 5 years.
- d) Distribution Transformers of capacity 16 KVA to 25 KVA (single phase as well as three phase as per detailed given) shall be installed on double pole structures. Hence, three phase 11 KV lines shall be laid for 16 KVA to 25 KVA (single phase as well as three phase) capacity sub-stations. Single phase 11 KV lines (2-wire) shall only be permitted for 10 KVA single phase transformers mounted on single pole structure. However, V-cross arms and top clamp shall be used on each line support so that whenever needed, this 2-wire line may be converted to 3-phase 11 kV line by erecting an additional conductor.
- e) Double pole support steel structures for 16 KVA and 25 KVA distribution transformers shall be designed in such a way that they can be augmented to 63 KVA transformer structures without any addition in near future on technical requirements.
- f) Single phase 10 KVA distribution transformer shall be installed on single pole structure.

Based on survey report, Project Manager shall decide type, capacity and location of Distribution Transformer sub-station.

4.00 Existing LT infrastructure:

Existing LT lines' conductor and fittings shall be dismantled. Tilted supports, if any, shall be straightened. Poles erected in water logging areas or loose soil areas shall be provided with cement concrete foundation.

5.00 Mid span support:

Requirement of mid span pole with all fittings, to suit 11 kV line conductor shall be examined during survey. Project Manager shall approve requirement of mid span poles and extra concreting on existing poles.

While deciding mid span poles, project manager shall decide type and length of poles matching with existing supports available in the field. Stay set wherever required in existing line to be converted may be provided.

6.00 Support for conversion of existing LT line into 11 KV overhead line and for new 11 kV line:

- i. 8 m/140 kgs PCC Poles (PCC Pole as per state practice)
- ii. 11 m long H-Beam 152x152 mm, 37.1 kg/mtr
- iii. 9 M long Steel Tubular poles of Designation 540 SP 28 (IS 2713, Pt I, II, III 1980)

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

7.00 Fabricated steel items:

Fabricated steel items like DC cross arm (100x50x6 mm), back clamps (65x8 mm), pole clamp (65x8 mm), DO mounting channel (100x50x6 mm), transformer mounting channel (100x50x6 mm), transformer clamping set (50x50x6 mm), transformer belting set (50x50x6 mm), V cross arm, top clamp, DC cross arm, bracket, clamps, cross bracings, bracings, strain plate, guarding channels, back clamp, transformer mounting structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electric cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

8.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure items like cross arms, top clamps, brackets, clamps, bracing, strain plates etc.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

#### 9.00 Stay Set:

Galvanized Stay Set with 50x8 mm stay clamp, guy insulator (1No.), anchor plate (200x200x6mm) , nut-bolts, 2 Nos turn-buckles, 1.8 m long, 16 mm diameter solid GS stay rod & 7/3.15 mm dia GI stranded wire complete.

Stay set shall be used at all sub-station location to nullify the tension of conductor/cable/transformer on the supports. 0.2 cmt cement concreting in mixture 1 part cement, 3 part coarse sand and 6 part 40mm size aggregate stone chips (1:3:6) shall be provided in the foundation of the stay set. 2 Nos. guy insulator shall be provided in 7/3.15 mm dia stranded GI wire at middle locations between two turn buckles. Erection of storm guys at suitable location in straight line may also be provided.

#### 10.00 Distribution Transformer:

Following type and sizes of minimum 4star rated {as per Bureau of Energy Efficiency (BEE)}, distribution transformers with all accessories are standardized in the project under HVDS:

- a) 5/6 KVA 1 phase Aluminium / Copper wound DTR
  - b) 10 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
  - c) 16 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
  - d) 25 KVA 1 phase / 3 phase Aluminium / Copper wound DTR
  - e) 63 KVA 3 phase Aluminium / Copper wound DTR
  - f) 100 KVA 3 phase Aluminium / Copper wound DTR
  - g) 200 KVA 3 phase Aluminium / Copper wound DTR
  - h) 250 KVA 3 phase Aluminium / Copper wound DTR
  - i) 315 KVA 3 phase Aluminium / copper wound DTR
- Or any other rating as per latest Indian Standard Specification

The Distribution Transformers shall be 11/0.4 KV or 11KV/230 V or 22/0.44 KV non-sealed type BEE specified minimum 4 Star Distribution Transformers. The transformers shall be double wound, three phase, CRGO M3 Grade (0.23mm) or better. The core shall be constructed from high grade, non-ageing, Cold Rolled Grain Oriented (CRGO) silicon steel of M3 Grade (0.23mm) laminations only. PRIME CORE M3 Grade (0.23mm) materials are to be used for transformers core.

Distribution Transformers shall be subject to inspection during manufacturing (stage inspection), pre-delivery inspection, and inspection at site during pre-erection/post erection/post commissioning conditions. Project Manager shall select samples from the core laminations and get the same tested in CPRI/ NABL Accredited laboratory to prove the quality of the core material at any time during pre-dispatch instruction/inspection at site etc.

The distribution transformers shall be supplied with transformer oil filled up-to maximum permissible level and all accessories viz. breather with silica gel etc.

The distribution transformers must have been successfully type tested within five years from date of Letter of Intent and the designs should have been in satisfactory operation for a period not less

than two years as on the date of bid opening. Compliance shall be demonstrated by submitting, (i) authenticated copies of the type test reports and (ii) performance certificates from the users, specifically from Central Govt./State Govt. or their undertakings.

4 STAR LEVEL: Each Distribution Transformers must contain minimum 4 Star Label with style and information provided by the Bureau of Energy Efficiency (B.E.E), Ministry of Power, Government of India.

The losses in Distribution Transformer should be as per Energy Efficiency Level-2 and above as specified in IS 1180 (Part-1):2014 for all kVA ratings of distribution transformers

Bimetallic clamps of suitable capacities and size are to be provided on LT side and on HT side of the transformer.

T-Clamps should be provided on each jumper on bus bars. Line jumpers should be provided with adequate size of PG Clamps (Two numbers PG Clamps at each end of jumper). Clamp should be made of aluminum grade T-1F as per IS-8309 having good electrical quality aluminum material and should not be brittle in nature.

Transformers should be tested for pre-commissioning checks which includes Insulation Resistance Test, ratio test and oil breakdown voltage test. Before formal energisation, oil leakages from the parts of the transformer, oil level in conservator tank, condition of silica gel, earth connection (two separate) between neutral and earthing, proper jointing of earth wires/flats at the joints and earth resistance of the individual earthing pits are to be checked and recorded. On commissioning of the transformer, phase current and phase to phase voltage, phase to neutral voltage are to be recorded. The loading on the transformers should be balanced. The quantum of neutral current flowing through neutral shall be recorded. A record of pre-commissioning checks/tests are to be prepared and submitted to the Project Manager.

#### 11.00 ACSR / AAAC Conductor:

ACSR raccoon conductor (or equivalent AAAC conductor) is to be used for connection between overhead lines to transformer studs/bushing. All road crossings and line crossings shall be guarded as per specifications. Conductor joint should not be provided in mid span length. Instead, it should be nearer to the support.

#### 12.00 11 KV AB Switch:

11 kV, 3-ph, 600 A, 3 Pin type, Vertical/Horizontal Mounting type, Gang Operated, AB Switch shall be installed at cut points and at suitable locations as per instructions of Project Manager. B Class GI pipe shall be used (without any joints) for operation of switch. AB Switch structure and handle must be earthed using 8 SWG GI wire.

#### 13.00 Distribution box and Power Cabling:

Distribution boxes are to be installed as per specifications enclosed. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks should be prepared and submitted.

The distribution boxes are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution box should be provided of 10mm dia.

The single core power cables should be terminated with proper size lugs and gland. Necessary tagging, identification of cores and dressing of cables with nylon cable ties shall be in the scope of work. The unutilized holes in the DBs provided for cable entry needs to be plugged properly in a manner that it must stop access to reptiles, dust and water ingress.

The Low Tension bus bars are to be painted with two or more coats of brush-able epoxy compound suitable to insulate the bus bars for 415 volts exposure.

The distribution box should also house three phase tri-vector energy meter / single phase meter depending on capacity and type of distribution transformer as per specifications.

The single core un-armored power cables shall be used for connection from Distribution Transformer to Distribution Box and Distribution Box to Outgoing LT lines. Cable should not be used in underground laying arrangement. Cables should be dressed & tied properly using clamps /cable ties at 1 meter intervals and tied with substation structure/poles. At-least one meter cable is to be kept as spare at the individual ends.

Following arrangements shall be made for LT Distribution Transformers and LT Cables:

No	Type of DTR	Incomer		Outgoing	Cable	
		MCB/Isolator	HRC fuse	MCCB	1	2
1	5/6/10 KVA 1 Ph	45A SPN MCCB		2x32A SP MCCB	1Cx16 sqmm UA	
2	16 KVA 1 Ph	80A SPN MCCB		2x50A SP MCCB	1Cx16 sqmm UA	
3	16 KVA 3 Ph	25A TPN MCCB		6x16A SP MCCB	1Cx16 sqmm UA	
4	25 KVA 1 Ph	40A SPN MCCB		3x25A SP MCCB	1Cx35 sqmm UA	
5	25 KVA 3 Ph	40A TPN MCCB		6x25A SP MCCB	1Cx35 sqmm UA	
6	63 KVA 3 Ph	200A TPN Isolator	100 A	6x60A SP MCCB	1Cx50/70 sqmm UA	1Cx70 sqmm UA
7	100 KVA 3 Ph	200A TPN Isolator	160 A	6x90A SP MCCB	1Cx50/70 sqmm UA	1Cx150 sqmm UA
8	200 KVA 3 Ph	600A TPN Isolator	315 A	9x120A SP MCCB	1Cx150 sqmm UA	1Cx300 sqmm UA
9	315 KVA 3 Ph	600A TPN Isolator	500 A	12X120A SP MCCB	1CX150 sqmm UA	1CX300 sqmm UA

1.1 KV XLPE Aluminium Conductor, Stranded, un-armored cable be used for connection of transformer LV bushing to Distribution Box and Distribution box to overhead line.

#### 14.00 Earthing:

Distribution Transformer Earthing shall be provided with 3 Nosearthing and making earth mat /risers using 50X6mm GI Flat. Earthing should be provided with GI earth pipe or Chemical Earthing depending of strata of soil in the location. Project Manager shall decide the type of earthing.

25x3mm GI Flat and 8 SWG GI wire shall be used for making earthing connection to various substation equipment as per given details. GI Flat and GI wire shall be properly dressed, bunched and clamped with the support at 2 feet intervals. An overlapping of 35mm shall be used at the place of flat to flat joint. Two sets of GI nuts, bolts and washers shall be used for flat-to-flat joints. GI nuts, bolts and washers must be used for GI Flat-to-GI wire & GI wire-to-GI wire joints.

Substation wise measurement of earth resistance of earth pits / mesh and corresponding drawing of existing earthing arrangement shall be recorded and submitted to Project Manager.

Description of equipment	Earth connection
Earthing pits	3 Nos. Earth Pipe 3 m long, 40 mm dia or Chemical Earthing
Earth mat and riser	50X6 mm GI Flat / 8 SWG GI wire

Laying of earth mat	Below ground 0.5 meter
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Standard requirements of earthing shall be as under:

- g) Earth Pit – 1 for Transformer Neutral,
- h) Earth pit - 2 for Lightning Arrester,
- i) Earth pit – 3 for Equipment body earthing.

Following arrangement is envisaged for various equipment of distribution transformer substation:

- q) Transformer Neutral (Two distinct connections) : GS Flat 25X3mm
- r) Transformer Body : GS Flat 25X3mm
- s) Lightning Arrester : GS Flat 25X3mm
- t) Fencing (Wherever required) : GI wire 8 SWG
- u) LT Distribution-cum-meter Box (Two distinct connections) : GI wire 8 SWG
- v) Steel structure of substation : GI wire 8 SWG

The location of earth pits should be at-least 3m apart, so that they their earth conductive areas do not overlap. In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used in place of normal GI pipe type earthing. Project Manager shall decide type of earthing pits.

#### 15.00 Insulator and hardware –

11 KV polymer/porcelain Disc/Pin insulator with suitable hardware fittings shall be used. Insulator should be tied properly using binding wire/helical form fitting. Bi-metallic clamps must be used at terminals.

The individual insulator shall be checked for insulation resistance before overhead line installation. Insulator should properly be cleaned before installation. No damage/crack insulator should be used.

#### 16.00 Substation numbering:

Each Substation should be numbered properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

#### 17.00 Anti-climbing device:

3.5 kgs, 2.5mm dia (12 SWG) galvanized barbed wire shall be used on each sub-station support. Galvanized barbed wire should be properly dressed and crimped at termination. While wrapping the wire on support, proper tension should be maintained.

#### 18.00 Danger board:

Each support should be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

#### 19.00 Support foundation:

Cement concrete in mixture 1 part cement, 3 part coarse sand, 6 part 40 mm size aggregate stone chips (1:3:6) shall be used in PCC Pole, steel tubular poles and H-Beam support foundation.

While erecting supports (poles), shuttering must be used for concreting so that proper quantity of cement concrete mixture be used and assessed during inspection. During concreting proper compaction by means of mobile vibrator be provided. While starting work of support erection, gang wise shutting and mobile vibrator shall be offered for inspection to Project Manager. While erecting support, mercury level gauge must be used to ensure vertical erection of support.

250mm dia X 12" inch size muffing shall be provided on steel tubular and H-Beam poles to prevent direct entry of rain water along the poles. Cement Concrete of 1:2:4 (1 part Cement, 2 parts coarse sand and 4 parts 20mm aggregate stones chips) shall be used for individual poles.

Steel plate shall be used in steel tubular poles and cement concrete reinforced plate shall be used as base plate for PCC poles.

20.00 11 KV Drop Out Fuses:

11 kV, 3-ph, Drop Out fuse units (set of 3 units) along with Support Insulators, Base Channel, fuse barrel etc. shall be used for all capacity Distribution Transformer Substations. DO Fuse structure shall be earthed using 8 SWG GI wire.

21.00 Lighting Arrester:

Distribution Class LAs shall be provided in the sub-station with base steel structure, terminals bi – metallic connectors / PG clamps and earth connectors. LAs are to be connected with separate earth connection. 25x3 mm GI flat shall be used for earth connection.

I. Feeder Metering (in existing substations):

The meters shall be procured centrally under New Initiative of Material Mobilisation. Supply and erection of meter Box as well as other accessories shall be under the scope of contractor including erection of meters provided by DISCOM/Power Department. Taking delivery of meters from DISCOM/Power Deptt.stores, loading, transportation, unloading at site etc shall be under the scope of contractor. The size of meter shall be provided by the Project Manager.

1.00 In existing substations, feeder metering shall be provided through two composite items. Payments against supply and erection shall be released on completion of supply as well as erection works as per composite item-wise scope as under:

- a. 33 KV Feeder Metering – Under this composite item, all required works like supply&erection of outdoor oil immersed type metering equipment comprising of 33kV/110V Potential Transformer and 3 ph 4 wire Current Transformer of ratio 400-200/5A including supporting steel fabricated structure, earthing coil, 2Cx2.5 sqmm copper control stranded unarmoured cable, 16 mm dia nuts & bolts, danger board, 8 SWG GI earth wire etc. The meter shall be provided by the employer.
- b. 11 KV Feeder Metering - Under this composite item, all required works like supply&erection of outdoor oil immersed type metering equipment comprising of 11 kV/110 V, 3 ph 4 wire CT ratio 300-150/5A including supporting steel fabricated structure, earthing coil, 2Cx2.5 sqmm copper control stranded unarmoured cable, 16 mm dia nuts & bolts, danger board, 8 SWG GI earth wire etc. The meter shall be provided by the employer.

2.00 Metering Equipment:

Following two types of metering equipment are envisaged in the work comprising of:

- a. 33 kV/110 V Metering Equipment (CTPT Unit) with CT of ratio 400-200/5 A
- b. 11 kV/110 V Metering Equipment (CTPT Unit) with CT of ratio 300-150/5 A

3.00 Meter shall be HT trivector DLMS compliant category suitable for substation/feeder metering. Meter shall be 3 ph 4 w 110 V 5 A accuracy class 0.5s with GSM (GPRS compatible) modem.

4.00 Fabricated steel items for mounting of metering equipment and meter-cum-meter box structure etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

5.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of above steel overhead structure items.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

#### 6.00 Earthing:

Following earthing arrangements are envisaged for feeder metering equipment:

- 21.2. GI Earthing spike made of 20mm solid rod or 8 SWG earthing coil
- 21.3. Chemical rod earthing including electrode, chemical, with 2000mm long, 50 mm diameter GI pipe, GI Strip of 24x3mm minimum in hard rock locations only.

##### a. 8 SWG GI wire for earthing

Each 11 kV or 33 kV metering equipment shall be provided with one GI earthing spike made of 20 mm solid rod or GI Earth Coil and connected with 8 SWG GI wire. Overhead line structure shall be connected to GI earthing spike or GI Earth Coil using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. GI wires must be properly dressed, bundled and fixed on supporting structure at 1 to 2 feet intervals.

Project Manager shall decide use of chemical earthing or GI Earth Coil or 20mm dia GI Solid Rod for individual pole earthing.

#### 7.00 Meter-cum-meter box and Control Cabling:

Meter-cum-meter box are to be installed on support gantry structure of substation as per specifications enclosed. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks should be prepared and submitted.

All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals.

The Meter-cum-meter box are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution boards should be provided of 10mm dia.

#### 8.00 Meter identification :

Each 33 kV/ 11 kV meter box shall be labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

9.00 Danger board:

Each 33 kV/ 11 kV meter box shall be provided with a danger board as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

J. 11 kV Capacitor Bank

1.00 Following three types of capacitor bank shall be installed in 33/11 kV power substation

- a. Fixed type 600 KVAR mounted with capacitor switch with all associated equipment like 11 kV 200 A Isolators with earth switch, RVT, 11 kV station class Lightning Arrestor, earth connection with substation earth mat by 50x6 GI flat.
- b. Automatic type 1200 KVAR mounted with all associated equipment like 11 kV VCB, control & relay panel, CTs, junction box, 11 kV 200 A Isolators with earth switch, RVT, 11 kV station class Lightning Arrestor, earth connection with substation earth mat by 50x6 GI flat, control wiring between field equipment and indoor control & relay panel by 2.5 sqmm flexible stranded copper conductor PVC insulated and PVC sheathed armoured cable of suitable core including lugs, glands etc as required.
- c. Automatic type 1500 KVAR mounted with all associated equipment like 11 kV VCB, control & relay panel, CTs, junction box, 11 kV 200 A Isolators with earth switch, RVT, 11 kV station class Lightning Arrestor, earth connection with substation earth mat by 50x6 GI flat, control wiring between field equipment and indoor control & relay panel by 2.5 sqmm flexible stranded copper conductor PVC insulated and PVC sheathed armoured cable of suitable core including lugs, glands etc as required.

2.00 A composite item is kept in BoQ for provision of above three capacities of capacitor bank in 33/11 kV power substations. Hence, execution of these items shall include supply of capacitor bank and associated accessories listed above. Composite items shall also include mounting structure for capacitor bank and associated equipment. Mounting structure shall be hot dip galvanized. All structural steel members and bolts shall be galvanized after fabrication as per IS:4759 and zinc coating shall not be less than 610gm/sq. meter for all structural steel members. All L45x45x5 will have 23 mm back mark. All L50x50x6 will have 28mm back mark. 3.5mm spring washers are to be used under each nut, structural steel shall conform to IS 2026. All weld shall be 6mm filled weld unless specified otherwise. All nuts and bolts shall be of property class 5.6 of IS 1367. Plain washers shall be as per IS 2016 & spring washers shall be IS: 3063.

3.00 Junction Box and Control Cabling:

In automatic capacitor bank, junction box shall be installed near capacitor bank for extending control connection to control & relay panel. Junction box is to be installed on capacitor bank structure support or erected on separate steel structures in the yard nearer to capacitor bank. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks shall be prepared and submitted. All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals. The Meter-cum-meter box are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the distribution boards shall be provided of 10mm dia.

K. DISTRIBUTION TRANSFORMER / STATION TRANSFORMER METERING

The meters shall be procured centrally under New Initiative of Material Mobilisation. Supply and erection of meter Box as well as other accessories shall be under the scope of contractor including erection of meters provided by DISCOM/Power Department. Taking delivery of meters from DISCOM/Power Deptt.stores, loading, transportation, unloading at site etc shall be under the scope of contractor. The size of meter shall be provided by the Project Manager.

1.00 Existing Distribution Transformer shall be metered on LT side as per following arrangement:

- a) Whole current meter for three phase 16 KVA transformer
- b) Whole current meter for three phase 25 KVA transformer
- c) CT operated meter for three phase 63 KVA transformer
- d) CT operated meter for three Phase 100 KVA
- e) CT operated meter for three Phase 200 KVA
- f) CT operated meter for three Phase 315 KVA

2.00 The metering shall be of two types:

- a. For transformer upto and including 25KVA transformers: Meter shall be installed inside the distribution box. The existing power cables shall be routed through the meter.
- b. For transformer of capacity 63KVA to 315 KVA, separate LT CT cum Meter box shall be installed and existing power cables shall be routed through CTs.

3.00 Meter shall be HT tri-vector DLMS compliant category suitable for DTR substation metering. Meter shall be 3 ph 4 w 110 V 5 A accuracy class 0.5s with GSM (GPRS compatible) modem.

4.00 Fabricated steel items for mounting of meter-cum- distribution box, LTCT box etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

5.00 Hardware:

MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of above steel overhead structure items.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

6.00 Meter-cum-Distribution box, LTCT cum Meter box and Control Cabling:

Meter-cum-Distribution box, LTCT cum Meter box are to be installed on substation support. The boxes are to be erected, electrically connected with the existing system, properly earthed, and labeled. The test report of pre-commissioning checks should be prepared and submitted.

All CT terminals are to be ring type and other terminals are of fork type. 2.5 sqmm copper multi stands wiring 1.1 KV grade, ISI marked, IS 694 shall be used for control wiring. A terminal block be provided between CT and Meter keeping 20% spare terminals.

Meter-cum-Distribution box / LTCT cum Meter box are to be earthed using 8 SWG GI wire direct connection to the earthing. 2 Nos Earthing bolts on the Meter-cum-Distribution box/ LTCT cum Meter box should be provided of 10mm dia. Meter-cum-Distribution box/ LTCT cum Meter box identification.

7.00 Labelling:

Each Meter-cum-Distribution box/LTCT cum Meter box shall be labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

8.00 Danger board:

Each Meter-cum-Distribution box/LTCT cum Meter box shall be provided with a danger board as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

L. Replacement of LT meters:

The meters shall be procured centrally under New Initiative of Material Mobilisation. Supply and erection of meter Box as well as other accessories shall be under the scope of contractor including erection of meters provided by DISCOM/Power Department. Taking delivery of meters from DISCOM/Power Deptt.stores, loading, transportation, unloading at site etc shall be under the scope of contractor. The size of meter shall be provided by the Project Manager.

1.00 LT meters shall be changed in following three ways:

- a) Replacement of meter in the premises of consumer: The existing defective, electro-magnetic meters shall be replaced with static meter in the existing location of meter in the consumer premises without changing service cables, and
- b) Shifting of meter outside the consumer premises: The existing meter installed in consumer premises shall be dismantled and shifted outside consumer premises on working height. Meter shall be replaced either on boundary wall, LT pole, wall of consumer house, any other fixed structure near consumer premises. LT service line shall also be replaced in this activity. A distribution box shall be provided to extend LT supply from LT line.
- c) Installation of meters at un-metered agriculture pumps.

2.00 Following LT meters are envisaged under the work:

- a. 1-Ph 2 wire, 5-30Amp, 1.0 Accuracy class static electronic meter with metallic meter box, and
- b. 3-Ph 4 wire, 10-40Amp, 1.0 Accuracy class static electronic meter with metallic meter box.

3.00 Existing defective or electro-magnetic meters upon dismantling shall be deposited in the office of Employer.

4.00 Distribution Box:

Single phase or three phase Distribution Box (DB) shall be provided for extending power supply to LT consumers. Distribution Box (DB) shall be mounted on LT pole with MS clamp of 40x3 mm size duly painted. DB shall be earthed using 8 SWG GI wire.

Single phase Distribution Box (DB) shall be suited for two core 25 sqmmaluminium conductor cable as incomer and 8 nos. two core 10 sqmm conductor cables as outgoing cables. Three phase DB shall be suited for four core 35 sqmmaluminium conductor cable as incomer and 4 nos. four core 16 sqmm conductor cables as outgoing cables.

5.00 Meter-cum-meter box:

While shifting single phase LT meters from inside to outside the premises, a metallic meter box shall be provided to house individual meter. A box may also contain more than one meter, if situation permits for installation. The box shall be installed on boundary wall, LT pole, wall or at any other stationary support nearer to consumer premises. The box is to be earthed using 8 SWG GI wire.

The meter extracted from the consumer premises shall be installed inside metallic meter box and re-commissioned. Metallic meter box shall be sealed so that unauthorized opening of box should not take place.

Meter box shall be connected to distribution box (at the line end) and to main switch of consumer internal electrification network (at the consumer end).

6.00 Power cables:

Following sizes of power cables are envisaged under the scope:

- a. 2Cx25 sqmm LT XLPE cable
- b. 4Cx35 sqmm LT XLPE cable

7.00 Connection from AB cable/Overhead LT conductor:

Two core 25 sqmm cable or four core 35 sqmm cable shall be used between ABC cable/overhead LT conductor and Distribution box. T-connector shall be used at ABC cable/overhead LT conductor and for tapping of LT connection. While tapping connection, highly skilled lineman/wireman shall be deployed along with sophisticated cutting plier/tool so that no damage should result in AB cable/Overhead conductor. T-connector should be crimped properly for resistance free/maintenance free electric connection. Alternately, piercing type connector may be used for tapping of LT connection from ABC cable conductor.

8.00 Labelling:

Each Meter-cum-meter box and distribution box shall be properly labelled using yellow base and black indication marks (number or digits). 40/50 mm height digits/words should be used for this purpose. Base shall be made using 2 or more coats of yellow enamel paint till good surface finish. Base preparation shall be completed before shifting of poles to site for erection. Base painting and marking of digits should be performed by a skilled and trained painter using branded enamel paint, Project Manager shall approve type and brand of enamel paint.

9.00 Danger board:

Each Meter-cum-meter box and distribution box shall be provided with a danger board with pole clamps as per approved drawing. Danger board should be in bi-lingual languages (local language and English). Clamp for danger board, nut-bolts and washers shall be painted with two or more coats of red-oxide and aluminium paints respectively till smooth surface before installation.

10.00 Fabricated steel items:

Fabricated steel items like clamps, D-clamp, stay clamp, etc shall be made of MS Channels, MS angle, MS flats as per approved drawings.

While fabricating, good quality electrical cutting tools and drill machine shall be used to ensure no sharp edges and perfect holes as per approved drawings. Gas cutting set should not be used for fabrication of MS steel items. Weld material shall be distributed equally between the two materials that were joined. The weld shall be free of waste materials such as slag. The weld surface should not have any irregularities or any porous holes (called porosity). The joint shall be tight. Most welds need to demonstrate the required strength. One way to ensure proper strength is to start with a filler metal and electrode rating that is higher than your strength requirement.

Fabricated steel structure items shall be hot dip galvanized and cleaned till good surface finish. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633 (with latest amendments). Galvanizing shall be checked and tested in accordance with IS: 2633. Items shall be offered for inspection and approval by Project Manager.

11.00 Cable accessories and Hardware:

Dead end clamp, eye hook and suspension clamp shall be supplied as per specifications. MS Nuts, bolts and washers (Galvanized) – 16 mm dia nuts, bolts & washers shall be used for tying of overhead structure wherever required.

While erecting, proper dimensions of nut-bolts and washers must be ensured. 2 to 3 threads only be visible of the bolt after full tightening of nut on requisite torque. The hardware shall be hot dip galvanized. The minimum coating of the zinc shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. Before shifting them to site for erection, they shall be offered for inspection and approval by Project Manager.

12.00 Following earthing arrangements are envisaged for Meter-cum-meter box and distribution box:

- a) GI Earthing spike made of 20mm solid rod or 8 SWG, 50 turns earthing coil
- b) Chemical rod earthing including electrode, chemical, with 2000mm long, 50 mm diameter GI pipe, GI Strip of 24x3mm minimum in hard rock locations only.
- c) 8 SWG GI wire for earthing

Each Meter-cum-meter box and distribution box shall be earthed with 8 SWG GI wire. Meter-cum-meter box and distribution box shall be connected to GI earthing spike or GI Earth Coil or system neutral-cum-earth conductor using 8 SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod. Project Manager shall decide use of GI Earth Coil or 20mm dia GI Solid Rod for individual pole earthing. GI wires must be properly dressed and fixed on supporting structure at 1 to 2 feet intervals.

In rocky soil where getting required earth resistance is a challenge, chemical rod earthing shall be used. Overhead line structure shall be connected to chemical earth electrode using 8SWG GI wire. GI nuts, bolts & washers shall be used to join two GI wires and 20 mm solid spike rod.

Project Manager shall decide type of earth pit. Project Manager shall also decide earth connection to existing system neutral-cum-earth conductor or to newly installed earth pit.

M. Ring Main Unit (RMU):

- 33 kV ..... way RMU's ( Manual ) : Nos.
- 33 kV .....way RMU's (SCADA enabled) : Nos.
- 11 kV ..... way RMU's ( Manual ) : Nos.
- 11 kV .....way RMU's (SCADA enabled) : Nos.

The scope of work shall include design, manufacture, pre-despatch testing, supply, and transportation, unloading at site complete erection, testing and commissioning of Ring Main Units capable of being monitored and controlled by the SCADA/DMS and also manually operated RMUs. This also includes supply of relevant 11 kV cable termination kits including the jointing as per specification.

Where relevant, the RMU scope of work shall be coordinated with the work to be carried out like providing of UG cable under the project's other construction packages.

Each RMU shall include its own power supply unit (including auxiliary power transformer, batteries, and battery charger), which shall provide a stable power source for the RMU. In case of remote operated RMUs, the same will be connected to the FRTU including the power supply required to be procured by utility separately.

Each new RMU shall be equipped with main-line load break switches and a fault passage indicator (FPI). Furthermore, to protect each of its lateral / transformer feeders, it shall be equipped with a corresponding set of circuit breakers and self-powered numerical relays. The RMU shall include potential-free contacts so as to connect to SCADA/DMS via FRTUs in case of remote operated RMUs, so as to:

- Monitor and control the open/closed status of the RMU circuit breakers and load break switches.
- Monitor the local/remote position of RMU manually-operated switches that can be used to enable and disable remote monitoring.
- Monitor the health of the power supply, which will include battery failure and low voltage indications.
- Monitor the open/closed status of RMU earthing switches.
- Monitor for low SF6 gas pressure indication in case of SF6 Breaker .
- Monitor for circuit breaker relay operations.
- Monitor for indication of main-circuit fault detected by the RMU's FPI.
- Power supply indications including battery failure and voltage alarms
- FPI reset control
- The civil works, foundations works including providing of Earth pits and earth flat and their connectivity to earth pits for erection and commissioning of the RMU's are in the scope of the Bidder.
- Any site/ equipment/ statutory approvals at site etc. required shall be in ..... Utility scope.
- Construct foundations /support structures of all equipments as per standard construction practice and in accordance with OEM's foundation drawing, with proper size and strength of plinth.
- Provide necessary earthing for RMUs, Sectionalizers, etc as per IS Code and IE rules.

- Also render all the services and activities required to be given contractually, within the contract period.

1.00 Detailed Scope:

The details of SCADA compatible equipment/material/services to be procured under IPDS are-

- 33kV Ring Main Unit (RMU) – 2 way/ 3 way/ 4 way/5 way
- 11kV Ring Main Unit (RMU)- 2 way/ 3 way/ 4 way/5 way
- 11kV Sectionalizers.
- 33 KV and 11KV XLPE Cables.
- 33 KV and 11KV XLPE Cable termination kits.
- Control cable & other related works.
- Communication and integration with SCADA application.
- Earthing of RMUs, Sectionalizers, etc as per IS Code and IE rules.
- Foundations /support structures of all equipments as per OEM's drawing and standard construction practice with proper size and strength of plinth.

It is not the intent to specify all aspects of design and construction of equipments mentioned herein. The systems, subsystems and equipments shall conform in all respect to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation.

For termination of RMUs with the distribution lines the scope covers survey of spots where RMUs have to be provided with optimization of RMU location, fabrication and supply of all type of RMUs, erection of 11kV XLPE cable, with all accessories including GI Pipe, hume pipe, cable trench, cable jointing kits etc as required along with testing and commissioning. The provisional list of proposed location of RMUs, and Sectionalizers shall be provided by the owner.

All the raw materials such as steel, zinc for galvanizing, reinforcement steel and cement for foundation, coke for earthing, bolts, nuts & washers, conductor pieces, danger plates, phase plate, number plate etc. required for RMUs / Auto reclosers/ Sectionalizers and other equipments& its structures are envisaged as part of the scope of supply. Bidders shall clearly indicate in their offer, the sources from where they propose to procure the major materials /equipments.

Return of old material to area store of the owner: All the old equipment/material removed in the process should be returned to the local store in coordination with the project in-charge as soon as possible but in any case before the issuance of the Operational Acceptance of the facility.

The equipment/material to be supplied shall be complete in all respect with all minor fittings and accessories, even though these may not have been specifically mentioned in the Tender specification or Contractor 's offer.

Contractor shall not be eligible for any extra price in respect of such minor fittings and accessories which can be considered as an essential part of the basic equipment even though they had not been specifically mentioned in the specification or in the offer.

Equipment to be procured under this contract are required to be integrated with the SCADA application. The responsibility of making all equipment operable on receipt of signals sent through SCADA Control Centre/ Master Control Centre/FRTU/RTUs shall be of Contractor.

Contractor shall be responsible for sending / receiving all alarms/ annunciations/operation commands from Sectionalizers, RMUs etc. to RTU/FRTUs/SCADA control centre and vice versa.

N. 11 KV Sectionalizer under IPDS

The scope covers high-voltage three-phase 11-kV class automatic circuit-Sectionalizer, as well as its accessories, for outdoor installation, to be used in the overhead primary distribution.

The Sectionalizers should be provided with necessary take off terminal units for automations. Remote operation of the Sectionalizers must be possible. It should provide the control and monitoring of networks from remote central point. Location of problems and re-configuration is completed with minimum downtime & without manual intervention.

The Sectionalizer shall be three-phase, automatic, appropriate for pole installation. The Sectionalizer shall be supplied with its respective pole-fixing support. All the requirements shall be taken into account in its design so that the electrical operation of the Sectionalizer can be done from remote location using SCADA.

It shall also be self-sufficient in functioning of protection and control.

The Sectionalizer shall have the following electrical characteristics:

- Type: Three pole, operated simultaneously by a common shaft
- Arc interruption in dielectric medium SF6 gas
- Local/Remote operation selector switch be provided
- Motor rated voltage 24V / 48V DC
- Emergency trip / open push button on panel front
- 

1.00 Mounting:

The sectionalizer shall be suitable for single pole mounting. It shall be fitted with an external M12 earthing stud, complete with a nut, lock nut and spring washer. The earth stud shall be welded to the tank for optimal earthing connection. A detailed drawing of the single pole sectionalizer mounting arrangement with surge arresters fitted shall be provided. The minimum phase-to-earth clearances shall be indicated on the drawing.

2.00 Detection characteristics:

- The following detection elements shall be available: over-current (O/C), earth fault (E/F) and sensitive earth fault (SEF).
- Each of the detection elements is monitored with independent definite time settings and fault thresholds.
- The ratio of drop-off current to pick-up current shall be at least 90% for all detection functions.
- The SEF function shall be equipped with harmonic filtering to prevent operation when harmonics are present in the primary residual earth currents.
- A low pass filter with 3rd harmonic rejection > 28dB shall be supplied.

3.00 Current Transformer and Voltage Transformer:

- Current transformer ratio: 200-100/1-1A and VA burden of the CTs shall be sufficient to supply the energy required by the relay and the MFT.

- Voltage ratio : Primary 11 KV (Phase to Phase), Secondary 230 V ac or as per manufacturer controller requirement
- THE HV terminal shall be adequately long from the bushing epoxy material such that the connecting lug shall not rest directly on the bushing epoxy
- Voltage transformer shall be provided for metering purpose and VA burden of Voltage transformer should be sufficient to provide auxiliary supply for battery charging and operation of MFT.

4.00 Housing:

- Enclosure Stainless steel enclosure suitable for IP67
- SF6 gas pressure low alarm
- Provision for SF6 gas pressure indication Manometer with non return valve
- Arc interruption method for SF6 breaker: Puffer type / rotating arc type

5.00 Earthing Arrangement:

All Sectionalizer should have a special earth bar with a sectional area of not less than 100 mm<sup>2</sup> run along the whole of metal enclosed switch structure, each end being connected to the main earthing system where metal cases are used on instruments these shall be connected to this bar by conductors of not less than 16 mm<sup>2</sup> section.

- It should be easily possible to test the cables by a simple earthing arrangement.
- Equipment earthing of GI / Copper strips of adequate size be provided.

6.00 Power Supplies:

The Sectionalizer system shall provide power for the electronics, operation of the Sectionalizer and Controller operation (Future FRTU and Modem ) shall be capable of supplying at least 45VA or higher suitable for self-operation of Sectionalizer and Modem.

Primary supply: Preference will be given to the ability to obtain primary power directly from the HV power system requiring no additional primary supply connection.

Test supply: The LBS shall accept an external AC 230 V 50 Hz supply. Optional supply: the LBS shall accept an external DC 110 V supply.

Auxiliary supply: An auxiliary supply with the following minimum characteristics shall be provided One battery and constant voltage charger with current limiting shall be part of the Sectionalizer.

O. Identification of DDUGJY / IPDS Assets:

Sign Boards for Village electrification: The DDUGJY sign boards shall be provided in Un-electrified villages only which have been electrified under the scheme. The board shall be erected at a suitable location preferably near the office of Sarpanch/Gram Panchayat/or any other prominent location.

- a. Size of board: 4 feet × 3 feet
- b. The script should be bilingual and should be uniform across the country.
- c. The name of village should be included on the sign board.
- d. The sample copy of signboard shall be provided separately by Project Manager

The boards are to be installed at prominent locations like public building, school, health center, PanchayatBhawan etc. A photograph depicting installation of board shall be submitted to the Project Manager while submission of claim for the completed village. The list of village wise photographs, in soft copy shall be maintained by the contractor and shall be submitted for review at the time of block wise reconciliation of works and associated payments.

All Support Structures: Single Pole (SP), Double Pole (DP), DTRSS (Distribution Transformer Substation Structures) are to be provided with unique identification of the structure as per prevailing practices of state. The details of pre-painting preparations, painting and writing shall be as per scope of work.

Specification of sign board on Power Substation, Distribution Transformer Sub-station under DDUGJY / IPDS:

Size of board	4 feet × 3 feet (for new/augmented grid sub-station)
	1 feet × 1 feet (for Distribution substation)

The grid substation / distribution transformer substation board should indicate the name of the scheme, name of implementation agency and capacity of substation. The sign board should be put up immediately when the substation is commissioned.

P. Testing during pre-commissioning and post commissioning

1.00 Type Test, Routine and Acceptance Tests:

All equipment with their terminal connectors, control cabinets, main protective relays, etc. as well as insulators, insulator strings with hardware, clamps and connectors, marshalling boxes, etc., shall conform to type tests and shall be subjected to routine and acceptance tests in accordance with the requirements stipulated under respective equipment sections.

Contractor shall submit all type test reports/certificates according to the relevant standards and/or specifications for all the equipments/material for Owner's review as a proof of their conformity to type tests along with a certificate regarding conformity of equipments to be supplied with the type test.

The test certificates submitted shall be of the tests conducted within 5 years prior to the date of bid opening. In case the test reports are of the tests conducted earlier than 5 years prior to the date of bid opening, or they do not meet the requirements of the specifications/relevant standards, or they are not available, the Contractor shall conduct these type test(s) under this contract at no extra cost to the Owner.

The Owner will have the right of getting any test of reasonable nature carried out on any component or completely assembled equipment at Contractor's premises or at site or in any other place in addition to the aforesaid type and routine tests, to satisfy that the materials/equipment comply with the specifications.

Failure of any equipment to meet the specified requirements of tests carried out at works or at site shall be sufficient cause for rejection of that equipment lot. Rejection of any equipment lot will not be held as a valid reason for delay in the completion of the works as per schedule. Contractor shall be responsible for removing all deficiencies, and supplying the equipment that meet the requirement.

Test results / Test reports of various tests performed under this contract shall be furnished by the agency in two copies signed jointly by agency and representative of Project Manager along with a soft copy in excel file in the office of Employer.

2.00 General Checks:

- i. Check for physical damages.
- ii. Visual examination of zinc coating/ painting.
- iii. Check from name plate that all items are as per order/ specification.
- iv. Check tightness of all bolts, clamp and connecting terminals using torque wrenches.
- v. For oil filled equipment check for oil leakage, if any. Also check oil level and top up.
- vi. Check ground connections for quality of weld and application of zinc rich paint over weld joint of galvanized surfaces.
- vii. Check cleanliness of insulator and bushings.
- viii. All checks and tests specified by the manufacturers in their drawings and manuals as well as tests specified in the relevant code of erection.
- ix. Visual examination of labelling, danger board, anti-climbing device, muffing, painting, tension on stay wires, straightening of poles, alignment of line/supports etc

Equipment test records, commissioning test records and drawings:

Factory test certificates of equipment, test certificates at the time of pre-dispatch inspections, pre-dispatch inspection reports, pre-commissioning check results and post commissioning check results shall be compiled and provided in three sets to Project Manager for his approval and records.

A copy of such test record shall be offered to electrical inspector and other inspecting officials during his/her visit to substation for inspection.

3.00 Power Transformer:

- i. Check for Vector group.
- ii. Checking for transformation ratio.
- iii. Checks for winding resistances,
- iv. Insulation resistance of windings, live parts, transformer oil,
- v. Operation of WTI, OTI, Buchholtz relays,
- vi. Calibration of OTI & WTI,
- vii. Functional checking for tripping of transformer on field inputs,
- viii. Transformer oil testing - BDV
- ix. Visual examination of statutory clearances
- x. Visual examination of earthing connections
- xi. Measurement of earth resistance of individual earth pit
- xii. Visual examination of termination of wires and cables
- xiii. Visual examination of Oil leakage in power transformer
- xiv. Visual examination of breather, filling of oil and silica gel in breather of power transformer
- xv. Visual examination of two separate earth connection to neutral bushing of power transformer
- xvi. Visual examination of valves between transformer tank and breathers
- xvii. Checking of transformer oil in conservator tank
- xviii. Visual examination of explosion vent

4.00 Circuit Breakers:

- i. Insulation resistance of each pole.
- ii. Check adjustment, if any, suggested by manufacturer.
- iii. Breaker closing and tripping time.
- iv. Slow and power closing operation and opening.
- v. Trip free and anti-pumping operation.
- vi. Minimum pick up volts of coils
- vii. Contact resistance.
- viii. Interlock with other breakers/circuits,
- ix. Functional checking of all accessories.
- x. Functional checking of control circuits, interlocks, tripping through protective relays and auto-reclose operation.
- xi. Insulation resistance of control circuits, motor etc.
- xii. Resistance of closing and tripping coils.

5.00 Isolators:

- i. Alignment,
- ii. Insulation resistance of each pole.
- iii. Manual and electrical operation on interlocks.
- iv. Insulation resistance of control circuit and motors.
- v. Ground connections
- vi. Contact resistance
- vii. Proper alignment to minimize the vibration to the extreme possible during operation.
- viii. Measurement of operating torque for isolator and earth switch
- ix. Resistance of operating and interlocking coils.

6.00 Current Transformers:

- i. Insulation Resistance Test
- ii. Polarity test.
- iii. Ratio identification test-checking of all ratios on all cores by primary injection of current.
- iv. Dielectric test of oil (Wherever applicable)
- v. Magnetizing characteristics test.

7.00 Voltage Transformers:

- i. Insulation resistance test
- ii. Polarity test.
- iii. Ratio test
- iv. Dielectric test of oil (if applicable)

8.00 Surge Arrester

- i. Grading leakage current
- ii. Resistance of ground connection

9.00 Phasing Out

The phasing out of all supplies in the Sub-station system shall be carried out.

10.00 Station Earthing

- i. Check soil Resistivity
- ii. Check continuity of grid wires
- iii. Check earth resistance of the entire grid as well as various sections of the same.
- iv. Check for weld joint and application of zinc rich paint on galvanized surface.
- v. Dip test on earth conductor prior to use.

11.00 Conductor Stringing and Power Connectors

- i. Physical check for finish
- ii. Electrical clearance check
- iii. Testing of torque by torque wrenches on all bus power connectors and other accessories.
- iv. Milli volt drop test on all power connectors
- v. Sag and tension check on conductors.

12.00 Insulators

- i. Visual examination for finish damage, creepage distance, etc.
- ii. Insulation resistance

13.00 33 kV & 11 kV Line testing

- i. Visual examination of statutory clearances
- ii. Visual examination of earthing connections
- iii. Measurement of earth resistance of individual earth pit
- iv. Checking of sag chart
- v. Visual examination of tensioning of wires, evenness of sag
- vi. Visual examination of straightening of individual pole
- vii. Visual examination of painting of support and fabricated items

- viii. Insulation resistance of line conductor
- ix. Visual examination of labelling, danger board, anti-climbing device, muffing
- x. Visual examination of unguarded road/line crossings
- xi. Visual examination of alignment of lines
- xii. Visual examination of position correctness of pre-fabricated items
- xiii. Visual examination of tightness and tidiness of stays

14.00 Distribution Transformer substation testing

- i. Visual examination of statutory clearances
- ii. Visual examination of earthing connections for tightness and tidyness
- iii. Measurement of earth resistance of individual earth pit
- iv. Visual examination of termination of wires and cables
- v. Visual examination of operation of AB switch and DO fuse units
- vi. Visual examination of straightening of individual substation pole, composite DP structure
- vii. Visual examination of painting of support and fabricated items
- viii. Insulation resistance of transformer and distribution board
- ix. BDV test of transformer oil
- x. Visual examination of Oil and silica gel leakage in distribution transformer
- xi. Visual examination of breather, filling of oil& silica gel in breather of distribution transformer
- xii. Visual examination of two separate earth connection to neutral bushing of distribution transformer
- xiii. Testing and recording of LV voltages (Ph-Ph and Ph-N) after commissioning of distribution transformer
- xiv. Testing and recording of neutral current after commissioning of distribution transformer
- xv. Checking of transformer oil in conservator tank
- xvi. Visual examination of valves between transformer tank and breathers
- xvii. Visual examination of labelling, danger board, anti-climbing device, muffing
- xviii. Visual examination of tightness and tidiness of stays

15.00 LT Line testing

- i. Visual examination of statutory clearances
- ii. Visual examination of earthing connections for tightness and tidyness
- iii. Measurement of earth resistance of individual earth pit
- iv. Checking of sag for evenness of sag
- v. Visual examination of tensioning of cables and wires
- vi. Visual examination of straightening of individual pole
- vii. Visual examination of painting of support and fabricated items
- viii. Insulation resistance of line conductor/ABC conductor
- ix. Visual examination of labelling, danger board, anti-climbing device, muffing
- x. Visual examination of alignment of line
- xi. Visual examination of tightness and tidiness of stay sets

Q. CIVIL WORKS AND SOIL INVESTIGATION

1.00 General

The provisions of this section of specification shall only be applicable to the extent of scope of works indicated in Bid Proposal Sheet (BPS). The intent of specification covers the following:

Design, engineering, and construction of all civil works at power sub-station, 66 kV line, 33 kV line, 11 kV line, DTR substation, LT line, metering, HVDS, augmentation/renovation of system etc. All civil works shall also satisfy the general technical requirements specified in other Sections of this Specification and as detailed below. They shall be designed to the required service conditions/loads as specified elsewhere in this Specification or implied as per National/ International Standards.

All civil works shall be carried out as per applicable Indian Laws, Standards and Codes. All materials shall be of best quality conforming to relevant Indian Standards and Codes.

The Contractor shall furnish all design, drawings, labour, tools, equipment, materials, temporary works, constructional plant and machinery, fuel supply, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with approved drawings, specifications and direction of Employer.

The work shall be carried out according to the design/drawings to be developed by the Contractor and approved by the Project Manager based on Tender Drawings Supplied to the Contractor by the Project Manager and Original Equipment Manufacturer recommendation. For all buildings, structures, foundations etc. necessary layout and details shall be developed by the Contractor keeping in view the functional requirement of the substation facilities and providing enough space and access for operation, use and maintenance based on the input provided by the Project Manager. Certain minimum requirements are indicated in this specification for guidance purposes only.

In case of R&M of existing substations, Contactor shall visit site to ascertain the amount of repair and strengthening of structures and foundations, dismantling and new construction of structures and foundations works are to be done before quoting. Contractor must furnish the design and drawings in support of the activities mentioned above that are to be carried out in the R&M of existing substation site.

The rate quoted by the bidder for all type of civil work shall be firm irrespective of the type of terrain and depth of filling.

This specification covers all the work required for detailed soil investigation and preparation of a detailed report. The work shall include mobilisation of necessary equipment, providing necessary engineering supervision and technical personnel, skilled and unskilled labour etc. as required to carry out field investigation as well as, laboratory investigation, analysis and interpretation of data and results, preparation of detailed Geo-technical report including specific recommendations for the type of foundations and the allowable safe bearing capacity for different sizes of foundations at different founding strata for the various structures of the substation. The Contractor shall make his own arrangement for locating the co-ordinates and various test positions in field as per the information supplied to him and also for determining the reduced level of these locations with respect to the benchmark indicated by the Project Manager.

All the work shall be carried out as per latest edition of the corresponding Indian Standard Codes.

a. Geotechnical Investigation

The Contractor shall perform a detailed soil investigation to arrive at sufficiently accurate, general as well as specific information about the soil profile and the necessary soil parameters of the site. So that the foundation of the various structures can be designed and constructed safely and rationally.

A report to the effect will be submitted by the Contractor for Project Manager's specific approval giving details regarding data proposed to be utilised for civil structures design.

The Contractor should visit the site to ascertain the soil parameters before submitting the bid. The topography is uneven steeply sloping at few places requiring cutting and filling operations including slope stability and protection measures (if slopes encountered). Any variation in soil data shall not constitute a valid reason for any additional cost & shall not affect the terms & condition of the Contract. Tests must be conducted under all the critical locations i.e. Control Room Building, Tower locations, transformer etc.

b. Bore Holes

Drilling of bore holes of 150 mm dia. in accordance with the provisions of IS: upto 10 m depth or to refusal whichever ever occur earlier. (By refusal it shall mean that a standard penetration blow count (N) of 100 is recorded for 30 cm penetration). For a new substation, minimum three (3) bore holes shall be done to find out the geological profile of the area. If any unconformity encountered then more bore holes shall be drilled with the approval of Project Manager for the new projects. However in case deep pile foundations are envisaged the depths have to be regulated as per codal provisions. In cases where rock is encountered, coring in one borehole per bay shall be carried out to 1.5 M in bedrock and continuous core recovery is achieved.

Performing Standard Penetration Tests at approximately 1.5 m interval in the borehole starting from 1.5 m below ground level onwards and at every change of stratum. The disturbed samples from the standard penetrometer shall also be collected for necessary tests.

Collecting undisturbed samples of 100/75 mm diameter 450 mm long from the boreholes at intervals of 2.5 m and every change of stratum starting from 1.0 m below ground level onwards in clayey strata.

The depth of Water table shall be recorded in each borehole.

All samples, both disturbed and undisturbed, shall be identified properly with the borehole number and depth from which they have been taken.

The sample shall be sealed at both ends of the sampling tubes with wax immediately after the sampling and shall be packed properly and transported to the Contractor's laboratory without any damage or loss.

The logging of the boreholes shall be compiled immediately after the boring is completed and a copy of the bore log shall be handed over to the Project Manager.

c. Electrical Resistivity Test

This test shall be conducted to determine the Electrical resistivity of soil required for designing safe grounding system for the entire station area. The specifications for the equipments and other accessories required for performing electrical resistivity test, the test procedure, and reporting of field observations shall confirm to IS: 3043. The test shall be conducted using Wagner's four electrode method as specified in IS: 1892, Appendix-B2. Unless otherwise specified at each test location, the

test shall be conducted along two perpendicular lines parallel to the coordinate axis. On each line a minimum of 8 to 10 readings shall be taken by changing the spacing of the electrodes from an initial small value of 0.5 m upto a distance of 10.0 m.

d. Water Sample

Representative samples of ground water shall be taken when ground water is first encountered before the addition of water to aid drilling of boreholes. The samples shall be of sufficient quantity for chemical analysis to be carried out and shall be stored in airtight containers.

e. Back Filling of Bore Holes

On completion of each hole, the Contractor shall backfill all bore holes as directed by the Project Manager. The backfill material can be the excavated material and shall be compacted properly.

f. Laboratory Test

1. The laboratory tests shall be carried out progressively during the field work after sufficient number of samples have reached the laboratory in order that the test results of the initial bore holes can be made use of in planning the later stages of the field investigation and quantum of laboratory tests.
2. All samples brought from field, whether disturbed or undisturbed shall be extracted/prepared and examined by competent technical personnel, and the test shall be carried out as per the procedures laid out in the relevant I.S. Codes.

The following laboratory tests shall be carried out

- a) Visual and Engineering Classification
- b) Liquid limit, plastic limit and shrinkage limit for C- & soils.
- c) Natural moisture content, bulk density and specific gravity.
- d) Grain size distribution.
- e) Swell pressure and free swell index determination for expansive soil only.
- f) Consolidated un-drained test with pore pressure measurement.
- g) Chemical tests on soil and water to determine the carbonates, sulphates, nitrates, chlorides, Ph value, and organic matter and any other chemical harmful to the concrete foundation.
- h) C.B.R value
- i) Rock quality designation (RQD), RMR in case of rock is encountered

g. Test Results and Reports

1. The Contractor shall submit the detailed report in two (2) copies wherein information regarding the geological detail of the site, summarized observations and test data, bore logs, and conclusions and recommendations on the type of foundations with supporting calculations for the recommendations. Initially the report shall be submitted by the Contractor in draft form and after the draft report is approved, the final report in two (3) copies shall be submitted. The test data shall bear the signatures of the Investigation Agency, Vendor and also site representative of XXXX (Name of Employer).
2. The report shall include but not limited to the following:
  - i. A plan showing the locations of the exploration work i.e. bore holes, dynamic cone penetration tests etc.

- ii. Bore Logs: Bore logs of each bore holes clearly identifying the stratification and the type of soil stratum with depth. The values of Standard Penetration Test (SPT) at the depths where the tests were conducted on the samples collected at various depths shall be clearly shown against that particular stratum.

Test results of field and laboratory tests shall be summarised strata wise as well in combined tabular form. All relevant graphs, charts tables, diagrams and photographs, if any, shall be submitted along with report. Sample illustrative reference calculations for settlement, bearing capacity, pile capacity shall be enclosed.

- h. Recommendations: The report should contain specific recommendations for the type of foundation for the various structures envisaged at site. The Contractor shall acquaint himself about the type of structures and their functions from the Project Manager. The observations and recommendations shall include but not limited to the following:
  - i. Geological formation of the area, past observations or historical data, if available, for the area and for the structures in the nearby area, fluctuations of water table etc. Slope stability characteristics and landslide history of the area shall be specifically highlighted. Remedial measures to be adopted shall also be given.
  - ii. Recommended type of foundations for various structures. If piles are recommended the type, size and capacity of pile and groups of piles shall be given after comparing different types and sizes of piles and pile groups.
  - iii. Allowable bearing pressure on the soil at various depths for different sizes of the foundations based on shear strength and settlement characteristics of soil with supporting calculations. Minimum factor of safety for calculating net safe bearing capacity shall be taken as 3.0 (three). Recommendation of liquefaction characteristics of soil shall be provided.
  - iv. Recommendations regarding slope of excavations and dewatering schemes, if required. Required protection measures for slope stability for cut & fill slopes of switchyard and approach road with stone pitching/retaining walls shall be clearly spelt out. Calculation shall also be provided for stability adequacy.
  - v. Comments on the Chemical nature of soil and ground water with due regard to deleterious effects of the same on concrete and steel and recommendations for protective measures.
  - vi. If expansive soil is met with, recommendations on removal or retaining the same under the structure, road, drains, etc. shall be given. In the latter case detailed specification of any special treatment required including specification of materials to be used, construction method, equipments to be deployed etc. shall be furnished. Illustrative diagram of a symbolic foundation showing details shall be furnished.
  - vii. Recommendations for additional investigations beyond the scope of the present work, if considered such investigation as necessary.

## 2.00 Site Preparation

The Employer shall be responsible for proper leveling of switchyard site as per layout and levels of switchyard finalised during detailed engineering stage. The Employer at his own cost shall make the layout and levels of all structure etc from the general grids of the plot and benchmarks set and approved by the Project Manager. The Contractor shall give all help in instruments, materials and personnel to the Project Manager for checking the detailed layout and shall be solely responsible for

the correctness of the layout and levels. Site leveling shall be in the scope of the Employer. Bidder may decide the level of the sites. However, the level shall be such that it is 300 mm higher than the highest flood level (HFL) of the site. If HFL is not available, then nearby road level shall be assumed as HFL.

Whenever for bay extension works the existing substation are to be modified or strengthen, contractor should keep same as EGL of existing sub-station so that FFL shall be same for both and all the necessary arrangements are to be carried out in this regard by the contractor.

This clause covers the design and execution of the work for site preparation, such as clearing of the site, the supply and compaction of fill material, slope protection by stone pitching/retaining walls depending on the site location & condition, excavation and compaction of backfill for foundation, road construction, drainage, trenches and final topping by brick soling/stone filling.

- 1) The Employer shall develop the site area to meet the requirement of the intended purpose. The site preparation shall conform to the requirements of relevant sections of this specification or as per stipulations of standard specifications. Employer shall also carry out necessary protection of slope of switchyard area and approach road.
  - 2) The fill material if required shall be suitable for the above requirement. The fill shall be such material and the site so designed as to prevent the erosion by wind and water of material from its final compacted position or the in-site position of undisturbed soil.
  - 3) Material unsuitable for founding of foundations shall be removed and replaced by suitable fill material and to be approved by the Project Manager.
  - 4) Backfill material around foundations or other works shall be suitable for the purpose for which it is used and compacted to the density described under Compaction. Excavated material not suitable or not required for backfill shall be disposed off in areas as directed by Project Manager upto a maximum lead of 1 km.
- a. Excavation and backfill
1. Excavation and backfill for foundations shall be in accordance with the relevant code.
  2. Whenever water table is met during the excavation, it shall be dewatered and water table shall be maintained below the bottom of the excavation level during excavation, concreting and backfilling.
  3. When embankments are to be constructed on slopes of 15% or greater, benches or steps with horizontal and vertical faces shall be cut in the original slope prior to placement of embankment material. Vertical faces shall measure not more than 1 m in height.
  4. Embankments adjacent to abutments, culverts, retaining walls and similar structures shall be constructed by compacting the material in successive uniform horizontal layers not exceeding 20 cm in thickness (of loose material before compaction). Each layer shall be compacted as required by means of mechanical tampers approved by the Project Manager. Rocks larger than 10 cm in any direction shall not be placed in embankment adjacent to structures.
  5. Earth embankments of roadways and site areas adjacent to buildings shall be placed in successive uniform horizontal layers not exceeding 20 cm in thickness in loose stage measurement and compacted to the full width specified. The upper surface of the embankment shall be shaped so as to provide complete drainage of surface water at all times.

6. The land required for borrowing earth shall be arranged & selected by contractor. The identified land shall be got approved by Project Manager. The quoted rates shall include cost of earth, taxes, duties, royalty, compensation for the land identified for borrow earth. The rate shall also be inclusive of all leads, lifts, ascent, descent and testing required for completion of work in all respect.
7. The ground levels for all measurements shall be taken at every 5 meter distance in uniformly sloping ground and at closer distance where pits/undulations are met with. In fairly leveled area, levels shall be taken at 15 mt. apart at the discretion of Project Manager. The ground levels shall be recorded and plotted on plans. The same shall be recorded by Project Manager before the earth work is started. All labor, material, tool, equipment etc required for the above work shall be arranged by the Employer at his own cost.

b. Compaction

1. The density to which fill materials shall be compacted shall be as per relevant IS and as per direction of Project Manager. All compacted sand filling shall be confined as far as practicable. Backfilled earth shall be compacted to minimum 95% of the Standard Proctor's density at OMC. The sub-grade for the roads and embankment filling shall be compacted to minimum 95% of the Standard Proctor's density at OMC. Cohesion less material sub grade shall be compacted to 70% relative density (minimum).
2. At all times unfinished construction shall have adequate drainage. Upon completion of the road's surface course, adjacent shoulders shall be given a final shaping, true alignment and grade.
3. Each layer of earth embankment when compacted shall be as close to optimum moisture content as practicable. Embankment material, which does not contain sufficient moisture to obtain proper compaction, shall be wetted. If the material contains any excess moisture, then it shall be allowed to dry before rolling. The rolling shall begin at the edges overlapping half the width of the roller each time and progress to the center of the road or towards the building as applicable. Rolling will also be required on rock fills. No compaction shall be carried out in rainy weather.

c. Requirement for fill material under foundation

All foundations shall rest below virgin ground level and the minimum depth of foundation below the virgin ground level shall be at least 500 mm. For small equipment and minor foundations like marshalling kiosk, Switch board stand, earth switch and main box support etc. may be reduced to 300 mm with specific approval of the Project Manager.

3.00 Stone Filling & Antiweed Treatment

The Contractor shall furnish all labour, equipment and materials required for complete performance of the work in accordance with the drawings, specification and direction of the Project Manager.

Stone filling shall be done in the areas of the switchyard wherever equipments and or structures are to be provided under present scope of work covering entire fencing area.

Prevailing practice of stone filling is to be adopted for the bay extension works of existing substations. Contractor shall verify the existing practice prevailing at site before quoting.

Before taking up stone rolling, antiweed treatment shall be applied in the switchyard area where stone filling is to be done and the area shall be thoroughly de-weeded including removal of the roots. The recommendation of local agriculture/horticulture department shall be sought where ever feasible while choosing the type of chemical to be used. Nevertheless the effectiveness of chemical shall be demonstrated by the contractor in a test area of size 10 meter x 10 meter (approx.). The final approval based on the result shall be given by Project Manager. Antiweed treatment shall be procured from reputed manufacturer. The dosage and application of chemical shall be strictly as per the manufacturer's recommendation. The contractor shall be requested to maintain the area free of weed for a period of one year from the date of application of the first dose of the chemical.

#### 4.00 General Requirement

- a. The material required for site surfacing shall be free from all types of organic materials and shall be of standard quality, and as approved by the Project Manager.

The material to be used for stone filling/ site surfacing shall be uncrushed/ crushed/ broken stone of 20 mm nominal size (single sized) conforming to table 2 of IS: 383- 1970. Hardness, flakiness shall be as required for wearing courses are given below.

##### (a) Sieve analysis limits/Gradation

Sieve size	% passing by weight
40mm	100
20mm	85-100
10mm	0-20
4.75mm	0-5

##### (b) Hardness

Abrasion value (IS: 2386 part-IV) not more than 40%

Impact value (IS: 2386 part-IV) not more than 30%

##### (c) Flakiness Index

As per (IS: 2386 part-IV) and maximum value is 25.

- b. After all the structures/equipments are erected, the surface of the switchyard area shall be maintained, rolled/compacted to the lines and grades as decided by Project Manager. De-weeding including removal of roots shall be done before rolling is commenced. Project Manager shall decide final formation level so as to ensure that the site appears uniform. The final formation level shall however be very close to the formation level indicated in the drawing using half-ton roller with suitable water sprinkling arrangement to form a smooth and compact surface.
- c. A base layer of uncrushed/crushed/broken stone of 20 mm nominal size (single sized) shall be spread and rolled/compacted by using half ton roller with 4 to 5 passes and water sprinkling to form a minimum 50 mm layer on the finished ground level of the specified switchyard area excluding roads, drains, cable trench and tower and equipment foundations as indicated in the drawing.
- d. Over the base layer of site surfacing material, a final surface course of minimum 50 mm thickness of 20 mm nominal size (single sized) broken stone as specified above shall be spread and compacted by light roller using half tones steel roller (width 30" and 24" dia meter) with water sprinkling as directed by the Project Manager. The water shall be sprinkled in such a way that bulking does not take place.

- e. In areas that are considered by the Project Manager to be too congested with foundations and structures for proper rolling of the site surfacing material by normal rolling equipments, the material shall be compacted by hand, if necessary. Due care shall be exercised so as not to damage any foundation structures or equipment during rolling compaction.

#### 5.00 Site Drainage

- a. Adequate site drainage system shall be provided by the Contractor in new and existing substation. In case of bay extension of existing substation, drainage layout shall be prepared by the contractor in such away that it should satisfy the technical parameters stated below while designing the drainage system so that flow of water of the existing part of substation remain uninterrupted and the same should be approved by the Project Manager. The technical parameters stated below also to be taken into account while designing the drainage system for new substation as well.

The Contractor shall obtain rainfall data and design the storm water drainage system, (culverts, ditches, drains etc.) to accommodate run off due to the most intense rainfall that is likely to occur over the catchments area in one hour period on an average of once in ten years. The surface of the site shall be sloped to prevent the ponding of water.

- b. The maximum velocity for pipe drains and open drains shall be limited to 2.4m/sec and 1.8m/sec respectively. However, minimum non-silting velocity of 0.6m/sec shall be ensured. Longitudinal bed slope shall not be milder than 1 in 1000.
- c. The drains shall be constructed using Brick masonry except at road crossings etc. where RCC pipe shall be used. The RCC pipe for drains and culverts shall be as per IS:456 and IS:783.
- d. The Contractor shall ensure that water drains are away from the site area and shall prevent damage to adjacent property by this water. Adequate protection shall be given to site surfaces, roads, ditches, culverts, etc. to prevent erosion of material by water.
- e. The drainage system shall be adequate without the use of cable/pipe trenches. (Pipe drains shall be provided in areas of switchyard where movement of crane will be necessary in operating phase of the substation).
- f. For pipe drains, concrete pipe of class NP2 shall be used. However, for road crossings etc. higher strength pipe of class NP3 shall be provided. For rail crossings, pipes conforming to railway loading standards or at least NP4 class shall be provided. Manholes shall be provided at every 30m interval, at connection points and at every change of alignment.
- g. Open surface drains for new s/s shall be provided with brick masonry in 1:6 (1 cement: 6 coarse sand) cement mortar with 12 mm thick, 1:4 (1 cement: 4 sand) cement plaster inside and exposed surface of drains as per approved drawing. For bay extension at existing substations, prevailing practice of the respective substation shall be adopted.
- h. Pipe drains shall be connected through manholes at an interval of max. 30m. Effluents shall be suitably treated by the Contractor to meet all the prevalent statutory requirements and local pollution control norms and treated effluents shall be conveyed to the storm water drainage system at a suitable location for its final disposal.
- i. Invert of the drainage system shall be decided in such a way that the water can easily be discharged above the High Flood Level (HFL) outside substation boundary at suitable location upto a maximum 50M beyond boundary wall of substation or actual whichever occurs earlier and approved by Project Manager.

- j. All internal site drainage system, including the final connection/disposal to Project Manager acceptance points shall be part of Supplier's scope including all required civil works. The Contractor shall connect his drain(s) at one or more points to outfall points as feasible at site.
- k. The drainage scheme and associated drawings shall be got approved and constructed as per enclosed tender drawing.

#### 6.00 Roads and Culverts inside substation premises

- a. The main approach road including modification of existing road to meet the site conditions, roads for access to equipment and buildings within substations (including bay extension in existing substations) are in the scope of the contractor. Layout of the roads shall be based on General detail & Arrangement drawing for the substation. If extra road is required for functional point of view, which has not been mentioned in the layout drawing, Contractor should provide the same without extra cost to the Project Manager.
- b. All substation roads shall be constructed so as to permit transportation of all heavy equipment. The roads shall have min. 3.0 m wide RCC road as per enclosed tender drawing.
- c. Road construction shall be as per IRC standards.
- d. Adequate provision shall be made for road drainage. Protection of cut and embankment slopes of roads as per slope stability requirement shall be made.
- e. All the culverts and its allied structure (required for road/rail, drain trench crossings etc.) shall be designed for class A loading as per IRC standard / IS code and should be checked for loading.
- f. All roads shall be designed for class 'D' of traffic as per IRC-37 Guide-lines for the design of rigid pavements.

#### 7.00 Transformer Foundation

The Contractor shall provide a road system integrated with the transformer foundation to enable installation and the replacement of any failed unit by the spare unit located at the site. This system shall enable the removal of any failed unit from its foundation to the nearest road.

If existing/failed transformer is required to be replaced by new one in augmentation/bay extension works of existing substations then the foundation supporting that equipment shall be strengthened by modifying the foundation itself or the foundation shall be dismantled and recast new foundation as per site conditions. However, contractor must furnish the design calculation incorporating all those changes so that safety of the structure and foundation remain adequate.

Similarly all types of equipment foundations with /without supporting structures shall be treated in similar manner as stated for transformer foundations.

Contractor must assess the amount of work involved for augmentation/bay extension of existing substations while quoting.

#### 8.00 Cable & Pipe Trenches

- a. The cable trenches and precast removable RCC cover (with lifting arrangement) shall be constructed using RCC of M20 grade for new substation whereas for bay extension of existing substation size and material of cable trenches shall be same as the existing one and pre-cast

removable RCC cover (with lifting arrangement) shall be constructed using RCC of M20 grade. Cable trenches must be designed for the design criteria stated below, whether it is of concrete or brick for both new substations and bay extension works in existing substations.

- b. The cable trench walls shall be designed for the following loads.
  - (i) Dead load of 100 kg/m length of cable support + 75 Kg on one tier at the end.
  - (ii) Triangular earth pressure + uniform surcharge pressure of 1T/m<sup>2</sup>.
- c. Cable trench covers shall be designed for self-weight of top slab + concentrated load of 200 kg at center of span on each panel.
- d. Cable trench crossing the road/rails shall be designed for class A. Loading of IRC/relevant IS Code and should be checked for transformer loading.
- e. Trenches shall be drained. Necessary sumps be constructed and sump pumps if necessary shall be supplied. Cable trenches shall not be used as storm water drains.
- f. The top of trenches shall be kept at least 100 mm above the finished ground level for the new substation. The top of cable trench shall be such that the surface rainwater does not enter the trench.
- g. The top of trench shall be kept same as existing one to maintain uniformity of the cable trenches structure in case of bay extension works of existing substations.
- h. All metal parts inside the trench shall be connected to the earthing system.
- i. Cables from trench to equipment shall run in hard conduit pipes.
- j. Trench wall shall not foul with the foundation. Suitable clear gap shall be provided.
- k. The trench bed shall have a slope of 1/500 along the run & 1/250 perpendicular to the run.
- l. Cable trenches shall be blocked at the ends if required with brick masonry in cement sand mortar 1:6 and plaster with 12mm thick 1:6 cement sand mortar.
- m. Cable trench contains cable tray that shall be supported on ISA. The size and spacing of angle section shall be as per design criteria mentioned above.
- n. Cable trench shall be constructed as per enclosed tender drawing.

#### 9.00 Foundation /RCC Construction

1. Work covered under this Clause of the Specification comprises the design and construction of foundations and other RCC constructions for switchyard structures, equipment supports, trenches, drains, control cubicles, bus supports, transformer, marshalling kiosks, auxiliary equipment & systems, buildings, tanks, boundary wall or for any other equipment or service and any other foundation required to complete the work. This clause is as well applicable to the other RCC constructions.

However, for the augmentation/bay extension works of existing substation, type of RCC structures and foundations etc. shall be similar to one already existing at the existing substation and for which design shall be furnished in support of safety of those RCC structures and foundations etc. Contractor must assess the amount of work involved for the construction of switchyard structures, equipment supports, trenches, drains, control cubicles,

bus supports, transformer, marshalling kiosks, auxiliary equipment & systems, buildings, tanks, boundary wall or for any other equipment or service and any other foundation required to complete the work for the existing substations.

2. Concrete shall conform to the requirements mentioned in IS: 456 and all the tests shall be conducted as per relevant Indian Standard Codes as mentioned in Standard field quality plan appended with the specification

A minimum grade for PCC and RCC shall be used for all structural/load-bearing members as per latest IS 456.

3. If the site is sloppy, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.
4. The switchyard foundation's plinths and building plinths shall be minimum 300mm and 500 mm above finished ground level respectively.
5. Minimum 75mm thick lean concrete shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction.
6. Concrete made with Portland slag cement shall be carefully cured and special importance shall be given during the placing of concrete and removal of shuttering.
7. The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The Spread footings foundation or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.
8. If pile foundations are adopted, the same shall be cast-in-situ driven/bored or precast or under reamed type as per relevant parts of IS Code 2911. Only RCC piles shall be provided. Suitability of the adopted pile foundations shall be justified by way of full design calculations. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used. Necessary initial load test shall also be carried out by the bidder at their cost to establish the piles design capacity. Only after the design capacity of piles has been established, the Contractor shall take up the job of piling. Routine tests for the piles shall also be conducted. All the work (design & testing) shall be planned in such a way that these shall not cause any delay in project completion.

a. Design

1. Foundations shall be of reinforced cement concrete for new substation but for the augmentation / bay extension works of existing substation it could be of RCC/ PCC depending on type of structures and materials used for the similar type of structures in those bay extension works of existing substation. Design requirement shall be fulfilled by the contractor and furnished for approval for both new substation and existing substation (for bay extension works) as specified in the scope of work. The design and construction of RCC/ PCC / Masonry structures shall be carried out as per IS: 456 and relevant IS code/CBIP manual/NBC etc and minimum grade of concrete shall be as per relevant IS code. Higher grade of concrete than specified above may be used at the discretion of Contractor without any additional financial implication to the Project Manager.
2. Limit state method of design shall be adopted unless specified otherwise in the specification.

3. For detailing of reinforcement IS: 2502 and SP: 34 shall be followed. Cold twisted deformed bars ( $F_y=415 \text{ N/mm}^2$ ) conforming to IS: 1786 shall be used as reinforcement. However, in specific areas, mild steel (Grade I) conforming to IS: 432 can also be used. Two layers of reinforcement (on inner and outer face) shall be provided for wall & slab sections having thickness more than 150 mm. Clear cover to reinforcement towards the earth face shall be minimum 40 mm.
4. RCC water retaining structures like storage tanks, etc. shall be designed as un-cracked section in accordance with IS: 3370 (Part I to IV) by working stress method. However, water channels shall be designed as cracked section with limited steel stresses as per IS: 3370 (Part I to IV) by working stress method.
5. The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions, which produces the maximum stresses in the foundation or the foundation component and as per the relevant IS Codes of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups or isolated /combined footings proposed to be used.
6. Design shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.
7. Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/harmful to the concrete/masonry foundations.
8. RCC columns /pedestals shall be provided with rigid connection at the base.
9. All sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be taken as mentioned in relevant IS Codes or as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.
10. Earth pressure for all underground structures shall be calculated using co-efficient of earth pressure at rest, co-efficient of active or passive earth pressure (whichever is applicable).
11. In addition to earth pressure and ground water pressure etc., a surcharge load of  $1\text{T/Sq.m}$  shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, substructure of any underground hollow enclosure etc., for the vehicular traffic in the vicinity of the structure.
12. Following conditions shall be considered for the design of water tank in pumps house, channels, sumps, trenches and other underground structures:
  - i. Full water pressure from inside and no earth pressure & ground water pressure & surcharge pressure from outside (application only to structures, which are liable to be filled up with water or any other liquid).
  - ii. Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.

- iii. Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.
  13. The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.
  14. The foundations of transformer and circuit breaker shall be of block type foundation. Minimum reinforcement shall be governed by IS: 2974 and IS: 456.
  15. The tower and equipment foundations shall be checked for a factor of safety of 2.0 for normal condition and 1.5 for short circuit condition against sliding, overturning and pullout.
- b. Admixtures & additives
1. Only approved admixtures shall be used in the concrete for the Works. When more than one admixture is to be used, each admixture shall be batched in its own batch and added to the mixing water separately before discharging into the mixer. Admixtures shall be delivered in suitably labeled containers to enable identification.
  2. Admixtures in concrete shall conform to IS: 9103. The water proofing cement additives shall conform to IS: 2645. Project Manager shall approve concrete Admixtures/ Additives.
  3. The Contractor may propose and the Project Manager may approve the use of a water-reducing set-retarding admixture in some of the concrete. The use of such an admixture will not be approved to overcome problems associated with inadequate concrete plant capacity or improperly planned placing operations and shall only be approved as an aid to overcoming unusual circumstances and placing conditions.
  4. The water-reducing set-retarding admixture shall be an approved brand of Ligno-sulphonate type admixture.
  5. The waterproofing cement additives shall be used as required / advised by the Project Manager.
- c. Gates and Boundary Wall
1. The Gate frame shall be made of medium duty MS pipe conforming to relevant IS with welded joints.
  2. The gates shall be fabricated with welded joints to achieve rigid connections. The gate frames shall be painted with one coat of approved steel primer and two coats of synthetic enamel paint.
  3. Gates shall be fitted with approved quality iron hinges, latch and latch catch. Latch and latch catch shall be suitable for attachment and operation of pad lock from either side of gates. Hinges shall permit gates to swing through 180 degree back against fence. Gates shall be earthed by G I wire.
  4. Gates shall be fitted with galvanized chain hook or gate hold back to hold gates open. Double gates shall be fitted with centre rest and drop bolt to secure gates in closed position.

5. Gates shall be installed in locations shown on drawings. Next to the main gate, a men gate (1.25 m wide, single leaf) shall also be provided.
6. Bottom of gates shall be set approximately 40mm above ground surface and necessary guiding mechanism shall be fitted.
7. The Contractor shall design and construct boundary wall around substation area as per requirements. The boundary wall shall be of height 2.0M and shall be made of RCC frame construction with RCC column and plinth beam arrangement and panels filled with one brick thick wall in cement sand mortar 1:6. The boundary wall shall be plastered on both external and internal faces with cement and sand plaster 1:6 of thickness 18 mm and 12 mm respectively. An additional barbed Y-shaped arm of MS angle 50x50x6 with 3-rows (6 nos) barbed wire A-4 IS: 278. Expansion joints shall be provided as per codal requirements. MS grating shall be provided at required locations for drainage purposes. The boundary wall shall be painted with minimum two coats of color wash over a base coat of white wash with lime. The front portion of boundary wall shall however be with a RC jail and 12 mm square MS bar top above brick work and pebble dash plaster finish with colour pigment. The steel work shall be given two coats of synthetic enamel paint of approved make over one coat of primer. Boundary wall and gate shall be constructed as per enclosed tender drawing.

#### 10.00 Buildings - General Requirements

The scope for new control room building includes the design, engineering and construction including anti-termite treatment, plinth protection, DPC of Building including sanitary, water supply, electrification, false ceiling etc. of control room building. The buildings shall be of RCC framed structure of concrete of M20 grade (Min.). Following design criteria shall be adopted for design purposes for new substation.

If any extension of the Control Room building is required in augmentation / bay extension works of existing substation then extension part shall be compatible to existing one structurally and architecturally but following design criteria shall be adopted for design purposes for R&M of existing substation.

##### a. Control room Building

Minimum floor area requirements shall be 10000×12000 mm excluding space for wash room which may be increased at the time of detailed engineering to suit project requirements. The layout of the control room shall be finalised as per detailed engineering to suit project requirements. The minimum dimension of different rooms required for C.R.building shall be as per drawing. The CR building shall consist of the following:

- a. Control room
- b. S/s In-charge room
- c. Battery room
- d. Store room
- e. Toilet

An open space of 1 m minimum shall be provided on the periphery of the rows of panel and equipment generally in order to allow easy operator movement and access as well as maintenance.

Any future possibility of annexe building shall be taken care of while finalizing the layout of the control room building.

Minimum headroom of 3 M below soffit of beams/false ceiling shall be considered for rooms. The roof shall have four side sloping roof or flat roof as finalised during detailed engineering.

i. Design

a) The buildings shall be designed:

1. To the requirements of the National Building Code of India, and the standards quoted therein.
2. For the specified climatic & loading conditions.
3. To adequately suit the requirements of the equipment and apparatus contained in the buildings and in all respects to be compatible with the intended use and occupancy.
4. With a functional and economical space arrangement.
5. For a life expectancy of structure, systems and components not less than that of the equipment, which is contained in the building, provided regular maintenance is carried out.
6. Be aesthetically pleasing. Different buildings shall show a uniformity and consistency in architectural design.
7. To allow for easy access to equipment and maintenance of the equipment.
8. With, wherever required, fire retarding materials for walls, ceilings and doors, which would prevent supporting or spreading of fire.
9. Suitable expansion joints shall be provided in the longitudinal direction wherever necessary with provision of twin columns.
10. Individual members of the buildings frame shall be designed for the worst combination of forces such as bending moment, axial force, shear force, torsion etc.
11. Permissible stresses for different load combinations shall be taken as per relevant IS Codes.
12. The building lighting shall be designed in accordance with the requirements of relevant section.
13. Sismic considerations as applicable.

ii. Design loads

Building structures shall be designed for the most critical combinations of dead loads, super-imposed loads, equipment loads, wind loads, seismic loads, and temperature loads.

Dead loads shall include the weight of structures complete with finishes, fixtures and partitions and should be taken as per IS: 1911.

Super-imposed loads in different areas shall include live loads, minor equipment loads, cable trays, small pipe racks/hangers and erection, operation and maintenance loads. Equipment

loads shall constitute, if applicable, all load of equipments to be supported on the building frame.

The wind loads shall be computed as per IS 875, Seismic Coefficient method shall be used for the seismic analysis as per IS 1893 with importance factor 1.5.

Wind and Seismic forces shall not be considered to act simultaneously.

Floors/slabs shall be designed to carry loads imposed by equipment, cables piping, equipment and other loads associated with building. Floors shall be designed for live loads as per relevant IS. Cable and piping loads shall also be considered additionally for floors where these loads are expected.

For consideration of loads on structures, IS: 875 shall strictly adhere to. Any other load coming in the structure, not mentioned in IS 875 shall be calculated as per relevant IS code and NBC.

iii. Submission

The following information shall be submitted for review and approval to the Project Manager:

1. Design criteria shall comprise the codes and standards used, applicable climatic data including wind loads, earthquake factors maximum and minimum temperatures applicable to the building locations, assumptions of dead and live loads, including equipment loads, impact factors, safety factors and other relevant information.
2. Structural design calculations and drawing (including construction/fabrication) for all reinforced concrete and structural steel structures.
3. Fully, dimensioned concept plan including floor plans, cross sections, longitudinal sections, elevations and perspective view of each building. These drawings shall be drawn at a scale not smaller than 1:75 and shall identify the major building components.
4. Fully dimensioned drawings showing details and sections drawn to scales of sufficient size to clearly show sizes and configuration of the building components and the relationship between them.
5. Product information of building components and materials, including walls partitions flooring ceiling, roofing, door and windows and building finishes.
6. A detailed schedule of building finishes including colour schemes.
7. A door & window schedule showing door types and locations, door lock sets and latch sets and other door hardware.

Approval of the above information shall be obtained before ordering materials or starting fabrication or construction as applicable.

iv. Finish Schedule

1. The finishing schedule is given in subsequent clauses.
2. M.S. Ladder should be provided to access the control room roof from outside. Ladder shall be made up of ISMC 75x40 which will run as beam one meter apart and intermediate

steps will be made up of 45x45x5 angle with rise of 300 mm. Red oxide primer shall be applied initially, then two coats of rich zinc paint shall be applied to avoid corrosion.

v. Flooring

Flooring in various rooms of control room building shall be as for detailed schedules given in Table -1

vi. Walls

Control room buildings shall be of framed superstructure. All walls shall be non-load bearing walls. Min. thickness of external walls shall be 230 mm (one brick) with 1:6 cement sand mortar.

vii. Plastering

All internal walls shall have minimum 12mm and 15 mm thick 1:6 cement sand plaster on either side of wall. The ceiling shall have 6mm thick 1:4 cement sand plaster.

viii. Finishing

All external surfaces shall have 18 mm cement plaster in two coats, under layer 12 mm thick cement plaster 1:5 and finished with a top layer 6 mm thick cement plaster 1:6 (DSR 13.19) with water proofing compound. The paint shall be antifungal quality of reputed brand suitable for masonry surfaces for high rainfall zone. White cement primer shall be used as per manufacturer's recommendation.

Internal finish Schedule is given Table - 1 below:

TABLE-1

Sl.No.	Location	Flooring & Skirting 150mm high	Wall Internal	Ceiling	Doors, Windows, Ventilators
1.	Control Room, Relay Room	Precast Terrazo tiles (DSR'02, item no. 11.29A.2 & 11.31.2	Oil bound washable distemper on smooth surface applied with 2mm thick Plaster of Paris putty. (DSR'02 – 13.40 A & 13.77.2)	White Wash (DSR'02 – 13.70.1)	1) Standard steel rolled section frames with 5 mm glass. DSR'02 – 10.12, 10.13 & 10.14  2) Flush door shutters - DSR'02 – 9.25.2
2.	Sub-station Incharge, Office, corridor, staff room.	Precast Terrazo tiles (DSR'02, item no. 11.29A.2 & 11.31.2	Oil bound washable distemper on smooth surface applied with POP putty. (DSR'02 – 13.40 A & 13.77.2)	White Wash (DSR'02 – 13.70.1)	1) Standard steel rolled section frames with 5 mm glass. DSR'02 – 10.12, 10.13 & 10.14  2) Flush door shutters - DSR'02 – 9.25.2
3.	Battery room	Acid and Alkali Resistant tiles. DSR'02 – 11.36 C. 1 & 11.36 C.1.1	Dado of acid resistant tile 1.2 M high & Paint above 1.2 M to ceiling. DSR'02 – 11.36 C. 2.1, 11.36C.2 & 13.96.1	Acid resistant Paint. DSR'02 – 13.96.1	1) Standard steel rolled section frames with 5 mm glass. DSR'02 – 10.12, 10.13 & 10.14  2) Flush door shutters - DSR'02 – 9.25.2

					Painted with acid resistant Paint. DSR'02 –13.96.1
4.	Toilet	Ceramic glazed tiles in flooring DSR'02 – 11.74	DADO glazed tile 2.1M high for toilet (DSR 02 - 11.73)	White Wash (DSR'02 – 13.70.1)	1) Standard steel rolled section frames with 5 mm glass. DSR'02 – 10.12, 10.13 & 10.14  2) Flush door shutters - DSR'02 – 9.25.2
5.	Other areas not specified	Terrazo tiles (DSR'02 - 11.29A.2 & 11.31.20	Oil bound distemper, DSR'02 - 13.40A & 13.77	White Wash (DSR'02 – 13.70.1)	

Note: DSR item references (DSR-2002) to be read with CPWD specifications are only for material and workmanship guidance of the Contractors.

ix. Roof

Roof of the C.R. Building shall consist of Cast-in-situ RCC slab treated with a water proofing system which shall be an integral cement based treatment conforming to CPWD specification (item no. 25.8 of DSR 2002). The water proofing treatment shall be of following operations:

- i. Applying and grouting a slurry coat of neat cement using  $2.75 \text{ kg/m}^2$  of cement admixed with proprietary water proofing compounds conforming to IS: 2645 over the RCC slab including cleaning the surface before treatment.
- ii. Laying cement concrete using broken bricks/brick bats 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 over 20mm thick layer of cement mortar of min 1:5 (Cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 to required slope and treating similarly the adjoining walls upto 300mm height including rounding of junctions of walls and slabs.
- iii. After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to IS: 2645.
- iv. Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 cement: 4 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 and finally finishing the surface with trowel with neat cement slurry and making of 300 x 300 mm square.
- v. The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Project Manager.

With average thickness of 120 mm and minimum thickness at khurra at 65 mm.

x. Glazing

Minimum thickness of glazing shall be 5.0 mm. as per IS: 2835.

xi. Doors and Windows

The details of doors and windows of the control room building shall be as per finish schedule Table-1 and tender drawing with the relevant IS code. Rolling steel shutters and rolling steel grills shall be provided as per layout and requirement of buildings. Paints used in the work shall be of best quality specified in CPWD specification.

xii. Plumbing & Sanitation

1. All plumbing and sanitation shall be executed to comply with the requirements of the appropriate byelaws, rules and regulations of the Local Authority having jurisdiction over such matters. The Contractor shall arrange for all necessary formalities to be met in regard to inspection, testing, obtaining approval and giving notices etc.
2. PVC syntax or equivalent make Roof water tank of adequate capacity depending on the number of users for 24 hours storage shall be provided. Minimum 1 Nos. 500 liters capacity shall be provided.
3. Galvanized MS pipe of medium class conforming to IS: 1239 shall be used for internal & external piping work for potable water supply.
4. Sand CI pipes with lead joints conforming to IS: 1729 shall be used for sanitary works above ground level.
5. Each toilet shall have the following minimum fittings.
  - (a) WC (Western type) 390 mm high with toilet paper roll holder and all fittings  
Or  
WC (Indian Type) Orissa Pattern (580 x 440 mm) with all fittings  
(both types of WCs shall be provided at alternate locations).
  - (b) Urinal (430 x 260 x 350 mm size) with all fittings.
  - (c) Wash basin (550 x 400 mm) with all fittings.
  - (d) Bathroom mirror (600 x 450 x 6 mm thick) hard board backing
  - (e) CP brass towel rail (600 x 20 mm) with C.P. brass brackets
  - (f) Soap holder and liquid soap dispenser.
6. All fittings, fastener, grating shall be chromium plated.
7. All sanitary fixtures and fittings shall be of approved quality and type manufactured by well known manufacturers. All items brought to site must bear identification marks of the type of the Manufacturer.
8. Soil, waste and drain pipes, for underground works shall be stoneware for areas not subject to traffic load. Heavy-duty cast iron pipes shall be used otherwise.
9. In case of Augmentation/R&M of existing substation, amount of work shall be envisaged by contract for lump sum quotation.

## 11.00 Miscellaneous General Requirements

1. Dense concrete with controlled water cement ratio as per IS-code shall be used for all underground concrete structures such as pump-house, tanks, water retaining structures, cable and pipe trenches etc. for achieving water-tightness.
2. All joints including construction and expansion joints for the water retaining structures shall be made water tight by using PVC ribbed water stops with central bulb. However, kicker type (externally placed) PVC water stops shall be used for the base slab and in other areas where it is required to facilitate concreting. The minimum thickness of PVC water stops shall be 5 mm and minimum width shall be 230 mm.
3. All steel sections and fabricated structures that are required to be transported on sea shall be provided with anti corrosive paint to take care of sea worthiness.
4. All mild steel parts used in the water retaining structures shall be hot-double dip galvanised. The minimum coating of the zinc shall be 750 gm/sq. m. for galvanised structures and shall comply with IS: 2629 and IS: 2633. Galvanizing shall be checked and tested in accordance with IS: 2633. The galvanizing shall be followed by the application of an etching primer and dipping in black bitumen in accordance with BS: 3416.
5. A screed concrete layer not less than 100 mm thick and of grade not weaker than M10 conforming to IS: 456-1978 shall be provided below all water retaining structures. A sliding layer of bitumen paper or craft paper shall be provided over the screed layer to destroy the bond between the screed and the base slab concrete of the water retaining structures.
6. Bricks having minimum 75kg/cm<sup>2</sup> compressive strength can only be used for masonry work. Contractor shall ascertain himself at site regarding the availability of bricks of minimum 75kg/cm<sup>2</sup> compressive strength before submitting his offer.
7. Doors and windows on external walls of the buildings (other than areas provided, with insulated metal claddings) shall be provided with RCC sunshade over the openings with 300 mm projection on either side of the openings. Projection of sunshade from the wall shall be minimum 450 mm over window openings and 750 mm over door openings.
8. Service ladder shall be provided for access to all roofs.
9. Angles 45x45x5 mm (minimum) with lugs shall be provided for edge protection all round cut outs/openings in floor slab, edges of drains supporting grating covers, edges of RCC cable/pipe trenches supporting covers, edges of manholes supporting covers, supporting edges of manhole precast cover and any other place where breakage of corners of concrete is expected.
10. Anti termite chemical treatment shall be given to column pits, wall trenches, foundations of buildings, filling below the floors etc. as per IS: 6313 and other relevant Indian Standards.
11. All rungs for ladder shall also be galvanised as per IS: 277 medium classes.
12. For all civil works covered under this specification, nominal mix by volume batching as per CPWD specification is intended. The relationship of grade of concrete and ratio of ingredients shall be as below:

Sl.No.	Mix	Cement	Sand	Coarse aggregate of 20 mm down grade as per IS 383
1.	M 10	1	3	6
2.	M 15	1	2	4
3.	M 20	1	1.5	3

The material specification, workmanship and acceptance criteria shall be as per relevant clauses of CPWD specification and approved standard Field Quality Plan.

13. The details given in tender drawings shall be considered along with details available in this section of the specification while deciding various components of the building.

14. Items/components of buildings not explicitly covered in the specification but required for completion of the project shall be deemed to be included in the scope.

#### 12.00 Interfacing

The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/walls/floors, fixing of foundation bolts, fixing of lighting fixtures, fixing of supports/embedment, provision of cutouts etc. shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum.

#### 13.00 Water Supply

- (i) Contractor shall make its own arrangement for construction water.
- (ii) The contractor shall carry out all the plumbing/erection works required for supply of water in control room building.
- (iii) The details of tanks, pipes, fittings, fixtures etc for water supply are given elsewhere in the specification under respective sections.
- (iv) A scheme shall be prepared by the contractor indicating the layout and details of water supply which shall be got approved by the Project Manager before actual start of work including all other incidental items not shown or specified but as may be required for complete performance of the works.
- (v) Bore wells and pumps for water supply are in the scope of contractor meeting the day-to-day requirement of the water supply.
- (vi) If the water is supplied by Municipal Corporation then bore well for water supply purposes is not required to be carried out by contractor. Contractor shall also make necessary arrangement /formalities to receive water connection from corporation.

14.00 Sewerage System

- (i) Sewerage system shall be provided for control room building.
- (ii) The Contractor shall construct septic tank and soak pit suitable for 5 users if outside of Municipal Corporation zone. Otherwise, all necessary arrangement for the disposal of sewerage to the Municipal Corporation's end shall be arranged by the contractor at his own cost for regularizing the disposal activity.
- (iii) The septic tank and soak pit shall be constructed as per enclosed tender drawing.

15.00 Statutory Rules

- a. Contractor shall comply with all the applicable statutory rules pertaining to factories act (as applicable for the State). Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control etc.
- b. Provisions for fire proof doors, no. of staircases, fire separation wall, plastering on structural members (in fire prone areas) etc. shall be made according to the recommendations of Tariff Advisory Committee.
- c. Statutory clearance and norms of State Pollution Control Board shall be followed as per Water Act for effluent quality from plant.
- d. Requirement of sulphate resistant cement (SRC) for sub structural works shall be decided in accordance with the Indian Standards based on the findings of the detailed soil investigation to be carried out by the Bidder.
- e. Foundation system adopted by Bidder shall ensure that relative settlement and other criteria shall be as per provision in IS: 1904 and other Indian Standards
- f. All water retaining structures designed as un-cracked section shall also be tested for water tightness at full water level in accordance with clause no. 10 of IS: 3370 (Part-I).
- g. Construction joints shall be as per IS: 456.
- h. All underground concrete structures like water retaining structures etc. shall have plasticizer cum water proofing cement additive conforming to IS: 9103. In addition, limit on permeability as given in IS: 2645 shall also be met with. The concrete surface of these structures in contact with earth shall also be provided with two coat of bituminous painting for water/damp proofing. In case of water leakage in the above structures, Injection Method shall be applied for repairing the leakage.
- i. All building/construction materials shall conform to the best quality specified in CPWD specifications if not otherwise mentioned in this specification.
- j. All tests as required in the standard field quality plans have to be carried out.

16.00 Fencing

- a. Product materials for fencing

The minimum requirements are as follows:

i. Chain Link fence fabric in accordance to IS-2721

- |    |                            |   |            |
|----|----------------------------|---|------------|
| 1. | Size of mesh               | : | 75 mm      |
| 2. | Nominal wire size          | : | 4.0 mm dia |
| 3. | Width of chain link        | : | 2000 mm    |
| 4. | Class of zinc coating      | : | medium     |
| 5. | Zinc coated after weaving. |   |            |

ii. Posts

Angle Section

- |                 |   |               |
|-----------------|---|---------------|
| Intermediate    | : | L 65 x 65 x 6 |
| Straining posts | : | L 65 x 65 x 6 |
| Stay post       | : | L 65 x 65 x 6 |

- All structural steel shall conform to IS: 2062 and shall be painted with a coat of approved steel primer and two coats of synthetic enamel paint.
- The Chain Link fabric shall be fixed to the post at the top and bottom of the fence by welding/fixing 50 mm MS flat all through its length.
- Fencing top shall be either of galvanised barbed wire or tape. Barbed wire shall conform to IS: 278.
- The barbed wire may consist of not more than two splices per reel. The barbed wire shall be formed by twisting two line wires, one containing the barbs. The barbed wire shall be designated as A-4 IS: 278 and shall be galvanized.
- Above chain link, 3-rows (6 nos) of barbed tape/wire shall be provided in each arm of the Y shaped barbed arm at top.
- With barbed tape/wire above the chain link fence, the total fence height shall be minimum 2500 mm above finished gravel level.
- Barbed tape/wire arms shall be same as intermediate and straining post.
- Tension wire: single strand, high tensile, galvanised steel wire, 4 mm diameter.
- Fittings and hardware: cast aluminum alloy or galvanized steel, malleable or ductile cast iron turnbuckles to be drop forged.
- GI chain link mesh shall be as per IS: 2721. Mesh size 75 mm and nominal wire size shall be 4.0 mm diameter.

On the results of these additional tests, the whole or portion of the barbed wire/tape shall be accepted or discarded by the Purchaser, as the case may be.

b. Installation

1. Contractor shall submit the fencing drawing Fence shall be installed along lines shown on approved drawings.
2. Post holes shall be excavated by approved methods.
3. Intermediate posts shall be spaced 2.5 m apart measured parallel to ground surface.
4. Straining posts shall be installed at equal intervals not exceeding 25.0 m.
5. Straining posts shall be installed at sharp changes in grade, at corners, at change of direction and where directed.
6. All corner post will have two-stay post and every tenth post will have a transverse stay post.
7. Posts shall be set in 1:2:4 plain cement concrete Blocks of minimum dimension 400 mm x 400 mm x 1000 mm deep Concrete work shall conform to relevant clause. Post shall be braced and held in plumb position and true alignment and elevation until concrete has set.
8. Fence fabric shall not be installed until concrete has cured a minimum of 7 days.
9. Bottom and top of the fence fabric shall be fixed with MS flats of 50 mm x 6mm (min).
10. Fence fabric shall be laid out with barbed edge on top, stretched tightly and shall be fastened to intermediate, post gate and straining post with 50 x 6 flats.
11. Fabric shall be secured to tension wires with tie wires at 400 mm intervals. Tie wires shall be given not less than two twists.
12. Barbed tape shall be spliced with standard wire splices.
13. Barbed tape shall be stretched to have uniform tension.
14. Barbed tape shall be attached to barbed wire arms with approved metal clips.
15. Toe wall of one Brick/Random Rubble masonry, with notches over 75 mm thick PCC (1:4:8) shall be provided below all fencing and shall be minimum 200 mm above and 200 mm below finished ground level. All exposed surfaces of brick toe wall shall be provided with 1:6 cement sand plaster and coated with two coats of colour wash with a base coat of white wash with lime. Rubble masonry toe wall shall be with raised & cut pointing and 50 mm PCC (1:2:4) band coping.
16. Proper earthing shall be done for fencing also.

Annexure-A to  
VOLUME – I : Section-VII

General Technical Instructions

(This document is meant for the exclusive purpose of bidding against this Package and shall not be transferred, reproduced or otherwise used for purposes other than that for which it is specifically issued.)

Technical Specification of DDUGJY/IPDS

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### General Technical Instructions

Following CEA regulations shall be applicable during execution of work:

- a. Construction Regulation – Central Electricity Authority (Technical Standards for construction of electrical plants and electric lines) Regulation, 2010 (as amended time to time)
- b. Safety Regulation for construction and O&M - Central Electricity Authority (Safety requirements for construction, Operation and Maintenance of electrical plants and electric lines) Regulation, 2011 (as amended time to time)
- c. Connectivity Regulation – Technical Standard for connectivity to the grid (Amendment) Regulation 2013; Technical Standards for connectivity of the Distributed Generation resources, 2013; Central Electricity Authority (Grid Standard) Regulation, 2010 (as amended time to time)
- d. Metering Regulations – Central Electricity Authority (Installation and Operation of meters) Regulations, 2006; Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations, 2010 and 2015 (as amended time to time)
- e. Central Electricity Authority (Measures relating to safety and Electric supply regulations), 2010 and amendment regulation 2015 (as amended time to time)

#### 1.1 33 KV Line support

- 1.1.1. 9.1 meter long PCC Pole or 11 KV long PCC pole (or PCC Pole as per state practice shall be used for 33 KV line support). 152x152mm H-Beam (37.1kg/m)<sup>1</sup> can also be used as support in urban/forest area and or Steel Tubular Poles may be used in hilly area where head load shifting is the only option. Cement concreting shall be used for 33 KV support foundations in mixture 1:3:6 (1: cement, 3: coarse sand and 6 Stone ballast 40mm sizes). Each support shall be concrete (0.5mx0.5mx2m) = 0.5 cmt. 0.014 cmt shall also be used in muffing of the support. PCC pole shall not be provided with muffing.
- 1.1.2. Pole base plates as per specifications shall be used.
- 1.1.3. Pole earthing shall be performed through earthing coil duly connected with 8 SWG wire. The GI wires between pole structure and the earthing coil should not be used in cut length. Wherever, cut is evitable, proper nut bolt, washer and binding should be made as per REC specifications. The GI wire between support and earth coil should be placed 1 meter below the ground level.
- 1.1.4. Earth coil should be inserted 1200 mm away from pole.

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<sup>1</sup> In hilly and difficult terrain, steel tubular support may be accepted, they shall be concreted as per speculations,

## 1.2 11 KV line Support and DTR Substation support

- 1.2.1. 8.0 meters or equivalent PCC Poles<sup>2</sup> as per prevailing practices of the state shall be used for 11 KV line and substation support. 152x152mm H-Beam (37.1kg/m)<sup>3</sup> can also be used as support in urban/forest area and or Steel Tubular Poles may be used in hilly area where head load shifting is the only option.

The single PCC pole supports shall be erected with Stone bolder/stone ballast mixed with excavated earth in normal soil. PCC poles in Double Pole structures, turning point structure, Distribution Transformer Substation structures shall be grouted in cement concrete mixture of 1:3:6 (1: cement, 3: coarse sand and 6 Stone ballast 40mm sizes). Single pole supports in water logging area shall also be grouted in cement concrete mixture of 1:3:6 (1: cement, 3: coarse sand and 6 Stone ballast 40mm sizes). PCC pole shall be grouted with concrete (0.6mx0.6mx1.35m)= 0.486 cmt.. In special location, wherever, Project Manager specifically decides, to enhance additional strength, concreting may be used as support foundation.

In forest, wherever special care is to be made for elephant corridors, 13m long, 152x152mm RS Joist (37.1kg/m) may be used for 11 KV line support.

152x152mm H-Beam (37.1kg/m)<sup>4</sup> and Steel Tubular Poles shall be grouted in cement concrete mixture of 1:3:6 (1: cement, 3: coarse sand and 6 Stone ballast 40mm sizes) in all the formation.

- 1.2.2. Pole base plates as per specifications shall be used.
- 1.2.3. Pole earthing shall be performed through earthing coil duly connected with 8 SWG wire. The GI wires between pole structure and the earthing coil should not be used in cut length. Wherever, cut is evitable, proper nut bolt, washer and binding should be made as per REC specifications. The GI wire between support and earth coil should be placed 1 meter below the ground level.
- 1.2.4. Earth coil should be inserted 1200 mm away from pole.

## 1.3 Route And Terrain

- 1.3.1. The scope of HT/LT length of feeder are enclosed with the tender documents. On award of the contract, contractor shall perform foot survey to access the route, pole location and thus Single Line Diagram of the line works. The survey shall be approved by Project Manager. Accordingly requirements of materials shall be finalized by the turnkey contractor in association with Project Manager.

## 1.4 Detailed Survey

- 1.4.1. The detailed survey shall be carried out for the approved feeders/spur lines by the contractor and submitted for owner approval.

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<sup>2</sup>In hilly and difficult terrain, steel tubular support may be accepted, they shall be concreted as per speculations,

<sup>3</sup> In hilly and difficult terrain, steel tubular support may be accepted, they shall be concreted as per speculations,

<sup>4</sup> In hilly and difficult terrain, steel tubular support may be accepted, they shall be concreted as per speculations,

## 1.5 Profile Plotting

- 1.5.1. Span: The number of consecutive spans between the section points shall not exceed design length considering wind pressure, type of poles and size of conductor.
- 1.5.2. Extension: An individual span shall be as near to the normal design span as possible. In case an individual span becomes too short with normal supports on account of undulation in ground profile, one or both the supports of the span may be extended by inserting standard body extension designed for the purpose according to technical specification.
- 1.5.3. Loading: There shall not be any upward force on poles under normal working conditions and the suspension poles shall support at least the minimum weight span as provided in the design. In case uplift is unavoidable, it shall be examined if the same can be overcome by adding standard body extensions to the poles failing which tension poles designed for the purpose shall be employed at such positions.
- 1.5.4. Horizontal Tensions on pin insulators are to be avoided by proper alignment of the line. In case where installation of DP structure is not possible to erect for turning the line, "two pins" arrangement with suitable jumpering shall be provided at all those locations where pins are subjected to horizontal tension. Bridling type V Cross arms for such installations shall be used by the agency accordingly.

## 1.6 Road Crossing

At all road crossings, the poles shall be fitted with horizontally aligned disc type tension insulator string(s) or bridling V-cross arms supports using double pin insulator per phase depending on the type of poles and line but the ground clearance at the roads under maximum temperature and in still air shall be such that it should not fall below 6.1m in case of 33 KV and 11 KV lines. Also, cradle guarding is to be used at all the road crossing locations as per drawings / specifications enclosed.

## 1.7 Railways Crossings

Railway Crossings at pre-planned locality shall be selected in such a way that minimum feeder length shall be re-routed. The line crossing should be executed as per prevailing practices and approved drawings of railways. Railways crossing shall preferably be executed through underground cabling. Horizontal drill machine shall be used for this purpose. Required permission to block the Railways traffic and approval for railway crossing shall be arranged by the owner at his own cost. All liaison works shall be performed by turnkey contractor.

## 1.8 Telecommunication, LT or HT Line Crossing

The angle of crossing shall be as near 90 degrees as possible. However, deviation to the extent of 30 degree may be permitted under exceptionally difficult situations. Cradle guarding is to be used at all such crossing locations as per drawings / specifications enclosed.

## 1.9 Details En-route

All topographical details, permanent features, such as well, trees, building etc. 75 m on either side of the alignment shall be detailed on the profile plan.

## 1.10 Clearances - General

For the purpose of computing the vertical clearance of an over-head line, the maximum sag of any conductor shall be calculated on the basis of the maximum sag in still air and the maximum design temperature. Similarly, for the purpose of computing any horizontal clearance of an over-head line, the maximum deflection of any conductor shall be calculated on the basis of the wind pressure specified by the State Government under rule 76 (2) (a) [or may be taken as 35°, whichever is greater]. Following clearances shall be maintained by the contractor while executing the work:

- 1.10.1. CLEARANCE ABOVE GROUND OF THE LOWEST CONDUCTOR: No conductor of an over-head line, including service lines, erected across a street shall at any part thereof be at a height less than
- |                                      |            |
|--------------------------------------|------------|
| (a) For low and medium voltage lines | 5.8 metres |
| (b) For high voltage lines           | 6.1 metres |
- 1.10.2. No conductor of an over-head line, including service, lines, erected along any street shall at any part thereof be at a height less than

a.	For low, medium and high voltage lines upto and including 11,000 volts, if bare - 4.6 metres
b.	For low, medium and high voltage lines Upto and including 11,000 volts, if insulated - 4.0 metres
c.	For high voltage lines above 11,000 volts - 5.2 metres

For extra-high voltage lines the clearance above ground shall not be less than 5.2 meters plus 0.3 meter for every 33,000 volts or part thereof by which the voltage of the line exceeds 33,000 volts:

Provided that the minimum clearance along or across any street shall not be less than 6.1 meters.

- 1.10.3. CLEARANCE FROM BUILDINGS OF LOW AND MEDIUM VOLTAGE LINES AND SERVICE LINES:

Where line is to cross over another line of the same voltage or lower voltage, pole with suitable extensions shall be used. Provisions to prevent the possibility of its coming into contact with other overhead lines shall be made in accordance with the latest CEA regulations (as amended from time to time). The contractor will required to under cross higher voltage lines by erecting gantries/suitable Rail Pole structures.

Where a low or medium voltage over-head line passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed:-

- a) For any flat roof, open balcony, verandah roof and lean-to-roof
- When the line passes above the building a vertical clearance of 2.5 meters from the highest point; and
  - When he line passes adjacent to the building a horizontal clearance of 1.2 meters from the nearest point, and
- b) For pitched roof

- i. When the line passes above the building a vertical clearance of 2.5 meters immediately under the lines, and
- ii. When the line passes adjacent to the building a horizontal clearance of 1.2 meters.

The horizontal clearance shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

#### 1.10.4. CLEARANCE FROM BUILDINGS OF HIGH AND EXTRA-HIGH VOLTAGE LINES:

Where a high or extra-high voltage over-head line passes above or adjacent to any building or part of building it shall have on the basis of maximum sag a vertical clearance above the highest part of a building immediately under such line, of not less than

(a)	For High Voltage Lines up to and including 33,000 volts	3.7 m
(b)	For Extra High Voltage Lines	3.7 m plus 0.3 m for every additional 33 KV or part thereof.

#### 1.11 Electrical System Data

	<u>33 KV</u>	<u>11KV</u>
Nominal voltage	33 kV	11KV
Maximum system voltage	36 kV	12KV
BIL (Impulse)	170 kVp	75KV
Power frequency withstand voltage (wet)	75 kV (rms)	28KV
Minimum corona extinction voltage for condition (rms) phase to earth	Not less than 27 kV, 50 Hz ac system under Dry	
Radio interference voltage at one MHz for 27 kV (dry condition)	Not exceeding 1000 micro-volts	

#### 1.12 Pole Location

In locating poles on lines, the following general principles should be kept in mind: -

1. Keep spans uniform in length as far as possible.
2. Locate to give horizontal grade.
3. By locating the poles on high places short poles can be used and will maintain proper ground clearance at the middle of the span. In extremely hilly or mountainous country, poles are located on ridges there by greatly increasing the spans without greatly increasing the pull on the conductor. This is possible because the sag can be made very large and will maintain the required ground clearance. Special attention should be given to the locations of poles, where the ground washes badly. Poles should not be placed along the edges of cuts at or embankment or along the banks of creeks of streams.

#### 1.13 Construction

The construction of overhead-lines may be divided into the following parts: -

- (1) Pit marking, pit digging.
- (2) Erection of supports and concreting.
- (3) Providing of guys to supports.

- (4) Mounting cross-arms, pin and insulators, and pin binding.
- (5) Paying and stringing of the conductor.
- (6) Sagging and Tensioning of Conductors.
- (7) Crossings.
- (8) Guarding.
- (9) Earthing.
- (10) Testing and Commissioning.

#### 1.14 Erection of DP Structure for Angle Locations

For angles of deviations more than 10 degree, DP structure may be erected. The pit digging should be done along the bisection of angle of deviation.

After the poles are erected, the horizontal/cross bracings should be fitted and the supports held in a vertical position with the help of temporary guys of Manila rope 20/25 mm dia.

Wherever space is not found sufficient to install double Pole structure, single pole cut point may be installed. The support so erected must be grouted.

#### 1.15 Concreting

The concreting mixture of one cum 1:3:6 ratios would mean 1 part cement, 3 parts coarse sand and 6 part 40 mm aggregate size stones. It may be noted that while preparing the concrete mixture, large quantities of water should not be used as this would wash away cement and sand.

#### 1.16 Providing Of Guys To Supports

Guys are installed at locations where terminal poles are erected at sectional cut points. These cut points may be in same alignment or at turn points. Guys are installed to nullify tension on supports resulted due to conductors tension. In spite of careful planning and alignment of line route, certain situations arise where the conductor tries to tilt the pole from its normal position due to abnormal wind pressure and deviation of alignment, etc. When these cases of strain arise, the pole is strengthened and kept in position by guys. One or more guys will have to be provided for all supports where there is unbalanced strain acting on the support, which may result in tilting/uprooting or breaking of the support.

Guys are braces fastened to the pole. In this work anchor type guy sets are to be used. These guys are provided at (i) angle locations (ii) dead end locations (iii) T - off points (iv) Steep gradient locations and (v) where the wind pressure is more than 50 kg / Sq.m.

The fixing of guys stays will involve (i) pit digging and fixing stay rod (ii) fastening guy wire to the support (iii) Tightening guy wire and fastening to the anchor. The marking of guy pit, digging and setting of anchor rod must be carefully carried out. The stay rod should be placed in a position so that the angle of rod with the vertical face of the pit is 30°/45° as the case may be.

Before start of erection of Stay sets, required concreting materials like Cement, Sand, Stone Chips and Construction water need to be made available near the pit.

G.I. stay wires of size 7/3.15 mm (10 SWG) & 7/4.00 mm (8 SWG), for 16 mm/20 mm stay rods respectively, are to be provided. 8.5 Kg. Stay Wire (7/4.00 mm) per Stay with 20 mm Stay rod for 33 KV line and 5.5 Kg. Stay Wire (7/ 3.15 mm) per Stay with 16 mm Stay rod for 11 KV lines are to be used. For double pole structure (DP), four stays along

the line, two in each direction and two stays along the bisection of the angle of deviation (or more) as required depending on the angle of deviation are to be provided. Hot dip galvanized stay sets are to be used. One stay to counter the angular deformation force shall be used.

After concreting, back filling and ramming must be done well and allowed 7 days to set. The free end of the guy wire/stay wire is passed through the eye of the anchor rod, bent back parallel to the main portion of the stay/guy and bound after inserting the G.I. thimble, where it bears on the anchor rod. If the guy wire proves to be hazardous, it should be protected with suitable asbestos pipe filled with concrete of about 2 m length above the ground level, painted with white and black strips so that, it may be visible at night. The turn buckle shall be mounted at the pole end of the stay and guy wire so fixed that the turnbuckle is half way in the working position, thus giving the maximum movement for tightening or loosening.

#### 1.17 Guy Strain Insulators

Guy insulators are placed to prevent the lower part of the Guy from becoming electrically energized by a contact of the upper part of the guy when the conductor snaps and falls on them or due to leakage. No guy insulator shall be located less than 2.6 m from the ground. Guy insulators are to be used in stay wires only. All stay conductors are to be provided with guy insulators as per following specifications.

11 KV line stay	Type C guy insulator (1 No)
33 KV line stay	Type C guy insulators (2Nos)

#### 1.18 Fixing Of Cross-Arms

After the erection of supports and providing guys, the cross-arms are to be mounted on the support with necessary clamps, bolts and nuts. The practice of fixing the cross arms before the pole erection is also there. In case, the cross-arm is to be mounted after the pole is erected, the lineman should climb the pole with necessary tools. The cross-arm is then tied to a hand line and pulled up by the ground man through a pulley, till the cross-arm reaches the line man. The ground man should station himself on one side, so that if any material drops from the top of the pole, it may not strike him. All the materials should be lifted or lowered through the hand line, and should not be dropped.

#### 1.19 Insulators And Bindings

Line conductors are electrically insulated from each other as well as from the pole by 'Insulators'. Following two type of insulators shall be used for the line insulation:

- (1) Pin type
- (2) Strain type

The pin type insulators will be used for straight stretch of line. The insulator and its pin should be mechanically strong enough to withstand the resultant force due to combined effect of wind pressure and weight of the conductor in the span.

The strain insulators are intended for use at terminal locations or dead end locations and where the angle of deviation of line is more than 10°. Strain insulators are also intending to use at major road crossing locations.

The pins for insulators are fixed in the holes provided in the cross-arms and the pole top brackets. The insulators are mounted in their places over the pins and tightened. In the case of strain or angle supports, where strain fittings are provided for this purpose, one strap of the strain fittings is placed over the cross-arm before placing the bolt in the hole

of cross-arms. The nut of the straps is so tightened that the strap can move freely in horizontal direction.

All HT/LT insulators shall be tested for insulation tests before installation on line. They shall be dipped into water for 24 hrs and then tested for insulation resistance tests at the stores. The insulators found fit in IR testing shall be sent to site for erection. 11KV na d33 KV insulators shall be tested by at-least 1 KV megger whereas LT insulators shall be tested by 500 Volts megger.

## 1.20 Conductor Erection

The main operations are:-

- (a) Transportation of Conductor to works site.
- (b) Paying and Stringing of Conductor
- (c) Jointing of Conductor
- (d) Tensioning and Sagging of Conductor

While transporting conductors drums to site, precautions are to be taken so that the conductor does not get damaged/injured. The drum could be mounted on cable drum support, which generally is made from crow-bar and wooden slippers for small size conductor drums. The direction of rotation of the drum has to be according to the mark in the drum so that the conductor could be drawn. While drawing the conductor, it should not rub causing damage. The conductor could be passed over poles on wooden or aluminum snatch block (pulley) mounted on the poles for this purpose.

When approaching the end of a drum length at least three coils shall be left in place when the stringing operations are stopped. These coils are to be removed carefully and if another length is required to be run out a joint shall be made as per the recommendations of the accessories manufacturer.

The mid span jointing is done through compressions or if helical fittings are used the jointing could be done manually. After completing the jointing, tensioning operation could be commenced. The conductor is pulled through come-along clamps to stringing the conductor between the tension locations.

Conductor splices shall not crack or otherwise be susceptible to damage in the stringing operation. The Contractor shall use only such equipment / methods during conductor stringing which ensures complete compliance in this regard.

All the joints on the conductor and earth-wire shall be of the compression type, in accordance with the recommendations of the manufacturer, for which all necessary tools and equipment like compressors, dies, etc., shall be obtained by the Contractor. Each part of the joint shall be cleaned by wire brush till it is free of rust or dirt, etc., and be properly greased with anti-corrosive compound. If required and as recommended by the manufacturer, before the final compression is carried out with the compressors.

All the joints or splices shall be made at least 15 meters away from the pole. No joints or splices shall be made in spans crossing over main roads, railways and small river spans. Not more than one joint per sub-conductor per span shall be allowed. The compression type fittings shall be of the self-centering type or care shall be taken to mark the conductors to indicate when the fitting is centered properly. During compression or splicing operation, the conductor shall be handled in such a manner as to prevent lateral or vertical bearing against the dies. After compressing the joint, the aluminum sleeve shall have all corners rounded; burrs and sharp edges removed and smoothened.

During stringing of conductor to avoid any damage to the joint, the contractor shall use a suitable protector for mid span compression joints in case they are to be passed over pulley blocks / aerail rollers. The pulley groove size shall be such that the joint along with protection can be passed over it smoothly.

#### 1.21 Tensioning and Sagging Operations

The tensioning and sagging shall be done in accordance with the approved stringing charts or sag tables. The "initial" stringing chart shall be used for the conductor and "final" stringing chart for the earth-wire. The conductors shall be pulled up to the desired sag and left in running blocks for at least one hour after which the sag shall be rechecked and adjusted, if necessary, before transferring the conductors from the running blocks to the suspension clamps. The conductor shall be clamped within 36 hours of sagging in.

The sag will be checked in the first and the last section span for sections up to eight spans and in one additional intermediate span for sections with more than eight spans. The sag shall also be checked when the conductors have been drawn up and transferred from running blocks to the insulator clamps.

At sharp vertical angles, conductor and earth-wire sags and tensions shall be checked for equality on both sides of the angle and running block. The suspension insulator assemblies will normally assume verticality when the conductor is clamped.

Tensioning and sagging operations shall be carried out in calm weather when rapid changes in temperature are not likely to occur.

#### 1.22 Clipping In

Clipping of the conductors into position shall be done in accordance with the manufacturer's recommendations. Jumpers at section and angle towers shall be formed to parabolic shape to ensure maximum clearance requirements. Fasteners in all fittings and accessories shall be secured in position. The security clip shall be properly opened and sprung into position.

#### 1.23 Fixing of Conductors and Earthwire Accessories

Conductor and earth-wire accessories supplied by the Contractor shall be installed by the Contractor as per the design requirements and manufacturer's instruction within 24hours of the conductor / earth-wire clamping. While installing the conductor and earth-wire accessories, proper care shall be taken to ensure that the surfaces are clean and smooth and that no damage occurs to any part of the accessories or of the conductors.

#### 1.24 Replacement

If any replacements are to be effected after stringing and tensioning or during maintenance e.g. replacement of cross arms, the conductor shall be suitably tied to the pole at tension points or transferred to suitable roller pulleys at suspension points.

Sagging of conductor has to be in accordance to the Sag Tension chart. In order to achieve it, it is preferred to pull the conductor to a tension a little above the theoretical value so that while transferring it from the snatch blocks to the pit insulators and to take care of temperature variation. Proper sag could achieve. Sagging for 33/11 KV line is mostly done by "Sighting". A horizontal strip of wood is fixed below the cross-arm on the pole at the required sag. The lineman sees from other end and the sag is adjusted by increasing or decreasing the tension. The tension clamps could then be finally fixed and

conductor be fixed on pin-insulators. All fittings, accessories like guys, cross-arms, etc., could be checked as they should not have de-formalities.

The maximum permissible spans for all the lines of 33/11/0.4 KV are prescribed according to the design of the supports. Sag-tension charts for these conductors are to be followed.

#### 1.25 Tying Of Conductor On Pin Insulators

Conductors should occupy such a position on the insulator as will produce minimum strain on the tie wire. The function of the wire is only to hold the conductor, in place on the insulator, leaving the insulator and pin to take the strain of the conductor.

In straight line, the best practice is to use a top groove insulator. These insulators will carry grooves on the side as well. When the conductor is placed on the top groove, the tie wire serves only to keep the conductor from slipping out.

On corners and angles (below 5 degree deviations) the conductors should be placed on the outside of the insulators. On the far side of the pole, this pulls the conductor against the insulator instead of away from the insulator.

#### 1.26 Kind And Size Of Tie Wire To Be Used

Helically formed fittings are to be used for tying the insulators, end terminal connectors etc.. The tie should always be made of soft annealed wire so that it may not be brittle and injure the line conductor. A tie wire should never be used for second time. Specifications of helically formed fittings are given in this section.

#### 1.27 Rules Of Good Tying Practice

- a. Use only helically formed fittings.
- b. Use of size of tie wire which can be readily handled yet one which will provide adequate strength.
- c. Use length of tie wire sufficient for making the complete tie, including an allowance for gripping with the hands. The extra length should be cut from each end if the tie is completed.
- d. A good tie should
  - (a) Provide a secure binding between line wire insulator and tie wire.
  - (b) Have positive contacts between the line wire and the tie wire so as to avoid any chattering of the contacts.
  - (c) Re-enforce line wire in the vicinity of insulator.
- e. Apply without use of pliers.
- f. Do not use the wire which has been previously used.
- g. Do not use hard drawn wires for typing.

#### 1.28 Conductors At Different Voltages On Same Supports

In urban area, lines are to be erected with provision for forming lines of two different gradients as under

- a) 11 KV Line and LT Lines
- b) 33 KV Line and LT Lines

Where conductors forming parts of systems at different voltages are erected on the same supports, the contractor shall make adequate provision to guard against danger to

linesmen and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system; and the methods of construction and the clearances between the conductors of the two systems shall be as described in the specifications.

The agency shall be intimated by the Project Manager in writing about the locations where such provisions is intended by him. At all such locations, the contractor shall make adequate provision to guard against danger to linesmen and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system.

#### 1.29 Earthing

Earthing shall generally be carried out in accordance with the requirements of latest CEA regulations (as amended from time to time) and the relevant regulations of the Electricity Supply Authority concerned and as indicated below:

- a) All metallic supports shall be earthed.
- b) For PCC poles the metal cross-arms and insulator pins shall be bonded and earthed at every pole for HT lines.
- c) All special structures on which switches, transformers, fuses, etc., are mounted / likely to mount should be earthed.
- d) The supports on either side of the road, railway or river crossing should be earthed.
- e) All supports (Steel & PCC) HT lines passing through inhabited areas, road crossings and along such other places, where Earthing of all poles is considered desirable from safety considerations should be earthed.
- f) In special locations and special structures, road crossings etc., pipe/rod Earthing should be done on either side of the construction.
- g) At other locations the coil Earthing may be adopted. The coil Earthing consists of 10 m length of 8 SWG. G.I. wire compressed into a coil 450 mm length and 50 mm dia and buried 1500 mm deep as per REC standard J-1.

Following shall be the earthing requirements:

No	Description	Type of Earthing
1	Single Pole - PCC/RS Joist/steel tubular	1 No. Coil/Spike Earthing at each SP
2	Double pole - PCC/RS Joist/steel tubular	2 Nos. Coil/Spike Earthing at each DP
3	Substation Poles structure - PCC/RS Joist/steel tubular	GI Pipe Earthing 3 Nos
4	Road crossing	GI Pipe earthing on either side one each
5	Telephone line crossing	GI Pipe earthing on either side one each
6	DP with Isolating switch	Coil/Spike earthing 2 Nos and GI Pipe earthing 1 No

#### 1.30 Anti-Climbing Devices

In order to prevent unauthorized persons from climbing any of the supports of HT lines without the aid of a ladder or special appliance, certain anti-climbing devices are provided to the supports. Barbed wire binding is to be adopted for this purpose at a distance of 30 to 40 cm at a height of 3.5 to 4 m from ground level. The barbed wire shall conform to IS – 278 (Grade A1). The barbed wire shall be given chromatin dip as per procedure laid down in IS: 1340. At-least 3.5 kgs barbed wire is to be used per pole for the purpose.

#### 1.31 Testing And Commissioning

When the line is ready for energisation, it should be thoroughly inspected in respect of the following:-

- a) Poles-Proper alignment, concerting and muffing.
- b) Cross-arms – Proper alignment.
- c) Finishing of fabricated steel items used.
- d) Insulators – Proper finish, cleanliness, insulation resistance.
- e) Binding, clamps and jumpers – To check whether these are in reach.
- f) Conductor and earth wire – Proper sag to check whether there are any cuts, etc.
- g) Guys: To check whether the Guy wire is tight and whether the Guy insulators are intact.
- h) Earthing System: To check whether the earthing connections of supports and fittings are intact. Measure earth resistance with earth tester.

After the visual inspection is over and satisfied, the conductor is tested for continuity/ground, by means of megger. At the time of testing through megger person should not climb on the pole or touch the guarding, conductor, guy wire etc.

- a. Before charging any new line, it should be ensured that the required inspection fee for the new line is paid to the Electrical Inspector and approval obtained from him for charging the line.
- b. The line should be energized before the officer who has been authorized by the Project Manager in this regard.
- c. Before energizing any new line, the contractor of the line shall notify to the workmen that the line is being energized and that it will no longer be safe to work on line. Acknowledgement of all the workmen in writing should be taken in token of having intimated them.
- d. Wide publicity by Tom-toming should be arranged in all the localities through which the line, that is to be energized passes, intimating the time and date of energizing and warning public against the risk in meddling with the line.
- e. The Officer-in-charge of the line shall personally satisfy himself that the same is in a fit state to be energized.

#### 1.32 River Crossing

No special structures are to be erected for this work. River crossing more than normal span of poles are not considered under the package. For small rivers etc., data for the highest flood-level should be obtained for previous years. The structures should be located at such places that they should be approached under flood condition. Normal DP structures are to be used for such crossings on approval of Project Manager.

In case of river crossing with longer span, special designed structures are to be used for the purpose.

### 1.33 Guarding

Guarding is to be provided for the lines, so that a live conductor, when accidentally broken, is prevented to come in contact with other electric lines, telephone or telegraph lines, roads, and persons or animals and carriages moving along the road, by providing a sort of cradle below the main electric line.

Guarding is not required for crossings of 66 KV and higher voltage lines where the transmission line is protected by fast acting relay operated circuit breaker of modern design with a tripping time of the order of 0.25 sec. from occurrence of fault to its clearance. For all other crossings, guarding is essential for all telecommunication lines and major road crossing.

The guarding shall consist of GI guard cross arm of length 2.5 mtrs made out of 65x65x6 mm angle & shall be hot dipped galvanized generally conforming to IS : 2633/72. The clamps shall also be hot dipped galvanized generally conforming to IS: 2633/72 & suitable for 13 m 52 kgs/m rail pole & for 8.0 meters long RCC poles. Guarding shall be erected with ground & line clearances as per the I.E. rules. Cradle guard wire should be of 8 SWG GI Wire provided with lashing of 10 SWG GI wire at a distance of 2 m along the length of the guarding. Tension clamps, threaded eye bolts, turn buckles, thimble, tying wires and hardware are as per specified in the specifications. A sketch showing arrangement of guarding at road crossing is enclosed with tender drawing.

The minimum height between any guard wires and live crossing conductor shall not be less than 1.5 m in case of a railway crossing.

### 1.34 Repair to conductors

The conductor shall be continuously observed for loose or broken strands or any other damage during the running out operations. Repair to conductors, if necessary, shall be carried out with repair sleeves. Repairing of the conductor surface shall be carried out only in case of minor damage, scuff marks, etc. The final conductor surface shall be clean, smooth and free from projections, sharp points, cuts, abrasions, etc. The Contractor shall be entirely responsible for any damage to the poles during stringing.

### 1.35 LT Lines and Service connection

- 1.35.1. The LT line shall be erected of single phase or three phase arrangements through AB Cable depending on site requirements. Every 6<sup>th</sup> pole of LT line shall be earthed with GI spike/GI Coil as per specifications.
- 1.35.2. In all those locations where LT AB cable is to be erected on the same support in which 11KV or 33KV line is also erected, proper isolation is to be maintained.
- 1.35.3. All single phase service connections released under the DDUGJY/IPDS schemes shall be provided with one earth point near the energy meter. This point is connected with the proper earthing system through GI wires. 10mm diameter earth knob in form of bolt and nut is to be installed on energy meter board. This earth point is to be maintained by service providing Distribution Company after installation and energisation. In up-stream network, this earth point is to be connected with earth point.
- 1.35.4. Service connection is to be issued on proper surveying of the location so that excessive erection of LT line or 11 KV line may be avoided. The service wire is to be hanged on

supportive GI wire between pole support and the house. Before installing service wires and GI wire, GI pipe on the consumer premises is to be erected using clamps/ nails/proper binding etc. In case of hut or poor structure at consumer premises, GI pipe is to clamp on wooden planks/wooden structure existing in the house. The GI pipe should be supported for neutralizing tension by means of GI tie wire support. In pukka/brickwork/cement concrete foundations, house, GI support pipe is to be clamped by means of MS clips.

- 1.35.5. The consumer meter shall be installed at the premises of consumers at suitable height and at place which is not in direct approach of sun-light and rain water. Meters should be installed under the covering shade.