

TEESTAVALLEY POWER TRANSMISSION LTD.

**TECHNICAL SPECIFICATION
FOR
TRANSMISSION LINE TOWER PACKAGES –A1 & A2**

VOLUME-II

**SPECIFICATION NO.:
TOWER PACKAGE- A1 & A2**

(This document is meant for the exclusive purpose of bidding against this specification and shall not be transferred, reproduced or otherwise used for purposes other than that for which it is specifically issued).

**TECHNICAL SPECIFICATION
(VOLUME-II)**

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SECTION-I

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SECTION-I
TECHNICAL SPECIFICATIONS

1. General Information and Scope

M/s Teestavalley Power Transmission Limited ("TPTL"), the Owner, is a Special Purpose Vehicle ("SPV") incorporated under the provisions of the Companies Act, 1956, having its registered office at 119, Jor Bagh, New Delhi. TPTL is a joint venture between the Power Grid Corporation of India Limited ("POWERGRID") and M/s Teesta Urja Ltd. (TUL).TPTL proposes to set up the transmission system comprising of 400 kV D/C transmission line with QUAD Moose conductor from generating station to New pooling station at Kishanganj. This Project is primarily being executed for evacuating 1200 MW power generated by Teesta Urja Ltd for its beneficiaries in States located in Northern Region of India. The proposed transmission system is scheduled to be commissioned matching with the commissioning schedule of TEESTA-III HEP. Power Grid Corporation of India Ltd is a partner in the JV Company of Teestavalley Power Transmission Limited holding 26% of its equity capital.

1.1 Scope

1.1.1 The following 400 kV double circuit transmission lines are included in the scope of the Contractor for various packages :-

- | | | |
|---|------------------|-----------------|
| i) Package A1 | | |
| 400 kV D/C (Quad) TEESTA III HEP – Panighata TL | 105 km (approx.) | (Hilly Terrain) |
| ii) Package A2 | | |
| 400 kV D/C (Quad) Panighata - Kishanganj TL | 98 km (approx.) | (Plain Terrain) |

1.1.2 This Specification covers the following scope of works:

- (i) Detailed survey including route alignment, profiling, tower spotting, optimisation of tower locations, soil resistivity measurement & geotechnical investigation (including special foundation locations, viz.,pile/well foundation locations).
- (ii) Check survey;
- (iii) Fabrication and supply of all type of 400kV transmission line towers, including River crossing towers (wherever applicable) as per Owner design/drawings including fasteners, anti theft fasteners, step bolts, hangers, D-shackles etc.
- (iv) Development of structural drawings and fabrication shop drawings, Bill of Materials etc. based on owner supplied single line diagram of tower and fabrication of prototype tower and its assembly, erection of the tower at the test

bed and testing the same to the full design load for DB, DC & DD type towers for Package A1 only.

The bidders shall have adequate design & drawing development facilities. The testing of the towers shall be carried out at Bidder's own test bed or a suitable test bed where adequate facilities are available.

In case the bidder has no test bed, he shall be required to submit documentary evidence in the bid, in support of tie up with the test beds, in the form of letter of consent from test bed owner capable of testing of towers for undertaking the tests as per schedule indicated.

- (v) supply of all types of tower accessories like phase plate, circuit plate (where ever applicable), number plate, danger plate, anti climbing device, Bird guard (where ever applicable)
- (vi) supply of Earth wire, Hardware Fittings and Conductor & Earth wire Accessories,
- (vii) classification of foundation for different type of tower and casting of foundation for tower footings as per Owner foundations drawing;
- (viii) erection of towers, tack welding of bolts and nuts including supply and application of zinc rich primer & two coats of enamel paint, tower earthing, fixing of insulator strings, stringing of conductors and earth wire/OPGW along with all necessary line accessories,
- (ix) Painting of towers & supply and erection of span markers, obstruction lights (wherever applicable) for aviation requirements (as required)
- (x) Testing and commissioning of the erected transmission lines and
- (xi) Other items not specifically mentioned in this Specification and / or BPS but are required for the successful commissioning of the transmission line, unless specifically excluded in the Specification.

1.1.2.1 Owner shall provide structural drawings, shop drawings & Bill of Materials of all type of transmission line towers and its extensions, river crossing towers/special towers after placement of award, in sequence, suiting the project requirement. Similarly the drawings for all type of foundations for the towers shall also be provided by Owner to the Contractor. The scope of this specification also provides for fabrication of prototype tower, its assembly and proto-inspection, for which charges shall be indicated in the appropriate schedule of BPS.

- 1.1.2.2
- (a) The provisional quantities of fabricated & galvanised steel parts as per specifications required for towers, concrete, excavation volume & reinforcement steel for foundation and other items are given in appropriate Schedule of Bid Proposal Sheet (BPS) for respective packages. However, the work shall be executed as per approved construction drawings.
 - (b) The various items of work are described very briefly in the appropriate Schedule of BPS. The various items of the BPS shall be read in conjunction

with the corresponding sections in the Technical Specifications including amendments and, additions, if any. The Bidder's quoted rates shall be based on the description of activities in the BPS as well as other necessary operations required to complete the works detailed in these Technical Specifications.

- (c) The Unit rates quoted shall include minor details which are obviously and fairly intended, and which may not have been included in these documents but are essential for the satisfactory completion of the various works.
- (d) The unit rate quoted shall be inclusive of all plant equipment, men, material skilled and unskilled labour etc. essential for satisfactory completion of various works.
- (e) All measurements for payment shall be in S.I. units, lengths shall be measured in meters corrected to two decimal places. Areas shall be computed in square meters & volume in cubic meters, rounded off to two decimals.

1.1.2.3 The Bidder shall submit his offer taking into consideration that the tower and foundation designs/drawings shall be developed/provided by Owner and design rights will be strictly reserved with Owner. Bidder shall quote the unit rates for various items of towers and foundations as per units mentioned in appropriate schedule of (BPS). However, payment of these items identified in the schedule of prices shall be made as follows:

A)	TOWER	
i)	Supply items	On supply of respective complete tower
ii)	Erection items	On erection of respective complete tower
B)	Foundation items	On completion of respective foundation in all respect

The payment to be made for towers/foundations shall be worked out based on the unit rates and approved Bill of Materials (BOM) for towers and quantities/volumes as per approved tower foundation drawings.

1.1.3 This specification also includes the supply of earth wire, hardware fittings and all type of accessories for conductor and earth wire as detailed in the specification. Contractor shall clearly indicate in their offer, the sources from where they propose to procure these materials in appropriate Schedule of BPS. The technical description of these items is given in SECTION -V & VI of this Volume.

1.1.4 The Contractor shall take delivery of the Conductor, OPGW (if any) and Insulators as Owner's supplied materials at the stores established by the contractor in consultation with the Owner and ensure their safe custody and shall incorporate the same in the transmission lines as stipulated in this specification.

- 1.1.5 All the raw materials such as steel, zinc for galvanising, reinforcement steel, cement, coarse and fine aggregates for tower foundation, coke and salt for tower earthing etc. are included in the Contractor's scope of supply.
- 1.1.6 Bidder shall also indicate in the offer, the sources from where they propose to procure the fasteners, anti theft fasteners, step bolts, hangers, D-shackles etc., tower accessories, aviation signal (if required) etc.
- 1.1.7 **Stringing**
- a) The entire stringing work of conductor and earth wire/OPGW shall be carried out by tension stringing technique. The bidder shall indicate in their offer, the sets of tension stringing equipment he is having in his possession and the sets of stringing equipment he would deploy exclusively for each package which under no circumstance shall be less than the number and capacity requirement indicated in Qualifying Requirements for Bidder. However, the Bidder having requisite experience has freedom to use helicopter for stringing. The Bidder intending to use helicopter shall furnish detailed description of the procedure, type & number of helicopter & accessories etc., to be deployed for stringing operation.
 - b) In hilly terrain and thick forest, or areas with site constraints where deployment of tension stringing machine is not possible, manual stringing may be adopted after getting approval of Owner site Engineer. The contractor shall deploy appropriate tools / equipments / machinery to ensure that the stringing operation is carried out without causing damage to conductor / earth wire / OPGW and conductor / earth wire / OPGW is installed at the prescribed sag-tension as per the approved stringing charts.
- 1.1.8 The casting of special pile foundations shall be in the scope of the Bidder. The design shall be provided by Owner. If the bidder does not have necessary experience, some other agencies meeting the qualifying requirements may be engaged by the bidder for the casting of pile foundations.

1.2 **Details of Transmission Line Routes and Terrain**

Detailed survey including route alignment, profiling, tower spotting, optimization of tower locations of lines have been carried out by the Owner and these are not expected to vary substantially. However, during execution if due to right of way constraints or any other unforeseen circumstances the line route require changes detailed survey including profiling, tower spotting, optimisation of tower locations, soil resistivity measurement & geotechnical investigation etc. shall be undertaken by the Contractor. For this part, quantity of Detailed survey including route alignment, profiling, tower spotting, optimization of tower locations, soil resistivity measurement & geotechnical investigation etc. of lines have been included in the BPS.

Bidders may visit the line route to acquaint themselves with terrain conditions and associated details of the proposed transmission lines. For this purpose they are requested to contact the following address:

General Manager (Projects)
Teestavalley Power Transmission Limited (Owner)
Silliguri, West Bengal

1.2.1 The details collected through detailed survey viz. route alignment maps, detailed survey reports etc. will be given to the contractor during execution stage.

1.3 **Location Details and Terminal Points**

The 400 kV transmission line shall emanate from Teesta-III generating station switchyard in the state of Sikkim and terminate at Kishanganj sub-station in the state of Bihar/West Bengal.

1.3.1 The Contractor shall have to construct these 400 kV transmission lines completely up to dead end towers upto the respective switchyard/sub-station. Stringing shall also be carried out from dead end tower to terminal arrangements/terminal points by the contractor.

1.4 **Access to the Line and Right of Way**

Right of way and way leave clearance shall be arranged by the Owner in accordance with work schedules. Owner will secure way leave and Right of way in the Forest area.

2.0 **Qualification Requirement for Contractor's Supplied Line Materials**

The Bidder should have assured access to supply Earth wire, Hardware fittings and Conductor & Earth wire accessories from Qualified Manufacturers meeting the following minimum requirement and must demonstrate that based on known commitments they will be available for use in the proposed contract.

a) **Earthwire**

The qualified manufacturer should have manufactured, tested and supplied at least three hundred (300) km of galvanized steel ground wire/ ACSR core wire of size 7/3.15mm or above.

b) **Hardware Fittings (applicable for 400 kV lines)**

The qualified manufacturer should have designed, manufactured, tested and supplied hardware fittings for at least 450 sets of tension strings and 1,013 sets of suspension strings for 220 kV or above voltage transmission line and same should have been in satisfactory operation for a minimum period of three years as on date of bid opening. Further, qualified manufacturer should also have type tested tension & suspension strings for 345/400 kV or above application as on date of bid opening.

c) Accessories for Conductor and Earth wire (Applicable for 400 kV Quad bundle lines)

The qualified manufacturer (s) for any individual item(s) of accessories for conductor & earth wire covered under the package should have designed, manufactured, tested and supplied the item(s) of accessories for conductor & earth wire covered under the package or item(s) of similar/comparable nature. For spacer dampers for quad bundle conductor and vibration dampers for earth wire, the experience should include at least the supply of 6900 nos. of spacer dampers for quad bundle conductors and 1950 nos. of vibration dampers for earth wire for 345/400 kV or above voltage transmission line respectively and the same should have been in satisfactory operation for a minimum period of three years as on date of bid opening. (For accessories for galvanized steel earth wire, the requirement of voltage level shall not be applicable).

The manufacturer(s) meeting the above requirement for any individual item or items shall be considered qualified for the respective item or items only.

d) However, if the proposed manufacturer of Hardware fittings and Accessories for conductor and earth wire is not meeting the above requirements of its own, he should be qualified licensee of a qualified manufacturer meeting the above specified requirements.

i) Manufacturer/licensees shall have adequate design infrastructure and manufacturing facility and capacity and procedures including quality control.

ii) A qualified Licensee of a qualified manufacturer shall mean all of the following:

a) any design undertaken by the licensee shall be approved by the licensor

b) Manufacture by the licensee shall be done with the approval of the licensor and Owner under a quality assurance programme approved and monitored by the licensor.

c) Licensee must furnish back-up guarantee from the licensor for individual and overall performance of all equipment and materials supplied under the contract.

d) Licensor must guarantee sequential and timely supply of equipments and materials and submission of technical information and data as desired by the Owner so as to meet the overall construction schedule and

e) The agreement between licensee and licensor submitted along with the bid (Performa enclosed as Annexure–A to this section) shall be valid

for a period of at least five (5) years after the guarantee period of equipment and materials under supply is over.

- iii) For Spacer Dampers for quad bundle conductor, the proposed manufacturer can also be a qualified licensee meeting conditions at (i) and (ii) above of a licensor who has designed, got type tested & got manufactured under his direct supervision and supplied/installed 6900 nos of spacer dampers for quad bundle conductors for 345/400 kV or above voltage transmission line and the same should have been in satisfactory operation for a minimum period of three years as on date of bid opening.

3.0 Transmission towers and Line data

3.1 General Description of the Tower

3.1.1 The transmission towers are of self-supporting hot dip galvanised lattice steel type designed to carry the line conductors with necessary insulators, earth wire/OPGW and all fittings under all loading conditions. Outline diagram of single circuit and double circuit towers are enclosed with the Specification.

3.1.2 The tower shall be fully galvanised using mild steel or/and high tensile steel sections as specified in relevant clause in section-IV. Bolts and nuts with spring washer are to be used for connections.

3.1.3 The towers are of the following types:

- A) 400 kV (Quad) Double Circuit (DA, DB, DC & DD)

3.2 Classification of Towers

3.2.1 The towers for 400 kV Lines are classified as given below :

Type of Tower	Deviation Limit	Typical Use
DA	0 deg	i) To be used as tangent tower.
DB	0 deg - 15 deg	i) Angle towers with tension insulator string. ii) Also to be used for uplift force resulting from an uplift span upto 200/600* m under broken wire condition. iii) Also to be used for Anti Cascading Condition.
DB	0 deg	i) To be used as Section Tower.
DC	15 deg-30 deg	i) Angle tower with tension insulator string. ii) Also to be used for uplift forces resulting from an uplift span upto 200/720* m under broken

Type of Tower	Deviation Limit	Typical Use
		wire condition. iii) Also to be used for anti cascading condition.
DC	0 deg	i) To be used for transposition of transmission lines with modification
DD	30 deg-60 deg	i) Angle tower with tension insulator string. ii) Also to be used for uplift forces resulting from an uplift span upto 300/900* m under broken wire condition. iii) for river crossing anchoring with longer wind span & 0 deg. Deviation on crossing span side and 0 deg. to 30 deg. Deviation on other side.
DDE	0 deg.	i) Dead end with 0 deg. to 15 deg. Deviation both on line side and sub-station side (slack span)

Note: The above towers can also be used for longer span with smaller angle of deviations without infringement of ground clearance.

* values are for towers in Hilly region

3.2.2 Transposition tower for 400 KV Lines

DC type towers (Section Towers) with suitable modifications are to be used for transposition of the line maintaining all the required clearance and shielding. Two numbers of transposition towers shall be required for double circuit transmission line.

3.2.3 Special Towers

The towers which will be specially designed for very long spans (spans more than that of given in cl. 3.3) which can not be crossed by normal tower with extensions as given in cl.no.3.2.6, like Major River crossings etc. shall be treated as special towers.

3.2.4 Extensions

3.2.4.1 The Double Circuit towers are designed so as to be suitable for adding 3M, 6M and 9M body extensions/leg extensions for maintaining adequate ground clearances without reducing the specified factor of safety in any manner.

3.2.4.2 The provision for addition of 18/25M body extension to tower types DA and DD for 400 KV lines is also kept by the Owner. For Power Line Crossing or any other obstacle, tower types DA or DD can be used with 18/25 M extensions depending,

upon the merit of the prevailing site condition. The maximum reduced spans for DA and DD type towers shall be mentioned in the tower spotting data.

- 3.2.4.3 The towers have been designed for providing unequal leg extensions. The details of unequal leg extensions provided in the design shall be indicated to the contractor during execution stage, so that proper optimization of benching / revetment requirement can be done accordingly by the contractor. The towers are designed for unequal leg extensions of 3M, 6M and 9M generally with 3M maximum leg differential and in specific cases with 6m maximum leg differential. In exceptional situations where difference in leg differential does not suit the standard unequal leg extension provisions on the tower mentioned above, then suitable chimney extension shall be provided.
- 3.2.4.4 All above extension provisions to towers and foundations shall be treated as part of normal towers and foundations only.
- 3.2.4.5 The leg extensions, unequal leg extensions, chimney extensions and / or a combination of these suitable for a tower location shall be selected on the basis of techno-economics.

3.3 Span and clearances

3.3.1 Normal Span

The normal ruling span of the line is 400m.

3.3.2 Wind Span

The wind span is the sum of the two half spans adjacent to the support under consideration. For normal horizontal spans this equals to normal ruling span.

3.3.3 Weight span

The weight span is the horizontal distance between the lowest point of the conductors on the two spans adjacent to the tower. For spotting of structures, the span limits given in Table 3.1 shall prevail.

TABLE 3.1

TOWER TYPE	NORMAL CONDITION		BROKENWIRE CONDITION	
	MAX (m)	MIN (m)	MAX (m)	MIN (m)
DA	600	200	360	100
DB	600/1000*	0/-1000*	360/600*	(-) 200 / (-) 600*
DC	600/1200*	0/-1200*	360/720*	(-) 200 / (-) 720*
DD	600/1600*	0/-1500*	360/960*	(-) 300 / (-) 900*

* values are for towers in Hilly region

3.3.4 In case at certain locations where actual spotting spans exceed the design spans and cross-arms and certain members of towers are required to be modified/reinforced, in that case drawings for the modified/reinforced towers will be supplied to the Contractor as per requirement.

3.4 Electrical Clearances

3.4.1 Ground Clearance

The minimum ground clearance from the bottom conductor shall not be less than 8840 mm for 400KV lines at the maximum sag conditions i.e at 85° C and still air.

- a) An allowance of 150mm shall be provided to account for errors in stringing.
- b) Conductor creep shall be compensated by over tensioning the conductor at a temperature of 26°C lower than the stringing temperature for ACSR “MOOSE” conductor for 400 kV transmission lines.

3.5 Electrical System Data for 400 kV line

1.	Nominal Voltage	kV	400
2.	Maximum system voltage	kV	420
3.	BIL (Impulse)	kV (Peak)	1550
4.	Power frequency withstand voltage (Wet)	kV (rms)	680
5.	Switching surge withstand voltage (Wet)	kV (rms)	1050
6.	Minimum Corona extinction voltage at 50 Hz AC system under dry condition	kV (rms) phase to earth.	320(Min)
7.	Radio interference voltage at one MHz for phase to earth voltage of 305 KV under dry condition.	Micro Volts	1000 (Max)

4.0 Details of line Material:

4.1 Conductor & Earthwire for 400 kV QUAD Bundle line

Sl. No.	Description	Conductor	Earthwire
1.	Type	ACSR 'MOOSE' conductor	7/3.66mm GS Earthwire
2.	Stranding and wire dia		
	Aluminium	54/3.53	-
	Steel	7/3.53	7/3.66
3.	Conductor per phase	4	NA
4.	Spacing between conductor of same phase(sub conductor spacing)(mm)	457	NA
5.	Configuration	Vertical (for D/C with 8000 mm min. inter phase spacing)	Two continuously to run horizontally on top of the towers and conductors.
6.	Overall Diameter (mm)	31.77	10.98
7.	Unit mass (kg/km)	2004	583
8.	Min. UTS (kN)	161.2	68.4
9.	Ruling Design Span (m)	400	400

Note: Conductor to be supplied by the Owner & Steel Earthwire by the Contractor.

4.2 Insulator Strings

Insulator Strings for 400 kV line with Quad ACSR MOOSE conductor

Sl No.	Particulars	Double 'I' Suspension	Single 'I' Suspension Pilot	Single Tension	Quadruple tension
1.	No of Standard Insulator Disc	2 x 23	1 x 23 or 1 x 26*	1x 24 or 1 x 26*	4 x 23 or 4 x 25*
2.	Size of Disc	255 x 145 or 280 x 145	255 x 145 or 280 x 145	255 x 145 or 280 x 145	280 x 170
3.	E& M Strength of each disc KN	120	120	120	160
4.	Pollution	Light Polluted IEC 71-2			
5.	Size and Designation of pin ball shank (mm)	20	20	20	20
6.	Creepage distance of each disc (mm)	315	315	315	330

* for Hilly Region above 1000m altitude

Note : 1) As an alternative to disc insulators, porcelain long rod insulators may also be used

5.0 Service Condition

Equipment/material to be supplied against this specification shall be suitable for satisfactory continuous operation under conditions as specified below:

Maximum ambient temperature (Degree Celcius)	:	48
Minimum ambient temperature (Degree Celsius)	:	0
Relative humidity (% range)	:	10-100
Maximum annual rainfall & snowfall (Cm)	:	as per published Meteorological/ climatological data
Wind zone (as per IS: 875)	:	4
Maximum wind velocity (m/sec.)	:	47 m/sec. (as per IS : 875)
Maximum altitude above mean sea level (Metres)	:	Upto 1000 m for Package A2 Upto 2300 m for Package A1
Isoceraunic level (days/years)	:	50

Climate varies from moderately hot and humid tropical climate to cold climate.

6.0 Exclusions

6.1 The following sections/Paras/Clause nos. are excluded for the subject project:

S.No.	Section	Para/Clause Nos.	Page no.	Remarks
1.	Section - VIII	All	All	For Package A2 (Tower Testing not envisaged in Package A2)

**FORM OF JOINT UNDERTAKING BY THE LICENSOR
ALONG WITH THE LICENSEE**

On Non-Judicial Stamp Paper of Appropriate Value

THIS DEED OF UNDERTAKING executed this day of Two Thousand by a Company incorporated under the laws of and having its Registered Office at (hereinafter called the "Licensor" which expression shall include its successors, executors and permitted assigns) and a Company incorporated under the Companies Act, 1956 having its Registered Office at (hereinafter called the "Licensee" which expression shall include its successors, executors and permitted assigns) in favour of Teestavalley Power Transmission Limited, having its Registered Office at 119, Jorbagh, New Delhi-110003 (hereinafter called the "Employer" which expression shall include its successors, executors and permitted assigns).

WHEREAS the Employer invited Bids as per its Specification No. for the construction of transmission line which inter alia include design, manufacture, testing, supply on Final Destination delivery at site basis for Hardware Fittings and Accessories for Conductor & Earthwire for Transmission Lines.

AND WHEREAS Clause 2.0 (d) (ii) (e) of Section-I, Vol-II, forming part of the Bidding Document inter alia stipulates that the Licensee alongwith its Licensor must fulfill the Qualifying Requirements and be jointly and severally bound and responsible for the successful performance of the equipment and shall be fully responsible for the design, manufacture, testing, supply and final destination delivery at site basis in the event the Bid is accepted by the Employer resulting in a "Contract".

AND WHEREAS a company incorporated Companies Act 1956, having its Registered Office at (hereinafter called the "Bidder"/"Contractor" which expression shall include its successors, executors and permitted assigns) the Bidder has submitted its Bid for the Employer for Transmission Line having Specification No. vide Proposal No. dated based on the License of the Licensor.

NOW THEREFORE THIS UNDERTAKING WITNESSETH AS UNDER :

- 1.0 In consideration of the award of Contract by the Owner to the Bidder (hereinafter referred to as the "Contract") we, the Licensor and the Licensee do hereby declare that we shall be jointly and severally bound unto the Teestavalley Power Transmission Limited (Owner)/the Bidder for the successful performance of the equipment and shall be fully responsible for the design, manufacture, testing, supply and final destination delivery at site basis and successful performance of equipment 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 Licensor in particular hereby agrees to depute their technical experts to the Licensee's works as considered necessary by the Owner, Bidder and the Licensor to ensure proper design, manufacture, Quality Management, testing, supply on final destination delivery at site basis and successful performance of the equipment in accordance with Contract Specifications and if necessary the Licensor shall advise the Licensee suitable modifications of the designs and implement necessary corrective measures to discharge the obligations under the Contract.
- 3.0 As a security, the Licensor shall apart from the Contractor's performance guarantee, furnish a Performance Security from its Bank in favour of the Owner in a form acceptable to Owner. The value of such guarantee shall be equal to 5% of the Contract Price of equipment/material proposed to be manufactured and supplied by the Licensee under the contract awarded by the Employer to the Contractor and it shall be part of guarantee towards the faithful performance/compliance of this Deed of Undertaking in terms of the Contract. The Guarantee shall be unconditional, irrevocable and valid for the entire period of the contract, namely till the end of the warranty period ofpackage under the Contract. The Bank Guarantee amount shall be payable to the Employer on demand without any reservation or demur.
- 4.0 We, the Licensor undertakes to guarantee sequential and timely supply of equipments and materials and submission of technical information and data as designed of the Employer so as to meet the overall construction schedule.

- 5.0 We, the Licensor and the Licensee confirm that the License agreement shall be valid for a period of at least five (5) years after the guarantee period of the equipment and materials to be supplied under the Contract is over.
- 6.0 This Deed of Undertaking shall be constructed and interpreted in accordance with the Laws of India and the courts in Delhi shall have exclusive jurisdiction in all matters arising under the undertaking.
- 7.0 We the Licensor and the Licensee 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 and the Bidder discharge it. It shall become operative from the effective date of Contract.

IN WITNESS WHEREOF the Licensor and the Licensee have through their authorised Representative executed these presents and affixed Common Seals of their respective Companies, on the day, month and year first above mentioned.

WITNESS

FOR LICENSEE

- | | |
|---------------------------------|---|
| 1.
(Signatures) |
(Signature of Authorised Representative) |
|
(Name in Block Letter) |
(Name) |
|
(Office Address) | Designation
Common Seal of Company |

WITNESS

FOR LICENSOR

- | | |
|---------------------------------|---|
| 1.
(Signatures) |
(Signature of Authorised Representative) |
|
(Name in Block Letter) |
(Name) |
|
(Office Address) | Designation
Common Seal of Company |

- Note :** (i) This deed of joint undertaking should be attested by Notary Public of the place of the respective executant.
- (ii) To be filled separately for each package.