

TECHNICAL SPECIFICATIONS

SECTION-I

1.0 General information and scope

1.1 Scope

1.1.1 This specification covers (i) designing of 132kV, 4-circuit transmission line towers(suitable for 3-circuit stringing) including foundation design (ii) check survey & soil investigation, (iii) fabrication and supply of 132kV, 4- circuit transmission line towers(suitable for 3- circuit stringing), as per bidder's design/drawings approved by the owner including bolts, nuts and washers, hangers, D-shackles, etc. (iv) fabrication and supply of all type of 132kV, D/C transmission line towers as per owner's design/drawing including bolts, nuts and washers, hangers, D-shackles, etc. (v) fabrication and supply of all types of tower accessories like phase plate, circuit plate, number plate, danger plate, anti-climbing device, bird-guard and supply of conductor, earthwire, insulators, hardware fittings and accessories for conductor & earthwire, (vi) selecting type of foundation for different type of 132kV, 4 – circuit towers(suitable for 3- circuit stringing) and casting of foundation as per bidder's foundations design/drawing approved by the owner; (vii) selecting type of foundation for different type of 132kV D/C towers and casting of foundation as per owner's foundations design/drawing, (viii) erection of towers, tack welding of bolts and nuts including supply and application of zinc rich primer & enamel paint, painting of towers for aviation requirements, tower earthing, fixing of insulator strings, stringing of conductor, earthwire along with all necessary line accessories; (ix) testing and commissioning of the erected transmission lines and (x) all 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.

1.1.1.1 The contractor shall design and provide structural drawings and bill of materials of the 132kV 4- circuit towers and extensions needed for the above line(suitable for 3-circuit stringing), to the owner for approval, in sequence, suiting the project requirement. The criteria for the design will be based on the condition of this area which falls under seismic zone -5 & wind zone- 5. The construction drawings for all type of foundations for these towers(suitable for 3- circuit stringing) shall also be provided by the contractor to the owner after the placement of award for approval in sequence suiting the project requirement. 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.

1.1.1.2 (a) The contractor is to provide the quantities of fabricated & galvanised steel parts required for the 132kV, 4- circuit towers & extensions(suitable for stringing of 3-circuit line), concrete, excavation volume & reinforcement steel for foundation of the same in the appropriate schedule of BPS(bid proposal sheet) & quote their rate accordingly. The tower quantities provided by the bidder in the respective price

schedules shall correspond to the guaranteed tower weights of the towers. However, the final quantities shall be determined on actual implementation of the work. The final quantities shall be taken as per the guaranteed tower weight or actual tower weight used, whichever is lower.

(b) The various item of work is described very briefly in the schedule of quantities of bid proposal sheet (BPS). The various items of the schedule of quantities shall be read in conjunction with the corresponding sections in the technical specifications including amendments and, additions, if any. The bidder's rates shall be based on the description of activities in the schedule of prices as well as necessary operations 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 metres corrected to two decimal places. Areas shall be computed in square metres & volume in cubic metres, rounded off to two decimals.

1.1.1.3 The bidder shall submit his offer taking into consideration that the tower and foundation designs shall be developed/ provided by bidder and design rights will be strictly reserved with owner. Further, the bidder shall quote the unit rate for these items as per their units mentioned in the BPS. However, payment shall be made on per tower/foundation basis on completion of supply/erection as applicable to be worked out based on the approved bill of materials for towers and approved foundation drawings.

1.1.2 This specification also includes the supply of conductor, earthwire, insulator, hardware fittings and all type of accessories for conductor, earthwire as detailed in the specification. Contractor shall clearly indicate in their offer, the source from where they propose to procure these materials in appropriate schedule of BPS. The technical descriptions of these items are given in relevant sections of this bidding document.

1.1.3 All the raw materials such as steel, zinc for galvanising, reinforcement steel and cement for tower foundation, coke and salt for tower earthing etc. bolts, nuts, washers, D-shackles, hangers, links, danger plates, phase plates , number plates, circuit plates etc., required for tower manufacture and erection shall be included in the contractor's scope of supply. Bidder shall clearly indicate in the offer, the sources from where they propose to procure the raw materials and the components.

1.1.4 The entire stringing work of conductor and earthwire shall be carried out by standard stringing technique. The bidder shall indicate in the offer, the detail description of the procedure to be deployed for stringing operation.

1.1.5 The following transmission lines are included in the scope of the contractor:

‘The construction the 132kV multi circuit line on 4- circuit towers from 220/132kV substation, Killing to 132kV EPIP-I substation, Byrnihat along with all associated works’.

1.1.6 The detail of works involved are (i) construction of 132kV, 3-circuit line on 4-circuit towers – 5.86km from Killing substation upto location no. 16 (near M/s Sai Prakash Ispat Ltd., Byrnihat), (ii) construction of 132kV S/C line on D/C towers – 0.386km from location No. 16 to M/s Sai Prakash Ispat Ltd., Byrnihat (iii) stringing only for the second circuit line & interconnecting both the circuits – 3.5km (approx.) of the existing 132kV S/C line on D/C towers from location no. 16(near M/s Sai Prakash Ispat Ltd., Byrnihat) to 132kV EPIP-I substation Byrnihat.(a copy of the tower schedule for the survey already carried out is attached

1.1.7 Location details and terminal points

The transmission lines shall be laid in the Indian State of Meghalaya. The transmission line will start from 220/132kV substation, Killing and terminate at 132kV EPIP-I substation, Byrnihat.

1.2 Details of transmission line routes and terrain

The detail collected through walkover/preliminary surveys for the lines viz. route, crossing, accessibility, infrastructure details and the location of all obligatory points shall be provided to successful bidder. **The contractors are advised to visit the proposed/likely routes of the lines to acquaint themselves about topography of the line routes and other details before submitting the bids.**

1.3 Access to the line and right of way

Right of way clearance shall be arranged by the owner in accordance with work schedules.

2.0 Qualification for contractor's supplied line materials

The bidder should have assured access to supply conductor, earthwire, insulators, hardware fittings and conductor & earthwire 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. The bidder shall submit along with the bid, an undertaking (as per format enclosed) from the manufacturer of conductor and insulators.

(a) Conductor:

The qualified manufacturer shall be a manufacturer of conductor of similar nature for the last five years. The bidder's experience should include the following:

The qualified manufacturer should have manufactured, tested and supplied at least 1000(one thousand) km. of 37 or above strands ACSR/AAAC conductor in the last 5(five) years as of the date of bid opening.

(b) Earthwire:

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

(c) Insulators:

The qualified manufacturer shall be a manufacturer of insulators of similar nature for the last five years. The bidder's experience should include the following:

The qualified manufacturer should have designed, manufactured, tested and supplied 90kN and 120kN or above electromechanical strength of disc insulators for 132kV or above voltage transmission line of quantities not less than 50,000 nos. disc insulators of each rating and the same should have been in satisfactory operation for a minimum period of two years as on date of bid opening.

(d) Hardware fittings:

The qualified manufacturer(s) for tension and suspension hardware fittings should have designed, manufactured, tested and supplied hardware fittings for at least 450 sets of tension strings and 1,013 sets of suspension strings respectively for 132kV 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.

(e) Accessories for conductor and earthwire:

The qualified manufacturer(s) for any individual item(s) of accessories for conductor and earthwire covered under the package should have designed, manufactured, tested and supplied the items of accessories for conductor & earthwire covered under the package or items of similar/comparable nature. For vibration dampers, the experience should include at least the supply of 5,850 nos. of vibration dampers for conductor and 1,950 nos. of vibration dampers for earthwire for 132kV 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. (For accessories for galvanized steel earthwire, 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.

(f) However, if the proposed manufacturer of conductor, insulators, hardware fittings and accessories for conductor and earthwire 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 alongwith the bid shall be valid for a period of at least 5(five) years after the guarantee period of equipment and materials under supply is over.

3.0 Line data

3.1 Electrical system data:

| | | | |
|---|---|----------|-----|
| 1 | Nominal voltage | kV | 132 |
| 2 | Maximum system voltage | kV | 145 |
| 3 | BIL (impulse) | kV(peak) | 650 |
| 4 | Power frequency withstand voltage (wet) | kV (RMS) | 275 |

3.2 Details of line materials:

3.2.1 Conductor & earthwire:

| Sl. no. | Description | Unit | Earthwire | Conductor |
|---------|---------------------|-------|---|---------------------------|
| 1 | Name /type | - | Galvanised steel | ACSR Panther |
| 2 | Size | mm | 7/3.15 | 30/3.00 Al + 7/3.00 steel |
| 3 | Conductor per phase | No. | N.A. | 1 |
| 4 | Configuration | - | One continuously to run on top of the towers and conductors | Vertical |
| 5 | Overall diameter | mm | 9.45 | 21.00 |
| 6 | Unit mass | kg/km | 428 | 974 |
| 7 | Minimum UTS | kN | 56 | 89.5 |
| 8 | Ruling design span | RM | 300 | 300 |

3.2.2 Insulator strings with disc insulators:

| Sl. No. | Particulars | Single suspension string | Single tension string |
|---------|--|--------------------------|-----------------------|
| 1 | Type of disc | Semi fog | Semi fog |
| 2 | E&M strength of each insulator in the string in kN | 90 | 120 |
| 3 | Nos. of disc insulator per string | 1 x 10 | 1 x 10 |
| 4 | Size of the disc in mm | 255 x 145 | 255 x 145 |
| 5 | Size and designation of pin ball shank in mm | 16 | 16 |
| 6 | Minimum creepage distance of each disc in mm | 292 | 292 |

3.2.3 Accessories for conductor & earthwire(as applicable):

- (a) Preformed armour rods.
- (b) Mid span compression joint.
- (c) Repair sleeves.
- (d) Flexible copper bonds.
- (e) Vibration dampers.
- (f) Suspension clamp for earthwire.
- (g) Tension clamp for earthwire.

4.0 Service condition:

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

| | | |
|---|--|---|
| 1 | Maximum ambient temperature | 50 ⁰ celsius |
| 2 | Minimum ambient temperature | 4 ⁰ celsius |
| 3 | Relative humidity | 10 – 100% |
| 4 | Maximum annual rainfall & snowfall (in cm) | As per published meteorological climatological data |
| 5 | Wind zone (as per IS:875) | 5 |
| 6 | Wind zone (as per IS:875) | 50m/sec (as per IS : 875) |
| 7 | Maximum altitude above mean sea level | Upto 1000 metre |
| 8 | Isoceraunic level (days/years) | 50 |

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

**FORM OF JOINT UNDERTAKING BY THE LICENSOR
ALONGWITH 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 Meghalaya Energy Corporation Ltd., having its registered office at Lum Jingshai, Short Round Road, Shillong-793001 (hereinafter called the 'owner' which expression shall include its successors, executors and permitted assigns).

WHEREAS the owner 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 f(ii) of section-I, Vol-II, forming part of the bidding document inter alia stipulates that the licensee along with 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 owner 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 to the owner 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 Meghalaya Energy Corporation Ltd. (owner) 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 owner 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 of package under the contract. The bank guarantee amount shall be payable to the owner on demand without any reservation or demur.
- 4.0 We, the licensor undertake to guarantee sequential and timely supply of equipments and materials and submission of technical information and data as designed of the owner 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 5(five) 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 Shillong 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 owner 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

1. Signature
-
- Name
- Designation
- Office address

FOR LICENSEE

- Signature of authorised representative
- Name
- Designation
- Common seal of company

WITNESS

1. Signature
-
- Name
- Designation
- Office address

FOR LICENSOR

- Signature of authorised representative
- Name
- Designation
- Common seal of company

Note : This deed of joint undertaking should be attested by notary public of the place of the respective executants.

PROFORMA OF UNDERTAKING BY THE MANUFACTURER OF CONDUCTOR & INSULATORS

(Non-judicial stamp paper of appropriate value, where ever applicable)

To,

The Chief Engineer(Transmission)
Meghalaya Energy Corporation Ltd.,
Lum Jingshai, Short Round Road
Shillong-793001

Dear sir,

WHEREAS Meghalaya Energy Corporation Ltd., with its registered office at the Lum Jingshai, Short Round Road, Shillong-793001 (hereafter referred to be as the 'owner'), having invited bids for (name of the package) & specification no. in response to which M/s..... (name of the bidder), with its registered office at (full address) are submitting the bid vide letter no. dated (hereafter called the 'bid').

We..... (name of the manufacturer) with its registered office at (full address) (hereafter referred to as 'the manufacturer', which expression shall unless repugnant to the context and meaning thereafter include its successor, administrator, executor and permitted assigns) do hereby undertake in the event of award of the contract to supply (conductor/insulators), fulfilling all the requirements and delivery schedule agreed under the contract.

Signed on this day of 20xx at

(Signature)

Authorised signatory on behalf on

M/s

(Name).....

Designation

Note: Separate undertaking to be provided from each of the manufacturer of conductor & insulators)

END OF SECTION - I