GUJARAT ENERGY TRANSMISSION CORPORATION LTD.

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TECHNICAL SPECIFICATIONS OF LAYING OF UNDER GROUND POWER CABLE FOR TRANSMISSION LINE

GETCO/E/TS–LUC058/R2. JULY-2018

PART –II

TECHNICAL PARTICULARS FOR LAYING, TESTING AND COMMISSIONING OF 66KV XLPE UNDERGROUND POWER CABLE

SECTION-I

SPECIFICATION FOR LAYING OF CABLE

1.1. LAYING, JOINTING AND INSTALLATION (GENERAL):

1.1.1. It will be necessary for the successful Bidder to arrange technical supervision during installation of cable laying and termination.

1.1.2. The successful Bidder shall arrange for the services of fully qualified and competent supervising Engineer / Engineers and necessary minimum number of jointers, semi-skilled laborers, as he deems it absolutely necessary.

1.1.3. Provision of special tools / appliances required for conductor jointing and stripping / dressing and application of XLPE insulation etc. shall be made by the successful Bidder.

1.1.4. The successful Bidder shall furnish all necessary information, including drawings, manuals and instructions relating to both cable laying and jointing practice.

1.1.5. The associated civil works, which are necessary in laying / installation of power cable, though not specifically mentioned, but shall be completely in the scope of successful Bidder.

1.1.6. The route map showing the proposed installation of power cable will be issued to the successful Bidder. Cables are to be laid in single trench as per instruction of E.I.C.

1.1.7. Successful Bidder has to arrange at his own for first-aid, fire protection, electricity and water requirement at site. He shall also arrange for sign GETCO, caution GETCO, safety & security personnel etc. on cable route.

1.1.8. The successful Bidder has to bear with any temporary interruption that may occur during actual erection work, when the matter with other agency is involved.

1.1.9. No idling charges or cost over run for the entire project shall be entertained.

1.1.10. Approval for installation of the underground cable route from Electrical Inspector shall be arranged by Purchaser. However, permission for

commencement of work and permission for commissioning of cable after completion of laying has to be arranged by the successful Bidder.

1.1.11. Successful Bidder shall arrange space for working office, workshop & store / yard for storing requisite materials like kits, cables etc.

1.1.12. The Arbitration in the dispute shall be strictly as per standard commercial terms & conditions of the GETCO.

1.2. LAYING OF POWER CABLE:

1.2.1. The 66kv (E) XLPE cable shall be installed underground and normally buried directly in the ground complying with all applicable standards and IS: 1255 & their amendments.

1.2.2 The sealing of power cable ends during the storage; execution & completion of jointing work shall be in the scope of successful Bidder. In no circumstances, the cable ends shall be kept open. The amount due to damages done because of water / moisture ingress OR penetration in the cable / conductors during execution shall be recovered from successful Bidder. It shall be responsibility of successful Bidder to make them good OR replace free of cost without affecting the completion schedules.

1.2.3 Three single core cables shall be laid in trefoil formation.

1.2.4 The power cable shall be laid generally at a depth of 1500 mm and can vary, if obstacles like power cable of other rating / telephone cable / water pipe line etc, come in the way of installation. At least minimum Depth of 1200 mm shall be maintained from nearest road level.

1.2.5 The cables shall be completely surrounded by a layer of having a low thermal resistivity (selected sand) sand about 350 mm over & 150 mm below of the cable surface throughout width of the cable trench at no extra cost. (River sand shall be allowed for surrounding layer)

1.2.6 The extra protection of pre-cast flat RCC slab with proportion 1:2:4 having size 600 (L) x 300 (B) x 50 (Thk) mm shall be provided about 350 mm over the power cables for complete route of the cable.
The RCC slab shall be with proportion not less than 1:2:4 (M-150) and also shall have steel reinforced of 6 / 8 mm dia. steel bar (4 Nos. of 300 mm side and 5 Nos. on 600 mm side) at adequate required distance. The slab shall be given curing time of minimum 15 days.

1.2.7 Normally, the back filling shall consist of the materials earlier excavated, however, bigger stones or piece of rock should be removed OR if required new soil has to be provided and used for back filling with no extra cost.

1.2.8 The cable drum must be handled correctly and with care during transport and laying of the power cables, in order to avoid damage to the cables. Any damages done because of poor handing of the cables to the properties of corporation, private OR to anybody shall be responsibility of successful bidder & the GETCO reserves the right to recover the amount due to such damages.

1.2.9 The minimum bending radius of the cable shall be 30xD where D is diameter of the cable.

1.2.10 The contractor has to keep allotted 66kv power cable, material supplied by him in safe custody and transport to the respective sites and will be fully responsible for any damage to or loss of any or all allotted equipments or materials supplied by him at any stage during transportation or erection or taking over of the sub station by the GETCO. The contractor has to return empty cable drum as instructed by E.I.C. The route map for cable will be issued free of cost to the contractor before commencement of work, however the changes made by Engineer in charge (i.e. Ex. Engr. (Const.) shall be incorporated.

The Contractor has to open site store at sub station site or at place nearby the substation site and ensure for safe custody of all the stored materials at his own cost.

The Contractor shall have total responsibility for the entire materials stored, loose, semi assembled and/or erected by him at site in his custody. The Contractor shall make suitable security arrangements at his own cost to ensure the protection of all materials, equipment and works from theft, fire pilferage and any other damages and loss. It shall be the responsibility of the contractor to arrange for security till the works are finally taken over by the GETCO.

1.2.11 Link box shall be rested/fixed on 230 mm thick brick masonry wall, which covers cable by all four sides, having appropriate height as per requirement of site & instruction of engineer in charge, however height shall not less than 500 mm above existing Ground level/Road Level.

1.3. CROSSINGS:

1.3.1 (a) Where road crossing comes in way of laying power cable, the power cable shall be laid through NP-4 RCC Hume pipes. The required length of Hume pipe shall be arranged by the successful Bidder at no extra cost.

(b) The RCC Hume pipe inner dia-meter shall not be less than 400 mm.

(c) The RCC pipes to be laid shall have minimum depth in such a way that the back filling on top surface of the pipe shall be at least 600mm in depth. The pipe joints shall be smooth so that cables are not damaged during pulling & operation.

(d) During the crossing of utilities like water line, drainage lines, telephone lines, gas lines etc, sufficient care shall be taken & protection shall be made available so that other utilities do not damage the cable mechanically and / or electrically or do not effect the performance of the cable.

(e) NALA CROSSINGS / CULVERT CROSSINGS: The Nala crossings are to be made with separate fly-over bridges of adequate sizes to carry all the cables in required formation. The bridges are to be made at the sufficient distances from the edge of Nala considering the further expansions of roads. The strength shall be such that it should not wash away with the flow of water during heavy rain.

1.4 IDENTIFICATION, MARKING AND WARNING:

1.4.1 The identification marker shall be of adequate size fabricated from 3 mm thick, 25 mm x 25 mm aluminium strip. The marker shall be embossed with letter as stated below:

“GETCO - 66KV S/S” and “Phase R or Y or B” – as the case may be.

The marker shall be tightened with nylon thread along with each cable at interval of 3 meters in such a way that it does not damage / penetrate the outer sheath of cable because of the dead weight of back filled materials OR soil.

1.4.2 A pre-warning PVC yellow tape with size 150 mm (width) x 100 microns thick (HDDPE) / LLDPF shall also be laid as per following clause of the specification. The warning tape shall also contain the **"WARNING"** printed in black letters as under **(In English as well as Gujarati):**

"CAUTION: 66000 VOLTS GETCO CABLE"

1.4.3 A pre–warning tape as per above clause shall be laid below ground level in the earth about 400 / 550 mm deep along the route of cable and in jointing bays.

1.4.4 The cable route marker is to be made from R.C.C. blocks duly embossed on all the side as under:

“GETCO 66 kV CABLE LINE”

The minimum size shall be 900(L) x 300(B) x 100(T) mm. It shall be at least embedded in ground up to minimum 400 mm depth. The exposed portions shall be painted with non-washable paints. The interval should be minimum 30 meters between two markers. It should be put at bends, curves, road crossing, etc. of cable route.

Name of cable route & Sr. no. of route marker shall also be painted with non-washable paints.

Warning board shall be made as per drawing & placed at major crossing points of cable route & at minimum 90-meter interval, including following details: Name of route, “GETCO 66 kV cable” & mobile no. of concern cable owner Substation.

1.5 TEST AFTER INSTALLATION:

1.5.1 Pre-commissioning tests on site, to be undertaken by the successful Bidder shall include the following:

a) Insulation Resistance of each cable drum length after laying and before jointing.

b) Tests for detection of damage to outer sheath, if any.

c) Serving insulation resistance after laying each cable length shall withstand a voltage of 10kv DC for one minute between each reinforcement and external conducting surface; In addition, the serving insulation resistance shall be measured and checked with the values obtained during routine factory tests.

d) On completion of the cable laying and jointing work, the complete installation shall be checked with a D.C. voltage of 3 Uo applied for 15 minutes between each conductor and sheath.

e) Conductor resistance of each cable of each complete circuit.

f) Test for 5 min. with system voltage applied between the conductor and the screen.

g) Test for 24 hours with normal operating voltage of the system.

h) Continuity & Phase confirmation.

NOTE: The pre-commissioning test at (f) or (g) at site to be undertaken as an alternative to the test (d).

1.6 GENERAL:

(1) The cable laying shall have to be done, as per actual site condition at the time of execution, and as per the instruction of the engineer-in-charge.

(2) The structures for termination of the cable at tower end shall be arranged by the GETCO. Necessary arrangement shall be made by the engineer-in-charge.

(3) The scope of work shall also include assistance in obtaining required permission / approval from various statutory authorities i.e. Municipal Corporation, Gram Panchayat (if any), PWD, Electrical Inspector, Telecom Department etc. Payment demanded by any statutory authority

as a compensation shall be reimbursed by GETCO on submission of documentary evidence i.e. Receipt of such payment made.

(4) The Un-priced schedule of the offered item shall also be submitted with technical Bid.

(5) The successful bidder has to complete the work within one Quarters after commencement period of one month.

(6) The end of cut pieces of cables left out during executions shall be sealed to prevent ingress of any moisture in the cable before handing over to consignee.

(7) The consignee shall be Executive Engineer (const.), Gujarat Energy Transmission Corporation Limited,

(8) Detailed route and sectional view for laying cables is available and may be collected.

(9) The rate of laying of 66 KV Cable covers the cost of fixing of 3 phase earth box and laying of Co – axial cable.

(10) Civil work for special crossings if any shall be considered in scope of bidder.

(11) Civil work for all nala crossings, road crossing etc. for all the above lines shall be considered in scope of bidder.

Signature of the Bidder: _____

Name: _____

Designation: _____

Date: _____

Authorised common rubber

Stamp / seal of the bidder: _____