

VOLUME -III

TECHNICAL SPECIFICATION

(TS)

For

OPERATION & MAINTENANCE (O&M)

OF

**400 kV D/C Palatana-Silchar Transmission Line-247 Kms
(Package-A)**

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1. Scope of Works for O&M Contractor

- a) The scope of work interalia include defect identification and maintenance activities to ensure the safe and reliable operation of the transmission line. These activities are aimed at preventing failures, extending the lifespan of equipment, and maintaining optimal grid performance with a minimum monthly availability of 99.75% and the lowest possible outage rate. The contractor shall also ensure the continued health of the transmission line without any deterioration during the contract period. In case of any deterioration, the contractor is responsible for conducting a root cause analysis and implementing appropriate corrective measures.
- b) O&M Contractor shall be responsible for carrying out the Routine, Scheduled, and Emergency & Opportunity Maintenance as per requirement of Situation in consultation with NETC and as per the instruction of Engineer-In-charge (EIC).
- c) O&M Contractor shall establish three offices and stores for **Package-A**, with due approval of NETC along the route to operate and maintain the above line.
- d) The new O&M contractor shall take over the already under O&M (Operation & Maintenance) 400 kV D/C Palatana-Silchar (247 kms) (**Package-A**) from the existing contractor, after proper physical ground checking of the line section. A list of the existing defects shall be jointly prepared with NETC. The contractor shall attend the defect as per the list in a time bound programme.
- e) Mitigation of Right of Way issues encountered and payment of compensation for the surface damages of the line shall be responsibility of O&M Contractor. However, support of administration shall be provided by NETC. In case of old ROW issues, i.e., existing since before the contract period, resolution shall be arranged by NETC.
- f) **Payment of the fitters' wages:** The payment to the fitters' salary shall be as per the norms of the respective Central Labour Commissioner rates, and shall be revised time to time as per the Govt. notifications (s). The same shall be checked by NETC EIC.
- g) **Deduction of the billing amount in case of absence of the fitters, safety officer or engineer:** NETC shall have the right to deduct an amount equivalent to 1.5 man-days from the monthly bill for each absent fitter, if the number of fitters falls below the minimum requirement as per the contract. In the event of absence of a safety officer or engineer, a deduction equivalent to 100% of the wages for the absent day(s) shall be imposed, in accordance with the rates specified in the Bill of Quantities (BOQ).
- h) **Relocation of the technicians/ fitters provided by the O&M agencies:** NETC shall have the right to shift or relocate the technicians/fitters provided by the O&M agencies across the 400 kV Palatana-Bongaigaon transmission line as needed to address site requirements in case of any work exigency. The O&M agency shall arrange insurance coverage for up to 25 personnel for the entire 400 kV Palatana-Bongaigaon transmission line, rather than limiting it to a specific section, to ensure adequate

coverage for emergency work. Travelling & accommodation cost as per actual shall be paid extra in case of work outside the section under contract, duly certified by NETC Engineer-In-charge.

i) Use and Reporting Through Mobile Application Software:

To enhance efficiency and transparency in the monitoring of transmission line operation and maintenance (O&M) activities, NETC has deployed the mobile application software (Mobile App). This app serves as a digital platform for real-time reporting and supervision of field activities. Each subsection under the contractor will be assigned one unique user ID to facilitate individual access and accountability.

The contractor's O&M personnel are required to use the Mobile app to document and submit comprehensive patrolling reports on a daily basis. These reports must include details of each tower or span inspected during the day. Submission of these reports through the app is mandatory and forms a critical part of the project's monitoring protocol. This initiative aims to ensure timely detection of issues, better resource management and improved overall reliability of the transmission network. Initial training to operate the Mobile App shall be provided by NETC.

2. Details of Transmission Line.

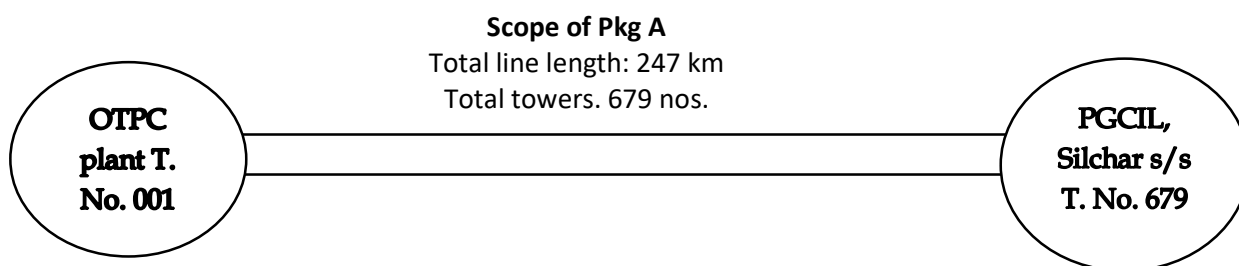
i) Package-A: 400 kV D/C transmission line from Palatana-Silchar transmission line Section:

Sr. No.	Particulars	Quantity
1	Line Length	247 km
2	Line Length in Tripura	171 km
3	Line Length in Assam	76 Km
4	Forest length in Tripura.	74 km
4	Forest length in Assam	4 km
5	Total nos. of towers in the line.	679 (470 in Tripura + 209 in Assam)
6	River Crossing	No

The section of line starts from OTPC plant at Palatana, Udaypur, Tripura and is getting terminated at Silchar Sub- station of POWERGRID located at Srikona, Silchar, Cachar, Assam.

The starting tower no. at OTPC plant at Palatana is tower no. 001 and the last tower no. at Srikona, POWERGRID is tower no.679. The scope of O&M starts from tower no. 001 to Sub-Station gantry point at Silchar S/S of POWERGRID.

Single Line Diagram (SLD) of the line showing the **Scope of work of the contract under Palatana-Silchar section (Package A)** is furnished below:



3. Maintenance of Transmission Line:

- a) **Ground patrolling (Non-Shutdown):** Entire line of each package shall be patrolled at least Four times in a year, as per the direction of EIC. Considering different terrains, patrolling frequency shall be as provided below:
- i. Normal Terrain: Quarterly.
 - ii. Vulnerable Terrain: Bimonthly.
 - iii. Most Vulnerable terrain: Monthly.

Note: Category of the terrain shall be finalized as per the direction of NETC Engineer-In-Charge.

Further, considering the climatic condition patrolling cycle of the line shall be adjusted to cover the following cycle as per the direction of the NETC Engineer-In-Charge:

- i. **Pre monsoon cycle:** This cycle shall be done in the month of March of every year and patrolling of complete line and all rectification works shall be completed by end of May every year.
- ii. **Post monsoon patrolling:** This cycle shall be started by end of monsoon from September every year and it shall be completed by November of every year.
- iii. **Before high wind season:** Palatana transmission system is in Wind Zone 6 & 6. In general, this area experiences high wind from April to May. This cycle shall be started by January and completed by March.

During each cycle all defects are to be attended.

b) **Inspection after climbing the tower (non-shutdown):**

This patrolling is carried out to identify following defects:

- i. Frequent tripping on line and fault is not identifiable.
- ii. Flash over mark on insulator.
- iii. Checking Nuts & Bolts.

c) Thermo-vision scanning (non-shutdown):

It shall be carried out to identify hot spots in Angle towers joints It shall be carried out on Annually & performance of the line, as per the instruction of the NETC EIC.

d) Tower Footing Resistance (TFR):

Tower Footing Resistance (TFR) shall be measured annually preferably during winter season. In case the TFR exceeds the required value, the existing earth connection to be checked, contacts clean and tightening if possible. In case of no improvement, new earthing improvement technique to be taken up in consultation with Engineering Department.

e) Puncture insulator detection / tracking (non-shutdown):

Punctured insulator detection and necessary corrective measures shall be carried out on need basis in insulator failure prone areas & as per instruction of NETC EIC. **Instrument/ Equipment shall be provided by NETC.**

f) Night patrolling (non-shut down):

- i. It shall be carried out in identified stretches to arrest thefts and to identify hot spots. This shall be carried out on need basis and as per the direction of NETC EIC. A minimum 5 km line span, as decided by NETC EIC, shall be covered with night patrolling in a contract year.

In addition, tower top emergency patrolling (in case of fault in line for the earliest restoration of the line for operation), patrolling of line sections as per indication of fault locators and after tripping are also required to be carried out to identify fault. This shall be on regular interval and shall be decided by NETC.

g) Identification of critical locations:

During taking over of the line most vulnerable terrains/ locations and vulnerable terrains/locations are to be jointly finalised between Contractor and NETC. Criteria for selection is indicated below:

i) Vulnerable location/terrain:

- a. Theft prone.
- b. Line in proximity of mining and blasting prone areas.
- c. Powerline (132 kV and above)/ railway line/ highway/ major river crossing.
- d. Pollution/ flood/ land slide/ erosion.
- e. Forest/ leaning trees on uphill side.

These areas are to be inspected every two months from September to March and monthly from April to August.

ii) Most vulnerable terrain/locations.

- a. Critical land slide prone areas.
- b. Insurgency/ disturbed areas.
- c. River course changing areas.
- d. Repeated thefts.

These areas are to be inspected every month.

4. Operation Level work.

- i) Providing daily / weekly / monthly reports to site In-charge / NETC, Delhi Head Office at Delhi.
- ii) Daily information on **healthiness of lines (refer NB1)**/Defects identification with proper photographs.
- iii) Co-ordination with S/S operators for availing S/D of lines.
- iv) Condition monitoring /Testing/ Maintenance of Tools & Plants.
- v) Alertness for receiving communications from S/S end about line tripping /status and coordination with NERLDC/PowerGrid Substation/Meghalaya & Azara S/s.

5. Maintenance Level work:

- i. **Ground Patrolling, defects identification and action there after:**
 - a) Patrolling shall be undertaken as per schedule indicated in clause no.: 3.
 - b) Report of observations shall be prepared after every patrolling and programme for rectification is to be finalised.
- ii. Agency to check and identify the probable causes of failure of towers foundation viz.,
 - Land slide.
 - Sinking of hill.
 - Soil erosion etc.
 - Unequal movement of various legs of foundation due to earth quake.
- iii. **During patrolling, the following may be checked:**
 - ✓ Leaning trees on uphill side, general trees, bushes and lopping of branches are to be identified.
 - ✓ Soil erosion and assessment of requirement of protection.
 - ✓ Defects in foundation, uneven settlement, chimney, coping and revetment works.
 - ✓ Missing accessories such as number plate, danger plate, phase plate, ACD and tower members.
 - ✓ Displacement of Spacer & Vibration Damper from position/ missing.
 - ✓ Loose Nut & Bolts.
 - ✓ Tack welding of nuts and bolts.
 - ✓ Missing and loose copper bond.

- ✓ Bird Guard.
- ✓ Measurement of vertical clearance in doubtful stretches.
- ✓ Checking of earthing.
- ✓ Fabrication of missing members and fixing.
- ✓ Clearance between top of coping and ground.
- ✓ Measurement of tower footing resistance etc.
- ✓ Insulators are to be checked to identify broken pieces, flash over and pollution.
- ✓ Conductor hardware defects and physical condition of conductor in forwarding span.
- ✓ Foreign materials in tower and conductor (In dead ckt.)
- ✓ New construction in the vicinity of the line.
- ✓ Identification of rusted points.
- ✓ Inspection of aviation lights.
- ✓ Vertical clearance between conductor and earth wire.
- ✓ Failure of jumpers.
- ✓ Snapping of conductor and earth wire.
- ✓ Any other abnormality observed.
- ✓ Repair of the broken or stolen portion of the existing retaining wall

Based on ground patrolling and various other types of patrolling, inspection and observations, programme for attending defects shall be prepared and corrective/ repair actions are to be taken. Defects may be categorised as given below:

6. Categorisation of defects.

Sr. No.	Work Description	Category
1	Foundation, back filling, coping, earthing, soil erosion, distance between top of coping and ground level etc.	A
2	Re fixing of stolen tower parts/N&B re fixing, tightening, tack welding.	A
3	Tower accessories fixing	A
4	Work on E/W and its accessories fixing, VD, copper bond etc.	A
5	Painting of rusted portions with zinc rich paints after application of primer.	A
6	Tree cutting including the grown up at outside the line corridor that may disturb the line, lopping of tree branches, vertical measurement, removal of foreign materials from tower etc.	A
7	Tree cutting including the lopping of the trees standing beneath the line corridor which may require line shutdown, removal of foreign materials from tower by taking shutdown etc.	B
8	Repairment & rectification of coping of tower legs, application of bitumen paint on tower legs	B

9	Work on bird-guard.	B
10	Jumper replacement	B
11	H/W replacement	B
12	Insulator replacement, cleaning.	B
13	Conductor & Earth wire -accessories replacement / repair	B
14	Restoration of broken E/W	B
15	Restoration of broken conductor	B
16	Repair of earthing and putting additional earthing if required	A
17	Replacement of conductor accessories	B
18	Any other items not considered above but observed during inspection/patrolling	A/B

Category A – Defects which can be attended at any time without shut down.

Category B – These defects are to be addressed during shutdowns with proper planning and in compliance with all safety measures outlined in the **Safety Plan** (Refer **Annexure-B** of Volume-II) to be submitted by the agency. However, there are two broad types namely repair of defects of urgent nature and secondly maintenance work against those defects which can be attended a later date during opportunity shut down/ planned deferred shut down. etc.

7. Rectification Programme: Based on the above observations after every patrolling, rectification is to be carried out as per chalked out agreed programme with specific time line under the following heads:

- a) Short term.
- b) Long term.
- c) Opportunity.

8. Major Break down work:

- i) Tower collapse.
- ii) Failure of cross arm/tower peak.
- iii) Failure of foundation.
- iv) Construction of new revetment/ protection work.
- v) Emergency Bamboo palisading with soil filled cement bag for temporary protection of the towers from collapse due to land slide near towers.
- vi) Any other major failure.

For these failures/ new works specific programme is to be worked out and work to be attended in a fixed time line. After assessing the extent of work, a joint programme on mutually agreed terms and condition shall be worked out and O&M Contractor shall execute the work as per agreed time line. Efforts shall be made to carry out maintenance work within agreed time schedule by employing additional resources, if required at agreed extra cost, for which manpower cost shall be considered as per the BOQ.

9. Installation of Emergency Restoration System:

NETC has Emergency Restoration system and presently stored in 400 kV Sub- Station of POWERGRID, Srikona, Silchar. In case of major break down, Emergency Restoration System is to be immediately mobilized from POWERGRID/NETC store within 24 hours. The field work is to be treated as most urgent activity and mobilisation must start within one hour of receipt of information. Additional resource mobilisation shall be separately paid.

10. Maintenance/installation of Transmission Line Surge Arrestor (TLSA) and Aviation Light in line:

O&M of the already installed TLSA (including cleaning) and Aviation light in the line shall be carried out by the O&M agency at its own cost. Additionally, replacement of the damaged TLSA/ Aviation light, installation of the new TLSA/ Aviation light to meet the emergency protection need etc. shall also be carried out the O&M agency without any additional claim of cost.

11. Training:

For special work like working with Thermo-Vision Camera, Punctured Insulator Detector, working with Emergency Restoration System training module shall be arranged by NETC where participation of representatives of working Contractor shall also be permitted to acquire complete working knowledge of the equipment/system. Contractor shall have to retain such manpower for entire contractual period otherwise suitable replacement have to be arranged by the Contractor immediately with the consent of NETC's site representative.

12. Store, spares and Consumables:

The stores established by the Contractor shall be for keeping necessary T&P required for maintenance of line and rolling spares etc. *All spares have been stored by NETC at POWERGRID premises located at 400 kV Sub- Stations at Silchar & Bongaigaon and in NETC stores at Agartala & Guwahati.* Time to time as per requirement for maintenance rolling spares shall be issued from POWERGRID/NETC store to O&M Contractor by NETC against their indent. Transportation shall be responsibility of the O&M Contractor. Time to time NETC shall carry out inspection of the store and Contractor shall assist with all documents during inspection.

The reconciliation report of the spares shall be submitted every year by the Contractor.

Spares shall be issued to the Contractor as per requirement of maintenance. After use of spares in the line during maintenance work, Contractor shall submit complete account of material used in maintenance and return all unused materials along with damaged materials to NETC. All transfers shall be carried out with proper handing over and taking over. The following spares are mainly available with NETC:

- i) Various types of towers with extensions.
- ii) Conductor and Earth wire.
- iii) Insulators.
- iv) Hardware fittings.
- v) Conductor and earth wire accessories.
- vi) Nuts & Bolts.

The List of Spares (available with NETC) along with the store(s) details shall be provided after award of Contract to the successful bidder.

13. Replacement / Re-fixing of missing tower members:

NETC shall maintain some stock of most standard sections of the galvanised tower parts at store to re-fix the stolen/missing tower parts. Contractor shall prepare / modify the member as per the standard size of stolen/missing members out of the available sections and re-fix it in place of stolen members in towers.

Alternatively, Contractor shall maintain some stock of most standard galvanised sections at their store to replace stolen/missing tower parts for re-fixing the stolen members in tower as and when required. The materials for such stock shall be provided by NETC.

Any other spares or consumable required for maintenance of the line shall be responsibility of/arranged by Contractor.

14. Temporary Protection Work:

The O&M agency shall be responsible for carrying out temporary protection work for the towers in the event of a landslide or any other cause. The arrangement of bamboos for palisading work, soil-filled plastic bags, or any other required materials, including the necessary manpower as per site conditions, for executing the temporary protection of the towers shall be undertaken by the contractor at no extra cost. No extra payment shall be paid for quantity up to 500 sqm per contract year. **For quantity exceeding 500 sqm, the unit rates shall be finalized as per manpower cost and additional material cost on producing the supporting documents as per the approval of the Engineer I/C.**

15. Arrangement of additional manpower:

O&M agency shall arrange additional manpower as when required basis as per the instruction / requisitioned by Engineer I/C. Payment for same shall be made as per the Price schedule of the contract.

16. Application of bituminous paint and repairment of coping of the tower legs:

For application of the bituminous paint at the tower legs at least up to a height of 1 (one) meter, the paint and manpower shall be under the scope of the contractor. Additionally, coping shall be done by O&M agency, if so required and shall arrange the manpower and materials at no cost.

17.

A. Manpower and vehicle requirement Palatana-Silchar section (Package-A):

Sr. No.	Position	Experience	No.
1.0	Safety officer	Certified Safety officer with diploma in safety from a recognized institution, having experience of at least three years in O&M and construction of EHV transmission lines.	01 no.
2.0	Engineer.	Graduate electrical/Civil Engineer with 5 to 7 years or Diploma electrical/civil engineer with 7 to 10 years' experience in EHV T/L construction/maintenance. Liaison with administration, State electricity utilities, LDC etc, Good communication skill. He shall be capable of planning and executing O&M of the line independently.	03 nos. (one for each team)
3.0	Technicians/ Skilled man power.	The fitters engaged shall be highly skilled type with min. 5 years' field experience in 220 kV and/or higher voltage level transmission line. The replacement of the fitters during the contract period if any, shall be done by the agencies with similar or higher experienced fitters.	15 nos.
4.0	Vehicle	A suitable 4WD (Four-Wheel Drive) vehicle including cost of fuel and driver, preferably a camper type, not more than 3 (three) years old, is required for the transportation of manpower and small items such as tools and plants (T&P), spares, etc., to the site. The vehicle must have a valid taxi permit for Assam, Tripura, and Meghalaya.	03 no. (one vehicle for each team)

The above manpower is the minimum deployment required for day-to-day work but Contractor shall have to deploy sufficient experienced manpower/ other resources as per maintenance requirement. However, for this additional deployment no extra payment shall be made.

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- i) Manpower shall be selected by NETC on recommendation of the Contractor. Maintenance team must be ready to attend any eventuality for 7*24 hours, with T&P, communication facilities, vehicle, safety appliances, GPS instrument etc. There must be readiness to move out in short notice.
- ii) Any change of manpower shall be against suitable replacement with one-month advance notice.
- iii) All persons must have PPE with proper safety training.
- iv) Manpower deployed by Contractor must be disciplined.
- v) During operation and maintenance of transmission line, if any, additional vehicles/ trucks etc are required the same shall be arranged by the Contractor without any additional cost.

18. Hiring of T&P and Instruments:

Contractor shall provide T&P as per the list below:

Sl. No.	Name of Item	Units	Qty for Pal-Sil line Package-A
1	Ratchet Drill machine with bits of 8, 12 & 16 mm dia hole	Sets	3
2	Heavy Duty Magnetic Drill Machine with bits.	Sets	1
3	Light weight Torque wrench of 8 kg-m torque rating with required Box spanners	Sets	3
4	Steel wire rope Sling for		
a	12 mm x 70 meter one end spliced	Nos	6
b	12 mm x 30 meter both ends spliced	Nos	6
c	12 mm x 3 meter both ends spliced	Nos	9
d	12 mm x 1.5 meter both ends spliced	Nos	6
e	16 mm x 3 meter both ends spliced	Nos	9
f	16 mm x 1.0 meter both ends spliced	Nos	6
5	Nylon/ Polyester Sling		
a	2.0 Meter-5 Ton capacity	Nos	6
b	3.0 Meter-5 Ton capacity	Nos	6
c	1.0 Meter- 8 Ton capacity	Nos	9
d	2.0 meter-8 Ton capacity	Nos	9
e	2.0 meter- 5 Ton Capacity	Nos	6
6	Poly propylene rope (220 meter in one Bundle)		
a	12 mm dia.	Bundles	2
b	16 mm dia.	Bundles	3
c	20 mm dia	Bundles	3
7	D- shackles		
a	1 T capacity	Nos	24
b	3 T capacity	Nos	24

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c	5 T capacity	Nos	24
d	10 T capacity	Nos	15
8	Bull dog clamp suitable for rope size		
a	8 mm	Nos	15
b	10 mm	Nos	15
c	12 mm	Nos	15
d	16 mm	Nos	15
9	Ratchet Hoist 6 ton capacity	Nos	2
10	Ratchet Hoist 10 ton capacity	Nos	2
11	Sag Plate for Rectangular and Tringula yoke plate.	set	2
12	Close type Single sheeve pulley 3.5 ton capacity suitable for 8 to 12 mm steel	Nos	6
13	Close type Single sheeve pulley of 5 ton capacity suitable for 10 to 12 mm steel wire rope	Nos	6
14	Open type single sheeve pulley of 3.5 ton capacity suitable for 8 to 12 mm steel wire rope	Nos	9
15	Open type single sheeve pulley of 5 ton capacity suitable for 8 to 12 mm steel wire rope	Nos	9
16	Single sheeve pulley of 2.5 T Capacity for 18 mm dia Poly propylene rope	Nos	9
17	Single sheeve pulley of 5 T capacity for 20 mm dia Poly propylene rope	Nos	9
18	Zoom binoculars with magnifying power of 8 to 20 times, outdoors -type, water resistant. Suitable for focusing the objects from a distance of 100 meters	Nos	3
19	Single way fibre pulley block (2 Ton capacity)	Nos	3
20	Two-way Poly propylene rope pulley (5 Ton capacity) (2 nos-1 Set)	Nos	6
21	Tarpaulins (18x 15 ft)	Nos	6
22	Telescopic type Discharge Rods with copper/ Aluminium connecting leads, clamps as per conductor requirement (1 set consists of 6 leads with both end clamps and 1 no. of fibre glass telescopic rod)	Sets	27
23	Tree pruner/ Power Hacksaw for tree cutting	Nos	3
24	Turn buckle open type 5 T capacity	Sets	6
25	Turn buckle close type 10 T capacity	Sets	6
26	Steel wire rope		
a	10 mm dia.	meter	750
b	12 mm dia.	meter	750

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c	16 mm dia.	meter	300
27	4 sheeve pulley block 10 ton capacity with 12 mm dia. steel wire rope (2 nos.- 1set)	Sets	3
28	Bolted type Come along clamps for-Each type of Conductor (Moose, Zebra, Panther)	Nos	9
29	Bolted type Come along clamp for-Each type of Earth wire (3.15 mm & 3.66 mm)	Nos	6
30	Light weight Automatic type come along clamps for Each type of conductors used (Moose) Each type of Earth wire used (3.15mm & 3.66mm)	Nos	6
31	Hydraulically operated ACSR conductor cutter suitable for cutting the ACSR conductor of 25 mm to 40 mm diameter along with the required sizes blades hand pump, hose pipe and other accessories	Nos	2
32	Light weight manual type Sagging Winch machine with handle and support 10 ton capacity/ Light weight Power Winch Machine 5T capacity (Small Portable, easy to transport)	Nos	3
33	100 MT Light weight Hydraulic compressor machine:	Nos	2
a	Die set (steel & Aluminium) for Moose conductor (Set)	Nos	2
b	Die set (steel & Aluminium) for AACSR conductor (Set)	Nos	2
c	Die set for 7/3.66mm Earth wire (Set)	Nos	2
d	Die set for AACSR Earth wire (Set)	Nos	2
34	Angle cutter (Motorized) with 12 Nos. of spare blades	Nos	2
35	Single pipe derrick 10 meter long, 80 mm Dia, class C (01 no for 132kV, 220kV, 400kV)	Nos	2
36	Megger 10 KV	Nos	3
37	Other accessories & hand tools such as crowbar, steel tape, socks, spanners, file, screwdriver, cutting plier, hacksaw frame, Blades & any other regular usage items.	Set	10
38	PPE		
a	Fall arrester	Nos	6
b	Retractable fall arrester	Nos	6
c	Safety Belt (ISI Mark)	Nos	30
d	Safety Helmet (ISI Mark)	Nos	30
e	Safety Shoes to all working personnel incl. Safety officer, Engineer & fitters.		
f	33 kV Hand Gloves	Set	3

g	Rescue kit for fall prevention	Nos.	3
h	High Beam Torch	Nos.	3
i	Snack Guard	Nos	30
j	Snack Catching Stick	Nos	6
k	First Aid Box	Nos	4
39	Instruments		
a	Binoculars	Nos	3
b	10 KV Megger	Nos	1
c	Walkie Talkies	Pairs	3
d	TFR machine	Nos	1
e	High Zoom Digital Camera Image Resolution-16 MP (minimum) Optical Zoom- 50X Minimum Video Recording Resolution-1080p HD video recording facility Data Transfer Mode-Built-in wifi/Bluetooth Memory Card Size-32 GB GPS enabled	Nos	3
f	Welding Machine	Nos	1
g	Thermo-vision camera	Nos.	1

*Additional T&P as required for successful completion of work shall be arranged immediately by Contractor on their cost & risk.

19. Time limit for repair / rectification and Penalty for Delay:

In transmission line maintenance work, timely attending the fault and its prompt rectification is the essence of the contract. There should not be any revenue loss to NETC due to casual attitude /behaviour of the Contractor to rectify the cause for disruption of Power.

For rectification / repair of defects and other works, the contractor shall adhere to the following time limits:

Sl. No.	Particulars	Time limit for repair / rectification
(a)	Foundation, chimney and Line Row	
(i)	Damage to revetment /retaining walls	30 days
(iii)	Land Slide/Sinking of foundation	15 days
(iv)	Tree clearance	6 Hours
(b)	Towers	
(ii)	Missing / damage tower members	3 days
(iii)	Tightening of bolts and nuts	1 days
(c)	Insulators	
	Broken /Damage /Punctured Insulators	
1	Suspension Strings	6 Hours

2	Tension Strings	12 Hours
(d)	Stock Bridge Dampers	
	Spacer – damper / spacer displacement	6 Hours
(e)	Conductors, Earth wires and Hardware	
(i)	Damage to conductors / earth wires	6 Hours for temporary restoration/ 12 hours for permanent
(ii)	Hot spots	6 Hours
(iii)	Damage corona rings / arcing horns	6 Hours
(iv)	Jumper damage / failure	6 Hours
(v)	Damage/ failure of hardware fittings and fixtures	
a	Suspension strings	6 Hours
b	Tension Strings	12 Hours
(f)	Earthing's Systems	
(i)	Damage to tower earthing	24 Hours
(ii)	Damaged / missing copper bonds	6 Hours
(g)	Cross Arms	
(i)	Replacement / Failure on suspension tower	24 Hours
(ii)	Replacement / failure on tension tower	3 days

In case of failure of the Contractor to mobilise within one hours (other than the conditions beyond control of Contractor) after receipt of information about breakdown, this shall be considered as default on the part of the Contractor and in case of default a penalty of Rs. 5000/- shall be recovered every hour delay in every incident on daily basis. This shall be applicable for all types of programmed/schedule mobilisation.

20. Penalty for loss of Availability: -

The target monthly availability of the transmission line shall be 99.75% or higher on a monthly basis. A disincentive amount shall be deducted if the availability falls below 99.75%, provided the reasons are attributable to the Contractor. However, the Head (O&M) shall ascertain and determine responsibilities. The decision of the Head (O&M) shall be final.

The bidder shall be disincentivized if the monthly availability falls below target monthly availability of 99.75% computed as per the formula mentioned below:

Disincentive = [0.05 x Monthly Maintenance work order price x (Target Monthly Availability - Actual Monthly Availability)]

Disincentive is subject to maximum 10% of monthly contract price (including GST). Payment or deduction of disincentive shall in no way relieve the bidder from completing the scope of work and discharging all its other obligations under the contracts.

Disincentive amount shall be deducted as per the recommendation/ duly certified by Head O&M. This amount shall be deducted by the Employer from monthly R.A. bills/outstanding payments.

21. Other Conditions

- ✓ Contractor shall arrange insurance of staff for working in entire 400 kV Palatana to Bongaigaon Transmission line of NETC as per Workmen Compensation Act.
- ✓ Contractor shall take care of Provisions of Labor Laws, Electrical Safety & General safety procedures as per Safety Manual of NETC and CEA Safety Regulations.
- ✓ Contractor shall provide Safety gears/gadgets/PPE.
- ✓ Contractor shall provide Stationary, Log books etc.
- ✓ Risk management & control measures.
- ✓ Contractor will have valid electrical license as per requirement (LV/MV/HV/EHV).
- ✓ Contractor shall abide by the Electricity Act 2013 and CEA Regulations for Transmission lines.

22. Control Measures and mitigation of risk/hazards.

To ensure following requirements before deployment of the manpower and other resources:

1. Maintenance training.
2. Site risk assessment and its mitigation.
3. Auditing process for safety and quality.
4. Safety procedures.
5. First aid training.
6. Rescue procedure and training.
7. Store management procedure.
8. PPE for all persons with proper training.
9. Rotation of work roles etc.
10. Provision of all important contact no. such as medical, Fire, police and ensure proper connectivity during the emergency situation and to apprise the NETC O&M teams apart from updating all above activities.

N.B.: Healthiness of a power transmission line:

The healthiness of a power transmission line refers to its condition and ability to operate reliably, safely, and efficiently under specified conditions. It encompasses several technical, operational, and environmental aspects to ensure uninterrupted power delivery.

Below are the key parameters that define the healthiness of a power transmission line:

1. Electrical Parameters:

- **Conductor Condition:** Integrity of the conductors, including absence of corrosion or breakage. The same shall be checked by visual means with or without using binocular by skilful technician.
- **Insulation Performance:** Quality of insulators and their ability to withstand electrical stress and prevent leakage currents. The same shall be checked by visual inspection during the tower top manual patrolling or using a drone by skilful technician and using PID.
- **Line losses and Load capacity:** Low resistive and corona losses indicating efficient energy transmission. Ability to handle the rated current and voltage without overheating or overloading.

2. Physical Condition:

- **Structural Integrity:** Condition of towers structure and foundations ensuring they are free from damage, rust, or deformities.
- **Sag and Tension:** Proper maintenance of sag and tension to avoid mechanical failures or clearance issues. Sag measurement shall be done as per instruction of EIC for maintaining appropriate ground clearance.
- **Clearance:** Adequate distance from trees, buildings, or other obstructions to avoid faults.

3. Environmental and Safety Factors:

- **Right-of-way (ROW):** Maintenance of the ROW area of the transmission line to prevent vegetation infringement or human encroachment /interference.

4. Operational Metrics:

- **Fault rates:** Frequency and type of faults occurring on the line (e.g., short circuits due to vegetation infringement or any other foreign materials, open circuits due to failure of jumper, hardware etc.).

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