भारत सरकार/ Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division

दिनांक : 22.06.2023

To,

<As per attached list>

Subject: Operation and Maintenance (O&M) guidelines and Standard Format for Memorandum of Understating between New TSP and Existing TSP- reg.

महोदया/ महोदय,

Inter-State Transmission System (ISTS) projects awarded through Tariff Based Competitive Bidding (TBCB) have generally in its scope to construct transmission lines along with associated bays on both ends of transmission line in the existing sub-stations and to construct greenfield sub-stations and/or brownfield sub-stations extension works [Voltage up-gradation by addition of ICT]. As per Request for Proposal (RfP) document for projects to be awarded under TBCB route, the New Transmission Service Provider (New TSP) is responsible for Operation and Maintenance (O&M) of the assets created by the New TSP. However, in case of the assets of the New TSP which are co-located in the existing sub-station, detailed scope of works as well as the roles and responsibilities of the New TSP and existing TSP have not been clearly defined in the TBCB Bid documents. In the absence of clarity in this regard, the coordination issues are being faced by the New TSP while undertaking the O&M works of the assets established in the premises of the existing sub-station.

Vide MoP's letter dated 28.11.2022, a committee was constituted under the Chairmanship of Member (Power Systems), CEA to deliberate on the issues raised by Electric Power Transmission Association (EPTA) and to bring out clarity on roles and responsibilities of the asset owners for Operation & Maintenance (O&M) of the substation extension works awarded through Tariff Based Competitive Bidding. Committee submitted the report to Ministry of Power on 08.02.2023.

Further vide MoM Dated 11-04-2023, CEA was directed by Secretary (Power) in meeting held on 28-03-2023 to issue guidelines for roles and responsibility of New TSP and existing Substation owner for operation and maintenance of assets created under TBCB Project.

In this regard, Central Electricity Authority has formulated guidelines for Operation & Maintenance and Standard O&M Agreement for Bay Terminal Equipment OR Terminal equipment associated with Transformation capacity enhancement/Voltage up gradations works / Creation of new voltage level in existing substation/ New Voltage expansion (addition of transformation capacity) etc. which results in addition of Transformer(s). The O&M guidelines comprehensively covers the various aspects of roles and responsibilities of existing and New TSP.

It is requested that all utilities may follow the aforementioned guidelines and MoU in letter and spirit to create a level playing field and for the benefit of the Power Sector as whole.

भवदीय,

22/06/2023

(भंवर सिंह मीना /Bhanwar Singh Meena)
निदेशक/Director

Copy to:
1. Secretary (Power), Ministry of Power, Shram Shakti bhawan, Rafi Marg, New Delhi
2. SA to Chairperson, CEA
3. SA to Member (PS), CEA

Attached list

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Guidelines for Operation and Maintenance of Bay Extensions/New Voltage Expansion awarded under TBCB

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Background

Tariff Based Competitive Bidding (TBCB) for award of Inter-State Transmission System (ISTS) projects provide the construction of transmission lines along with associated bays on both ends of transmission line in the existing sub-stations [with/without reactors/Interconnecting Transformer (ICT)] and construction of greenfield sub-stations and/or brownfield sub-stations extension works [Voltage upgradation by addition of ICT]. As per Request for Proposal (RfP) document for projects to be awarded under TBCB route, the New Transmission Service Provider (New TSP) is responsible for Operation and Maintenance (O&M) of the assets created by the New TSP. However, in case of the assets of the New TSP which are co-located in the existing sub-station, detailed scope of works as well as the roles and responsibilities of the New TSP and existing TSP have not been clearly defined in the TBCB Bid documents. In the absence of clarity in this regard, the coordination issues are being faced by the New TSP while undertaking the O&M works of the assets established in the premises of the existing sub-station.

In view of above CEA was directed by Secretary (Power) in meeting held on 28-03-2023 (copy of MoM Dated 11-04-2023 attached) to issue guidelines for roles and responsibility of New TSP and existing Substation owner for operation and maintenance of assets created under TBCB Project .

Accordingly, the following guidelines are issued which shall be followed for O&M of assets created under TBCB Project:

(i) These guidelines shall be applicable for all the upcoming and under bidding ISTS projects and for new contracts in case of operational/under construction projects under TBCB route.

(ii) All the existing contracts signed by the various TSPs for Operation and Maintenance activities and charges will remain in force till the end of their term.

(iii) For all upcoming projects and under bidding projects , existing sub station owner or agency of existing substation owner shall carryout the operation and maintenance activities in case of any bay extension as well as in case of voltage expansion works in the existing substation.

(iv) The O&M charges to be paid by the New TSP to the existing substation owner, for the relevant year, shall be 30% of the normative O&M expenses of relevant voltage level and transformer capacity as specified for that particular year in Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations as issued from time to time.

(v) In addition to (iv) above, taxes and duties, as applicable, shall also be paid to the existing substation owner by the new TSP.

(vi) To ensure proper coordination between the owner of the existing substation owner and the New TSP for carrying out the O&M Work, both the parties shall nominate Nodal Officer for coordination of all the O&M related matters.

(vii) The New TSP shall provide a copy of factory test results, pre-commissioning test results and all O&M documents for all equipment under O&M to the owner of the existing sub-station.

(viii) The New TSP and the existing substation owner shall sign a Memorandum of Understanding (MoU) in accordance with Standardised MoU as per **Appendix-I** in this regard.

(ix) Test / Maintenance check / Frequency as per **Annexure-II** and Minor Consumables / Small Spares List as per **Annexure-III** of the **Appendix-I** (Standardised MoU) shall be followed. However, these can be modified if mutually agreed by both the parties.

(x) A copy of MoU shall be provided to Central Transmission Utility (CTU), respective Regional Power Committee (RPC) and Grid Controller of India on request.

(xi) MoU singed between New TSP and existing substation Owner shall be amended as per direction of Central Government at any time.

(xii) CERC Norms for O&M charges are revised in every five years. Next revision of the Norms for O&M charges is due and will be effective from 01.04.2024. Therefore all Stakeholders may approach CERC with their issues regarding charges.

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Appendix-I

Draft Standard O&M Agreement for Bay Terminal Equipment OR Terminal equipment associated with Transformation capacity enhancement / Voltage upgradations works / Creation of new voltage level in existing substation / New Voltage expansion (addition of transformation capacity) etc. which results in addition of Transformer(s)

This agreement is made on this……..day [date] at……. [*insert place of execution of the Agreement*] ("**Agreement**"),

by and between

M/s **…….** [Name of New TSP] a company incorporated under the Indian Companies Act, 1956/2013, CIN: [•], and having its registered office at ……, represented by its authorized signatory, Mr. [•], duly authorized vide board resolution dated [•] (herein referred to as "**New TSP**", which expression shall include its administrators, successors, executors and permitted assigns) of the one part;

and

……..…[Name of existing Substation owner]**,** a company incorporated under Company's Act, 1956/2013, CIN: [•], having its registered office at ……, represented by its authorized signatory, Mr. [•], duly authorized vide board resolution dated [•] [address of office] (herein referred to as "**Existing Substation Owner**" which expression shall include its administrators, successors, executors and permitted assigns) of the other part.

Hereinafter, New TSP and the Existing Substation Owner are individually referred to as the "**Party**" and collectively referred to as the "**Parties**"**.**

WHEREAS:

A. The New TSP has requested to carry out the Operation & Maintenance ("**O&M**") of said **Bay Terminal Equipment OR Terminal equipment associated with Transformation capacity enhancement/ Voltage upgradations works/ Creation of new voltage level in existing substation/ New Voltage expansion (addition of transformation capacity) etc.** which results in addition of Transformer(s) (*strike out which is not applicable*) to the Existing Substation Owner, situated at …….(Name of the Substation) ("**Substation**").

B. Existing Substation Owner has agreed to carry out O&M of the said **Bay Terminal Equipment OR Terminal equipment associated with Transformation capacity enhancement/Voltage upgradations works / Creation of new voltage level in existing substation/ New Voltage expansion (addition of transformation capacity) etc.** which results in addition of Transformer(s) (*strike out which is not applicable*) as per power system operational requirements as per the terms and conditions of this Agreement.

NOW THEREFORE, THE PARTIES AGREE TO BE LEGALLY BOUND IN ACCCORDANCE WITH THE TERMS CONTAINED HEREIN IN THIS AGREEMENT AS WITNESS AS UNDER:

For the purpose of this Agreement, the terms & conditions incorporated used herein shall unless repugnant to the context thereof shall have the meaning assigned to them as under:

1.0 PREAMBLE

a) The following are equipment owned by New TSP and located at the Substation of Existing Substation Owner in accordance with requirement of transmission services agreement dated [●] executed between the New TSP and the [Nodal Agency] for [*insert name of the project*] ("**TSA**"):

i. All associated **Bay Terminal Equipment** as per RfP document/ TSA (detailed list of equipment is provided as Annexure – I hereto) ("**Equipment(s)**")

ii. All **Terminal equipment associated with Transformation capacity enhancement/Voltage upgradations works / Creation of new voltage level in existing substation/ New Voltage expansion (addition of transformation capacity) / etc.** as per RfP document/ TSA which results in addition of Transformer(s) (detailed list of equipment is provided as Annexure – I hereto) ("**Equipment(s)**")

(*Strike out which is not applicable i,e. a(i) or a(ii)*)

b) The Existing Substation Owner agrees to undertake operation and maintenance works (the agreed Scope of Service with respect to operation and maintenance works is provided in clause 2.0 of this Agreement) of the said equipment.

c) The Agreement should come into effect after Handing Over and Taking Over of element(s)/systems installed by new TSP between the new TSP and the existing Substation owner.

2.0 SCOPE OF SERVICES:

The scope of the services to be provided by Existing Substation Owner for Operation & Maintenance for Equipment as per Clause 1.0 ("**Scope of Services**") without any additional charges shall be as under (subject to specific exclusions as per the Clause 3.0):

a) To carry out routine operation & maintenance, periodic maintenance, testing as per relevant standards, regulations and as per Annexure-II.

b) all expenses related to the personnel, labour, testing equipment and T&Ps for the preventive and routine maintenance of Equipment shall be borne by Existing Substation Owner.

c) maintain records of operation & maintenance carried out and provide quarterly to New TSP.

d) permit New TSP to go through the maintenance records pertaining to its equipment.

e) Inform at least three days in advance, about the Existing Substation Owner's program for periodical testing & maintenance of the Equipment(s) to New TSP to enable the New TSP for witnessing the testing and maintenance of its Equipment(s) (*if New* TSP *desires so*).

f) Authorize New TSP to access the Substation (*including control room and switchyard*) for routine inspection and periodical testing of the Equipment(s) (in case of major breakdown maintenance); and also provide access of the Substation to the New TSP and/or any contractor appointed by the new TSP for undertaking the activities which are excluded from the Scope of Services (as mentioned in Clause 3.0)

g) provide small spares as listed in Annexure IV and spares of similar nature required for maintenance.

h) provide all consumables for various recording instruments i.e., disturbance recorders, voltage recorders, frequency recorders, event logger etc.

i) Maintain in healthy condition of all common facilities like Firefighting, LTAC supply, DG supply, DC supply, bus-bar protection, etc.

j) liaison with respective RPCs, RLDCs etc. for operation & maintenance.

k) Data transmission to RLDC for grid operation shall be through Existing Substation Owner gateway. However integration of data to gateway of Existing Substation Owner for the purpose of remote operation as well as RLDC communication shall be in the scope of New TSP.

l) After any tripping incident, Existing Substation Owner shall take necessary action for early restoration including co-ordination with RLDCs/SLDC on behalf of New TSP. However, in case of incident causing major breakdown *(as per Annexure III)*, the responsibility for restoration shall lie with New TSP.

m) In case of tripping, information to new TSP to be provided at the earliest.

3.0 EXCLUSION FROM THE SCOPE OF SERVICES:

a) Major breakdown/breakdown maintenance/overhauling involving failure of equipment/foundation damaged, etc., which are of capital nature

b) Rectification work due to any force majeure condition as defined in the TSA

c) Insurance of Equipment(s)

d) Hot line maintenance

e) The liability of compensation towards Generation loss / availability loss due to outage of the equipment and any other third-party liability

f) Settlement of any disputes with any public/statutory bodies/local authorities/tax authorities/state authorities

g) Supply of any equipment/major spare/material for replacement

h) The expenses towards outsourced services like that of OEM experts

i) All required Statutory Clearances

j) Any additional maintenance/testing as per the requirement of New TSP which is not covered under the scope of agreement, the same shall be carried out by Existing Substation Owner on mutual agreement at an additional cost to the New TSP

k) Any activity not mentioned specifically in the scope of Existing Substation Owner

4.0 SPARES AND O&M CHARGES:

a) MANDATORY SPARES: Mandatory spares are crucial for quick restoration of the system, and it shall be in the interest of the New TSP to maintain a minimum quantity of mandatory spares as per OEM recommendation (and also keeping in view CEA mandatory spare guidelines) at the store of Existing Substation Owner or at its own store, as per its own discretion, which shall be the property of New TSP. Existing Substation Owner shall maintain spares in healthy condition if stored by New TSP with the Existing Substation Owner. In cases where spares are stored with the New TSP and

there is a delay in providing such spares to the existing Substation owner, the liability for such delay will fall on the new TSP. However, any expenditure towards repair of spares in cases where spares are stored with the new TSP will be borne by the New TSP.

b) ANNUAL O&M CHARGES:

i. **Bay Terminal Equipment**: The O&M charges for the relevant year shall be calculated @30% of the normative operation and maintenance expenses of relevant voltage level and year as specified in Central Electricity Regulatory Commission (Terms and Condition of Tariffs) Regulations, issued from time to time ("**Annual O&M Charges**").

ii. **Terminal equipment associated with Transformation capacity enhancement/Voltage upgradations works / Creation of new voltage level in existing substation/ New Voltage expansion (addition of transformation capacity)**:

The O&M charges for the relevant year shall be calculated @ 30% of the normative operation and maintenance expenses of relevant voltage level and year as specified in CERC (terms and condition of tariffs) Regulation, issued from time to time ("**O&M Charges**").

c) The aforementioned annual O&M Charge does not include any taxes & duties. All applicable taxes & duties on annual O&M charge shall be paid by New TSP in addition to the annual O&M Charges.

5.0 INSURANCE

New TSP shall take mandatory and adequate insurance cover, to be periodically renewed at its own cost to cover the damage/Loss to its equipment resulting out of any cause and including theft incident. In the event of making any insurance claim by New TSP, it shall lodge claims with its insurer and get it processed for which the Existing Substation Owner shall provide all required & necessary support.

6.0 AVAILABILITY OF SUBSTATION EQUIPMENT:

Existing substation owner shall maintain the Equipment on behalf of New TSP as per best industry practices, however following shall not be attributable to Existing Substation Owner:

a) Outage of transmission elements due to force majeure.
b) Outages on account of shutdown availed by other agencies.
c) Outage due to overvoltage or as per the directions of RLDC.
d) Outage caused by grid incident or disturbance not attributable to Existing Substation Owner.

7.0 TERMS OF PAYMENT:

a) Payments shall be made in advance by New TSP on quarterly basis within 30 days of submission of invoice by Existing Substation Owner.
b) In case New TSP fails to release the payment within 30 days of presenting the invoice, interest charges @ 15% per annum shall be levied.

8.0 EFFECTIVE DATE & CONTRACT PERIOD:

The Agreement will remain in force till the expiry of 5 years from the date of signing of this Agreement or transmission license of Existing Substation Owner whichever is earlier or as directed by the Central Government. After 5 years, the MoU will be renewed as per prevailing guidelines for O&M

9.0 GENERAL TERMS & CONDITIONS:

a) Liability of compensation towards generation/ load loss due to outage of the Equipment shall be the responsibility of New TSP. In no way, Existing Substation Owner shall be responsible for generation loss on account of outage of the line However, Existing Substation Owner shall endeavor in good faith and best effort basis to restore the system on priority.

b) Existing Substation Owner shall arrange planned shutdown of the Equipment after written concurrence of New TSP as and when required. Annual maintenance of Equipment shall be coordinated among Existing Substation Owner and New TSP.

c) Any delay due to limitation imposed on shutdown duration or non-performance of testing due to non-availability of shutdown will not be the responsibility of Existing Substation Owner. This will be treated as reasons beyond the control of Existing Substation Owner.

d) To ensure proper coordination between Existing Substation Owner and New TSP for carrying out the O&M, both Existing Substation Owner and New TSP shall nominate Nodal officer, who shall be the focal point for all matters related to this Agreement.

e) In case of any abnormalities in test results or during O&M of equipment are noticed, the same shall be brought to the notice of New TSP and any necessary corrective measures required shall be taken on mutual agreement.

10. PAYMENT TO OTHER AGENCIES:

The following payments, if required shall be paid by New TSP:

a) Payments of statutory charges to electrical inspector, RLDC, local authorities etc.,
b) Compensation payable to third parties due to accidents/mishaps.
c) Payment liabilities arising out of litigation between the New TSP and third parties with respect to the systems installed by new TSP.
d) Any other charges not covered under Scope of Services.

11. TAKING OVER BY THE OWNER:

Upon expiry of this Agreement, responsibility of Existing Substation Owner for maintenance of Equipment shall cease unless New TSP and Existing Substation Owner agree in writing to renew the

Agreement.

12. FORCE MAJEURE:

a) The term Force Majeure shall be as per Transmission Service Agreement (TSA).

b) Existing Substation Owner shall not be liable for any delays in performing its obligation resulting from force majeure causes as referred to and/or defined herein above. However, it shall be the responsibility of the Existing Substation Owner to take all reasonable steps to ensure mitigation of the situation/ delay. Should one or both Parties be prevented from fulfilling their obligations by state of force majeure lasting for a period of one month, both Parties shall consult each other and decide as to further course of action.

13. TERMINATION OF AGREEMENT:

a) In the event when the Parties mutually agree to terminate the Agreement, on account of Force Majeure reasons, the termination shall take effect from the date and time be agreed upon mutually.

b) In the event of any directives given by Central Government, the agreement would be deemed terminated.

c) In the event of termination of this Agreement, O&M Charges shall be paid to Existing Substation Owner for works performed by it up to the date of termination as per the terms and conditions of this Agreement. Existing Substation Owner shall be paid proportionately for such items of work, which have been completed/partially completed up to the date of termination.

14. SETTLEMENT OF DISPUTE AND ARBITRATION:

a) This Agreement shall be governed by and construed in accordance with the law of India.

b) All differences and/or disputes between the parties arising out of or in connection with these presents shall at first instance be settled through amicable settlement.

c) In case of non-settlement of dispute or difference, matter shall be referred to CEA for the resolving the matter.

d) In case where either of or both the parties are private entities, all dispute(s) or difference(s) between New TSP and Existing Substation Owner arising out of or in connection with this Agreement that could not be settled mutually or with mediation of CEA, the Parties shall resolve the dispute(s) or difference(s) in accordance with the arbitration procedures stipulated under the Arbitration and Conciliation Act 1996. and/ or any amendment/ reenactment ("**Arbitration Act**") thereof.

e) In case both the parties are Central Public Sector Enterprises (CPSEs) or one party is CPSE and other is Government Departments/Organizations (excluding Railways, lncome Tax, Customs & Excise Departments), all dispute(s) or difference(s) between New TSP and Existing Substation Owner arising out of or in connection with this Agreement that could not be settled mutually or with mediation of CEA, such dispute or difference shall be taken up by either party for its resolution through Administrative

Mechanism for Resolution of CPSEs Disputes (AMRCD).

f) The seat and venue of arbitration shall be at …… (*City mutually agreed*).

g) Notwithstanding existence of any disputes and differences referred to the arbitration, the parties herein shall continue to perform their respective obligations under this Agreement.

15. THIRD PARTY DISPUTE:

If any litigation/arbitration cases crop up due to various contract orders placed by existing substation owner during the currency of this Agreement, existing substation owner shall resolve the same on behalf of New TSP.

16. JURISDICTION:

All disputes arising out of and touching or relating to the subject matter of contract shall be subject to jurisdiction of courts at New Delhi.

17. AMENDMENT:

This Agreement may be amended or modified, if any directions in this regard are issued by Central Government, by a written instrument signed by the Parties and the same shall be considered as an integral part of this document.

18. NOTICE OF DEFAULT:

Notice of default given by either party to other party under this Agreement shall be in writing and shall be deemed to have been duly and properly served upon the Parties hereto is delivered against acknowledgement due, addressed to the signatories to this Agreement.

19. CORESPONDENCE:

- All communications from New TSP to Existing Substation Owner shall be addressed to the Nodal officer nominated by Existing Substation Owner in writing for purpose of this work.

- All communications from existing substation owner to New TSP shall be addressed to the Nodal officer nominated by New TSP in writing for purpose of this Agreement at the following address of existing substation owner.

20. Representations and Warranties

Each Party represents and warrants to the other Party that:

a) it is duly constituted, validly existing under the laws of India;

b) it has taken all necessary corporate and other actions to authorize the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement; and

c) it is not in violation of, or in default under, any laws which default or violation would materially and adversely affect its ability to perform its obligations under this Agreement.

21. Indemnity and Limitation of Liability

a) Indemnity

Each Party ("**Indemnifying Party**") shall indemnify, defend and hold harmless the other Party ("**Indemnified Party**") against any and all demands, judgments and direct costs and expense, including in respect of any property damage, bodily injuries or death suffered by third parties resulting from breach of its obligations, fraud, negligence or willful default or any statutory non-compliance of the Indemnifying Party except to the extent that any such claim has arisen due to a negligent act or omission, breach of contract or breach of statutory duty on the part of the Indemnified Party.

b) Limitation of Liability

Except as herein explicitly stated, no Party shall have any liability for any indirect, incidental and consequential damages. Notwithstanding anything to the contrary in this Agreement, the overall liability of the Existing Substation Owner under this Agreement, shall be limited to the Annual O&M Charges under this Agreement.

22. Confidential Information:

a) All data, information, documents or reports furnished (whether in writing, verbally or by any other means and whether directly or indirectly) by either Party pursuant to this Agreement or in relation to the transactions contemplated under this Agreement, shall be treated, by the other Party, as confidential ("**Confidential Information**").

b) Unless compelled to do so pursuant to applicable law, the Parties shall not disclose the Confidential Information to any third party without the prior consent in writing of the disclosing Party. The obligation of either Party as to confidentiality under this clause shall survive termination or expiration of this Agreement. However, disclosure of confidential information as per statutory requirement shall be exempted.

23. Miscellaneous

a) In no event shall either Party be liable for any special, incidental, indirect, consequential or exemplary damages arising out of this Agreement, including, without limitation, any costs, expenses or liabilities incurred as a result of lost profits or revenues.

b) The Parties shall work and conduct themselves in compliance with all applicable laws.

c) Binding Obligations: This Agreement is binding on the Parties in accordance with the terms agreed herein.

d) Waiver: Any waiver by a Party of a breach of any provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach of the same or any other provision hereof.

e) Severability: The invalidity or unenforceability of any provision of this Agreement shall not in any way effect, impair or render unenforceable this Agreement or any other provision contained herein, which shall remain in full force and effect.

f) Assignment: New TSP shall have right to assign its rights and obligations under this Agreement to any of its affiliates, subsidiaries or group/ associate companies.

g) Headings: Headings and subheadings are for convenience only and shall not be deemed to be a part of this Agreement.

h) This Agreement and other documents or communications incorporated herein, represents the entire agreement between the Parties and supersedes all prior negotiations, understandings, and agreements, written or oral, relating to the subject matter herein.

i) Nothing in this Agreement shall, or shall be deemed to create an agency, a partnership, or a relationship of employer and employee between the Parties and both the Parties are independent under this Agreement.

j) This Agreement may be executed in one or more counterparts, each of which will be deemed to be an original copy of this Agreement and all of which, when taken together, will constitute one and the same instrument.

IN WITNESS WHEREOF the Existing Substation Owner and New TSP hereto have fully executed these present through their authorized representatives on the Day, Month and Year mentioned above.

For & on behalf of Existing Substation Owner	For & on behalf of New TSP
Witnesses:	Witnesses:
1)	1)
2)	2)

Annexure I

Detailed list of equipment to be undertaken for operation and maintenance works

[the list of equipment to be taken for O&M is to be specified in this annexure]

Annexure II

SWITCHYARD O&M ACTIVITIES

I. Transformer/Reactor/Neutral Grounding Reactor (NGR):

Sl. No.	Test Name/Maintenance Check	Frequency
1.	Capacitance/Tan Delta for a)Bushing & b)winding	Yearly (for Bushing) 10 Yearly/SOS (for Winding)
2.	Magnetizing current Test (Excitation Current Test)	SOS
3.	Magnetic Balance Test (Three Phase) on transformer	SOS
4.	Winding resistance (Resistance converted to 75 ºC)	SOS
5.	Voltage Ratio (All Taps) on transformer	SOS
6.	IR Value of Winding	SOS
7.	Polarization Index (Ratio of IR values at 10 min to 1 min)	SOS
8.	Core Insulation Test (Between core to clamp; clamp to tank; & core to tank)	SOS
9.	Neutral Earth pit Resistance Value	Yearly
10.	Turret/ Neutral CT Ratio Errors	SOS
11.	Vibration Level for reactors	SOS
12.	Sweep Frequency Response Analysis Tests (20 Hz to 5 MHz)	SOS
13.	Insulation Condition Dry (at commissioning) Normal in operation Wet Extremely Wet	SOS
14.	Short Circuit Impedance of transformer	SOS
15.	Dissolved Gas Analysis (DGA) of tank oil & Onload Tap Changer (OLTC) oil	Half Yearly
16.	Oil parameters of tank oil	Yearly
17.	Thermo-vision Scanning	Half Yearly
18.	Other maintenance checks:	
	(a) Checking of bushing oil level	Monthly
	(b) Checking of oil level in conservator	Monthly
	(c) Checking of oil level in OLTC conservator	Monthly
	(d) Checking of oil leaks	Monthly
	(e) Checking condition of silica gel in breather	Monthly
	(f) Checking of oil level in oil seal of breather	Monthly
	(g) Manual actuation of cooler fans and oil pumps	Monthly
	(h) External cleaning of all bushings	Yearly
	(i) External cleaning of radiators	Yearly
	(j) Checking of marshalling box/control cubicles: cleaning,	Yearly

	tightening of terminations, checking of contactors, space heater, lamps etc	
	(k) Maintenance of OLTC driving mechanism	Yearly
	(l) Checking/testing of buchholz relay by oil draining	Yearly
	(m) Electrical checking/testing of Pressure Relief Device (PRD), buchholz relay, rapid pressure rise relay, OLTC surge relay, checking of alarm/trip	Yearly
	(n) Checking of gaskets	Yearly
	(o) Checking of Oil Temperature Indicator (OTI)/Winding Temperature Indicator (WTI) and tap position indicator and top up of oil in pockets, if required	Yearly

II. Current Transformer:

Sl. No.	Test Name/Maintenance Check	Frequency
1.	Measurement of Tan Delta & Capacitance	Yearly
2.	Measurement of Insulation Resistance (IR) value	SOS
3.	Measurement of Current Transformer (CT) secondary resistance	2 Yearly
4.	Magnetization characteristics	SOS
5.	CT ratio test	SOS
6.	DGA and testing of other parameter of oil	SOS
7.	Thermo-vision scanning of CT and top dome	Quarterly
8.	Checking of bellow expansion	Monthly
9.	Visual inspection of CT for oil leakage and crack	Monthly
10.	Checking of healthiness of marshalling box gaskets	Yearly
11.	Checking of space heater and illumination	Yearly
12.	Checking the tightness of all connections including earthing	Yearly
13.	Cleaning of marshalling box and junction box	Monthly

III. SF6 circuit breakers:

Sl. No.	Test Name/Maintenance Check	Frequency
1.	Checking of SF6 gas pressure (wherever pressure gauges are provided)	Daily
2.	Checking of oil leaks form grading capacitor	Monthly
3.	Status of healthiness of CSD relay	Monthly
4.	Tan delta and capacitance of grading capacitor	2 Yearly
5.	SF6 gas leakage test	SOS
6.	Dew point measurement of SF6 gas	2 Yearly
7.	Operating timing of Circuit Breaker (CB)/Pre-insertion Resistance (PIR)]	Yearly
8.	Static contact resistance	Yearly
9.	Checking of pole discrepancy relay	Yearly
10.	Checking of all operation lockouts	Yearly
11.	Checking of all interlocks	Yearly
12.	Cleaning of breaker interrupter, support insulators, PIRs and grading capacitors	Yearly

13.	Checking of healthiness of operation counter	Yearly
14.	Checking of tightness of all cable's termination in Marshalling Box (MB)	Yearly
15.	Checking of door sealing gaskets and replacement, ift necessary	Yearly
16.	Repainting of metallic surfaces (if required)	2 Yearly
17.	Checking of space heater	Yearly
18.	Dynamic Contact Resistance Measurement (DCRM) test	2 Yearly

IV. Capacitor Voltage Transformer:

1.	Visual checking of earthing HF (high-frequency) point [(in case it is not being used for Power Line Career Communication (PLCC) system]	Yearly
2.	Checking for any breakage of cracks	Yearly
3.	Checking of oil leaks	Monthly
4.	Cleaning of Capacitive Voltage Transformer (CVT) capacitor stacks and tightness of terminal connections	Yearly
5.	Capacitance and tan-delta measurement	SOS
6.	Measurement of voltage ratio error	SOS
7.	Measurement of voltage at metering points in control room	Monthly
8.	Testing of EMU tank oil for Break Down voltage (BDV)	SOS
9.	Thermo vision scanning of capacitor stacks	Quarterly
10.	Checking of space heater and illumination	Yearly
11.	Checking and tightness of all connections including earth connections	Yearly
12.	Cleaning of marshalling box and junction box	Yearly
13.	Checking of healthiness of gaskets	Yearly

V. Isolators:

1.	Maintenance of linkages and transmission gears	Yearly
2.	Cleaning of auxiliary switch contacts with rustolene spray	Yearly
3.	Lubrication of operating mechanism, hinges, locks, joints on leavers, bearings	Yearly
4.	Checking of all bolts for tightness	Yearly
5.	Cleaning and lubrication of main contacts	Yearly
6.	Alignment	Yearly
7.	Main contact resistance measurement	Yearly
8.	Tightness of bolts, nuts and pins etc	Yearly
9.	Cleaning of support insulators and checking of insulator cracks, if any	Yearly
10.	Thermo vision scanning of insulator hinges and contacts	Quarterly

VI. Earth Switch:

1.	Checking & alignment of earthing blades	Yearly
2.	Cleaning of contacts	Yearly
3.	Contact resistance	Yearly
4.	Operation of earthing switch	Yearly
5.	Checking of aluminum/copper flexible conductor	Yearly

6.	Checking of earth connections of structure and Manual Operating Mechanism (MOM) box	Yearly
7.	Visual check of auxiliary contacts	Yearly
8.	Cleaning and terminal tightness in MOM box	Yearly
9.	Checking of space heater and illumination	Yearly
10.	Checking of healthiness of marshalling box gaskets Surge Arresters	Yearly

VII. Surge arrester:

1.	Checking of leakage current	Monthly
2.	Reading of surge counter	Daily
3.	Testing of counters	Yearly
4.	Cleaning of Lightning Arrester (LA) insulator	Yearly
5.	Measurement of capacitance and tan-delta	SOS
6.	Measurement of IR value	SOS
7.	Stack meggering	SOS
8.	3rd harmonic resistive current measurement	4 Monthly

VIII. Wave Traps:

1.	Tightness and cleanliness	Yearly
2.	General inspection	Yearly

IX. Protection System:

1.	Testing of Disturbance Recorder and Event Logger	Monthly
2.	Calibration of panel meters (indicating / recording instruments along with the transducers)	Yearly
3.	Calibration of tariff/non-tariff energy meters	SOS
4.	Secondary injection test of individual protection schemes	5 Yearly
5.	Checking of voltage (in services) for relays	Half Yearly
6.	Checking of Direct Current (DC) logic circuits for trip and ammonization including timers and simulation	Yearly

X. Line Protection Distance Protection:

1.	Reach check for all four (4) zones	Yearly
2.	Time measurement	Yearly

XI. PLCC System:

1.	Power supply measurements	Yearly
2.	Checking of alarms	Yearly

XII. Miscellaneous:

1.	Measurement of station earth resistance	Yearly
2.	Cleaning of insulator for cracks	Yearly
3.	De-weeding of switchyard	Monthly
4.	Repainting, rust removal of all structures, equipment's etc	SOS
5.	Checking of switchyard lighting	Daily

XIII. Thermal Imaging & Corona Scanning:

1.	Thermo vision scanning of all conductor joints, terminal connector/clamps	Quarterly
2.	Removal of hot spots	SOS
3.	Corona Scanning of Bay equipment	Yearly

XIV. Other Operational activities:

1.	Visual checking of the bay	Daily
2.	Isolation & restoration of bays as per LDC instruction	As required
3.	Mega Watt (MW)/Mega Volt Ampere Reactive (MVAR) meter reading (line flows)	Hourly
4.	Energy Meter readings	Daily
5.	PLCC counter readings	Daily
6.	Battery charger voltage and current	Daily
7.	Measurement of cell voltage	Monthly
8.	Healthiness of FF system	Daily
9.	Healthiness of SAS system/DR PC/Event Logger	Daily
10.	Providing trip related information/ documents to LDC/New TSP	As required
11.	Healthiness of AC plant system/KIOSK AC	Daily
12.	Defect Records	As required
13.	Healthiness of Emergency DC Lighting system	Monthly

SOS: as and when needed.
The above test / Maintenance check / Frequency shall be followed, however, can be modified if mutually agreed by both parties.

Annexure III

List of Major Breakdown

1. **Equipment Failure resulting in replacement or repairing:**
   (a) Failure of Transformer including bushing
   (b) Failure of Reactor including bushing
   (c) Failure of Circuit breaker
   (d) Failure of CT/CVT
   (e) Failure of LA/Wave trap
   (f) Failure of Isolator
   (g) Failure of bus bar/IPS tube/Jack bus
2. **Flashover cases:**
   (a) Flashover in bushings of Transformer, Reactor
3. **Equipment Foundation issues**
4. **Failure/malfunction of Control Protection resulting in replacement**
   (a) Distance, differential, REF, PLCC/DTPC relay etc.

Annexure IV

Minor Consumable/ Small Spares List

S.No	Description
1.	Nut & Bolts
2.	Terminal Blocks
3.	Ferrules
4.	Wires
5.	Indicating Lamps
6.	Control switches
7.	Fuses
8.	FO cable (LC-ST--> 6 Mtre)
9.	Silica Gel
10.	CAT6 LAN Cable
11.	RJ45 Connecter
12.	CFL Bulb
13.	Capacitor
14.	Choke
15.	Ignitor
16.	Trip Coil (applicable only for AIS)
17.	Closing coil (applicable only for AIS)
18.	SF6 gas cylinder (applicable only for AIS)
19.	N2 Gas Cylinder
20.	DG Engine Oil
21.	DG Coolant
22.	DG Battery Water
23.	Insulation Tape
24.	Battery bank cell
25.	Petroleum jelly
26.	OFC cable
27.	Basic testing equipments calibration
28.	Diesel for DG set
29.	Any other mutually agreed

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