



TP CENTRAL ODISHA DISTRIBUTION LIMITED

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Name of the Document

Standard Operating Procedure (SOP) for Remote Operations & Issue of PTW for 11 kV Feeders emanating from Unmanned 33/11kV TPCODL Sub-Station under Power System Control Centre (PSCC)

Prepared By

A Antony

Reviewed By

Tushar Kulkarni

Approved By

Chintamani Chitnis

Issued By

Niranjan Rout



**TP CENTRAL ODISHA
DISTRIBUTION LIMITED**

(A Joint Venture of Tata Power and Government of Odisha)

Standard Operating Procedure (SOP)

For

**Remote Operations & Issue of PTW for 11 kV Feeders
emanating from Unmanned 33/11kV TPCODL Sub-
Station under Power System Control Centre (PSCC)**

POWER SYSTEM CONTROL CENTER

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1. Scope

This document includes Standard Operating Procedure (SOP) for Operation, Communication between PSCC, Mobile Operation Crew (MOC) and authorized working party for issuing Permit-To-Work (PTW) on 11 kV feeders and other associated 11kV network elements in the power distribution network emanating from Unmanned 33/11kV Primary Sub-stations (PSS) under Power System Control Center.

The Unmanned PSS are those where the Mobile Operation Crew (MOC) is strategically placed in a centralized location and will be looking after operations of 2-3 Primary Substation.

2. Permit-To-Work Guidelines

- 2.1. Any work carried out on the 11kV distribution network and any associated 11kV network element requires Permit-To-Work (PTW).
- 2.2. The PTW is issued from Power System Control Center using Suraksha Kavach 2.0 web application.
- 2.3. PTW is issued only to the authorized personnel who has been given permission by appropriate authority (i.e., Executive Engineer) of that particular area in Suraksha Kavach 2.0 web application using the working party approval procedure.
- 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.
- 2.5. The authorized personnel i.e., the PTW holder should have a valid ELBO license to work on 11kV electrical network.
- 2.6. Part feeder shutdowns in Rural Feeders will be availed only by Section In-charge/SDO/Executive Engineer.

3. Elaboration of Operating Procedure

3.1 Full feeder shutdown or outage and issuing PTW

3.1.1 Outage of 11kV feeder emanating from PSS

1. The authorized personnel calls PSCC requesting an outage and shares the following details:
 - a) Name of the Authorized person who is asking for PTW.
 - b) Substation/Feeder /Feeder Section/Equipment where the work is to be done.
 - c) Brief Work Description.
 - d) Information regarding the isolation of back feeding if any.
 - e) Any requirements for feeders in close vicinity that also need to be de-energised for this work.

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(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

2. PSCC checks if the shutdown is Planned (PSD) or Emergency (ESD):
 - a) In case of PSD, it should be approved by PSCC and Executive Engineer of the respective area and available in Suraksha Kavach.
 - b) If it is not approved and required to be availed, then it needs to be approved by Executive Engineer and issued as Unplanned Shutdown (UPSD).
 - c) In case of Emergency, the PSCC creates the entry in Suraksha Kavach.
3. PSCC get the confirmation from authorized personnel for the availability of safety equipments such as neon tester, discharge rod, Ladder & PPEs.
4. PSCC after creating the entry in Suraksha Kavach, check for the availability of MOC at the PSS where outage is required. If the MOC is not available PSCC instruct them to move to the required PSS.
5. Once the MOC is available at the PSS where the outage is required below mentioned procedure is to be followed:
 - a) PSCC will OPEN the breaker remotely in SCADA system and inform Opening Reference Number to MOC for further isolation
 - b) Once breaker opened by PSCC, MOC has to confirm the same (i.e., breaker shows open indication and load current drops to zero).
 - c) MOC opens AB Switch/ GOD of the particular feeder and confirms it to PSCC after confirming the isolation of all the three blades.
 - d) MOC then closes Earth Switch or provide local portable grounding.
 - e) MOC will put the "Do Not Operate" tags on the Breaker Panel and Feeder AB Switch/GOD.
 - f) MOC will give a return opening reference no. confirming the above isolation of that particular feeder, which PSCC will record it in the Suraksha Kavach.

Note:

- i. *In case of indoor switchgear, when there is no AB Switch/ GOD is available for the particular feeder MOC will rack out the respective circuit breaker for complete isolation.*

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- ii. *In case of Gas Insulated switchgear, MOC will open the dis-connector switch for isolation.*
- iii. *In case of Ring Main Unit, MOC will open LBS or dis-connector for isolation.*

6. PSCC will now take the authorized personnel on conference call along with MOC and get confirmation of following safety checks before creating the PTW,
 - i. Zero Voltage confirmation
 - ii. No Live Line Crossing near the working area
 - iii. Identification and isolation of all HT & LT back-feeding points
7. PSCC then generates PTW number in Suraksha Kavach (which is randomly generated unique number by system).
8. PSCC will put PTW Tag on SCADA system the particular Circuit Breaker of the feeder against which the PTW is generated.
9. PSCC then shares generated PTW number with authorized personnel and asking him to ensure proper safety zone before executing work.
10. In case of multiple PTWs on same feeder -
 - a) In the event of another outage requirement on the same feeder by different authorized personnel, PSCC will follow all the points mentioned in the section 3.1.1 except for isolations, which is already in place for the particular feeder.
 - b) PSCC then share this information of multiple PTWs with other PTW holders for information.

3.1.2 Normalization of 11kV feeder after completion of work

1. The authorized personnel who is the PTW holder calls PSCC for the return of the same and shares the following details
 - a) PTW number that was issued.
 - b) Substation/Feeder /Feeder Section/Equipment where the work is completed.
 - c) Location where work execution is completed.
 - d) Name of the Authorized person who has taken PTW.
 - e) Confirmation whether all portable grounds, tools and materials are removed and all men at work are moved out of the working perimeter.

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(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

2. PSCC checks the record against PTW number shared and validates all the information received in Suraksha Kavach and SCADA (for Tags)
3. PSCC checks for any other pending PTWs on the same feeder. If yes then PSCC will await for call from other PTW holders for closure of PTW.
4. PSCC will repeat from Point no 1 to 3 of section 3.1.2 until all the PTWs with same isolation called for normalization of the particular feeder.
5. PSCC after updating in Suraksha Kavach, check for the availability of MOC at the PSS where outage is required. If the MOC is not available PSCC instruct them to move to the required PSS.
6. PSCC calls MOC and shares Closing Reference Number to do the following operations:
 - a) MOC will remove the PTW tags of the Breaker Panel and Feeder AB Switch/GOD.
 - b) MOC will open the respective Earth Switch /remove local portable groundings.
 - c) MOC will close the AB Switch/ GOD and visually confirm all three blades connected properly.
(MOC will rack-in the circuit breaker in case of indoor switchgear or close the dis-connector.)
 - d) MOC will give a return closing reference no. confirming the all isolation is normalized of that particular feeder, which PSCC will record it in the Suraksha Kavach.
7. PSCC will now take all PTW holders on conference call along with MOC and after confirmation, will remove the TAG in SCADA from the respective circuit breaker. Then he will CLOSE the breaker remotely from SCADA.
8. PSCC will close the PTWs on that feeder in Suraksha Kavach.
9. PSCC will confirm PTW holders and MOC regarding the restoration/normalization of the feeder in case feeder charged ok and shows healthy electrical parameter.

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10. In case of any abnormalities, the authorized person will once again have to take PTW as per requirement for execution of further work.

11. PSCC will instruct the MOC to return to their base station.

3.2 Part feeder shutdown or outage and issuing PTW.

3.2.1 Part Section isolation by opening Line AB Switch/ DT AB Switch.

1. The authorized personnel calls PSCC requesting for outage and shares the following details:

- Name of the Authorized person who is asking for PTW.
- Substation/Feeder /Feeder Section/Equipment where work is to be done
- Brief Work Description.
- Information regarding the isolation of back feeding if any.
- Any requirements for feeders in close vicinity that also need to be de-energised for this work.
- Information of the isolation point (Name & Location of Line AB Switch/RMU/DT AB Switch).

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

(Refer Clause 2.6. Part feeder shutdowns in Rural Feeders will be availed only by Section In-charge/SDO/Executive Engineer.)

2. PSCC checks if the shutdown is Planned (PSD) or Emergency (ESD).

- In case of PSD, it should be approved by PSCC and Executive Engineer of the respective area and available in Suraksha Kavach.
- If it is not approved and required to be availed, then it needs to be approved by Executive Engineer and issued as Unplanned Shutdown (UPSD).
- In case of Emergency, the PSCC creates the entry in Suraksha Kavach.

3. PSCC get the confirmation from authorized personnel for the availability of safety equipments such as neon tester, discharge rod, Ladder & PPEs.

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4. PSCC after creating the entry in Suraksha Kavach, asks authorized personnel if the concerned feeder breaker needs to be opened to isolate on load zero.
- a) In case of Line AB Switch/GOD or DT AB Switch/GOD isolation on dead feeder-
- PSCC will OPEN the respective breaker remotely in SCADA and share Opening Reference number after confirmation of load zero.
 - Authorized personnel will check and confirm with neon tester that the feeder is dead.
 - Authorized personnel will open the AB Switch/GOD.
 - Authorized personnel will confirm against visual inspection that all three blades clearly opened and share opening reference no. of his own. This will be recorded in Suraksha Kavach confirming the section is isolated.
 - The feeder will be now charged remotely on SCADA and confirm the charging of the feeder to authorized personnel.
- b) In case of DT ABS/GOD isolation on No load by opening LT ACB/MCCB-
- Authorized personnel will hand trip incoming LT ACB/MCCB.
 - DT ABS/GOD will be opened on no load condition.
 - Authorized personnel will confirm against visual inspection that all three blades are clearly opened and share opening reference no. of his own. This will be recorded in Suraksha Kavach confirming isolation of the section.
- c) In case of RMU isolation on load-
- Authorized personnel will hand trip RMU Circuit breaker or open RMU Load break Switch.
 - Authorized personnel will confirm once isolation is done and share opening reference no. of his own. This will be recorded in Suraksha Kavach confirming isolation of the section.
5. PSCC get confirmation of following safety checks from authorized personnel before creating the PTW,
- Zero Voltage was Confirmed.
 - No Live Line Crossing near the working area.
 - All HT & LT back-feeding points were identified and isolated.

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6. PSCC then generates PTW number in Suraksha Kavach (which is randomly generated unique number by system).
7. PSCC will put PTW Tag on SCADA system the particular Circuit Breaker of the feeder against which the PTW is generated.
8. PSCC then shares generated PTW number with authorized personnel and asking him to ensure proper safety zone before executing work.
9. In case of multiple PTWs on section of feeder/DT -
 - a) In the event of another outage requirement on the same feeder by different authorized personnel, PSCC will follow all the points mentioned in the section 3.2.1 except for isolations, which is already in place for the particular feeder section/DT.
 - b) PSCC then share this information of multiple PTWs with other PTW holders for information.

3.2.2 Normalization by Closing Line AB Switch/ DT AB Switch

1. The authorized personnel who is the PTW holder calls PSCC for return of the same and shares the following details-
 - a) PTW number that was issued.
 - b) Substation/Feeder /Feeder Section/Equipment where work is completed.
 - c) Location where work execution is completed.
 - d) Name of the Authorized person who has taken PTW.
 - e) All portable grounds, tools and materials are removed and all men at work are moved out of the working perimeter.
 - f) Information of the isolation point (Name & Location of Line AB Switch/RMU/DT AB Switch).

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

(Refer Clause 2.6. Part feeder shutdowns in Rural Feeders will be availed only by Section In-charge/SDO/Executive Engineer.)

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2. PSCC checks the record against PTW number shared and validates all the information received in Suraksha Kavach and SCADA (for Tags).
3. PSCC checks for any other pending PTWs on the same feeder. If yes then PSCC will await for call from other PTW holders for closure of PTW.
4. PSCC will repeat from Point no 1 to 3 of section 3.2.2 until all the PTWs with same isolation called for normalization of the particular feeder.
5. PSCC will now take all PTW holders on conference call and asks if the concerned feeder breaker needs to be opened to normalize the isolation on load zero.
 - a) In case of Line AB Switch/GOD or DT AB Switch/GOD normalization on dead feeder.
 - i. PSCC will OPEN the respective breaker remotely in SCADA and share Closing Reference number after confirmation of load zero.
 - ii. Authorized personnel will check and confirm with neon tester whether the feeder is dead.
 - iii. Authorized personnel will close the AB Switch/GOD.
 - iv. Authorized personnel will confirm against visual inspection that all three blades clearly engaged and share closing reference no. of his own. This will be recorded in Suraksha Kavach.
 - v. The feeder will be now charged remotely on SCADA and confirm the charging of the feeder to PTW holder.
 - b) In case of DT ABS/GOD normalization by closing LT ACB/MCCB.
 - i. DT ABS/GOD will be closed on no load condition.
 - ii. Authorized personnel will charge incoming LT ACB/MCCB.
 - iii. Authorized personnel will confirm closing reference no. of his own. This will be recorded in Suraksha Kavach confirming the section is charged.
 - c) In case of RMU normalization on load.
 - i. Authorized personnel will CLOSE RMU Circuit breaker or RMU Load break Switch.
 - ii. Authorized personnel will confirm closing reference no. of his own. This will be recorded in Suraksha Kavach confirming the section is charged.

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6. PSCC will remove the TAG in SCADA from the respective circuit breaker.
7. PSCC will close the PTWs on that feeder in Suraksha Kavach.
8. PSCC will confirm PTW holders regarding the restoration/normalization of the feeder section/DT in case charged ok and shows healthy electrical parameter.
9. In case of any abnormalities, the authorized person will once again have to take PTW as per requirement for execution of further work.

3.3 Outage for work inside PSS and issuing PTW.

3.3.1 Issuing PTW for any work inside PSS.

1. The authorized personnel calls PSCC requesting for outage and shares the following details:
 - a) Name of the Authorized person who is asking for PTW.
 - b) Substation/Feeder /Feeder Section/Equipment where work is to be done.
 - c) Brief Work Description.
 - d) Information regarding the isolation of back feeding if any.
 - e) Any requirements for feeders in close vicinity that also need to be de-energised for this work.

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

2. PSCC checks if the shutdown is Planned (PSD) or Emergency (ESD).
 - a) In case of PSD, it should be approved by PSCC and Executive Engineer of the respective area and available in Suraksha Kavach.
 - b) If it is not approved and required to be availed, then it needs to be approved by Executive Engineer and issued as Unplanned Shutdown (UPSD).
 - c) In case of Emergency, the PSCC creates the entry in Suraksha Kavach.
3. PSCC get the confirmation from authorized personnel for the availability of safety equipments such as neon tester, discharge rod, Ladder & PPEs.

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4. PSCC after creating the entry in Suraksha Kavach, check for the availability of MOC at the PSS where outage is required. If the MOC is not available PSCC instruct them to move to the required PSS.
5. Once the MOC is available at the PSS where the outage is required below mentioned procedure is to be followed,
 - a) PSCC will OPEN the upstream and downstream breakers remotely in SCADA system and inform Opening Reference Number to MOC for further isolation.
 - b) Once breaker opened by PSCC, MOC has to confirm the same (i.e. breaker shows open indication and load current drops to zero).
 - c) MOC opens upstream and downstream Isolator/AB Switch/ GOD of the particular equipment or racks out the upstream and downstream circuit breakers in case of indoor switchgear.
 - d) MOC then confirms it to PSCC after all the three blades are in open confirming visually or CB racked out condition.
 - e) MOC then closes Earth Switch or provide local portable grounding.
 - f) MOC will put the Do Not Operate tags on the Breaker Panels and Isolator/AB Switch/GOD.
 - g) MOC will give a return opening reference no. confirming the above isolation of that particular equipment, which PSCC will record it in the Suraksha Kavach.
6. PSCC will now take the authorized personnel on conference call along with MOC and get confirmation of following safety checks before creating the PTW-
 - i. Zero Voltage Confirmed.
 - ii. No Live Line Crossing near working area.
 - iii. All back-feeding points identified and isolated.
7. PSCC then generates PTW number in Suraksha Kavach (which is randomly generated unique number by system).
8. PSCC will put PTW Tag on SCADA system the particular Circuit Breaker of the feeder against which the PTW is generated.
9. PSCC then shares generated PTW number with authorized personnel and asking him to ensure proper safety zone before executing work.

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10. In case of multiple PTWs on same feeder -

- a) In the event of another outage requirement on the same feeder by different authorized personnel PSCC will follow all the points mentioned in the section 3.3.1 except for isolations, which is already in place for the particular feeder.
- b) PSCC then share this information of multiple PTWs with other PTW holders for information.

3.3.2 Normalization of system after work inside PSS.

1. The authorized personnel who is the PTW holder calls PSCC for return of the same and shares the following details-

- a) PTW number that was issued.
- b) Substation/Feeder /Feeder Section/Equipment where work is completed.
- c) Location where work execution is completed.
- d) Name of the Authorized person who is has taken PTW.
- e) All portable grounds, tools and materials removed and all men at work are moved out of the working perimeter.

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

2. PSCC checks the record against PTW number shared and validates all the information received in Suraksha Kavach and SCADA (for Tags).
3. PSCC checks for any other pending PTWs on the same feeder. If yes then PSCC will await for call from other PTW holders for closure of PTW.
4. PSCC will repeat from Point no 1 to 3 of section 3.3.2 until all the PTWs with same isolation called for normalization of the particular feeder.
5. PSCC after updating in Suraksha Kavach, check for the availability of MOC at the PSS where outage is required. If the MOC is not available PSCC instruct them to move to the required PSS.
6. PSCC calls MOC and shares Closing Reference Number to do the following operations:

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- a) MOC will remove the PTW tags of the upstream and downstream Breaker Panel and Isolator/AB Switch/GOD.
- b) MOC will open the respective Earth Switch /remove local portable groundings.
- c) MOC will close the upstream and downstream Isolator/AB Switch/ GOD and visually confirm all three blades connected properly or will rack in upstream and downstream circuit breakers in case of indoor switchgear.
- d) MOC will give a return closing reference no. confirming that all isolations of the particular feeder normalized, which will be recorded by PSCC in the Suraksha Kavach.

7. PSCC will now take all PTW holders on conference call along with MOC and after confirmation, will remove the TAG in SCADA from the respective circuit breaker. Then he will CLOSE the breaker remotely from SCADA. The closing of the Breakers should be done in sequence to the direction of the power flow (i.e. 11kV I/C to 11kV OG).
8. PSCC will close the PTWs on that feeder in Suraksha Kavach.
9. PSCC will confirm PTW holders and MOC regarding the restoration/normalization of the feeder in case feeder charged ok and shows healthy electrical parameter.
10. PSCC will confirm the authorized person and the substation operator regarding the restoration/normalization of the PTW zone.
11. In case of any abnormalities, the authorized person will once again have to take PTW as per requirement for execution of further work.
12. PSCC will instruct the MOC to return to their base station.

3.4 Test Charging of 11kV Feeder tripped on fault.

This includes the 11kV feeders emanating from Substation and 11kV Incomers (LT Side breakers of Power Transformer).

1. In case of fault trip of any 11kV feeder, PSCC gets an alarm in SCADA.
2. PSCC on getting clearance for charging from respective authorized personnel, PSCC will CLOSE the breaker remotely and communicate to both lineman/JM and Substation Operator.

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3. In case of any delay in charging due to any abnormality message received or failed test charge (feeder declared to be under breakdown), PSCC in consultation with JM/Lineman and checking the load management perspective, will changeover the load fed to alternate source.
4. In case of any fault found or for attending the full feeder/part feeder breakdown, PTW to be availed by the authorized person as per the process laid down in Section-3.1 above
5. Any breakdown will be attended by taking the PTW from PSCC by authorized personnel only.

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

3.5 Hand Trip required for Emergency Condition/ Situation

During the emergency condition/situation which includes:

- a) Fire Hazard.
- b) Circumstance, which might lead to risk of life of Human/Animal/Property.

1. On receipt of information, the feeder shall be hand tripped immediately either by PSCC Engineer.
2. Authorized personnel call PSCC to inform the details of the information and to check and clear for charging. PSCC will record the information as Tag in SCADA and as entry in Suraksha Kavach.
3. Against the receipt of clearance authorized personnel will call PSCC engineer giving clearance to charge the feeder.
4. Any breakdown will be attended by taking the PTW from PSCC by authorized personnel only.

(Refer Clause 2.4. The authorized personnel should be Executive Engineer/SDO/EMR/Section In-charge/Lineman.)

3.6 Loss of telephonic communication during operation.

1. All operations are to be done as per the SOP based on telephonic communication with PSCC.
2. In case of loss of telephonic communication channel PSCC have to escalate the matter to the respective section In-charge/SDO/Executive Engg. for pursuing subsequent operations.
3. Respective section In-charge/SDO/Executive Engg. will take the entire responsibility for restoration/normalization of the power supply ensuring safe operating procedures.
4. Once the supply is restored Respective section In-charge/SDO/Executive Engg. share the details of tripping & outages with PSCC, so that the same can be recorded in Suraksha Kavach for further reporting.

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Name of the Document	Standard Operating Procedure (SOP) for Remote Operations & Issue of PTW for 11 kV Feeders emanating from Unmanned 33/11kV TPCODL Sub-Station under Power System Control Centre (PSCC)			
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3.7 Loss of SCADA/ RTU Network Communication during operation

During the SCADA Communication failure, PSCC will instruct the MOC to move to required PSS and all operations to be done locally by MOC against the instructions from PSCC Only.

In case of PTW requirement the respective procedure will be followed as deliberated in this document.

3.8 Requirement of Load Curtailment

1. In case of demand limitation, generation failure or equipment breakdown at distribution side requirement of Load curtailment from SLDC/Respective Executive Engineer/SDO will communicate it to PSCC.
2. PSCC will also be intimated regarding volume of load restriction and duration.
3. PSCC then get the confirmation from the respective Executive Engineer.
4. Against the receipt of the confirmation, PSCC will conduct operation as per requirement with intimation to section in-charge.
5. Note that when a line is dead due to load curtailment, no work is to be done without PTW issued from PSCC.