Enhanced Power Line Safety Settings (EPSS) and Patrol Process

SUMMARY

This utility procedure describes the process for implementing Enhanced Powerline Safety Settings (EPSS) on devices protecting zones that intersect High Fire Risk Areas (HFRA). It also provides information on the automated features that interact with applications used by Distribution Operators (DO).

Level of Use: Informational Use

TARGET AUDIENCE

This document applies to all employees who respond to and patrol EPSS outages.

SAFETY

Failure to follow proper EPSS, patrolling, and restoration procedures may result in employee injury, public safety exposure, or damage to facilitates.

BEFORE YOU START

Perform operating, switching, and restoration procedures safely and in accordance with the Company’s Utility Standard SAFE-1001S, PG&E Injury & Illness Prevention Plan (IIPP) and the Code of Safe Practices.

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PROCEDURE STEPS

1 General Information

1.1 EPSS enablement is based on criteria that is reviewed and approved by the Wildfire Risk Governance Committee.

1. WHEN criteria are met,

THEN the DOs are DIRECTED to enable EPSS on identified devices.

2 EPSS Enablement Process

2.1 Electric Distribution Asset Planning PROVIDES a list of circuits/devices (supervisory control and data acquisition (SCADA) and non-SCADA) that have EPSS installed.

2.2 The DO ENABLES EPSS on all prescribed devices.

1. NAVIGATE to device in SCADA.

2. CUT OUT the reclosing relay.

3. ENABLE EPSS and TAG control point caution.
   a. EPSS settings are instantaneous trip settings with small delays.
   b. Optional: ENABLE sensitive ground fault (SGF).

4. DISABLE Fault Location, Isolation and Service Restoration (FLISR) at the circuit level, and TAG caution, on all EPSS enabled circuits.

Do NOT DISABLE FLISR on adjacent circuits unless enabled with EPSS.

5. DISPATCH field personnel immediately to all devices without SCADA or with communication failure to cut out the reclosing relay and enable EPSS.

2.3 After EPSS has been enabled on all devices on the prescribed list, the DO COMPLETES the following actions in Integrated Logging Information System (ILIS) [SEE Figure 1]:

1. NAVIGATE to the Distribution Operator Dashboard (DOD) and SELECT the EPSS tab/page.

2. SELECT the circuit being affected from the dropdown menu.
2.3 (continued)

3. CLICK the empty box next to the device in the device list that has had EPSS enabled.
   IF all the devices are involved,
   THEN CLICK the “Enable All Devices” button to place a check mark in all the boxes.
   The auto-populated information in the Tag Comments section populates in DOD and DMS EPSS tags next to the selected devices.

4. ENTER EPSS comments with the following information:
   a. In the Tag Comment field, ENTER text that states EPSS is being enabled.
   b. If the circuit has FLISR, RECORD that it has been disabled.

5. ENTER text into the required EPSS Comments field.

6. CLICK “Save.”
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NOTE
The Routine Log automatically creates an entry containing the updated EPSS entry information.

![Distribution Operator Dashboard](image)

Figure 1. Distribution Operator Dashboard (DOD) (illustrative)
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2.4 Distribution Management System (DMS): An EPSS tag is automatically placed on every device listed under the circuit selected in the ILIS EPSS page. See Figure 2.

Figure 2. EPSS Tag (illustrative)

1. For EPSS enabled devices that have not yet been added to the ILIS device list, MANUALLY TAG that device with an EPSS tag in DMS, and ADD appropriate comments to the comment box. See Figure 3.

Figure 3. Manual EPSS Tag (illustrative)
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3 Placing New EPSS Devices in Service

3.1 LEAVE the new device in normal profile with the reclose relay cut out.

1. IF EPSS is active on the conductor being protected by this device, THEN CUT OUT/ CHK CUT OUT the reclose relay, and ENABLE EPSS on the device.

2. Once SCADA has been released, VERIFY the device status is correct, including proper tagging.

3. Once a new device has been added to the ILIS device list,
   a. REPEAT the instructions in step 2.3 to place an auto-generated tag on that new device in DMS.
   b. REMOVE the manually placed tag in DMS.
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4 EPSS Enabled Outage Information and Requirements

4.1 WHEN an outage occurs:

1. The Outage Management Tool (OMT) District Summary page shows a “Y” in the EPSS column for each EPSS enabled outage. SEE Figure 4.

Figure 4. OMT FTS Column (illustrative)
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4.1 (continued)

2. Outage Dispatch Tool (ODT) shows the EPSS box checked. SEE Figure 5

![Outage Dispatch Tool](image)

Figure 5. ODT Check Box (illustrative)

3. IF the automatic device that locks out is an EPSS device with an EPSS tag,

THEN a check will automatically be placed in the EPSS checkbox in the ILIS outage report.
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5 Patrolling and Restoring an Unplanned EPSS Outage

5.1 Energizing or de-energizing planned outages.

1. IF picking up or dropping load during planned switching is determined to be the cause of the EPSS outage,

   THEN the DO may restore the outage without conducting a patrol.

   a. RECORD outage cause in ILIS as “Company Initiated; Personnel, company.”

Figure 6. EPSS Zone of Protection (illustrative)

5.2 PATROL the entire EPSS zone of protection of the locked out automatic device. SEE Figure 6

1. PATROL beyond fuses, TripSavers, and non-EPSS enabled devices with the following exceptions:

   a. IF obvious trouble is found (i.e. car-pole, tree, or branch through the line) AND it is determined to be the initial cause of the outage, given targeting and field reports,

      THEN PATROL only the de-energized overhead line through which the fault current passed. For example, from the found trouble to the automatic protective device that locked out.
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5.2 (continued)

NOTE

Additional fault current sources, such as grounded auto-transformers and distributed generation, may cause protective or fault indicating devices to target and/or lock out downstream, or on unrelated circuit branches of a confirmed fault location. SEE step 5.8.

2. IF trouble with no cause is found (e.g., wire down or wrapped conductor), THEN PATROL the entire zone of protection of the automatic device that locked out, up to and beyond the fuses and TripSavers in that zone of protection.

5.3 Fault indicators (navigators only) and line sensors with good communication

Faulted line sensors with good communication may be used as information to reduce the patrol footprint.

1. Non-fused tap and mainline installations

   a. Within the first 4 hours, ONLY faulted overhead navigator fault indicators (FI) identified by field personnel may be used as information to reduce the patrol footprint. SEE Figure 7.

   b. Any fault indicators (including line sensors) that are indicating clear/no fault may not be used to reduce the patrol footprint. SEE Figures 1, 2, and 3 in Attachment 1.

2. Fused tap line F1 installation use

   a. Within the first 4 hours, FIs that indicate faulted or clear that are identified by field personnel may be used as information to reduce the patrol footprint. SEE Figure 4 in Attachment 1.

3. For lockouts on SGF, DO NOT USE fault indicators, whether installed on main lines or fused tap lines, to reduce the patrol footprint, since fault indicators do not detect under an SGF-protective operation.

Figure 7. Navigator Fault Indicator
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5.4 Devices with Hot-Line Tag (HLT) enabled for EPSS protection

1. IF a device has HLT enabled for EPSS protection,

   THEN PATROL the entire de-energized line, with the following exceptions:

   a. IF obvious trouble is found (e.g., car-pole, tree, or branch through the line), AND is determined to be the initial cause of the outage, given targeting and field reports,

         THEN PATROL only the de-energized overhead line through which the fault current passed (i.e., from the found trouble to the automatic protective device that locked out).

   b. IF trouble with no cause is found (e.g., wire down or wrapped conductor),

         THEN PATROL the entire de-energized line, up to and beyond the fuses and TripSavers.

   c. Within the first 4 hours, REDUCE the patrol footprint by using overhead Navigator fault indicators identified by field personnel, found on fused tap lines only.

   d. REDUCE the patrol footprint by using faulted line sensors with good communication.
5.5 Restoration

1. Before restoring power, COMPLETE the following actions:
   a. MITIGATE all hazards before restoring power to the de-energized line.
   b. DISABLE EPSS on all devices that will be picking up load during restoration efforts.
   c. Once restoration is complete, RE-ENABLE EPSS on devices.

   (1) ENSURE that all tagging has been replaced and is accurate.

   **NOTE**

   Stripping the main line of fuses and TripSavers may allow for quicker energization for most of the customers involved.
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5.5 (continued)

2. WHEN a source outage occurs, such as a loss of transmission line,
   THEN DISABLE EPSS on all devices that will be picking up load before step restoration activities begin.
   a. IF possible, OPEN SCADA mainline device to allow for step restoration.

3. IF an outage occurs on a circuit that no longer requires EPSS to be enabled, but the settings have not yet been returned to normal,
   THEN RETURN the settings to normal, and TROUBLESHOOT as a non-EPSS outage.

5.6 Multiple devices trip simultaneously

1. The DO ENGAGES distribution operations engineer (DOE) via call and email, AND PROVIDES outage details.

2. DOE ANALYZES outage using all available tools.

3. IF the DOE determines the fault condition passed through multiple devices,
   THEN DOE ENDORSES to patrol only beyond the farthest downstream protective device that experienced the fault.
   a. OTHERWISE, PATROL all required zones.

4. DOE REPORTS to the DO via phone call and email, with complete analysis and recommendation on how to proceed.

5.7 Device trips on SGF with auto-transformer, downstream generation, or a grounding bank on the circuit

1. DO ENGAGES DOE via call and email, AND PROVIDES outage details.

2. DOE ANALYZES outage using all available tools.

3. IF the DOE DETERMINES that a residual ground (51N, 50N) or SGF (50GS) nuisance trip occurred as a result of auto-TX, downstream generation, and/or grounding BK current contribution,
   THEN the DOE ENDORSES not patrolling zones not in the direct path of the fault to the source.
   OTHERWISE, PATROL all required zones.

4. DOE REPORTS to DO via phone call and email, supplying complete analysis and recommendation on how to proceed.
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5.8 Device trips due to suspected loading issue
   1. DO ENGAGES DOE via call and email, and PROVIDES outage details.
   2. DOE ANALYZES the outage using any and all available tools at their disposal.
   3. IF DOE determines that the outage was caused by unintentional or unforeseen excessive loading conditions (i.e., not faulted),
      THEN DOE ENDORSES not patrolling, and PROVIDES mitigation strategy for immediate restoration (e.g., load transfer, raise MTTs, cut out SGF).
      OTHERWISE, PATROL all required zones.
   4. DOE REPORTS to DO via phone call and email, PROVIDING complete analysis and recommendations on how to proceed.

5.9 Single or multiple device trip occurs due to transformer, motor, or load inrush
   1. DO ENGAGES DOE via call and email, providing outage details.
   2. DOE ANALYZES outage, using any and all available tools.
   3. IF the DOE determines that transformer, motor, or load inrush has caused a protective device's nuisance trip,
      THEN the DOE ENDORSES the exclusion of patrol and PROVIDES mitigation strategy for immediate restoration (e.g., disable EPSS, C/OUT SGF).
      OTHERWISE, PATROL all required zones.

5.10 Device trips on SGF with downed conductor detection (DCD) alarmed (Beckwith controller page 2)
   1. The DO ENGAGES the DOE via call and email, providing outage details.
   2. The DOE ANALYZES outage, using all available tools.
   3. IF the DOE determines that DCD is also detected on a downstream device,
      THEN DOE ENDORSES patrolling only beyond the farthest downstream protective device that experienced the DCD event.
      Otherwise, PATROL per section 5.4 of this document.
   4. DOE REPORTS to DO via phone call and email with complete analysis and recommendation on how to proceed.
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6 Responding to a Partial Voltage Outage with EPSS Enabled

6.1 IF SmartMeters are reporting a partial voltage outage that is fuse-level or above (SEE Figure 8) that has not rolled up to a 3-phase gang operated protective device,

THEN LOCATE the next operable 3-phase gang operated SCADA device immediately source-side of partial voltage outage calls, and OPEN de-energizing section.

1. De-energizing must take place as soon as the operator is aware of the partial voltage condition.

6.2 IF SmartMeters are reporting a partial voltage outage, that is fuse level or above (SEE Figure 8), that has rolled up to a 3-phase gang operated protective device, however that device has not tripped,

THEN LOCATE the 3-phase gang operated SCADA device immediately source-side of partial voltage outage calls, and OPEN de-energizing section.

Figure 8. Example of Partial Voltage Outage Calls
6.3 Patrol and Restoration Process

1. **CONDUCT** a patrol, starting from the load side of where the partial voltage outage calls clearly start, back to the desired de-energization point. **SEE Figure 9.**

2. **IF** obvious trouble is found (i.e. car-pole, tree, or branch through the line) **AND** is determined to be the initial case of the outage given the gathered information,

   **THEN** **PATROL** the de-energized overhead line, back to the desired de-energization point, source-side of all customers involved in the partial voltage outage.

   a. **PATROL** from the found trouble to the 3-phase gang operated SCADA device that was forced opened.

3. **IF** trouble with no cause is found (e.g. wire down, burned open jumper),

   **THEN** **PATROL** the de-energized overhead line, back to the desired de-energization point, source side of all customers involved in the partial voltage outage.

   a. **PATROL** from the found trouble to the 3-phase gang operated SCADA device that was forced opened.
6.3.3 (continued)

b. IF partial voltage indicators still exist,

THEN TROUBLESHOOT for cause.

4. Electric Dispatch MUST DISPATCH immediately for all partial voltage outages, AND HAVE personnel on site within 60 minutes.

7 Planned Switching Involving EPSS Devices

7.1 Switching that renders an EPSS circuit abnormal for more than 7 days MUST BE SENT to engineering for approval.

7.2 LEAVE SGF disabled on all devices in the parallel path on circuits that are switched abnormal.

1. IF the circuit will be abnormal for more than 7 days,

THEN SEND to engineering for review. Devices that are abnormally feeding into an EPSS area and do not have EPSS settings:

a. IF line recloser (LR) with a 4-C controller,

(1) THEN REQUEST a DOE study to ensure adequate EPSS tripping is in place.

(2) CUT OUT the reclosing relay and TAG caution.

b. IF LR with a Form 6 or Beckwith controller,

(1) THEN PLACE the HLT to the ON/ENABLED position.

(2) TAG caution.

c. IF circuit breaker (CB),

(1) THEN REQUEST a DOE study to ensure adequate EPSS tripping is in place.

(2) CUT OUT the reclosing relay.

(3) TAG caution.

2. DO PLACES a manual EPSS tag on each device in DMS.
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7.3 Before looping or paralleling through EPSS devices, DISABLE EPSS in the loop/parallel path until switching is complete.

1. RE-ENABLE EPSS on all devices as soon as possible once switching is complete, UNLESS:
   a. Ground current is above the SGF threshold with SGF enabled.
   b. A device is abnormally fed, AND is protecting a line that does NOT require EPSS.

8 Disable EPSS Process

8.1 The DO RECEIVES a list of circuits with EPSS devices to be disabled.

8.2 The DO DISABLES EPSS on all prescribed devices.

1. REMOVE tag and DISABLE EPSS.
2. CUT IN reclose relay.
3. ENABLE FLISR at the circuit level, and REMOVE caution tag on all EPSS disabled circuits.
4. DISPATCH field personnel immediately to all devices on the provided list without SCADA or with communication failure to disable EPSS.

8.3 Once EPSS has been disabled on all devices of a prescribed circuit, the DO COMPLETES the following actions: [SEE Figure 1]

1. In ILIS, NAVIGATE to the DOD, and SELECT the EPSS tab/page.
2. SELECT the circuit from the circuit drop-down menu that is being affected.
3. UNCHECK the box next to the device in the device list that has had EPSS disabled.
   a. IF EPSS is disabled on the entire circuit,
      THEN CLICK the “Disable All Devices” button to remove the check marks from all the boxes.
4. LEAVE the auto-populated statement in the Tag Comments field.
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**NOTE**

The EPSS Comments field is mandatory.

5. In the EPSS Comments field, ENTER:
   a. Text about EPSS being disabled.
   b. IF the circuit has YFA,
      THEN RECORD the status.
   c. IF EPSS has been disabled on the entire circuit,
      THEN ENABLE YFA.

6. CLICK Save.

8.4 In ILIS, a Routine Log entry is automatically created with the updated EPSS entry information.

8.5 In DMS, the EPSS tag is automatically removed from every device listed under the circuit that was selected in the ILIS EPSS page.

1. REMOVE any EPSS tags from DMS that have been added to devices manually.
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9 General Device EPSS Settings

9.1 LR Settings
1. Form 6 Rev 30 Alternate profile #3.
2. Form 6 Rev 28 Alternate profile #1.

9.2 FuseSaver Settings
1. Fast Single Non Reclose

9.3 Feeder CB Settings (SEE Figure 10)

** = General rules, exceptions can occur due to synchronous generation on feeder, etc.

Figure 10. Generally Accepted Feeder CB EPSS Settings

END of Instructions
Enhanced Power Line Safety Settings (EPSS) and Patrol Process

**DEFINITIONS**

**High Fire Risk Area (HFRA):** The High Fire Risk Area includes Tier 2 and Tier 3 of the CPUC High Fire Threat District (HFTD), and additional areas evaluated by PG&E to have elevated fire risk.

**IMPLEMENTATION RESPONSIBILITIES**

Superintendents, managers and supervisors of electric transmission and distribution work personnel are responsible for ensuring work personnel are aware of and comply with this procedure.

Work personnel in the operation of the electric grid transmission and distribution systems and associated Company equipment, must comply with the instructions in this procedure.

Work personnel are responsible for executing only the work for which they have been trained. When necessary, personnel must notify their supervisor of any additional training, equipment, or resources they need to perform their assigned duties and/or job assignments.

**GOVERNING DOCUMENT**

Utility Standard TD-2700S, “Electric Distribution General Operating, Clearance, and Non-Test Instructions”

**COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT**

Electric Rule 2, “Description of Service”
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Compliance Requirement / Regulatory Commitment

Records and Information Management:

Information or records generated by this procedure must be managed in accordance with the Enterprise Records and Information Management (ERIM) program Policy, Standards and Enterprise Records Retention Schedule (ERRS). Refer to GOV-7101S, “Enterprise Records and Information Management Standard” and related standards. Management of records includes, but is not limited to:

• Integrity
• Storage
• Retention and Disposition
• Classification and Protection

REFERENCE DOCUMENTS

Developmental References:

Utility Procedures:

• TD-1470P-01, Attachment 1 – “Application Guide Device Profile Settings”
• TD-2700P-03, “Clearances and Non-Tests”
• TD-2700P-04, “Processing Applications for Work and Switching Logs”
• TD-2700P-05, "Operating Procedures for Fault Location, Isolation and Service Restoration (FLISR)"
• TD-2700P-07, “Tags”
• Attachment 1, “Graphics”
• TD-2700P-11, “Testing and Sectionalizing Distribution Equipment”
• TD-2700P-20, “Distribution Switching Requiring Engineer Review”

Utility Standards:

• TD-1470S, "Enhanced Powerline Safety Settings (EPSS)"
• S1418, “Notice to Customers, Planned Electric Service Interruption"
Enhanced Power Line Safety Settings (EPSS) and Patrol Process

Supplemental References:

*Code of Safe Practices*

Utility Standards:

- Utility Standard SAFE-1001S, PG&E Injury & Illness Prevention Plan (IIPP)
- TD-1464S, “Preventing and Mitigating Fires While Performing PG&E Work”

APPENDICES

NA

ATTACHMENTS

Attachment 1, "Using Navigator Fault Indicators to Restore an EPSS Outage"

DOCUMENT REVISION

This document cancels and supersedes TD-2700P-26, “Enhanced Powerline Safety Settings (EPSS) and Patrol Process,” Rev. 0, published 05/05/2022.

This document also cancels and obsoletes TD-2700P-26-B001, "Enhanced Powerline Safety Settings (EPSS) Partial Voltage Outage De-Energization & Restoral Process”, Rev. 0, published 07/01/2022.

DOCUMENT ApproVER

[Redacted] Distribution Control Center Director, Electric Operations

DOCUMENT OWNER

[Redacted] Distribution Control Center Director, Electric Operations

DOCUMENT CONTACT

[Redacted] Business Process Supervisor, Electric Operations

[Redacted] Distribution Operations Specialist, Expert

[Redacted] Distribution Operations Specialist, Expert

[Redacted] Training and Simulation Specialist, Expert

[Redacted] Training and Simulation Specialist, Senior

[Redacted] Training and Simulation Specialist, Expert
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REVISION NOTES

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<tr>
<td>1.2</td>
<td>Removed</td>
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<tr>
<td>2.2</td>
<td>YFA is to be disabled and tagged caution on every circuit with EPSS enabled.</td>
</tr>
<tr>
<td>2.3</td>
<td>The process for logging EPSS enablement in ILIS has been updated.</td>
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<td>4</td>
<td>Outage reporting</td>
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<tr>
<td>5.3</td>
<td>Updated how FIs are used during unplanned outages.</td>
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<td>5.4</td>
<td>Added how to respond to an EPSS outage with HLT enabled.</td>
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<tr>
<td>5.5.3</td>
<td>Added wording about outages occurring on a circuit that no longer requires EPSS to be enabled.</td>
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<td>How to respond to an outage when multiple devices trip simultaneously.</td>
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