

SUMMARY

This utility procedure provides instructions for entering, maintaining, and editing data pertaining to substation equipment, preventative maintenance, and corrective work within the SAP/Work Management System (SAP/WMS). It also includes steps to properly document and record maintenance activities in support of <u>Utility Standard TD-3322S</u>, "Substation Equipment <u>Maintenance Requirements.</u>"

This procedure is not intended to be an SAP user manual.

Level of Use: Informational Use

TARGET AUDIENCE

- Asset and maintenance planning personnel
- Substation maintenance and construction (SM&C) personnel
- SM&C compliance personnel
- Asset performance management (APM) personnel

SAFETY

This document describes administrative tasks that do not raise the risk of a specific hazard to personnel, the public, or equipment.

BEFORE YOU START

NA

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PROCEDURE STEPS

1 Adding, Maintaining, and Removing Equipment in SAP

- 1.1 General Information
 - 1. FOLLOW <u>Utility Standard TD-3322S, "Substation Equipment Maintenance</u> <u>Requirements,"</u> for new or out-of-service equipment in SAP.
- 1.2 Adding New Equipment into SAP
 - 1. Field crews INSTALL equipment AND RECORD nameplate information in the APM software.
 - a. As an option, USE the <u>New Equipment Form</u> in addition to entering all information in APM.
 - (1) IF using the <u>New Equipment Form</u>,

THEN SUBMIT a completed <u>New Equipment Form</u> to the asset and maintenance planning shared mailbox at: <u>EDM&CSubstationAsset@pge.com.</u>

- (2) OTHERWISE, a change request from APM creates a Request for Work (RW) in SAP for the asset and maintenance planners.
- 2. TEST to verify that installed equipment is ready to release.
 - a. PROVIDE test information to the maintenance supervisor and asset and maintenance planners.
 - b. NOTIFY asset and maintenance planners that equipment is released.
- 3. Substation maintenance crew leads or delegates CONDUCT a new equipment postenergize inspection.
- 4. Asset and Maintenance Planning personnel REVIEW AND APPROVE new equipment RW notifications in SAP and/or a completed <u>New Equipment Form</u> received via email.
 - a. CREATE a new equipment record in SAP based on information received via RW or **completed** <u>New Equipment Form</u> received via email.
 - b. IDENTIFY the CAISO AND/OR the NERC/WECC indicator in the SAP equipment record as follows:
 - CAISO Indicator field INDICATE whether equipment falls under the control of the CAISO by filling in "Y" or "N" for all equipment, regardless of ownership.



1.2 (continued)

- REFERENCE the CAISO Transmission Rating Registry to identify if criticality code is ISO "Y" or "N."
- (2) **NERC\WECC Compliance Requirement field** INDICATE which NERC/WECC compliance standard is applicable, if any, for all equipment.
- c. IF any major equipment is marked as being under CAISO control,

THEN MARK the batteries AND station functional location to match the highest level of CAISO control.

d. IF any battery is marked FAC-501-WECC,

THEN MARK the charger the same.

- e. OBTAIN AND ASSIGN Accumulated Critical Current (ACC) trigger levels for circuit breakers, reclosers, and circuit switchers as described in <u>Attachment 14,</u> <u>"Accumulated Critical Current Process."</u>
- f. OBTAIN AND ASSIGN fault duty for circuit breakers, reclosers, and circuit switchers as described in <u>Attachment 14.</u>
- g. CREATE recurring maintenance plans in accordance with <u>Utility Standard</u> <u>TD-3322S, "Substation Equipment Maintenance Requirements,"</u> when applicable.
- 5. For as-found equipment, TAKE the following steps:
 - a. IF the equipment is in SAP,

THEN UPDATE the equipment information AND CREATE OR CORRECT maintenance plans within 5 business days.

b. OTHERWISE, IF the equipment is **not** in SAP,

THEN asset and maintenance planners ADD the equipment to SAP AND CREATE any required maintenance plans.

(1) The asset and maintenance planners must RECEIVE the "Request for Work Form" (SEE <u>TD-3320P-12-F04</u>) or an RW request from APM.



1.2 (continued)

NOTE

When as-found equipment is discovered, a Corrective Action Process (CAP) is created for any potential self-reporting, if necessary.

Example: Preventive maintenance cadence is past the out-of-compliance (OOC) date or going to go past the OOC date.

- 6. For mobile equipment maintenance plans and tracking, FOLLOW <u>Attachment 2,</u> <u>"Mobile Maintenance Plans."</u>
 - a. SEE <u>Attachment 6, "Substation Equipment Maintenance Process,"</u> for the detailed processes.
- For all Installation records The construction supervisor (or designee) SENDS all installation test reports electronically to the responsible maintenance supervisor within 10 business days after the equipment is released for service.
 - a. Headquarters (HQ) maintenance personnel PRINT AND FILE hard copies of all installation test reports within 10 business days of receiving the electronic copies of test reports.
- 8. Substation personnel at each HQ MAINTAIN a hard-copy filing system containing all maintenance and installation test reports for equipment within their jurisdiction.
- 1.3 Changing Maintenance Plan in SAP
 - 1. IF APM is available,

THEN PROCEED as follows:

- a. CREATE a change request in APM.
 - (1) FILL OUT all required fields.
 - (2) IDENTIFY the functional location and specific equipment.
 - (3) PROVIDE a brief explanation for requested change in the notes section.
 - (4) UPLOAD any supporting documentation.
- b. ROUTE the change request for approvals through APM.



1.3 (continued)

- c. The local maintenance supervisor AND substation specialist must REVIEW AND APPROVE the change request.
 - (1) IF a change request is approved,

THEN MAKE updates in the Work Management System.

- Asset and maintenance planner UPDATES the long text with the current condition of the equipment (including the current maintenance plan assignments) AND DOCUMENTS **any** new updates.
- (2) OTHERWISE, IF changes are denied,

THEN DOCUMENT the reason for rejection.

(3) IF additional information is required,

THEN the original requester must CREATE a new change request within APM with corrected information.

2. OTHERWISE, IF APM is unavailable,

THEN USE TD-3320P-12-F04, "Request for Work Form."

- a. Clerk ENTERS the information into an RW notification in SAP AND ROUTES for approvals.
- b. Once approved, asset and maintenance planners UPDATE maintenance plans or asset information in accordance with the RW request.
- 1.4 Removing Equipment from SAP
 - 1. Asset and maintenance planning personnel REVIEW AND APPROVE equipment removal RWs in SAP.
 - 2. Asset and maintenance planners MAINTAIN oil-filled equipment in the DeltaX TOA4 (Transformer Oil Analysis) database as follows:
 - a. ADD new equipment.
 - b. REMOVE archived equipment.
 - c. UPDATE attributes to oil-filled assets.



2 Alarm Management

2.1 WHEN abnormal conditions are recorded in the APM alarm dashboard after an inspection or maintenance activities,

THEN maintenance supervisor DETERMINES whether the abnormal conditions require action AND MARK the alarm Request for Work to generate a Line Corrective (LC) notification.

1. IF LC notification already exists,

THEN the maintenance supervisor still MARKS the alarm Request for Work AND SELECTS "link to:".

- This action links the alarm to the open notification and ensures that no new/additional notification is created.
- 2. OTHERWISE MARK the abnormal condition as an incorrect reading, incorrect alarm, or a condition to monitor with supporting comments.
 - a. IF the abnormal condition is placed in monitoring,

THEN ENSURE that the item is RE-EVALUATED, and the condition is RECORDED accordingly at the next inspection.

3. IF a work request is created in SAP,

THEN COMPLETE the corrective action before the required end date.

3 Line Corrective (LC) Notification Management

- 3.1 When creating an LC notification from an APM alarm or manually, FOLLOW the requirements listed below:
 - 1. USE the Facility Damage Action (FDA) matrix, which helps recommend a default priority code (e.g., Priority "A," "B," "E," or "F") and duration.
 - a. SEE Form TD-3220P-12-F01, "Corrective Work Form Substation Maintenance and Test Department," for the complete and current FDA matrix.
 - b. IF unable to find an appropriate FDA option,

THEN USE "Miscellaneous-Other." (This FDA option is rarely used.)

- 2. ASSIGN a priority code to all corrective work notifications (LC) and PM orders (T080). The priority code indicates the urgency to complete the task. The priority codes are:
 - A Immediate/Correct Unsafe Condition (30 days)
 - B Urgent Compliance (90 days)



3.1 (continued)

- E System Repair/Improvement (365 days)
- F System Repair/Improvement (1+ years)
- 3. INCLUDE a description of required work in the notification's long text.
- 3.2 Clerks RELEASE the LC notification AND GENERATE the PM orders.
 - 1. RELEASE all Priority "A" and "B" notifications to an order upon order creation.
- 3.3 Maintenance supervisors PERFORM the following tasks:
 - 1. REVIEW AND VERIFY requests for work.
 - 2. ENSURE that the request does not already have an active work order.
 - 3. In conjunction with the crew lead, DETERMINE when the labor, materials, tools, rental equipment, contractors, etc., are ready for the work to be scheduled.
 - 4. ASSIGN daily SAP/WMS work, including necessary resources, employees, etc.
- 3.4 To ensure safety and reliability, COMPLETE all LC notifications by the required end date.
 - 1. PERFORM field reassessments, as needed.
 - a. EVALUATE the current condition of a corrective action.
 - b. RE-PRIORITIZE the notification if the situation allows. SEE <u>Section 6</u>, <u>Notification Reprioritization</u>," on Page 11 for details.
 - 2. The completion date for capital corrective notifications can extend past 1 year. DOCUMENT this work under a Priority "F" notification.
 - a. Asset and maintenance planners MANAGE **all** Priority "F" notifications
 - b. Priority "F" notifications have a required default 2-year end date that can be extended. REFER to <u>Section 6</u> for details.

NOTE

In some cases, LC tags may be bundled under capital projects for efficiency purposes.



3.4 (continued)

3. WHEN LC tags are bundled under capital projects,

THEN the maintenance supervisor, asset and maintenance planner, project manager, or maintenance and construction engineer must COLLABORATE as follows:

- a. ESTABLISH an agreement via email or memorandum of understanding (MOU), on a case-by-case basis, documenting the scope and benefits of shifting the corrective work within the scope of the capital project.
- b. ATTACH this agreement email or MOU to the notification.
- c. DOCUMENT the capital order number or planning order number in the notification's long text.
- d. Asset and maintenance planner DOCUMENTS this agreement in the long text of the notification in SAP.
- 4. Once work is completed in the field, PERFORM the following steps:
 - a. ADD photographs.
 - b. DOCUMENT the corrective action in the long text.
 - c. POPULATE the reference date with the completed-in-field date.
 - d. CLOSE the LC notification as soon as possible.

NOTE

The PM order can remain open, pending all necessary job charges, not to exceed 3 months from the date the work is completed in the field.

4 Preventative Maintenance (PR) Notification Management

- 4.1 Monthly/Bi-Monthly Station
 - 1. COMPLETE the monthly/bi-monthly station inspections within the month they are due.
 - 2. Maintenance supervisors and crew leads must ENSURE that all tasks OR check-sheets are **100% completed** and **submitted**.
 - a. INSPECT all equipment within the substation, whether in service or not (OUTS).
 - b. IF equipment has been physically removed from the station,

THEN COMPLETE the Removal Form in the APM remote software AND UPLOAD to submit.



- 4.1 (continued)
 - 3. ENSURE that the reference date in SAP reflects the date when the checklist was **entirely** completed.
 - **Example:** If a substation takes multiple days, the reference date is the **final** date of the inspection (i.e., the day the inspection is concluded).
 - Some substations have split plans with separate checklist and PR notifications.
- 4.2 Mechanism (Mech) Service Notifications
 - 1. REQUEST a T180 order for a mech service when a breaker fails an exercise.
 - a. The maintenance supervisor (or designee) must REVIEW the hard copy OR the electronic records.
 - (1) ENSURE that all forms are filled out properly AND all required checks, measurements, tasks, etc., are completed.

NOTE

Work is considered complete after the documents pertaining to the work are attached to the notification in SAP and the notification is **properly** closed.

- 4.3 NERC/WECC Notifications
 - 1. PROCESS substation maintenance job packages for equipment associated with NERC/WECC standards in accordance with <u>Attachment 12, "Documentation</u> Requirements for NERC/WECC Substation Maintenance."
- 4.4 Deferred Maintenance
 - 1. Maintenance deferral submissions and reviews are the responsibility of the first line supervisor (FLS), with support from the field specialist.
 - 2. IF maintenance deferrals are needed,

THEN FLS INITIATES deferrals AND COMPLETES the process steps included in Utility Standard TD-3322S, Attachment 3, "Deferring Preventive Maintenance."

a. Asset maintenance planners COMPLETE the SAP documentation steps outlined in <u>Utility Standard TD-3322S, Attachment 3, "Deferring Preventive</u> <u>Maintenance."</u>



- 4.5 Closing PR Notifications
 - 1. Local clerical support personnel COMPLETE Steps **a** through **c** below before closing the notification:
 - a. ENTER the following required values into SAP:
 - (1) Fault duty data from APM for circuit breakers and circuit switchers.
 - (2) Station inspection reads from APM for counters and load tap changers (LTCs) through neutrals.
 - (3) Circuit breaker interrupter wear assessment analysis (WAA) from breaker oil analysis (BOA) comments located on laboratory oil sample test reports and field generated overhaul/mechanism service test reports in the SAP equipment record.
 - b. ENSURE that **all** required maintenance and test reports are attached to the corresponding notification in SAP including, but not limited to, the following:
 - Maintenance history cards
 - Copies of test reports for all planned maintenance activities
 - Inspection reports/checklists
 - Measurements activities
 - c. ENSURE that all work orders in APM are **100% completed and uploaded**.
 - 2. When needed, clerks RUN SAP/WMS list edits AND PRINT shop/work tickets to support the supervisor, crew lead, and electricians.

5 Unresolved Maintenance Issues (UMI)

- 5.1 DOCUMENT all UMIs (see <u>Definitions</u> section on Page 13) with batteries and chargers that are designated in SAP as "<u>NERC PRC-005</u>."
 - 1. CREATE an SAP corrective notification (T080) before the preventive maintenance order (T180) is closed. The corrective notification must include the following information:
 - a. The letters "UMI" at the beginning of the short text.
 - b. A thorough description of the problem.
 - c. Evidence of actions taken to correct the UMI (e.g., work orders, replacement component orders, invoices, project schedules with completed milestones, return material authorizations [RMAs], or purchase orders).



- 5.2 Once the preventive maintenance work is completed and documented, the appropriate supervisor must PERFORM the following actions:
 - 1. REVIEW the results to ensure that the corrective notification was created for tracking the UMI AND that evidence was captured demonstrating the UMI was mitigated and resolved.
 - 2. TRACK all UMIs AND DOCUMENT them in SAP WM.
 - 3. USE reports from SAP to show compliance with the regulatory requirement.

6 Notification Reprioritization

- 6.1 Supervisor MUST APPROVE any change to an LC notification priority code once it is released in SAP.
 - 1. ENSURE that a detailed explanation is included in the notification's long text.
 - 2. INCLUDE a substation specialist on the approval of LC notifications affecting oil.
- 6.2 USE the following criteria for the reprioritization of LC notifications.
 - 1. Incorrect Priority Code Based on the Predetermined FDA Matrix
 - a. USE when the severity of the notification does not match the FDA-matrixassumed priority.

Example of long-text language:

Per headquarter supervisor (Name of supervisor and or specialist), work was incorrectly prioritized based on the FDA matrix. Substation reassessed and validated in the field that it does not pose a safety, reliability, compliance, or environmental risk. Due to incorrect priority, updated priority from a ("B" to an "E" or "F").

- 2. Operational Constraints
 - a. USE when there are constraints with clearances, resources, long lead material, emergencies, etc.
 - b. To **downgrade** under this condition, PERFORM a Field Safety Reassessment (FSR) to confirm that the condition has not worsened over time.
 - (1) IF the condition has worsened,

THEN DO NOT DOWNGRADE the notification.



6.2 (continued)

Examples of long-text language:

- Per headquarter supervisor (name of supervisor and or specialist), Substation reassessed and determined it was safe to downgrade the priority from a ("B" to an "E" or "F") based on the current field condition and existing operational constraints. Emails from operations and supervisor and or what are the operational constraints should be uploaded into SAP.
- Per headquarter supervisor, (name of supervisor and or specialist) Substation reassessed and updated the priority from a ("E" to an "F") due to long lead material. Emails confirming the long lead material and email from supervisors should be uploaded into SAP.
- 6.3 APPLY the LC notification reprioritization criteria listed in <u>Section 6.2</u> on Page 11 to notifications generated from the Enhanced Inspection (EI) process.
- 6.4 DO NOT DOWNGRADE the following types of notifications from Priority "B":
 - Infrared (IR) re-inspection notifications
 - Re-test LC notifications

7 Changing Ownership of Notifications

7.1 IF it is determined that another line of business (LOB) is responsible for completing the tag work,

THEN PERFORM the following actions:

- 1. ATTACH an agreement (email or MOU) to the notification.
 - a. The LOB must CREATE a new notification based on their business process.
- 2. DOCUMENT the other LOB's notification number in the notification's long text.
- 3. SEND a notification to the asset and maintenance planner to "delete-flag" (DLFL) the notification. SEE <u>Section 8</u> below.

8 Delete-Flagging Notifications

8.1 IF an LC or a PR notification is no longer needed,

THEN supervisors or field employees SEND a detailed explanation to the asset and maintenance planners.



- 8.1 (continued)
 - 1. USE the following possible justifications:
 - Duplicate notification (REFERENCE the notification in long text).
 - Work was completed or replaced by maintenance (REFERENCE the notification where the work was completed).
 - Equipment has been removed or is no longer active.
 - The work will be completed by another LOB.
- 8.2 Asset and maintenance planners REVIEW AND APPROVE justifications.
- 8.3 ENSURE that any explanations are entered into the notification's long text and the PM order.
- 8.4 DELINK the notification from the PM order.
- 8.5 DELETE-FLAG (DLFL) the notification in SAP.

END of Instructions

DEFINITIONS

Accumulated critical current (ACC): The total fault current a circuit breaker has accrued since the last overhaul.

Asset performance management (APM): A system of hardware and software used to collect and analyze inspection and test results.

Breaker oil analysis (BOA): An external method for analyzing the internal condition of oil circuit breakers.

Criticality code: Defines the importance of work tasks, notifications, and PM orders within a priority code. Also known as the "ABC indicator."

Job package: The supporting paperwork given to field personnel to complete the work.

Major equipment: Includes, but is not limited to, station transformer banks, circuit breakers (CBs), load tap changers (LTCs) and regulators, condensers, station cap banks, station batteries, reactors, transmission line conductors, splices, and structures.

Maintenance plan: An SAP/WMS-scheduled, recurring maintenance task.



DEFINITIONS (continued)

North American Electric Reliability Corporation (NERC): A self-regulatory organization, subject to oversight by the U.S. Federal Energy Regulatory Commission (FERC) and governmental authorities in Canada. NERC provides the following functions to ensure the reliability of the Bulk Power System in North America:

- Develop and enforce reliability standards.
- Assess reliability annually.
- Monitor the Bulk Power System.
- Educate, train, and certify industry personnel.

Notification: A document that SAP/WMS uses to capture information and/or history (technical and process) of an asset requiring repair, replacement, or tracking. Creating a notification is the first step in identifying work. The notification is the official record of work completion.

Preventative maintenance: Planned or unplanned work to prevent failure.

Priority code: An SAP term used to indicate the urgency of a task. SAP assigns priorities based on the work task and order type.

Unresolved Maintenance Issue (UMI): A deficiency identified during a maintenance activity that causes the component to not meet its intended performance, cannot be corrected during the maintenance cycle, and requires follow-up corrective action by assigned personnel.

Wear assessment analysis (WAA): Estimation of circuit breaker interrupter wear percentage based on breaker oil analysis (BOA) sample results or physical inspection of the interrupter.

Western Electric Coordinating Council (WECC): A regional entity authorized to audit and enforce the NERC standards.

IMPLEMENTATION RESPONSIBILITIES

The manager in charge of substation asset and maintenance planning is responsible for approving, revising, and distributing this procedure.

Employees involved in asset and maintenance planning and the maintenance and construction of substation facilities and equipment must review, understand, and follow this procedure.

Substation maintenance superintendents are responsible for managing the SAP/WMS processes in their areas.

Substation maintenance supervisors are responsible for managing the SAP/WMS process in their HQs.



GOVERNING DOCUMENT

Utility Standard TD-3320S, "Substation General Work Procedures"

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

CAISO Transmission Maintenance Procedures (Filed Maintenance Practices)

NERC PRC-005, "Transmission and Generation Protection System Maintenance and Testing"

WECC Standard PRC-STD-005, "Transmission Maintenance"

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 <u>GOV-7101S</u>, "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:

NA

Supplemental References:

Code of Safe Practices

New Equipment Form

Substation Maintenance and Construction (SM&C) Manual (TD-3322M)

Utility Procedure TD-3320P-36, "Substation Asset Performance Management (APM) Process"

Utility Standard TD-3322S, "Substation Equipment Maintenance Requirements"

Utility Standard SAFE-1001S, "PG&E Injury & Illness Prevention Plan (IIPP)"

APPENDICES

NA



ATTACHMENTS

Attachment 1, TD-3320P-12-F01, "Corrective Work Form – Electric Substation"

Attachment 2, "Mobile Maintenance Plans"

Attachment 4, "Substation Maintenance Plans"

Attachment 5, "Substation and Protection New Equipment Form and Asset Registry Records <u>Process</u>"

Attachment 6, "Substation Equipment Maintenance Process"

Attachment 12, "Documentation Requirements for NERC/WECC Substation Maintenance"

Attachment 14, "Accumulated Critical Current (ACC) Process"

NOTE

Attachments 3, 7, 8, 9, 10, 11, and 13 have been obsoleted or superseded.

Form: TD-3320P-12-F04, "Request for Work Form"

Job Aids:

- TD-3320P-12-JA02, "Identifying Levels of Corrosion and LC Notifications"
- <u>TD-3320P-12-JA03, "Identifying Levels of Foundation Deterioration and Creating LC</u> Notifications for Further Civil Engineering Assessment"
- TD-3320P-12-JA04, "Establishing and Setting ACC Limit Values"
- TD-3320P-12-JA05, "Establishing and Setting ACC Max Fault Duty in SAP"
- TD-3320P-12-JA06, "Recording Counter Change and Fault Activity"
- TD-3320P-12-JA07, "Entering Fault Duty Data & Equipment Condition Codes in SAP"
- TD-3320P-12-JA08, "ACC Reviews and Controls"

DOCUMENT RECISION

This utility procedure cancels and supersedes Utility Procedure TD-3320P-12, "Substation SAP Work Management System (WMS) Process," Rev. 6, dated 08/26/2020.

DOCUMENT APPROVER

, Manager, TS M&C Compliance and Quality



DOCUMENT OWNER

, Supervisor, Asset Maintenance and Planning

DOCUMENT CONTACT

Supervisor, Asset Maintenance and Planning

REVISION NOTES

Where?	What Changed?	
Target Audience	Added SM&C compliance personnel and asset performance management (APM) personnel.	
Throughout the document	Comprehensive content update. Different section titles (added two new sections).	
	Removed references to CBM.	
	 Added reference to TD-3320P-36 for creating and removing assets in APM. 	
	Updated CAISO classification reference from ABC to Y/N.	
	 Added reference to new "DLFL" requirement for notification management. 	
	Added section for changing ownership of notifications.	
	Removed "Hard Copy Records" Section 3.1.1, and updated language to refer to attaching documents electronically in SAP.	
Definitions	Added UMI.	
Implementation Responsibilities	Removed reference to old Section 2.	
Reference Documents	Removed references to job aids and 2016 Substation Accounting Handbook. Added Utility Procedure TD-3320P-36.	
Attachment	New Form TD-3320P-12-F04, "Request for Work Form"	
Document Approver, Document Owner, Document Contact	Updated names and titles.	