Development of the Annual Substation Supplemental Inspection Plan

SUMMARY

This procedure describes how to develop the annual substation supplemental inspection plan.

To reduce system risk, ensure compliance with regulatory requirements, fulfill PG&E Wildfire Mitigation Plan commitments and because factors can change over time, it is imperative to develop an updated and accurate supplemental inspection plan each year.

Deciding whether or not to perform supplemental inspections of substations and switchyards is dependent on many factors including location of the site, High Fire Threat District (HFTD) boundaries, asset types, previous inspection history, current inspection criteria, and strategy etc. Some of these factors change. For example, HFTD area boundaries can change if the California Public Utilities Commission (CPUC) issues updated maps.

Level of Use: Informational Use

TARGET AUDIENCE

This procedure is written for substation asset strategy, power generation asset strategy, and system inspections 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 Annual Substation Supplemental Inspection Plan Requirements

The annual substation supplemental inspection plan is the list of facilities included in the supplemental inspection program for each year.

1.1 Substation asset strategy personnel PROVIDE the annual inspection plan to the system inspection team before the end of the year preceding the plan.

1. INCLUDE the following elements in the plan for each substation:

- Facility name
- SAP-WMS functional location
- Owner of the facility
- HFTD tier rating
- Wildfire Risk score
- Wildfire Consequence score

NOTE

Utility Standard TD-3328S, Attachment 1, "Substation Supplemental Inspection Program" defines the strategy for the supplemental inspection program and contains the prescribed percentages for risk and consequence.

1.2 System inspections personnel USE the information in the plan to plan, schedule, execute, and report the status of substation supplemental inspections.

1.3 Substation asset strategy personnel USE the plan to develop the commitments supporting the Wildfire Mitigation Plan (WMP).

1.4 ENSURE the inspection plan meets the following requirements:

- Correctly reflects the HFTD rating of the facility.
- Calls for inspecting each facility at the correct interval based on the requirements in Utility Standard TD-3328S, Attachment 1.
- Correctly reflects the ownership of assets within the facility, that is, electric operations (EO), power generation (PGEN), or shared.

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1.5 COUNT each functional location in SAP-Work Management System (WMS) as a facility in the supplemental inspections program.

NOTE

Substation owned facilities that do not contain PGEN assets are counted as one facility.

PGEN owned facilities that do not contain substation assets are counted as one facility.

Facilities that contain assets that are owned by substation and assets that are owned by PGEN are counted twice, once for the functional location listed in substation SAP-WMS and once for the functional location listed in PGEN SAP-WMS.

1.6 In each year's supplemental inspection plan, INCLUDE any substations and switchyards that are in HFTD Tier 3, Tier 2, Zone 1, and High Fire Risk Area (HFRA) and meet the following criteria:

1. High Wildfire Risk: This includes substations captured within the prescribed percentage of the total wildfire risk.

2. High Consequence: This includes substation captured within the prescribed percentage of the total consequence.

3. High Terrain/Suppression Risk: This includes substations which meet all the following requirements below that will be reviewed by the public safety specialist (PSS) within the safety and infrastructure protection team (SIPT) to determine if they will be included in the in-year plan:

   - Not classified as High Risk or High Consequence
   - Located in Zone 1 or Tier 3
   - Have not achieved 100% of the defensible space requirements

4. Substations and switchyards that don't meet the requirements above, that have not been inspected in the previous 2 calendar years.

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2 Source Data

2.1 The information required to develop the annual plan comes from several sources. Table 1. Data Matrix," on Page 4 lists the data (attribute) required, its source, and how the data is used.

2.2 The following information defines the data sources and explain the purpose of the data.

- **SAP-WMS** is the source of facility and asset data for both EO and PGEN substations. Though both groups have their facility and asset data in the same system, it is not possible to extract one list from SAP-WMS that shows all the EO and PGEN facilities or assets. The data must be pulled separately and merged in Excel. The facility data is used to develop the list of facilities to be inspected on a given year and the asset data is used to determine which assets within each facility are to be inspected.
- **Electric Transmission Geographical Information System (ET-GIS)** is the source for geospatial information about each facility. Many of the factors used to determine which facilities are inspected each year are based on the geospatial information. These factors include whether the facility is located in an HFTD or HFRA area, etc.
- **System inspection compliance report** is a spreadsheet created by the system inspection team that captures when each of the inspections (ground, infrared and aerial) were last completed.
- **Wildfire consequence score** for each substation is developed by the PG&E risk management and analytics team. It provides a rating for the potential consequence of an ignition event at the location of the substation and is used to inform and prioritize the inspection schedule.
- **High terrain/suppression** substations will be reviewed by the public safety specialist (PSS) to determine if they will be included in the in-year plan. These substations may have difficulties with terrain access and suppression efforts and meet the criteria below:
  - Not classified as high risk or high consequence
  - Located in zone 1 or tier 3
  - Have not achieved 100% of the defensible space requirements
- **Percentage vegetation work completed** for each substation is developed by the PG&E Natural Resource Management (NRM) team. It is used as a factor in the defensible space status score for the risk calculation.
- **Percentage structure mitigation completed** for each substation is developed by the PG&E NRM team. It is used as a factor in the defensible space status score for the risk calculation.

Table 1. Data Matrix

Data Sources		
Attribute	**Source**	**Method of Determination**
Substation name	SAP-WMS	Description of functional location field.
Functional location	SAP-WMS	Functional location field.
Facility owner	SAP-WMS	Determined by planner group field in substation SAP-WMS, and if it is listed in PGEN SAP-WMS.
Site type (EO, PGEN or shared)	SAP-WMS	Determined by reviewing the data from substation and PGEN SAP-WMS for each facility. Locations with inspectable assets in both databases are shared, those with assets only in substation SAP-WMS are EO and those with assets only in PGEN SAP-WMS are PGEN.
Last inspection date	System inspection compliance report	Completion date field in the report.
HFTD rating - Tier 3, Tier 2, Zone 1, and HFRA	ET-GIS	Directly from GIS for each facility.
Wildfire consequence score	PG&E risk and analytics team	Provided on a spreadsheet via email.
Percentage vegetation work completed	NRM team	Provided on a spreadsheet via email.
Percentage structure mitigation completed	NRM team	Provided on a spreadsheet via email.
Terrain and suppression risk review	Public safety specialist (PSS) within safety & infrastructure protection team (SIPT)	Perform a manual review of all stations that are 1) not classified as high risk or high consequence 2) located in HFTD zone 1 or tier 3, and 3) have not achieved 100% of the defensible space requirements. The PSS will provide insightful feedback and recommendations for each of the locations reviewed.

3 Feedback from Stakeholders

3.1 Once the draft plan is compiled, SOLICIT feedback from the following stakeholders before finalization:

- Substation asset strategy
- Power generation asset strategy
- System inspections

3.2 WHEN the feedback is received from the stakeholders,

THEN RESOLVE all identified issues AND FINALIZE the plan.

4 Approval and Documentation

4.1 PRESENT the plan to the wildfire risk governance steering committee (WRGSC) for approval once the inspection plan is finalized.

4.2 ROUTE the plan in the Electronic Document Routing System (EDRS) for approval by the following personnel once approval is received from the WRGSC,

- Director and senior director – substation asset strategy
- Director – digital strategy
- Director and senior director – power generation asset excellence
- Director and senior director – system inspections

5 Periodic Review

Because of the possibility of changes in the source data used to develop the annual inspection plan, PERFORM periodic reviews to ensure that any changes that would impact the plan are identified and the plan updated.

5.1 At the beginning of each quarter, REVIEW the inspection plan to ensure on-going accuracy throughout the year.

5.2 INCLUDE the following actions in the quarterly review:

1. REVIEW the list of facilities from both substation AND PGEN SAP-WMS AND CONFIRM that all required sites are correctly reflected on the plan.

   a. For this review, FOCUS on the following changes:

      - Newly commissioned substations.
      - Substations that were removed, decommissioned, converted to distribution line assets, or divested.
      - Changes in assets that may cause the facility to be added or removed from the inspection plan.

5.2 (continued)

2. REVIEW all substations with the GIS team to ensure the following conditions:

   a. The GIS system contains the latest HFTD maps from the CPUC.

   b. All identified substations are listed in GIS.

   c. All substation HFTD AND HFRA ratings are consistent with the current inspection plan.

NOTE

The High Risk, High Consequence, and Terrain/Suppression Risk categorizations are not a part of the quarterly review except as required for the addition of new substations to the plan.

3. MODIFY the plan to align with any changes that have occurred AND FOLLOW the guidance in Section 6, "Modifications to the Plan."

6 Modifications to the Plan

6.1 IF the plan must be modified throughout the inspection year,

THEN ENSURE the plan is reapproved.

6.2 The following are requirements for reapproval:

1. MAKE required changes to the plan.

2. On the change-log tab in the plan (spreadsheet), DOCUMENT the following items:

   - Each specific change that was made to the previous version of the plan.
   - The date of the change.
   - The specific reason for each change.

3. SOLICIT feedback on the revised plan as outlined in Section 3, "Feedback from Stakeholders" above.

4. OBTIAN approval by completing the steps outlined in the Section 4, "Approval and Documentation" above.

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7 Annual Inspection Plan Development

7.1 REVIEW Utility Standard TD-3328S, Attachment 1 to validate the inspection frequency and criteria.

7.2 EXTRACT the list of all EO substation facilities from SAP-WMS.

7.3 REFINE the list as follows:

1. REMOVE facilities that are not in-service as follows:
   a. REVIEW the User Status field for each asset.
   b. REMOVE the facilities that don't have "INSV" listed.
2. REMOVE facilities that are owned by third parties. This is determined by reviewing the User Status field for each asset AND removing the facilities that have "3rd" listed.
3. REMOVE all remedial action scheme (RAS) facilities, including but not limited to the following sites:
   - Cinnabar RAS site
   - Fresno Operations Center (FOC) (RAS site)
   - Sacramento RAS site
   - San Francisco RAS site
   - Santa Cruz RAS site
   - Vacaville Grid Control Center (RAS site)
4. REMOVE facilities that are not substations, including but not limited to following sites:
   - Tesla mobile storage (mobile equipment storage)
   - Evolution substation (training facility)

7.3 (continued)

5. REMOVE the following PGEN facilities listed in substation SAP-WMS that have no substation assets. These sites are included later with the rest of the PGEN facilities. Some may have protection assets only, including but not limited to the sites listed below:

- Alta Power House (PH)
- Butt Valley PH
- Chili Bar PH
- Coal Canyon PH
- Cow Creek PH
- Deer Creek PH
- Dutch Flat #1 PH
- Grizzly PH
- Hat Creek #2 PH
- Helms PH
- James B Black PH
- Kern Canyon PH
- Lime Saddle PH
- Desabla PH
- Newcastle PH
- Oak Flat PH
- Pit 4 PH
- Pit 6 PH
- Pit 7 PH
- Toadtown PH
- Tule River PH
- Spaulding #3 PH

6. The following facilities have been decommissioned or sold. VALIDATE that none are included in the list

- Cliff Drive substation
- Limestone substation
- Narrows PH #1
- Opal Cliffs substation

a. IF any are still on the list,

THEN REMOVE them AND REQUEST that the required corrections are made in SAP-WMS to correctly reflect their status.

7. VALIDATE that no other facilities on the list have been decommissioned or sold.

8. VALIDATE that Colusa Power Plant (PP) is not on the list because it only contains protection equipment owned by EO.

7.3 (continued)

9. Fountain Wind switching station, Avila substation, and Santa Teresa substation are facilities that are planned to be constructed and are not yet in service.

   a. IF any are on the list,

      THEN VALIDATE they are in service.

      (1) IF any have been placed in service,

         THEN LEAVE them on the list.

      (2) IF not yet in service,

         THEN REMOVE them from the list until they are placed in service.

10. VALIDATE that Red Bluff junction is not on the list.

   a. IF it is,

      THEN REMOVE it because it is not a substation.

7.4 EXTRACT the list of PGEN facilities from PGEN SAP-WMS.

1. REMOVE the facilities from the list that meet the following criteria:

   a. Have been divested, including but not limited to.

      (1) Chili Bar PH

      (2) Kern PH

   b. Have been permanently removed from service, including but not limited to.

      (1) Coal Canyon PH switchyard

      (2) Centerville PH switchyard

      (3) Kilarc PH switchyard

7.5 MERGE the substation AND power generation lists into one list (via a spreadsheet).

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7.6 OBTAIN a list of all HFTD and HFRA facilities from GIS.

1. COMPARE the HFTD ratings from GIS to those shown from SAP-WMS.
2. CORRECT any discrepancies.
   a. The GIS is the system of record for HFTD and HFRA ratings.
      (1) IF GIS and SAP-WMS ratings for Zone 1, Tier 2, Tier 3, and HFRA are different,

      THEN CORRECT the SAP-WMS data to align with GIS.

7.7 REMOVE all sites except those located in HFTD or HFRA areas.

7.8 EXTRACT the date of the last completed supplemental inspection for each site on the list from the system inspections compliance report AND add the information to the list.

7.9 OBTAIN the current Wildfire Consequence score for each facility AND IMPORT it into the list.

7.10 DETERMINE the defensible space status for each facility on the list.

NOTE

The defensible space status is based on two factors; percentage of vegetation mitigation and the risk of structures located within the defensible space perimeter.

1. IMPORT the current percent vegetation mitigation completion for each facility from the defensible space report.
2. REVIEW each site for structure related risk. Sites where structures are within the defensible space perimeter must be identified in the report.
3. ESTIMATE the percentage of risk mitigation due to the structure.
   a. SCORE structure risk as either 25%, 50%, 75% or 100%. Use 100% for locations that have no structure issues within the defensible space perimeter AND a lower percentage for more risk from the structure.
4. MULTIPLY the percentage vegetation mitigation by the percentage structure risk and subtract the product from one. The result is the defensible space status.

7.11 DETERMINE the risk score for each facility on the list by multiplying the Wildfire Consequence score by the defensible space status.

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7.12 IDENTIFY the facilities with the highest risk scores that include substations captured within the prescribed percentage of the total wildfire risk.

1. DETERMINE the total risk by adding up the individual risk scores for all facilities on the list.
2. CALCULATE prescribed percentage of the total risk.
3. SORT the list (high to low) by the risk score.
4. Starting with the highest risk facility, SUM the individual risk scores until the total is equal to prescribed percentage of the total risk.
5. IDENTIFY these facilities as High Risk.

7.13 IDENTIFY the facilities with the highest Wildfire Consequence scores, that in addition to the High Risk facilities, includes substations captured within the prescribed percentage of the total Wildfire Consequence.

1. DETERMINE the total Wildfire Consequence by adding up the individual Wildfire Consequence score for all the facilities on the list.
2. CALCULATE prescribed percentage of the total Wildfire Consequence.
3. SORT all the facilities on the list that are not identified as High Risk (high to low) by Wildfire Consequence.
4. Starting with the highest Wildfire Consequence facility, SUM the individual wildfire consequence scores with the wildfire consequence scores of the High Risk facilities until the total is equal to prescribed percentage of the total Wildfire Consequence.
5. IDENTIFY these facilities as High Consequence.

7.14 IDENTIFY facilities that meet all the following requirements as High Terrain/Suppression Risk:

1. Not classified as High Risk or High Consequence.
2. Located in Zone 1 or Tier 3.
3. Have not achieved 100% of the defensible space requirements.
    a. These stations will be reviewed by the public safety specialist (PSS) to determine if they will be included in the in-year plan

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7.15 IDENTIFY all the facilities not already identified as either high risk, high consequence, or high terrain/suppression risk as Remainder.

7.16 POPULATE inspection frequency information for each facility.

1. ENTER “Annually” for each facility identified as high risk, high consequence, or high terrain/suppression risk.

2. ENTER “3-year” for each facility identified as Remainder.

7.17 For each facility on the 3-year inspection cycle, DETERMINE the year of the last completed supplemental inspection.

7.18 IF facilities identified as Remainder have been inspected in the previous two years (assuming a 3-year inspection cycle),

THEN REMOVE them from the list.

1. IF the cycle has changed,

   THEN ADJUST accordingly.

7.19 REVIEW the list AND CONFIRM that it includes the following information.

- All High Risk facilities
- All High Consequence facilities
- All High Terrain/Suppression Risk facilities
- All Remainder facilities that have not been inspected in the previous two years

7.20 Once the draft plan is developed, PRESENT it to the WRGSC for approval.

7.21 After the WRGSC approval, ROUTE it for approval in the EDRS.

7.22 After EDRS approval, PROVIDE the approved plan to all stakeholders.

7.23 FILE the finalized AND approved plan (spreadsheet) in the designated SharePoint site maintained by substation asset strategy personnel.

END of Instructions

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DEFINITIONS

High Fire Threat Districts (HFTD): Areas defined by the CPUC, within the state of California, with an increased risk for utility associated wildfires.

Remedial action scheme (RAS) sites: Locations where protection and communication equipment for remedial action schemes is located, outside of an electric substation. These sites do not contain any other substation type equipment.

Substation: For this procedure, the term substation includes substations, switchyards, and switching stations.

Wildfire Risk Governance Steering Committee (WRGSC): The committee is comprised of the following voting members:

- Senior vice president (SVP), electric operations
- Vice president (VP), asset risk management and Community Wildfire Safety program
- VP, major projects and programs, EO
- VP, wildfire safety and public engagement
- VP, chief audit officer

Wildfire Mitigation Plan (WMP): An annual plan mandated by the CPUC, developed by the utility, intended to cover the utility's activities to reduce the risk of a utility associated wildfire. The plan documents status of activities and actions planned to reduce risk.

IMPLEMENTATION RESPONSIBILITIES

The directors in charge of substation asset strategy, power generation asset strategy, and system inspections are responsible to ensure their teams are made aware of this document. Substation asset strategy personnel, with assistance from power generation, system inspections, and other personnel, are responsible for developing the annual inspection plan.

GOVERNING DOCUMENT

Utility Standard TD-3328S, "Substation Supplemental Inspection Program"

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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 (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:

NA

Supplemental References:

Utility Standard TD-3328S Attachment 1, "Substation Supplemental Inspection Program"

PG&E Wildfire Mitigation Plan

APPENDICES

NA

ATTACHMENTS

NA

DOCUMENT RECISION

NA

DOCUMENT APPROVER

[redacted] Director, transmission, substation and storage strategy

DOCUMENT OWNER

[redacted] Manager, substation asset strategy

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DOCUMENT CONTACT

[redacted] Expert Specialist, substation asset strategy

REVISION NOTES

Where?	What Changed?
Entire document	This is a new procedure.