PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

September 30, 2024 SA2024-1171

Vincent Tanguay, Senior Director
Electric Compliance, Electric Engineering
Pacific Gas & Electric Company (PG&E)
300 Lakeside Dr., Oakland, CA 94612

SUBJECT: Electric Substation Audit of PG&E Cottonwood Headquarters

Mr. Tanguay:

On behalf of the Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission (CPUC), Gordon Szeto and Mathew Yunge of ESRB staff conducted an electric substation audit of PG&E Cottonwood Headquarters from May 6 through May 10, 2024. During the audit, ESRB staff conducted field inspections of PG&E's substation facilities and equipment and reviewed pertinent documents and records.

As a result of the audit, ESRB staff identified violations of General Order 174. A copy of the audit findings itemizing the violations is enclosed. Please provide a response no later than October 31, 2024, by electronic copy of all corrective actions and preventive measures taken by PG&E to correct the identified violations and prevent the recurrence of such violations.

Please note that ESRB will be posting the audit report and your response to our audit on the CPUC website. If there is any information in your response that you would like us to consider as confidential, we request that in addition to your confidential response, you provide us with a public version (a redacted version of your confidential response) to be posted on our website.

If you have any questions concerning this audit, please contact Gordon Szeto at gordon.szeto@cpuc.ca.gov or (415) 652-1847.

Sincerely,

Rickey Tse, P.E.
Program and Project Supervisor
Electric Safety and Reliability Branch
Safety and Enforcement Division
California Public Utilities Commission

Enclosure: CPUC Electric Substation Audit Report for PG&E Cottonwood Headquarters

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CPUC SUBSTATION AUDIT FINDINGS
PG&E Cottonwood Headquarters
May 6 – 10, 2024

I. Records Review

During the substation audit, Electric Safety and Reliability Branch (ESRB) reviewed the following standards, procedures, and records for PG&E's Cottonwood Headquarters (HQ):

- List of all PG&E substations in the Cottonwood HQ
- Map showing all PG&E substations in the Cottonwood HQ
- PG&E Substation Maintenance and Construction (SM&C) Manual, Utility Standard: TD-3322M, Revision 11, with attachments 1 through 11
- PG&E Utility Standard: TD-3328P, Revision 0, with attachments 2 through 4
- PG&E Mobile Substation Equipment – Maintenance and Operating Procedures, Utility Standard: TD-3468P-01, Revision 2, with attachments 1 through 3
- PG&E Substation Equipment Maintenance Requirements, Utility Standard: TD-3322S, Revision 9, with attachments 2 through 12
- PG&E Substation Supplemental Inspection Program, Utility Standard: TD-3328S, Revision 3, with attachment 1
- PG&E Substation Asset Performance Management (APM) Process, Utility Procedure: TD-3320P-36, Revision 0
- PG&E Substation SAP Work Management System (WMS) Process, Utility Procedure: TD-3320P-12, Revision 7, with attachments 2, 4 through 6, 12, and 14
- PG&E Substation Fire Protection Systems and Equipment – Inspection, Test and Maintenance: TD-3320P-07, Revision 3
- PG&E Substation General Work Procedures, Utility Standard: TD-3320S, Revision 2
- Explanation of PG&E inspector training policies
- List of all substation inspections conducted in the last five years for Cottonwood HQ
- List of all open/pending, completed, cancelled, and late work orders and maintenance items in the previous five years (2019-2023)
- Equipment lists for ESRB selected substations
- Single-line diagrams of ESRB selected substations
- Last two visual inspection checklists for ESRB selected substations
- List of transformer banks that operated beyond nameplate capacity for the last five years (2019-2023) for ESRB selected substations.
- Infrared Testing records for ESRB selected substations in the last two years
- Most recent oil sample test results for ESRB selected substations
- Most recent electric test results for ESRB selected substations
- Training records for all substation inspection and maintenance personnel in the past five years (2019-2023)
- Other relevant substation inspections for the past five years (2019-2023) for ESRB selected substations
- Internal audit findings for Cottonwood HQ for the past five years (2019-2023)

II. Records Violations

ESRB observed the following violations during the records review portion of the audit:

1. General Order (GO) 174, Rule 12, General states in part:

> *"Design, construction and maintenance should be performed in accordance with accepted good practices for the given local conditions known at the time by those responsible."*

PG&E Substation Equipment Maintenance Requirements, Utility Standard: TD-3322S[1], establishes PG&E's required end dates and out-of-compliance dates as follows:

Table 1: Due Dates Per Priority Code

Priority Code	Required End Date	Out-of-Compliance Date
A	Within 30 days	Close notifications after removing the hazard [make safe] with either permanent or temporary repairs within 30 days. Create a new lower priority notification immediately for any remaining work that will exceed 30 days.
B	Within 90 days	The out-of-compliance date is the 1st day of the 2nd month following the month in which the required end date occurs.
E	Within 365 days	The out-of-compliance date is the 1st day of the year following the year in which the required end date occurs.
F	Greater than 365 days	There is no out-of-compliance date. This work will be completed when it is operationally efficient to perform the work.

Based on Table 1 above, ESRB noted that out of a total of 4,671 Line Corrective (LC) notifications, 11 were closed after their out-of-compliance date. Therefore, PG&E did not perform maintenance in accordance with accepted good practices described in Utility Standard TD-3322S. See Table 2 below for the past-due LC notifications. The 2nd LC in Table 2 had a Priority E assigned in the record instead of Priority B. This was inconsistent with the 3rd and 4th LC in Table 2, even though the Description of the Repair was the same for all three LCs. The 3rd and 4th LCs had Priority B assigned (Birds Nest in Transformer Radiators). Also, 10 of the LCs in Table 2 appeared to have errors in the records as the Out-of-Compliance Dates (OOC) were not established in accordance with criteria in Table 1 above.

[1] PG&E Utility Standard TD-3322S, August 3, 2023, Revision 9.

Table 2: Overdue LC Notifications

Notification #	Priority	Notification Date	Completion Date	Out-of-Compliance Date	Out-of-Compliance Date per Record	Days Late
115442190	B	12/3/2018	6/5/2019	5/1/2019	2/1/2020	35
115442356	B	12/3/2018	6/30/2019	5/1/2019	1/1/2020	61
115442352	B	12/3/2018	6/30/2019	5/1/2019	2/1/2020	61
115442279	B	12/3/2018	6/30/2019	5/1/2019	2/1/2020	61
117899804	B	1/18/2019	9/18/2019	6/1/2019	11/1/2019	110
115420200	E	12/7/2017	11/19/2019	1/1/2019	1/1/2020	323
115469234	E	12/1/2017	12/12/2019	1/1/2019	1/1/2020	346
115469235	E	12/28/2017	12/12/2019	1/1/2019	1/1/2020	346
113828835	E	11/20/2017	7/1/2020	1/1/2019	1/1/2020	547
114436136	E	3/22/2018	7/1/2020	1/1/2020	1/1/2020	182
114980977	E	9/18/2018	7/1/2020	1/1/2020	1/1/2021	182

2. General Order 174, Rules for Electric Utility Substations, Rule 33, Records states in part:

*"**33.1** Electronic or hard copy of records of completed Inspections shall include, at a minimum:*

- *Inspector name or identification*
- *Inspection date*
- *Brief description of identified discrepancies*
- *Condition rating (where applicable)*
- *Scheduled date of corrective action (where applicable)*

***33.2** Electronic or hard copy records of completed Inspections shall be retained for not less than five (5) years."*

In the Response to Pre-Audit Data Request (PADR) Item Number 21, training records were provided for substation inspectors for the past 5 years (2019-2023) for the Cottonwood HQ. The records for 10 Qualified Electrical Workers (QEW) who were substation inspectors was provided. During the initial audit meeting on May 6, 2024, ESRB commented that 10 inspectors for the Cottonwood HQ seemed low for a 5-year period, since there are 45 substations in the district. PG&E commented that it likely covered only a 2-year period from 2023-2024. ESRB requested PG&E to provide training records for an additional 2 years for 2021 and 2022.

In response to Post Audit Data Request 1, PG&E stated it could not include QEW inspectors that no longer work in the department due to technology limitations within its training system and was unable to pull previously assigned QEW inspector profiles without pulling a manual report from their Human Resources Department and then research each individual that was previously assigned to the Cottonwood Headquarter.

In Response to Post Audit Data Request 2, PG&E stated it worked with its Human Resources Department to obtain a list of employees that worked at the Cottonwood HQ from 2019 to 2024 and provided the training records for 16 additional inspectors.

a. The initial response to PADR Item Number 21 was incomplete. PG&E provided 10 inspectors' training record and later an additional training record of 16 inspectors. ESRB was unable to verify if the 26 inspectors were all the employees who inspected the Cottonwood HQ substations, because the inspector training records provided do not have inspector names or identifications.

b. Review of the spreadsheet for the 26 QEW substation inspectors provided in Post Audit Data Request 2 shows QEW 1, 7, 12, 15, 21 and 22 did not have an entry in the record for the two substation training courses required in PG&E's substation inspector training policies specified in PADR Item Number 11, (ESUB-200WBT and ESUB-200). Also, for QEW 9 and 10 records, no entries were found for the ESUB-200 course. ESUB-200 requires performing Field Activity and Skill Assessment to demonstrate competency in completing substation inspections. Upon successful completion of the Skill Assessment, participant will become certified substation inspectors (PG&E policy in PADR Item Number 11).

3. Records Observations

In the Response to Pre-Audit Data Request Item Number 1, PG&E provided the list of substations and equipment information for the Cottonwood HQ. The Benton Substation was listed as having one transformer bank. During the field audit, there was no transformer bank located at the Benton Substation. PG&E shall correct its database to reflect this discrepancy.

III. Field Inspection

During the field inspection, ESRB inspected the following 17 substations:

Substation	City
Cottonwood Substation	Cottonwood
Panorama Substation	Anderson
Anderson Substation	Anderson
Jessup Substation	Anderson
Benton Substation	Redding
Cascade Substation	Pine Grove
Oregon Trail Substation	Redding
Deschutes Substation	Palo Cedro
Pit#1 Power House Substation	Fall River Mills
Burney Substation	Burney
Round Mountain Substation	Round Mountain
Red Bluff Substation	Red Bluff
Tyler Substation	Red Bluff
Rawson Substation	Red Bluff
Gerber Substation	Gerber
Corning Substation	Corning
Dairyville Substation	Dairyville

IV. Field Inspection – Violations List

ESRB noted the following violations of GO 174, Rule 12 during the field inspection:

GO 174, Rule 12, General states in part:

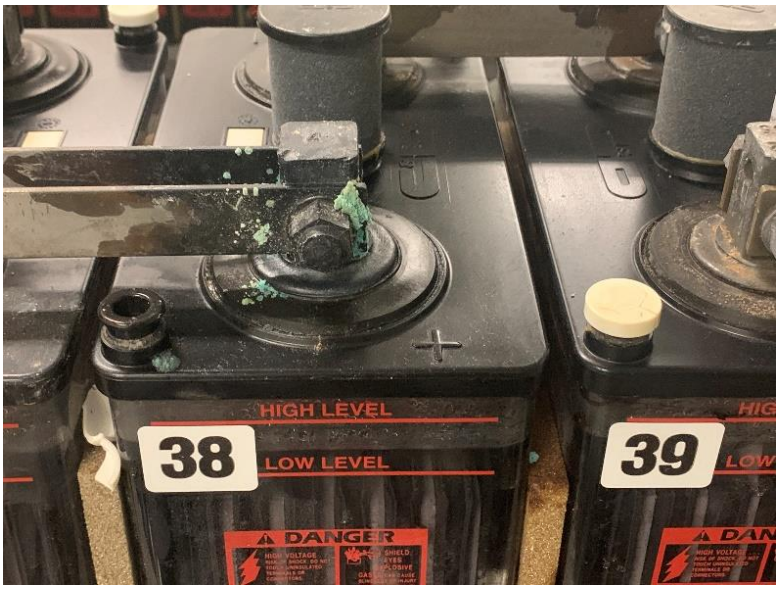
> *"…Substations shall be designed, constructed and maintained for their intended use, regard being given to the conditions under which they are to be operated, to promote the safety of workers and the public and enable adequacy of service Design, construction, and maintenance should be performed in accordance with accepted good practices for the given local conditions known at the time by those responsible."*

1. Cottonwood Substation

1.1 Oil Circuit Breaker 542 had a Faded Counter

1.2 Transformer Bank 8 had a fan that was Not Working

1.3 The Battery in Control Room 2 had Corrosion on Cells 3, 4, 6, 8, 12, 18, 25 and 38 (Existing Tag #128520098)



1.4 The Ground Rod was Removed from Fence Post Next to Perimeter Wall During Installation of New Drainage Swell and Needs to be Reinstalled (Existing Tag#128547153)

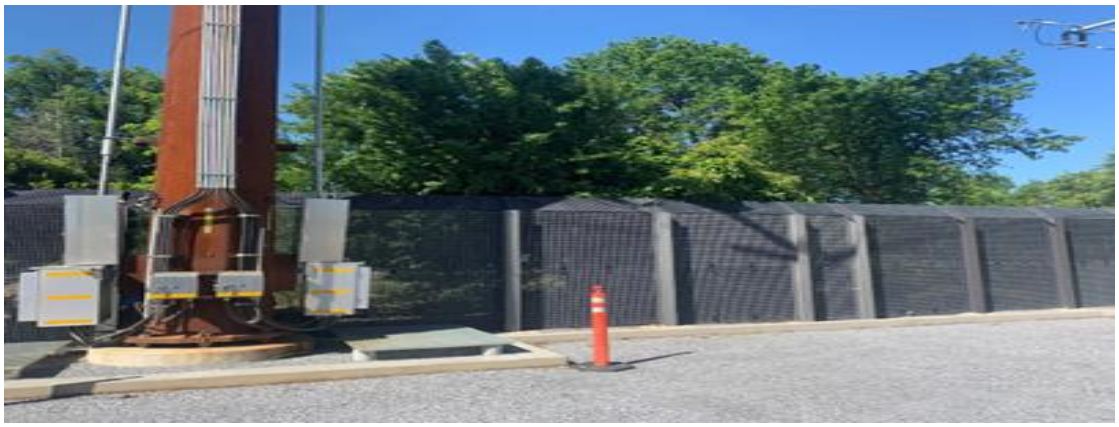
2. Panorama Substation

2.1 Transformer Bank 1 Fan was Not Working (Existing Tag#128497717)

3. Anderson Substation

3.1 The Fan in the Battery Room/Control Room was Not Working

3.2 There is vegetation overhanging the perimeter wall (Existing Tag 128495165)



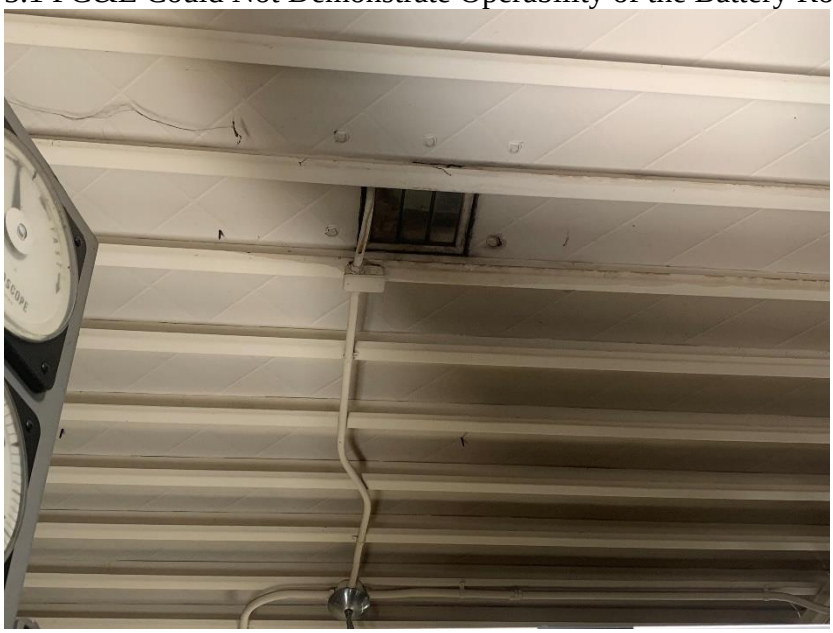
4. Benton Substation

4.1 The ceiling ventilation fan in the Battery Room/Control Room was Not Working

4.2 The Battery had Low Electrolyte Level in Many Cells Including Cells 2-12 and 43-60

5. Cascade Substation

5.1 PG&E Could Not Demonstrate Operability of the Battery Room Fan



6. Oregon Trail Substation

6.1 The Nitrogen Bottle for Transformer Bank 2 was Empty. PG&E Replaced the Empty Bottle with a Spare Nitrogen Bottle During the Audit

7. Deschutes Substation

7.1 One of the Station Lights was Not Working

7.2 A Fan in Transformer Bank 1 was Not Working (Existing Tag#128631194)

7.3 Transformer Bank 1 Had a Wasp Nest

7.4 Transformer Bank 2 had an Oil Leak from the Upper Gasket of the Oil Filter. PG&E Cleaned Up the Oil Leak During the Audit

7.5 Transformer Bank 2 Had a Wasp Nest

8. Pit #1 Power House Substation

8.1 Transformer Bank 2 had 2 Bird Nests, Fans 10 and 11, and Fans 17 and 18.


8.2 Transformer Bank 1 had 3 Bird Nests, Fans 10 and 11, Fans 17 and 18, and Fans 24 and 25



8.3 Eyewash in Battery Room Expired

8.4 There was Battery Corrosion at Cell 31. PG&E Fixed in Field During the Audit

8.5 Potential Transformer B Phase Near Circuit Breaker 220 had a Bird Nest

9. Burney Substation

9.1 Transformer Bank 1 Phase B has an Oil Weep on Side

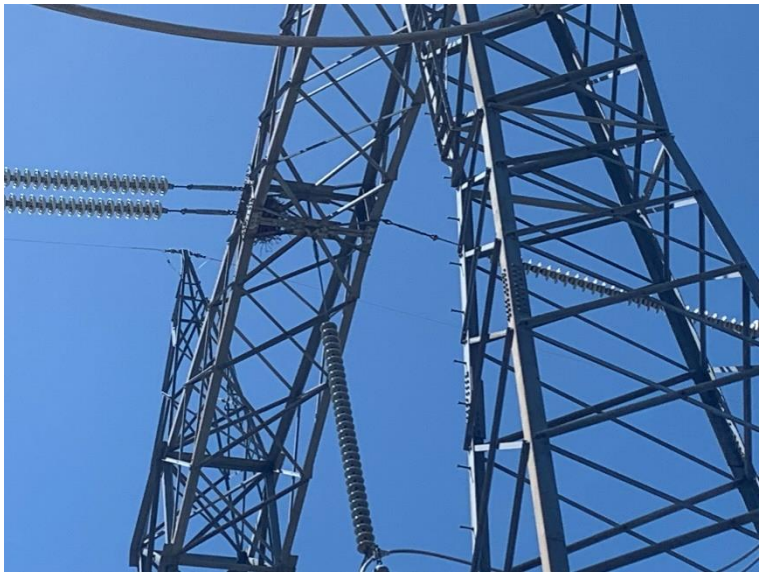
9.2 Transformer Bank 2 Phase A Pressure Gauge Was Not Readable

9.3 Transformer Bank 1 Phase A, Phase B, Phase C, and Spare All Need Painting (Existing Tags#128525782, 128525598, 128525685, 128525687)

9.4 Transformer Bank 2 Phase A, Phase B, Phase C, and Spare All Need Painting (Existing Tags#128525704, 128525709, 128525743)

10. Round Mountain Substation

10.1.a Bird Nest on 500 kV Tower Near Capacitor Bank SC4.B



10.1.b Bird Nest on 500 kV Tower Near Capacitor Bank SC1.B.

10.2 Transformer Bank 1 Spare Had Fan Not Working (Existing Tag 128086582)

10.3 Battery Room Fan Was Not Working

11. Red Bluff Substation

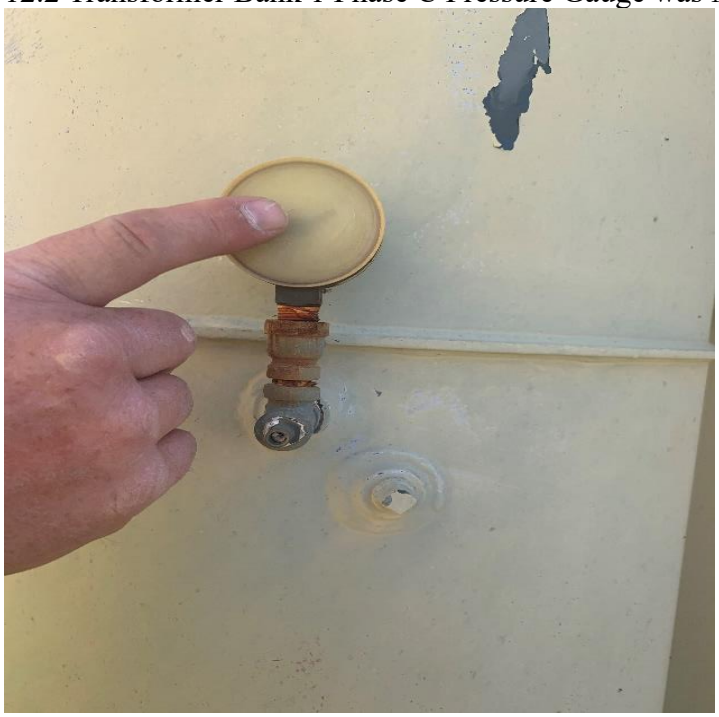
11.1 Transformer Bank 1 Fan Was Not Working. (Existing Tag#128546856)

11.2 Battery Room Fan Was Not Operational

12. Tyler Substation

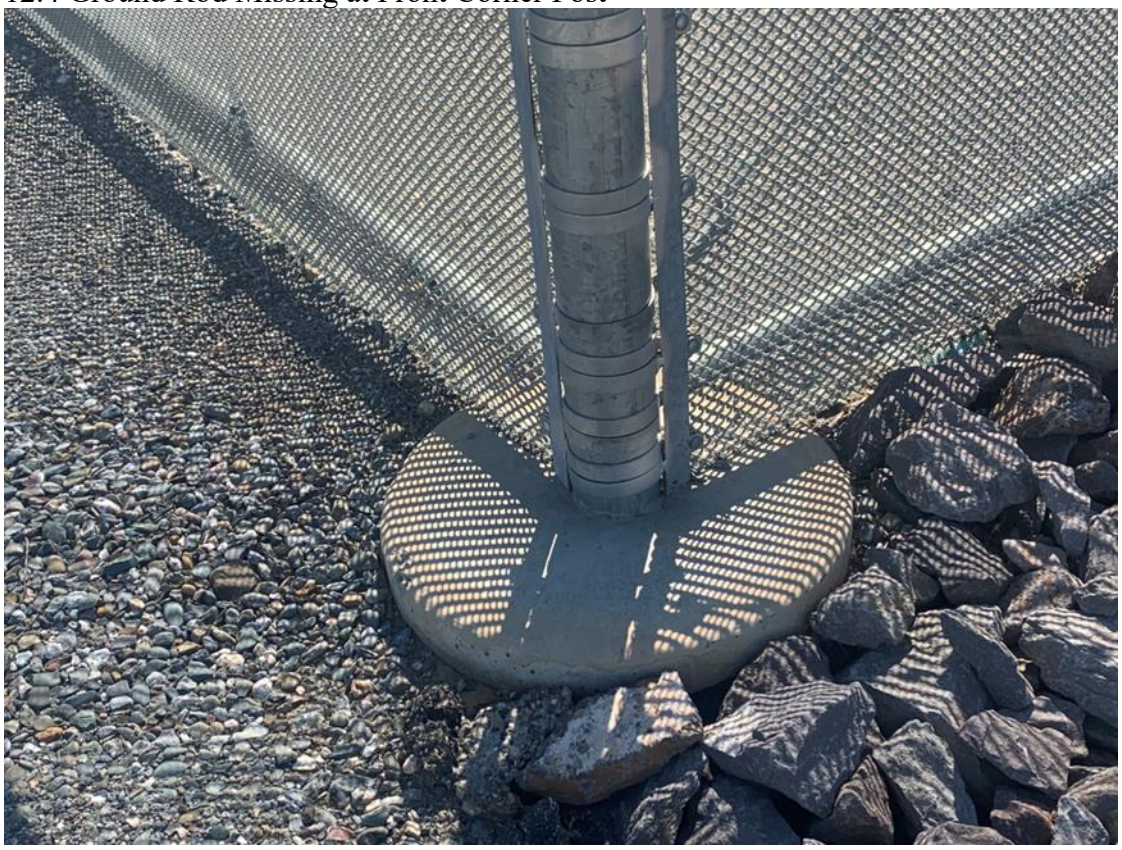
12.1 Transformer Bank 1 Phase A Fan Was Not Working

12.2 Transformer Bank 1 Phase C Pressure Gauge was Not Readable



12.3 Ground Rod Missing at Side Entrance Gate

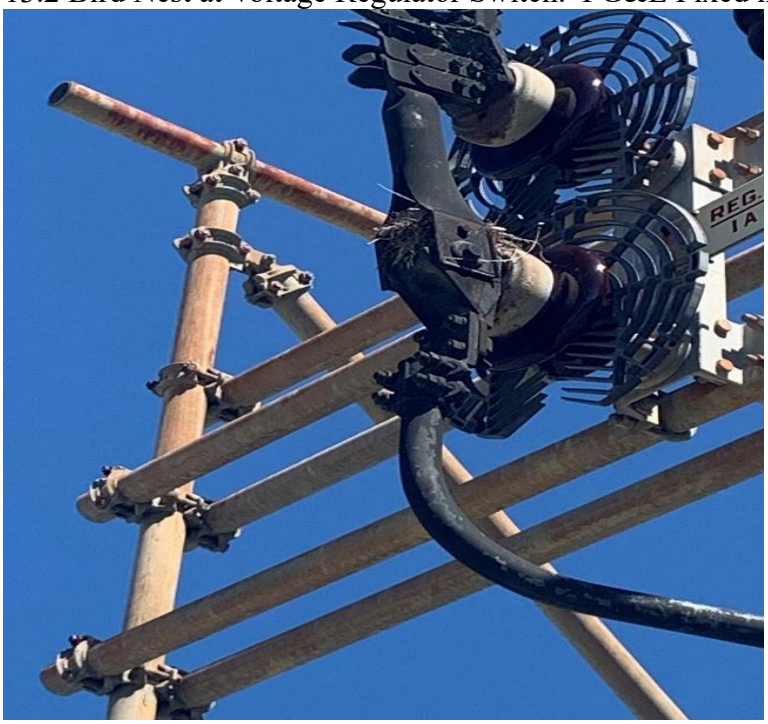
12.4 Ground Rod Missing at Front Corner Post



13. Rawson Substation

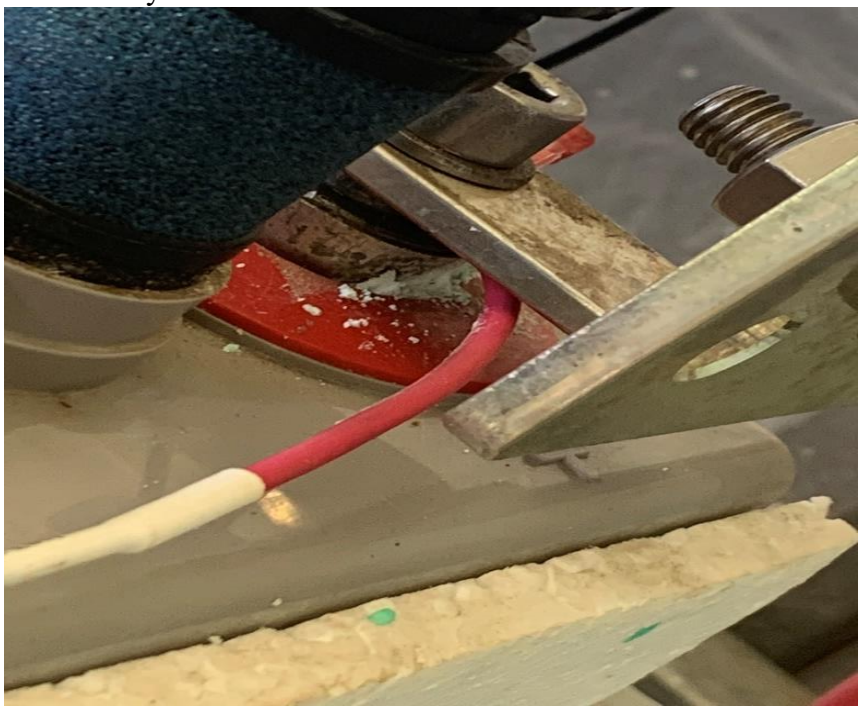
13.1 Transformer Bank Phase A, B and C had low Nitrogen Pressure at 0 psig. PG&E Fixed in Field During Audit.

13.2 Bird Nest at Voltage Regulator Switch. PG&E Fixed in Field.

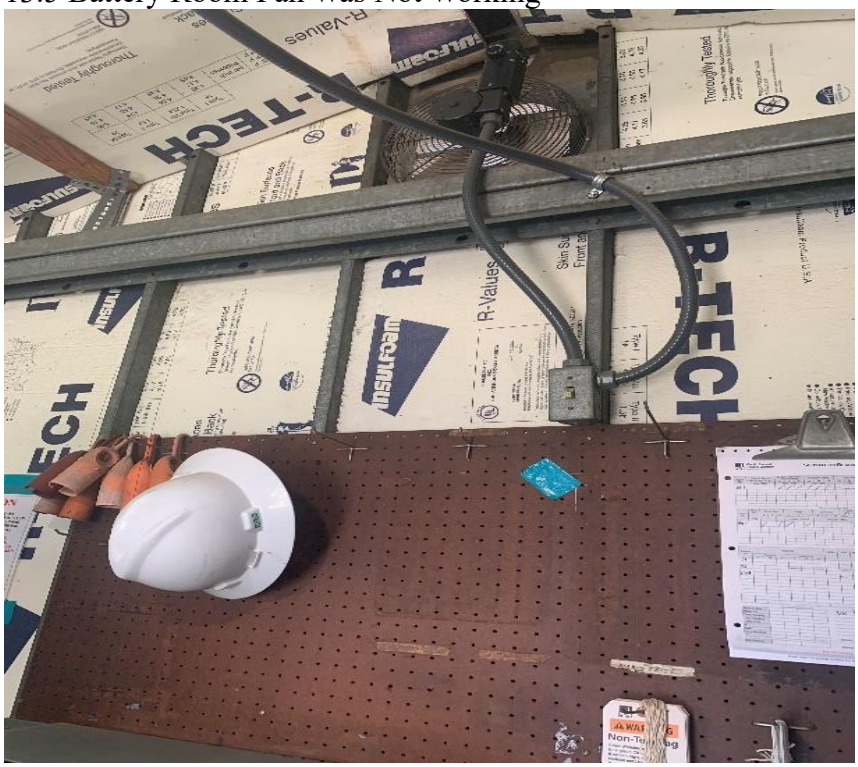


13.3 Wasp Nest at Capacitor Bank 1C. PG&E Fixed in Field.

13.4 Battery Corrosion on Cell 1 Positive Terminal. PG&E Fixed in Field During Audit.



13.5 Battery Room Fan Was Not Working



14. Gerber Substation

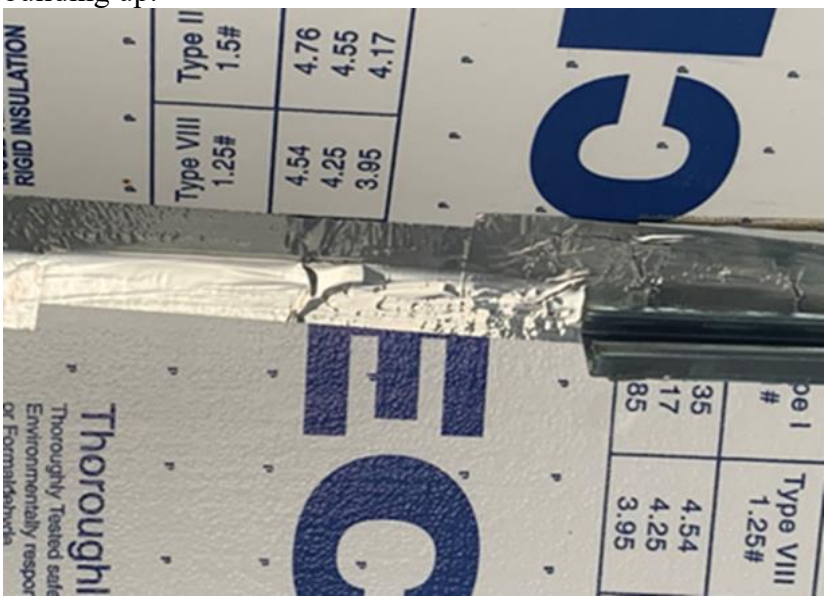
14.1 Transformer Bank 1 Phase C has Cracked Gauge Glass (Existing Tag#128545797)

14.2 Transformer Bank 1 Phase B has Cracked Temperature Gauge (Existing Tag# 128545795)

14.3 Transformer Bank 1 Phase C has a Faded Oil Level Gauge

14.4 Battery Room Eye Wash Expired 2/24

14.5 The Battery Room Fan Was Working but the interior of the Battery Room was insulated and fully sealed, thus preventing hydrogen gas from being removed through the fan exhaust. Hydrogen gas needs to be vented from the room to avoid a detonable concentration from building up.



15. Corning Substation

15.1 The No Smoking Sign to the Battery/Control Room was Painted Over and not readable

16. Dairyville Substation

16.1 Transformer Bank 1 Phase A and Phase B had Nitrogen Pressure Readings of 0 Psig and Need Filling

16.2 Transformer Bank Phase C Cooling Fan Was Not Working

16.3 Wasp Nest Inside Circuit Breaker Cabinet

16.4 Transformer Bank Phase A Label For Tank Entry is Damaged

V. Third Party Notification

Benton Substation

A large Osprey Nest was observed on a communication structure. The nest is active.