

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298



September 23, 2024

SA2023-1153

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 Bakerfield Headquarters

Mr. Tanguay:

On behalf of the Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission (CPUC), Monica Hoskins, Sajjad Mansuri, and Tom Roberts of ESRB staff conducted an electric substation audit of PG&E Bakersfield Headquarters from November 13 through November 17, 2023. 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 23, 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 Monica Hoskins at monica.hoskins@cpuc.ca.gov or (415) 652-1847.

Sincerely,

A handwritten signature in blue ink, appearing to read "Rickey Tse".

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 Bakersfield Headquarters

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Cc: Lee Palmer, Director, Safety and Enforcement Division (SED), CPUC
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**CPUC SUBSTATION AUDIT FINDINGS
PG&E BAKERSFIELD HEADQUARTERS
NOVEMBER 13 – 17, 2023**

I. Records Review

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

- List of all assigned PG&E substations
- Map showing all assigned PG&E substations in the Bakersfield HQ
- PG&E Substation Maintenance and Construction (SM&C) Manual, Utility Standard: TD-3322M, Revisions 9 and 11, with attachments 3 through 8 & 11, with forms 1, 2, 5, 6, 7
- PG&E Utility Standard: TD-3328P attachments 2 through 4, Revision 0
- PG&E Mobile Inspection Form, Utility Standard: TD-3468-01-F01, Revision 1
- PG&E Substation Equipment Maintenance Requirements, Utility Standard: TD-3322S, Revisions 8 and 9, with attachments 2 through 12
- PG&E Substation Supplemental Inspection Program, Utility Standard: TD-3328S, Revision 2, 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
- PG&E SM&C Manual – Infrared Inspections, Utility Standard: TD-3322M, Revision 11
- PG&E SM&C Manual – Insulating Oil, Utility Standard: TD-3322M, Revisions 7 and 8
- PG&E Accumulated Critical Current (ACC) Process, Utility Standard: TD-3320P-12, Revision 0
- PG&E SM&C Manual – Substation Batteries, Utility Standard: TD-3322M, Revision 13
- 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 Bakersfield HQ
- List of all open/pending, completed, cancelled, and late work orders and maintenance items in the previous five years
- 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 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 and maintenance personnel in the past five years
- Other relevant substation inspections for the past five years for ESRB selected substations
- Internal audit findings for Bakersfield HQ for the past five years

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-3322S¹, 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 1 st day of the 2 nd month following the month in which the required end date occurs.
E	Within 365 days	The out-of-compliance date is the 1 st 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 42 notifications that were closed after their past due dates. 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 Line Corrective (LC) notifications.

Table 2. Overdue LC Notifications

Notification Number	Priority	Notification Date	Completion Date	Out-of-Compliance Date	Days Late
124695326	B	10/12/2022	6/30/2023	3/1/2023	121
120158993	B	12/9/2020	6/15/2021	5/1/2021	45
120106121	B	11/25/2020	5/15/2021	4/1/2021	44
120210622	B	12/15/2020	6/14/2021	5/1/2021	44
124454515	B	9/7/2022	3/15/2023	2/1/2023	42
124773472	B	9/30/2022	3/6/2023	2/1/2023	33

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

120158992	B	12/9/2020	5/14/2021	5/1/2021	13
119994875	B	7/17/2020	12/12/2020	12/1/2020	11
124486411	B	9/12/2022	2/10/2023	2/1/2023	9
120165073	B	12/10/2020	5/4/2021	5/1/2021	3
120210576	B	12/15/2020	5/2/2021	5/1/2021	1
120210626	E	12/15/2020	5/26/2023	1/1/2022	510
120084069	E	11/21/2020	5/26/2023	1/1/2022	510
120084070	E	11/21/2020	5/26/2023	1/1/2022	510
120084072	E	11/21/2020	5/26/2023	1/1/2022	510
120165218	E	12/10/2020	4/18/2023	1/1/2022	472
120165078	E	12/10/2020	3/24/2023	1/1/2022	447
120165159	E	12/10/2020	3/24/2023	1/1/2022	447
120189221	E	12/11/2020	3/24/2023	1/1/2022	447
120084064	E	11/21/2020	3/22/2023	1/1/2022	445
120084067	E	11/21/2020	3/22/2023	1/1/2022	445
120018066	E	8/4/2020	3/21/2023	1/1/2022	444
121675460	E	7/7/2021	8/3/2023	1/1/2023	214
122150805	E	10/5/2021	5/24/2023	1/1/2023	143
121408770	E	5/22/2021	4/14/2023	1/1/2023	103
119051298	E	5/21/2020	4/1/2022	1/1/2022	90
119997608	E	8/13/2020	3/30/2022	1/1/2022	88
120018321	E	8/11/2020	3/4/2022	1/1/2022	62
120033190	E	8/12/2020	3/4/2022	1/1/2022	62
120033192	E	8/11/2020	3/3/2022	1/1/2022	61
121921519	E	8/13/2021	2/24/2023	1/1/2023	54
119969901	E	7/30/2020	2/23/2022	1/1/2022	53
120189220	E	12/11/2020	2/10/2022	1/1/2022	40
120506103	E	2/6/2021	1/21/2023	1/1/2023	20
118536015	E	2/7/2020	1/16/2021	1/1/2021	15
118757971	E	3/30/2020	1/16/2021	1/1/2021	15
124637790	E	10/6/2022	1/9/2023	1/1/2023	8
124637734	E	10/6/2022	1/9/2023	1/1/2023	8
117035913	E	N/A	5/8/2019	5/1/2019	7
120693494	E	N/A	5/5/2021	5/1/2021	4
119013295	E	N/A	6/3/2020	6/1/2020	2
123967114	E	N/A	8/2/2022	8/1/2022	1

2. GO 174, Rule 31.1, Inspection Program Frequency states in part:

“Substations shall be inspected as frequently as necessary.

- *Time intervals or other bases shall be specified in the Inspection Program.”*

PG&E Substation Equipment Maintenance Requirements, Utility Standard: TD-3322S², establishes PG&E’s substation inspection program as follows:

“Substation inspections – PG&E Substation Inspection Program is based on a time-based trigger. Substation Inspections are scheduled to be performed monthly for high criticality substations, and every other month for low criticality substations.

The Substation Inspection Program activities include the following:

1. Inspecting the substation and equipment for damages or abnormal conditions.
2. Inspecting all other items appropriate to the substation and its equipment.
3. Documenting and reporting any abnormal conditions found in the substation and documenting any repairs, services, or other work performed.”

ESRB found that PG&E completed a monthly inspection for the Columbus Substation late. The Columbus Substation had a monthly inspection for the mobile circuit breaker CB-115 (Notification #123623222) with an out-of-compliance date of August 1, 2022, however PG&E did not complete this inspection until August 3, 2022.

² PG&E Utility Standard TD-3322S, August 3, 2023, Revision 9 – Attachment 11, PG&E Substation Inspection Program Summary, April 7, 2022, Revision 3.

III. Field Inspection

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

Substation	City
Live Oak Switching Station	Bakersfield
Cal Water Substation	Bakersfield
Weedpatch Substation	Weedpatch
Adobe Switching Station	Arvin
Tejon Substation	Lebec
Old River Substation	Knob Hill
Rosedale Substation	Bakersfield
Midway Substation	Button Willow
Semitropic Substation	Wasco
Shafter Substation	Shafter
Elk Hills Substation	Valley Acres
Norco Substation	Bakersfield
Stockdale Substation	Bakersfield
Kern Power Distribution	Bakersfield
Bakersfield Substation	Bakersfield
Belridge 1B Substation	Button Willow
Ganso Substation	Button Willow

IV. Field Inspection – Violations List

ESRB observed 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. Live Oak Switching Station

1.1. Circuit Breaker 182 has a faded exterior warning label. PG&E has existing Notification #127308651 for this issue.



1.2. Circuit Breaker 172 has a faded exterior warning label.

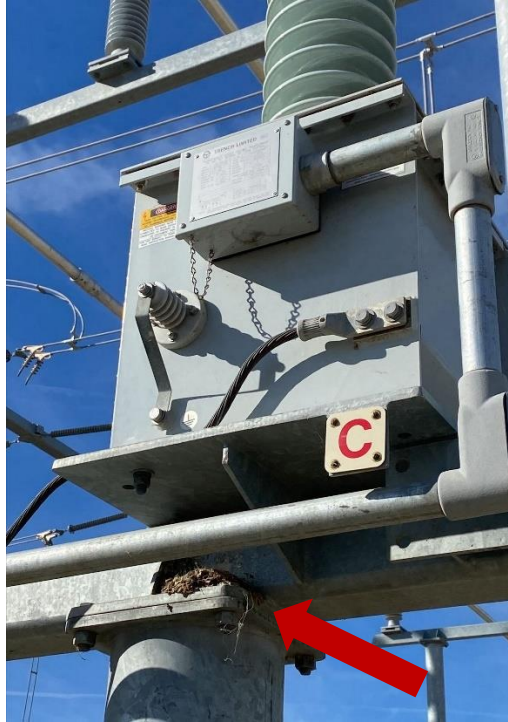


1.3. Circuit Breaker 182 has a faded counter. PG&E has existing Notification #125255196 for this issue.



2. Weedpatch Substation

2.1. The C Phase Bus Section E has a bird's nest. PG&E removed the bird's nest in the field.



2.2. Circuit Breaker 72 has bird's nests. PG&E has existing Notification #126885854 for this issue.



2.3. Distribution Pole #120073005 has a loose guy wire.



2.4. There are missing grounds throughout the substation. PG&E has existing Notification #127465284 to replace the stolen grounds.

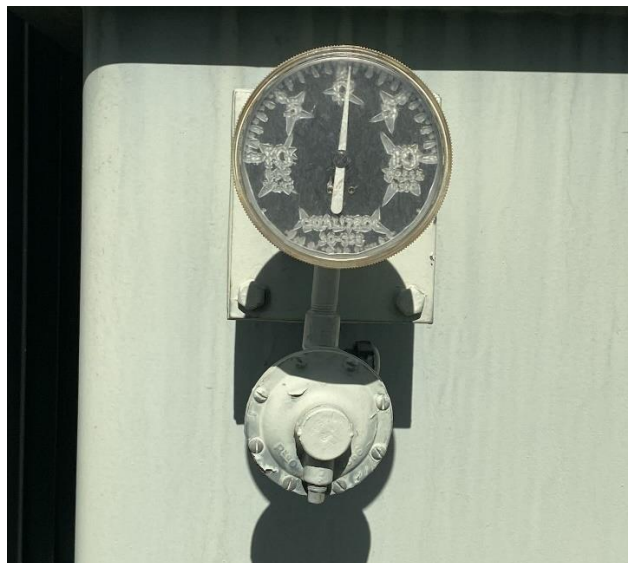


3. Adobe Switching Station

Station missing spare fuses.

4. Tejon Substation

4.1. Transformer Bank 1 B Phase has a faded nitrogen pressure gauge. PG&E has existing Notification #127304752 for this issue.



4.2. Transformer Bank 1 B Phase has an illegible site glass on a high side bushing. PG&E has existing Notification #127304711 for this issue.



4.3. Transformer Bank 2 LTC Liquid Temperature gauge is cracked.



4.4. Station has various large holes in the ground that present tripping hazards. PG&E has existing Notification #124703573 for this issue.

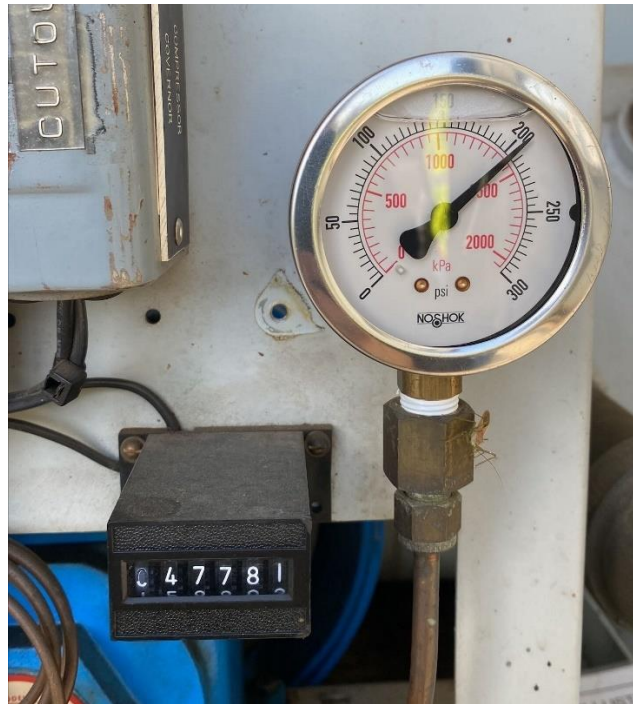


5. Old River Substation

5.1. Circuit Breaker 32 has a faded counter. PG&E has existing Notification #127305881 for this issue.



5.2. Circuit Breaker 12 has a faded counter.



5.3. Oil Circuit Breaker 1103 has a faded semaphore. PG&E has existing Notification #127305512 for this issue.



5.4. Transformer Bank 1 has bird's nests in the radiator fins. PG&E has existing Notification # 127304898 for this issue.



6. Rosedale Substation

6.1. Transformer Bank 1 Circuit Switcher 176 has a faded counter.



6.2. Transformer Bank 1 oil filtration system has a missing OPEN button cover and a motor that needs replacement. PG&E has existing Notification #127327829 to replace the motor, and all other issues will be resolved when the repair occurs.



6.3. Circuit Breaker 1102 has a faded counter and a faded semaphore. PG&E has existing Notification #127327491 for the faded counter.



7. Midway Substation

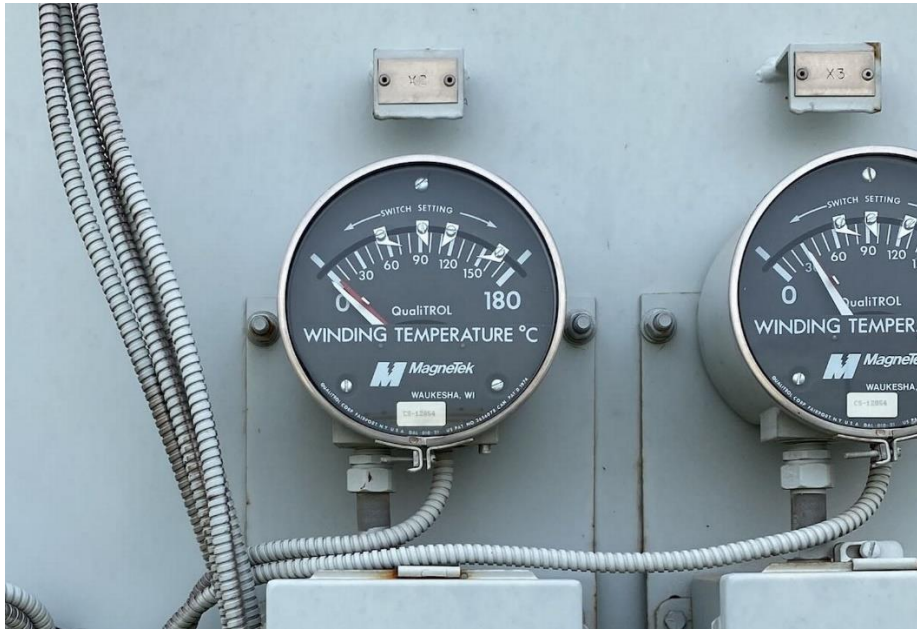
7.1. Circuit Breaker 1104/2 has a faded counter and a faded semaphore. PG&E has existing Notification #126254408 for this issue.



7.2. Transformer Bank 7 (70kV) has extra nitrogen canisters that need to be removed. PG&E has existing Notification #127338464 for this issue.



7.3. Transformer Bank 8 (70kV) has a broken X2 winding temperature gauge that is not reading.



7.4. Circuit Breaker 482 has a faded semaphore. PG&E has existing Notification #127337715 for this issue.



7.5. Circuit Breaker 572 has a faded counter. PG&E has existing Notification #126281693 for this issue.



7.6. Circuit Breaker 512 has a faded counter. PG&E has existing Notification #126280359 for this issue.



7.7. Circuit Breaker 532 has a faded counter. PG&E has existing Notification #126281046 for this issue.



7.8. Circuit Breaker 552 has a faded counter. PG&E has existing Notification #127346613 for this issue.



7.9. Circuit Breaker 212 has a faded counter. PG&E has existing Notification #127346610 for this issue.



7.10. Circuit Breaker 672 has a faded counter. PG&E has existing Notification #126293369 for this issue.



7.11. Circuit Breaker 292 has a faded counter. PG&E has existing Notification #126281199 for this issue.



7.12. Transformer Bank 12 C Phase has a leaking nitrogen system that is not displaying positive pressure and an empty nitrogen tank. PG&E has existing Notification #127353472 for this issue.

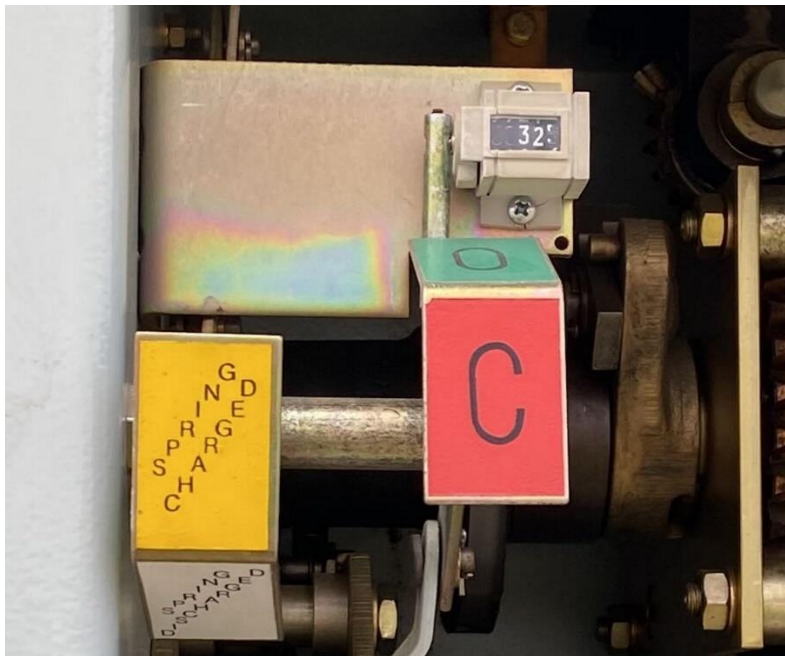


7.13. Circuit Breaker 822 has a faded counter.



8. Semitropic Substation

8.1. Circuit Breaker 152 has a faded counter. PG&E has existing Notification #127286609 for this issue.



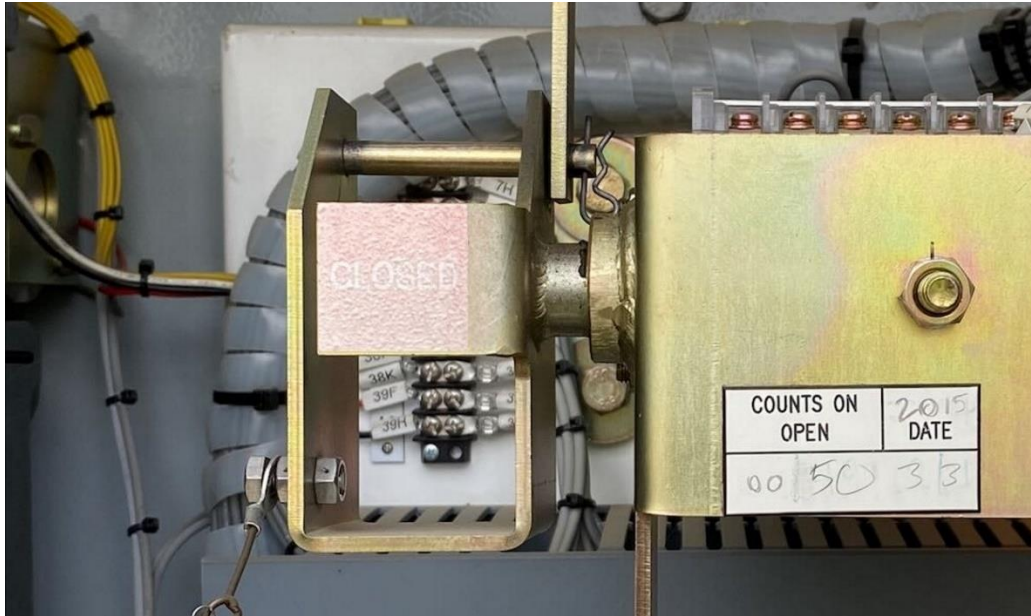
8.2. Circuit Breaker 1112 has a faded counter.



8.3. Circuit Breaker 1110 has a faded counter. PG&E has existing Notification #127286600 for this issue.



8.4. Circuit Breaker 142 has a faded semaphore.



8.5. Circuit Breaker 1106 has a faded semaphore. PG&E has existing Notification #127286516 for this issue.



8.6. Transformer Bank 1 A Phase has a discolored desiccant that needs replacement.
PG&E has existing Notification #127287729 for this issue.



8.7. Transformer Bank 1 B Phase has a discolored desiccant that needs replacement.
PG&E has existing Notification #127287761 for this issue.



- 8.8. Transformer Bank 1 C Phase has a discolored desiccant that needs replacement. PG&E has existing Notification #127287768 for this issue.



- 8.9. Transformer Bank 1 Spare has a discolored desiccant that needs replacement. PG&E has existing Notification #127288117 for this issue.



9. Shafter Substation

9.1. Circuit Breaker 1022 has bird's nests. PG&E has existing Notification #127310855 for this issue.



9.2. Circuit Breaker 1062 has bird's nests. PG&E has existing Notification #127316803 for this issue.



9.3. Transformer Bank 1 has a spare tank/cylinder that needs to be removed.



9.4. Air Switch 1041 has bird's nests in the A Phase, B Phase, and C Phase. PG&E has existing Notification #127310758 for this issue.



9.5. Air Switch 1033 has bird's nests in the A Phase, B Phase, and C Phase. PG&E has existing Notification #127310757 for this issue.



10. Elk Hills Substation

10.1. Transformer Bank 1 has an empty nitrogen tank.

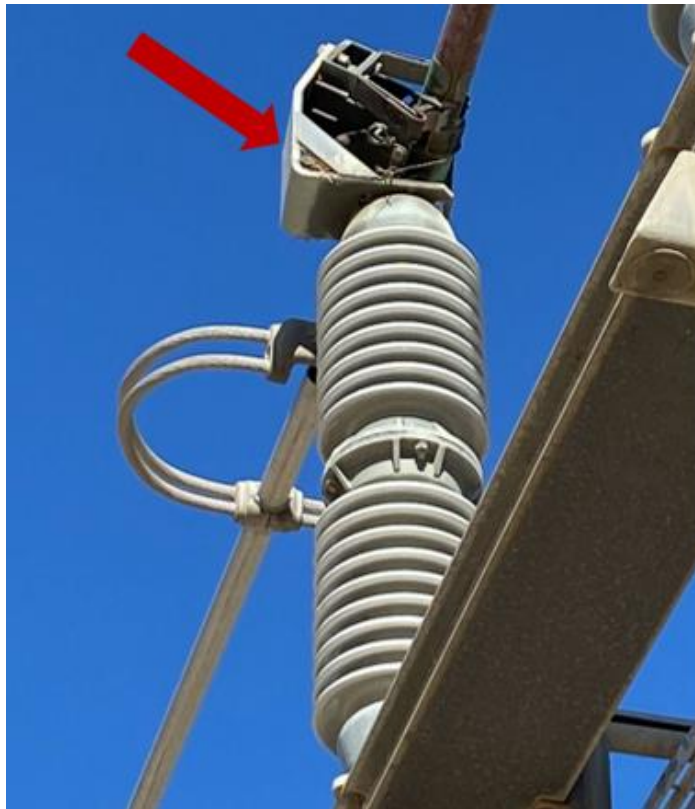
11. Norco Substation

11.1. Station batteries (Numbers 32, 39, 42, 44, 46, 47, 48, 49) have low water levels. PG&E has existing Notification #127206385 to clean and fill the batteries and existing Notification #126622566 to replace the station batteries.

11.2. Circuit Breaker 1102 has a faded semaphore. PG&E has existing Notification #127292280 for this issue.



11.3. Air Switch 175 has a bird's nest. PG&E has existing Notification #127291098 for this issue.



12. Stockdale Substation

12.1. Transformer Bank 1 has a broken cover on the winding temperature gauge. PG&E has existing Notification #127327898 for this issue.



12.2. Transformer Bank 6 has a broken winding temperature gauge that is not reading. PG&E has existing Notification #127327924 for this issue.



12.3. Circuit Breaker 222 has a faded counter. PG&E has existing Notification #127328784 for this issue.



12.4. Circuit Breaker Bank 5/22 has a faded counter. PG&E has existing Notification #127328787 for this issue.



12.5. Circuit Breaker 2106 has a faded counter. PG&E has existing Notification #127328726 for this issue.



12.6. Circuit Breaker 2107 has a faded counter. PG&E has existing Notification #127328729 for this issue.



12.7. Circuit Breaker 2109 has a faded counter. PG&E has existing Notification #127328781 for this issue.



12.8. Circuit Breaker 2111 oil tank has oil residue. PG&E has existing Notification #127329067 to clean the oil tank.



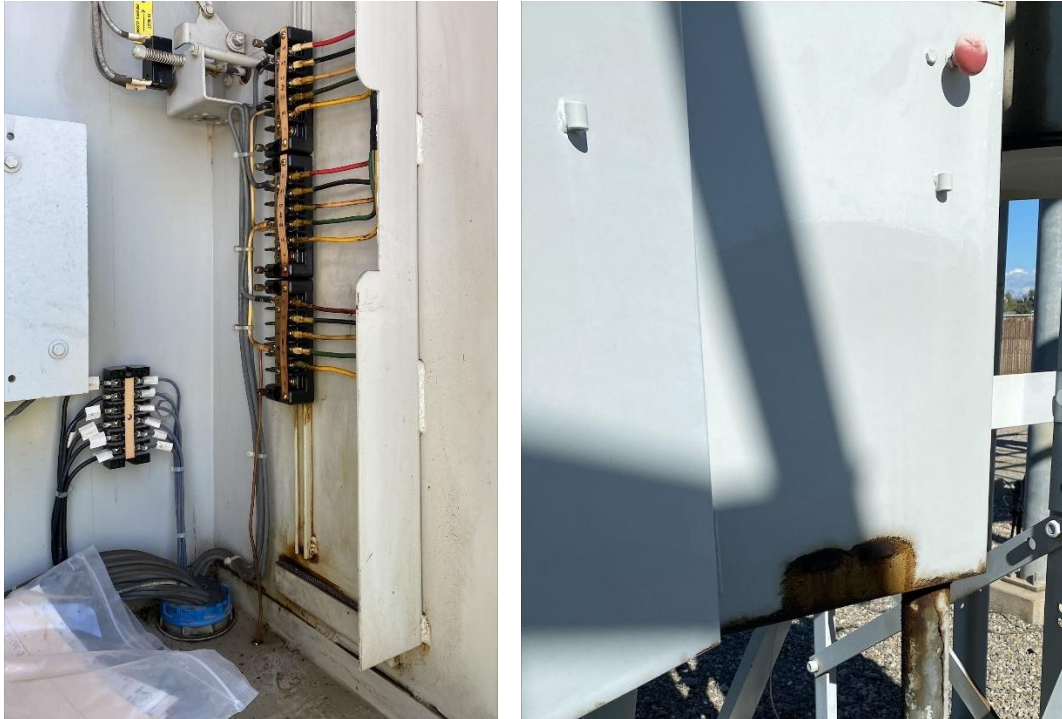
12.9. Circuit Breaker 2111 has oil residue on the inside and outside of the cabinet. PG&E has existing Notification #127329695 to clean the cabinet.



12.10. Circuit Breaker 2113 oil tank has oil residue and a possible oil leak. PG&E has existing Notification #127329260 to clean the oil tank and check for oil weeping.



12.11. Circuit Breaker 2113 has oil residue on the inside of the cabinet. PG&E has existing Notification #127329751 to clean the cabinet interior.



13. Kern Power Distribution Substation

13.1. Circuit Breaker 292 has a faded counter.



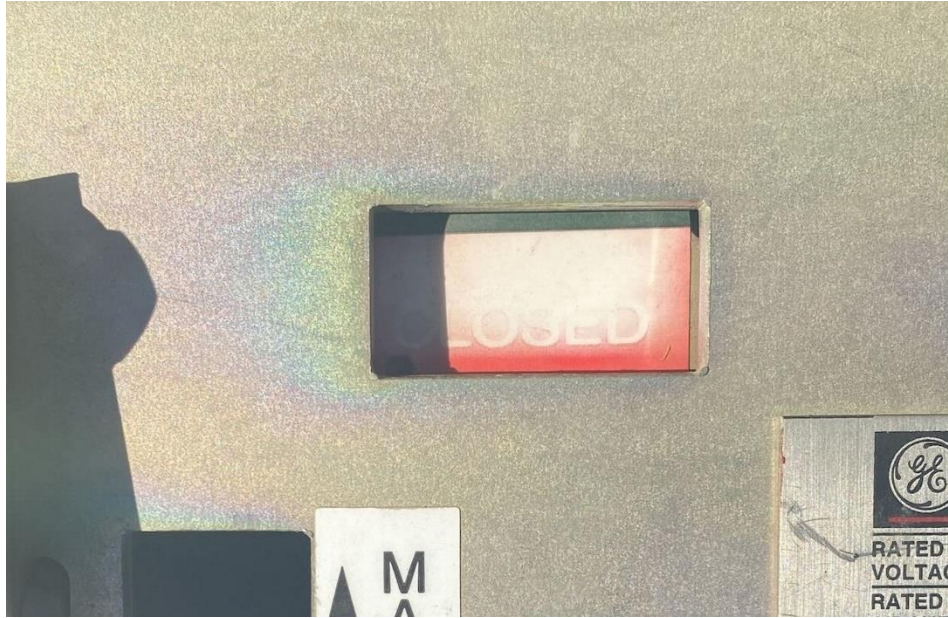
13.2. Circuit Breaker 2103 has a faded counter. PG&E has existing Notification #127325805 for this issue.



13.3. Circuit Breaker 2101 has a faded counter. PG&E has existing Notification #127325804 for this issue.



13.4. Circuit Breaker 2700 has a faded semaphore. PG&E has existing Notification #127325746 for this issue.



13.5. Circuit Breaker 2104 has a faded counter. PG&E has existing Notification #127325806 for this issue.



13.6. Circuit Breaker 2104 has a faded semaphore. PG&E has existing Notification #127325743 for this issue.



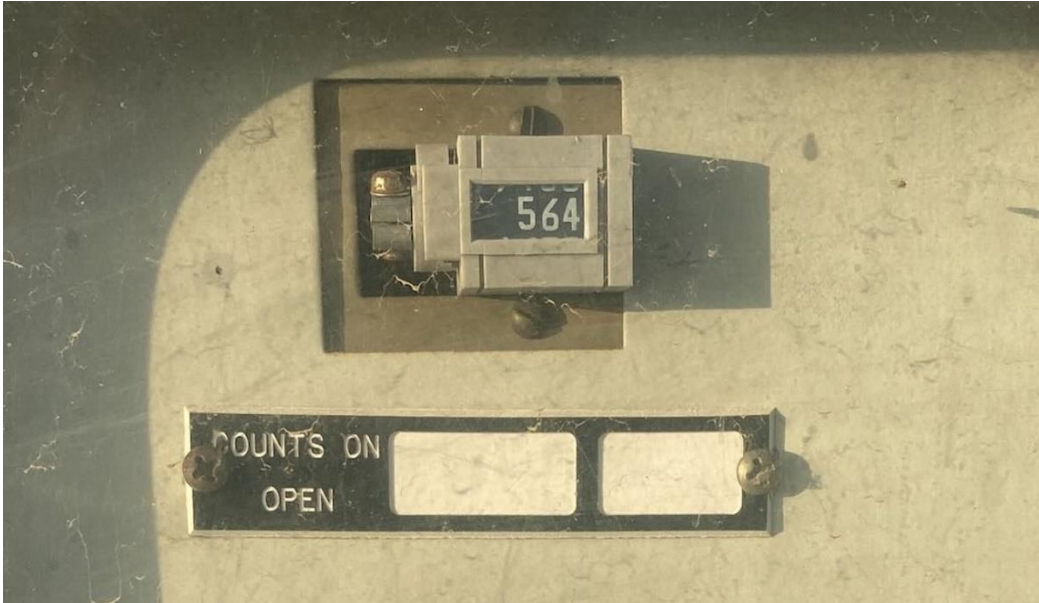
13.7. Transformer Bank 6 has an empty nitrogen bottle.

14. Bakersfield Substation

14.1. Circuit Breaker 1101 has a faded counter.



14.2. Circuit Breaker 1105 has a faded counter. PG&E has existing Notification #127286648 for this issue.



14.3. Circuit Breaker 1114 has a faded semaphore. PG&E has existing Notification #127286604 for this issue.



14.4. Circuit Breaker 1106 has a faded counter. PG&E has existing Notification #12728668 for this issue.



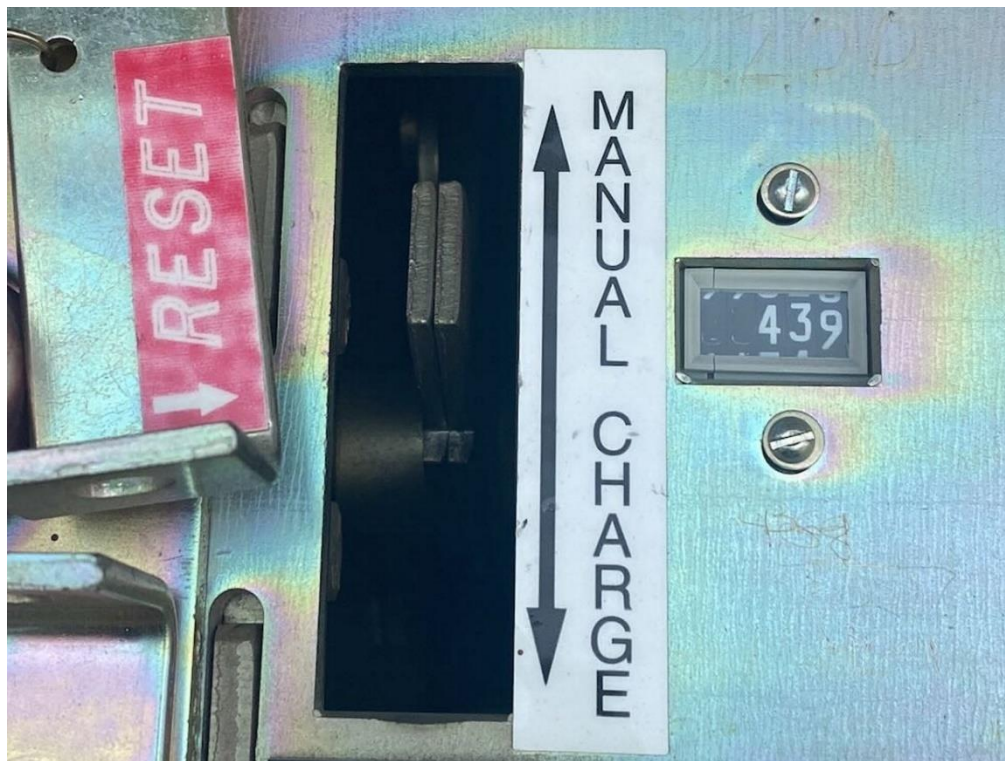
14.5. Circuit Breaker 2300 has a faded counter. PG&E has existing Notification #127286685 for this issue.



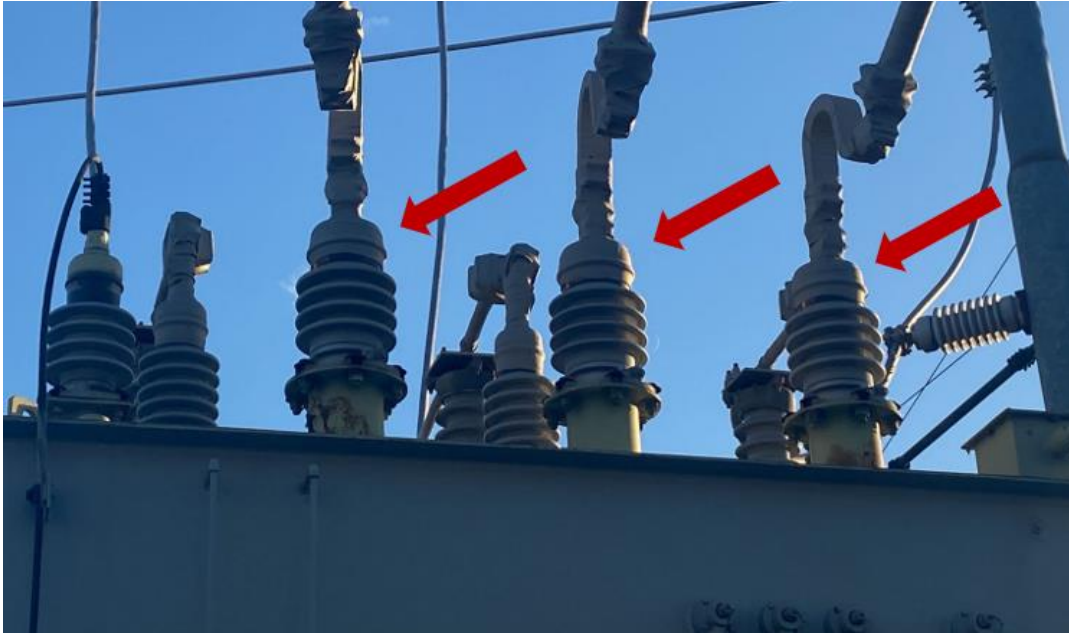
14.6. Circuit Breaker Bank 5/22 has a faded counter. PG&E has existing Notification #127286689 for this issue.



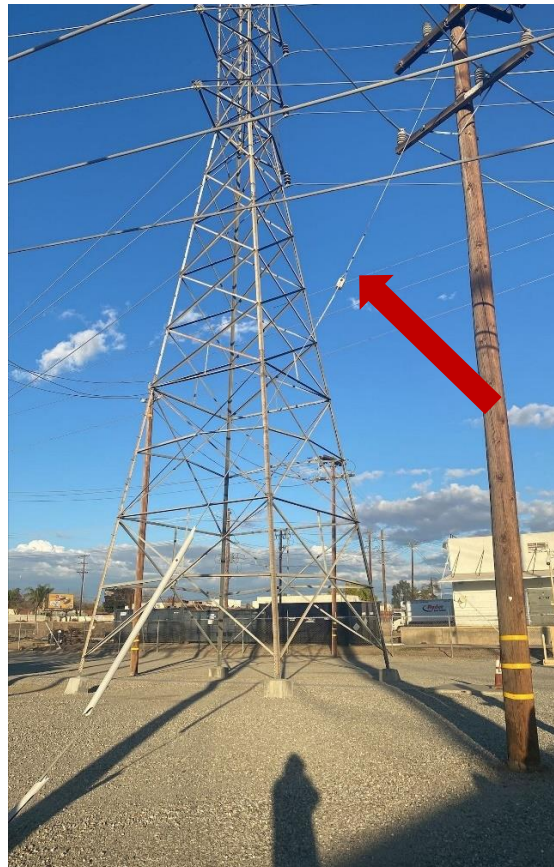
14.7. Circuit Breaker 2200 has a faded counter. PG&E has existing Notification #127286684 for this issue.



14.8. Transformer Bank 5 has animal guarding that is covering the low side bushing sight glasses and making the oil levels unreadable.



14.9. Distribution Pole #120070956 has a loose guy wire.



15. Ganso Substation

15.1. Transformer Bank 1 Winding Temperature Gauge is dirty and missing the glass cover. PG&E cleaned the gauge and replaced the cover in the field.



15.2. Transformer Bank 1 has bird's nests in the radiator fins. PG&E has existing Notification # 127303938 for this issue.

