



California Independent System Operator Corporation

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**Subject: 2022 California Independent System Operator Corporation (ISO)
Maintenance Review – Final Report**

This report documents the ISO 2022 annual maintenance review of the San Diego Gas & Electric (SDG&E) filed maintenance practices for those transmission facilities placed under ISO operational control.

The report first describes the details of the maintenance review including the facilities, equipment types, procedures reviewed, and concludes with the review results. The results describe where maintenance programs are showing positive results and where additional focus may be required. The 'Deviations to the Maintenance Practices' section of this document covers the areas requiring additional focus.

The ISO thanks SDG&E's staff on their effort to gather and provide data. The ISO also appreciates that SDG&E personnel were readily available during this year's review.

THE REVIEW

On Monday, August 15, 2022, ISO representatives received maintenance record information from SDG&E personnel then the ISO began the review of station and transmission line maintenance records. Due to the volume of records and additional information required from SDG&E, the ISO completed the maintenance review on August 18, 2022.

Stations Records Review

Review of the station maintenance records included the examination of records and reports in SDG&E's maintenance management system, and included the review of sample check off sheets and history cards or records for the following equipment placed under ISO operational control:

- Circuit breakers
- Transformers/Regulators
- Voltage regulators
- Insulators/Bushings/Arrestors
- Protective relay systems
- Remedial Action Scheme (RAS) / Special Protection Scheme (SPS) selected for review
- Battery systems

- Disconnect switches
- Reactive power components

In accordance with ISO Maintenance Procedure 4, section 4.1.2, the ISO selected the stations listed below and reviewed the records for the above referenced equipment.

Voltage Class (kV)	Station
500 kV	Ocotillo
230 kV	Escondido
230 kV	Penasquitos
138 kV	Penasquitos
138kV	Trabuco
138kV	Carlton Hills
69 kV	Escondido
69 kV	Penasquitos
69 kV	Pacific Beach
RAS/SPS	TL 23040 IV 500kV N-1 RAS

Station Site Visits

Starting on August 16, 2022 and concluding on August 18, 2022, the ISO visited all of the stations listed above. The station site visits consisted of an examination of the station logs, review of history maintenance cards or records, and inspection of the general condition of equipment, fences, grounds, buildings, and relays.

Transmission Line Records Review

The transmission line maintenance records review included the examination of records and various line patrol reports, for the following activities and equipment placed under ISO operational control:

- Patrols and inspections
- Vegetation management
- Structures/Foundations
- Structure grounds
- Insulators
- Guys/anchors
- Conductor and shield wire
- Rights-of-Way
- Disconnects/pole-top switches

In accordance with ISO Maintenance Procedure 4, section 4.1.2 the following transmission line facilities were selected and reviewed:

Voltage Class (kV)	Transmission Line
500 kV	50002 (Imperial Valley - North Gila)
230 kV	23003 (San Luis Rey - Encina)
230 kV	23022 (Miguel-Mission)
230 kV	23050 (Imperial Valley - La Rosita)
138 kV	13825 (Batiquitos - Shadowridge)
138 kV	13809 (Proctor Valley - Telegraph Canyon)
138 kV	13827 (Mission - Friars)
69 kV	653 (F - Mission)
69 kV	697 (Oceanside - San Luis Rey)
69 kV	662 (Penasquitos - Torrey Pines)
69 kV	663 (Kearny - Mission)
69 kV	6970 (Paradise - Sunnyside)

Transmission Line Site Visits

From August 16, 2022 and concluding on August 18, 2022, the ISO visited selected line sections. The site visits consisted of an inspection to view vegetation management, erosion control, right-of-way access, condition of steel structures, insulators, conductors and shield wire, foundations, wood poles, guys, and anchors.

Positive Results:

The ISO appreciates SDG&E's efforts in providing the substation and transmission line maintenance records to facilitate the annual maintenance review. The records provided were complete, well laid out and organized. SDG&E staff also provided quick and thorough responses to the ISO's questions during the maintenance records review.

Deviations to the Maintenance Practices

Deviations to the maintenance practices are categorized as findings, concerns, or observations. 'Findings' are deviations related to a similar cause that indicates a systemic problem with adherence to the maintenance practices; 'concerns' are deviation(s) related to a similar cause that indicates a local problem with adherence to the maintenance practices; and 'observations' are deviation(s) that do not indicate a systemic or local problem.

During this year's review, station maintenance had one findings, no concerns, and one observations. Transmission line maintenance had no findings, concerns, or observations.

Findings – Stations: (One)**1. Maintenance done Late/ Maintenance Not done:**

- i. SDG&E discovered and self-reported a gap in the relay maintenance being performed on transmission class relays protecting distribution banks that trip 69KV busses on the 69kV system. Specifically, SDG&E noted that,

“During the preparation for the 2022 CAISO audit SDG&E discovered that the relays at Pacific Beach Bank (BK) 31 went a period longer than SDG&E’s planned maintenance interval for a transmission relay.... Per SDG&E practices, relays on distribution transformers that do not have a voltage breaker get treated as transmission relays. In the case of this relay in question, it was discovered that the relay was mis-classified as a non-transmission relay thus allowing for a longer maintenance interval...

After discovering this, SDG&E did a complete analysis of all situations where a distribution transformer does not have a dedicated high voltage breaker. We uncovered nine more cases of distribution transformers where the relays were mis-classified as non-transmission. SDG&E is currently working to correctly classify these relays and adjust their maintenance intervals. Furthermore, of those nine instances, on two banks, the protective relay maintenance dates had elapsed the transmission maintenance interval. Currently, we are addressing these by getting the appropriate relays maintained as soon as resources and outage constraints allow.”

SDG&E Response:

Per previously documented response: SDG&E discovered and self-reported this gap in relay maintenance on transmission class relay protecting distribution banks that trip 69kV busses on the 69kV system. SDG&E is currently working to correctly classify these relays and adjust their maintenance intervals following complete analysis of all similar situations.

CAISO Response:

The ISO accepts this response and requests an update from SDG&E once they have completed their analysis.

- ii. The performance battery testing for the Escondido 69kV battery bank was completed late. Based on SDG&E’s response the trigger for the first performance battery test had been inappropriately set. SDG&E has since implemented a practice of evaluating triggers on an annual basis.

SDG&E Response:

Per previously documented response: SDG&E had inappropriately set trigger for the first performance battery test. SDG&E has since implemented a practice of

evaluating triggers on an annual basis.

CAISO Response:

The ISO accepts this response; no further action is required.

Concerns – Stations: (None)

Observations – Stations: (One)

1. Protective Relaying Record inconsistencies:

The drawings provided by SDG&E did not match the specific relays located in the field at the Penasquitos Substation. Specifically, the single lines provided did not show the existing relays for the 69kV TL662, TL666 and 69KV Cap Bank protection schemes on drawing PQ-E-41.1. In addition, the drawings and relaying spreadsheet, did not depict the actual relay that was in place in the field for the same cap bank protection (IP-210 versus IDP-440, the actual relays in the field are ICP-440s from Cooper Power Systems).

SDG&E Response:

All the necessary prints for Cap Bank 1 and Protection replaced were corrected on September 28, 2022. Prints now show ICP-440 relay instead of IDP-210.

CAISO Response:

The ISO accepts this response; no further action is required.

Other Substation General Maintenance Items

Trabucco

1. The yard had some minor vegetation growth that needs to be removed.



SDG&E Response:

Weed removal was completed on August 17, 2022.

CAISO Response:

The ISO accepts this response; no further action is required.

Escondido

1. 230kV Shunt Capacitor bank 2 circuit breaker has a small internal leak on the hydraulic system

SDG&E Response:

Replacement parts ordered on October 6, 2022. Subject to outage approval, SDG&E plans to repair the leak within 120 days.

CAISO Response:

The ISO accepts this response; please provide the ISO an update when the work is complete.

2. The RFL 9745 relay for TL6934 and GE L90 for TL 23015 had standing trouble alarms.

SDG&E Response:

The RFL 9745 relay for TL6934 was fixed on October 6, 2022. Subject to outage approval, SDG&E is scheduled to replace L90 battery on October 25, 2022.

CAISO Response:

The ISO accepts this response; please provide the ISO an update when the work is complete.

Penasquitos

1. 138KV OCB 2S has a cracked pressure gauge and has a leak at the oil tank valve.

SDG&E Response:

Subject to outage approval, SDG&E is scheduled to repair the leak on October 26, 2022.

CAISO Response:

The ISO accepts this response; please provide the ISO an update when the work is complete.

2. The desiccant for Bank 71 needs to be replaced.

SDG&E Response:

Desiccant at Bank 71 was replaced on September 29, 2022.

CAISO Response:

The ISO accepts this response; no further action is required.

3. 230kV cap bank 1 GCB is low on hydraulic fluid.



SDG&E Response:

Subject to outage approval, SDG&E is scheduled to address the low hydraulic fluid on October 26, 2022.

CAISO Response:

The ISO accepts this response, please provide the ISO an update when the work is complete.

4. The 230kV wave trap for TL23013 is missing a cover plate.



SDG&E Response:

Cover plate installation will require an outage for measuring the part and a second outage for installation and putting back in service. The first outage is scheduled for November 10, 2022. Pending approval of outages, SDG&E plans to address missing cover plate within 120 days.

CAISO Response:

The ISO accepts this response; please provide the ISO an update when the work is complete.

5. 138KV OCB 4N has a leak at the oil tank valve.

SDG&E Response:

Subject to outage approval, SDG&E is scheduled to repair the leak on October 25, 2022.

CAISO Response:

The ISO accepts this response; please provide the ISO an update when the work is complete.

6. Bank 51 has an oil leak at the radiator flange.

SDG&E Response:

Radiator flange was cleaned and tightened on September 29, 2022.

CAISO Response:

The ISO accepts this response; no further action is required.

7. The oil and winding temperature gauges for the Bank 51 are temporarily secured to the transformer using zip ties.

SDG&E Response:

Bank 51 oil and winding temperature gauges secured to transformer and zip ties removed on September 29, 2022.

CAISO Response:

The ISO accepts this response; no further action is required.

8. There are a number of outstanding audio tone alarms on the 69KV protection circuits for TL660.



SDG&E Response:

TL666 had a terminal removed and is anticipated to get relays replaced in Q2 2023.

CAISO Response:

The ISO accepts this response; please provide the ISO once the work is completed.

9. There is a moderate amount of vegetation in the 60KV portion of the switchyard.

SDG&E Response:

Weed removal completed on September 16, 2022.

CAISO Response:

The ISO accepts this response; no further action is required.

Carlton Hills

1. The batteries show signs of positive plate growth and corrosion; a number of the positive post seals are broken.

SDG&E Response:

The replacement battery is on order. The replacement project is currently in design and engineering and is anticipated to occur in Q2 2023.

CAISO Response:

The ISO accepts this response: please provide the ISO an update when the work is complete.

Findings – Transmission Lines: (None)**Concerns – Transmission Lines: (None)****Observations – Transmission Lines: (None)****Other Transmission Line General Maintenance Items**

During the ISO field visit, it was observed that Structure Number 279691 on TL 653 received an internal inspection and treatment in 2020 yet the woodpole groundline inspection records provided to the ISO did not reflect this maintenance.

SDG&E Response:

Transmission Construction & Maintenance (TCM) issued intrusive inspections for Structure Number 279691 in 2014 and 2022. SDG&E design protocols recommend requesting new intrusive inspection before adding load if the previous inspection is over 5 years old. TCM requests inspectors forward all offcycle inspection results, however not

all inspection results are received. A non-maintenance project completed in 2020 required a 5-year intrusive inspection. TCM maintenance records have been updated to results from that off-cycle inspection.

CAISO Response:


The ISO accepts this response; no further action is required.

ISO Expectations:

The ISO looks forward to hearing from SDG&E on how it plans to address the expectations and open items listed throughout this report. Specifically, the CAISO would like additional details on SDG&E's relay testing schedule in association with the Station Finding in this report.

Please do not hesitate to contact me at (916) 351-4428 if you have any questions concerning this report.

Respectfully,

DocuSigned by:

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Scott Vaughan
Manager, Transmission Assets
ISO

cc: N. Millar
S. Rutty